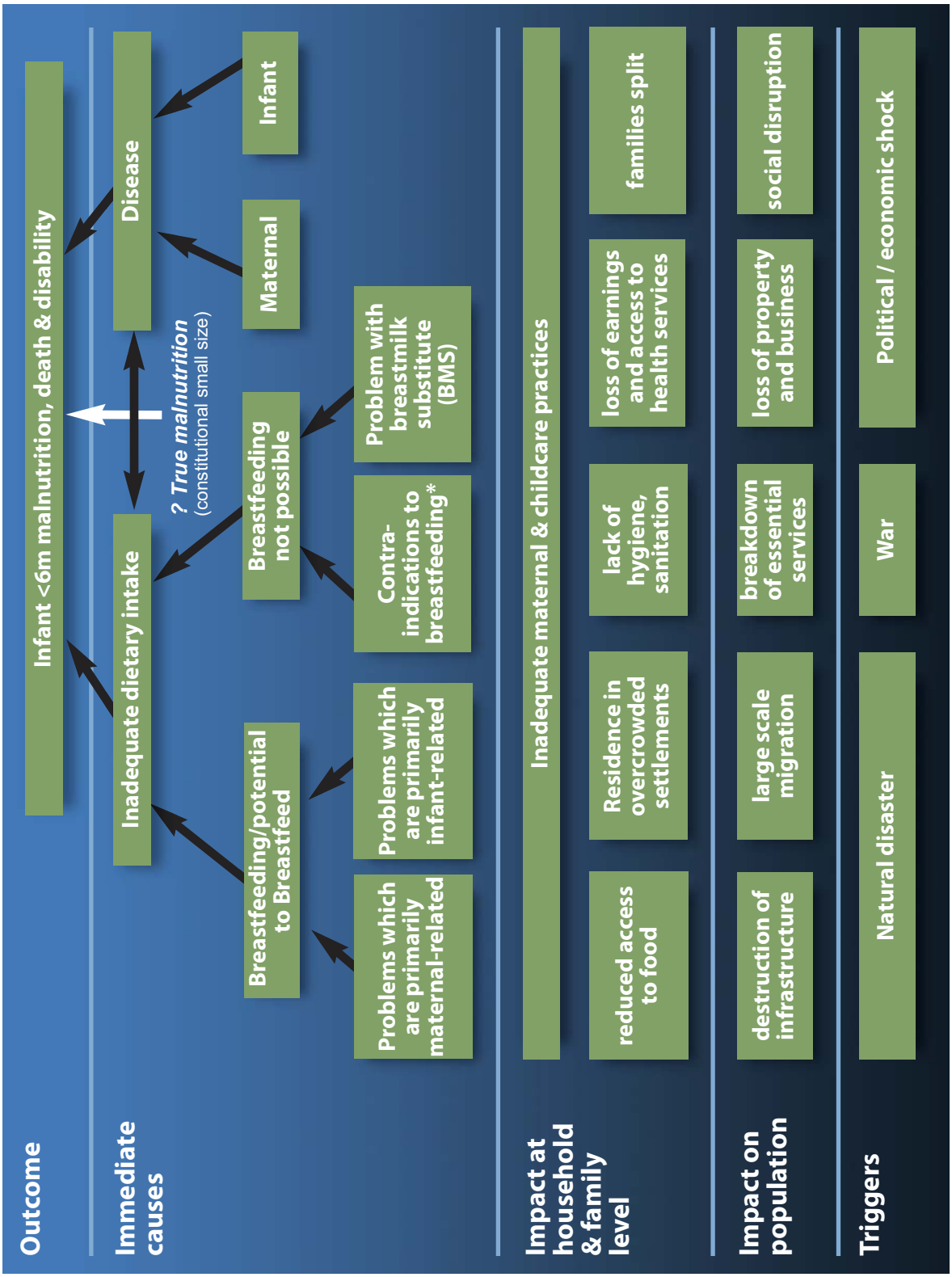
Appendices

Appendix A Key Resources

Online links are provided to electronic versions where available. All resources listed are also located at www.ennonline.net/resources and select 'MAMI'.

- **ACF Assessment and Treatment of Malnutrition in Emergency Situations,** Claudine Prudhon, 2000 *(Book available for purchase via http://www.aahuk.org/publications.htm)*
- **IFE Core Group (2009) Infant Feeding in Emergencies Orientation Package (Module 1), updated 2009**. *(Download free from http://www.ennonline.net/resources/view.aspx?resid=1)*
- **IFE Core Group (2007) Infant feeding in emergencies. Module 2. Version 1.1** Developed through collaboration of ENN, IBFAN-GIFA, Fondation Terre des hommes, UNICEF, UNHCR, WHO, WFP. Core Manual (for training, practice and reference). English and French. *(Download free http://www.ennonline.net/resources/view.aspx?resid=4 or in print from ENN, Oxford, UK or UNHCR, Nairobi)*
- **IFE Core Group (2007) Operational Guidance on IFE, version 2.1, May 2007. 11 languages.** *(Download free from http://www.ennonline.net/resources/view.aspx?resid=6)*
- **International Code of Marketing of Breastmilk Substitutes (1989)** *(Available at http://www.who.int/nutrition/publications/code_english.pdf)*
- **MSF Nutrition Guidelines (2006)** *(Download from http://www.msf.org.uk/books.aspx)*
- **Sphere Humanitarian Charter & Minimum Standards in Disaster Response (2004)** *http://www.sphereproject.org/*
- **Valid International (2006) International. Community-based Therapeutic Care (CTC). A Field Manual.** Oxford: Valid International. *(Available at http://www.fantaproject.org/ctc/manual2006.shtml)*
- **WHO/UNICEF (2003) Global Strategy on Infant and Young Child Feeding.** Geneva: World Health Organisation. *(Available at http://www.who.int/nutrition/publications/infantfeeding/9241562218/en/index.html)*
- **WHO (2003) Training course on the management of severe malnutrition**. Geneva: World Health Organisation. *(Available at http://www.who.int/nutrition/topics/severemalnutrition_training_courses/en/index.html)*
- **WHO (2004) Severe malnutrition: report of a consultation to review current literature.** Geneva, World Health Organization, 6-7 September 2004. *(Available at http://www.who.int/nutrition/publications/malnutrition/en/index.html)*
- **WHO (2004) Guiding Principles for feeding infants and young children during emergencies** *(Available at http://www.who.int/nutrition/publications/emergencies/9241546069/en/index.html)*
- **WHO (1999) Management of severe malnutrition: a manual for physicians and other senior health workers.** World Health Organisation. Geneval: World Health Organisation. *(Available at http://www.who.int/nutrition/publications/malnutrition/en/index.html)*
- **WHO (2003) Guidelines for the inpatient treatment of severely malnourished children.** Geneva: World Health Organisation. *(Available at http://www.who.int/nutrition/publications/malnutrition/en/index.html)*
- **WHO & UNICEF (2009) WHO child growth standards and the identification of severe acute malnutrition in infants and children.** A joint statement by the World Health Organization and the United Nations Children's Fund. *(Available at http://www.unicef.org/nutrition/files/stmt_child_growth_sam_final.pdf)*
- **World Health Organization. The WHO child growth standards.** *(Available at http://www.who.int/childgrowth/standards/en/)*
- **WHO, WFP & UNICEF (2007) Community-based management of severe acute malnutrition. A Joint Statement by the World Health Organization, the World Food Programme, the United Nations System Standing Committee on Nutrition and the United Nations Children's Fund.** *(Available at http://www.who.int/nutrition/topics/statement_commbased_malnutrition/en/index.html)*
- **UNICEF, UNAIDS, WHO, UNFPA (2003) HIV and infant feeding. A guide for health-care managers and supervisors.** *(Available at http://www.who.int/child-adolescent-health/publications/NUTRITION)*
- **WHO (2007) HIV and Infant Feeding: Update based on the Technical Consultation held on behalf of the Inter- agency Task Team (IATT) on Prevention of HIV Infection in Pregnant Women, Mothers and their Infants** Geneva, 25–27 October 2006
- **UNHCR (2009) Guidance on infant feeding and HIV in the context of refugees and displaced populations.** *(Available at http://www.ennonline.net/resources)*
- **WHO, UNICEF (2009) Acceptable medical reasons for using breastmilk substitutes.** *(Available at http://whqlibdoc.who.int/hq/2009/WHO_FCH_CAH_09.01_eng.pdf)*
- **WHO UNICEF (2006) Integrated IYCF Counselling Course. Trainers Guide.** *(Available at http://www.ennonline.net/resources)*
- **CARE, URC, CHS (2007) Infant and Young Child Feeding Counselling - Community Focused Approach. Trainers Guide.** *(Available at http://www.ennonline.net/resources)*
- **ENN/IFE Core Group (2009) Integration of IYCF support into CTC/CMAM. Facilitators Guide and handouts.** ENN, IFE Core Group & collaborators. October 2009. *(Available at http://www.ennonline.net/resources)*

Appendix B Conceptual framework for causes of malnutrition in infants <6m



Key references:
Breastfeeding and Human Lactation, Riordan & Wambach, 4th Edition, 2010
Behavioural & Metabolic Aspects of Breastfeeding. International trends. Eds Simopoulos, Dutra de Oliveira, Desai, 1995
Fast Facts - Infant Nutrition. Lucas & Zlotkin, 2003
Forfar & Arneil's Textbook of Pediatrics. Sixth Edition
Breastfeeding and Human Lactation, Riordan & Auerbach, 2nd Edition, 1998
Breastfeeding. A guide for the medical profession. Lawrence & Lawrence. 6th ed, 2005
IASC Nutrition cluster Harmonized training package

Table 43: Discharge codes by country and by frequency

Discharge code*	Afghanistan	Burundi	DRC	Ethiopia	Kenya	Liberia	Myanmar	Niger	Somalia	Sudan	Tajikistan	Uganda	N	Countries using this code
Cured	+			+	+	+	+		+	+	+	+	50,483	9
Defaulter	+				+	+	+		+	+	+	+	8,531	8
Missing code data	+	+		+			+	+	+	+		+	1,611	8
Admission mistake					+	+	+		+	+	+	+	449	7
Death				+	+		+			+	+	+	691	6
Transfer				+	+	+				+	+	+	863	6
Other	+								+	+	+	+	545	5
Dead	+					+			+			+	294	4
Medical transfer					+		+		+			+	201	4
Non respondent				+	+						+	+	9,355	3
Abandon		+	+					+					2,061	3
Décès		+	+					+					710	3
End of TFC follow up					+						+	+	2,090	3
Erreur d'admission		+	+					+					283	3
Guéri		+	+					+					23,921	3
Non répondant			+					+					1,645	3
Transfert medical		+	+					+					33	3
Autres		+						+					72	2
CNR							+			+			613	2
Critères non-atteints		+						+					163	2
Default											+	+	76	2
Died	+											+	14	2
Inconnu		+						+					44	2
non responder							+		+				136	2
Non response										+		+	317	2
NR										+		+	51	2
Others						+				+			15	2

Table 43 cont'd

Discharge code*	Afghanistan	Burundi	DRC	Ethiopia	Kenya	Liberia	Myanmar	Niger	Somalia	Sudan	Tajikistan	Uganda	N	Countries using this code
Transfer to OTP					+							+	59	2
Transfer to TFC					+							+	786	2
Transfert			+					+					584	2
Unknown							+					+	8	2
Admission error										+			1	1
AM							+						5	1
C							+						902	1
C.N.R										+			276	1
CH							+						45	1
Cheating							+						36	1
Criteria not reached						+							23	1
D							+						104	1
D/Regestration					+								9	1
Décédé								+					35	1
Def					+								1	1
DNG								+					45	1
End of CBC												+	3	1
End of CBC follow up												+	86	1
End of follow up												+	711	1
End of OTP follow up												+	7	1
End of TFC												+	90	1
End of transit												+	5	1
End OTP					+								1	1
Erreur admission								+					7	1
Error										+			4	1
Fin suivi CNT			+										2,660	1
M						+							13	1

Table 43 cont'd

Discharge code*	Afghanistan	Burundi	DRC	Ethiopia	Kenya	Liberia	Myanmar	Niger	Somalia	Sudan	Tajikistan	Uganda	N	Countries using this code
Medical referal												+	1	1
Mistake												+	6	1
Mistake admission												+	2	1
Mistake of admission												+	3	1
Non guéri								+					47	1
Non respond												+	5	1
Non respondant												+	326	1
OTP transfer													1	1
R,Creni								+					10	1
R,Transfert								+					68	1
Refus Creni								+					6	1
Refus de transfert								+					2	1
Refus transfert								+					5	1
Refused to go TFC					+								1	1
SFC transfer												+	2	1
T							+						43	1
T, Creni								+					21	1
TFC												+	20	1
To other OTP												+	1	1
Transfer CTC / TFC												+	12	1
Transfer HP										+			139	1
Transfer other												+	3	1
Transfer others										+			6	1
Transfer SFC					+								46	1
Transfer TFC												+	26	1
Transfer to CBC												+	101	1
Transfer to CTC												+	32	1

Table 43 cont'd

Discharge code*	Afghanistan	Burundi	DRC	Ethiopia	Kenya	Liberia	Myanmar	Niger	Somalia	Sudan	Tajikistan	Uganda	N	Countries using this code
Transfer to Health Ce												+	1	1
Transfer to OPT												+	3	1
Transfer to other CTC												+	5	1
Transfer to other OTP					+							+	5	1
Transfer to other SFC												+	965	1
Transfer to OTP / TFC												+	414	1
Transfer to SFC												+	249	1
Transféré								+					31	1
Transfert Centre de S			+										1	1
Transfert CNS			+										1,494	1
Transfert CNT			+										619	1
Transfert CS			+										4	1
Transfert H								+					1	1
Transfert hopital			+										161	1
Transfert vers crenam								+					9	1
Transfert vers creni								+					31	1
Transit												+	2	1
Wrong admission												+	7	1
Wrong child					+								14	1
Wrong discharge												+	13	1
N	1,096	5,481	24,155	59	8,466	2,797	2,011	5,721	3,730	8,355	9,329	45,591	116,79	
Number of outcome codes used in each country	6	9	13	5	18	7	16	25	8	16	9	48		

* As originally appear in the datasets

DRC: Democratic Republic of the Congo.

Table 44: Oedema by country and programme

	< 6 months						6 to 59 months					
Country	**Oedema**		**No oedema**		**Missing values**		**Oedema**		**No oedema**		**Missing values**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Afghanistan	12	1.2%	1,018	98.8%	0	0.0%	1	1.6%	62	98.4%	0	0.0%
Burundi	1	0.7%	145	99.3%	0	0.0%	1,209	60.1%	803	39.9%	0	0.0%
Ethiopia	0	0.0%	30	90.9%	3	9.1%	1	4.2%	22	91.7%	1	4.2%
Kenya	1	2.7%	32	86.5%	3	10.8%	57	11.5%	377	76.3%	60	12.1%
Liberia	1	0.6%	165	98.8%	1	0.6%	534	23.7%	1,715	76.3%	0	0.0%
Myanmar	5	2.8%	175	97.2%	0	0.0%	114	9.6%	1,075	90.4%	0	0.0%
Niger	1	0.7%	108	74.5%	36	24.8%	178	18.5%	534	55.5%	251	26.1%
DRC	116	8.3%	1,284	91.7%	0	0.0%	3,069	66.2%	1,564	33.8%	1	0.0%
Somalia	1	0.2%	398	99.0%	3	0.7%	524	20.4%	2,034	79.4%	5	0.2%
Sudan	2	0.6%	358	99.4%	0	0.0%	905	18.4%	4,020	81.6%	3	0.1%
Tajikistan	0	0.0%	83	96.5%	3	3.5%	5	1.7%	274	95.5%	8	2.8%
Uganda	0	0.0%	16	100.0%	0	0.0%	664	52.7%	597	47.3%	0	0.0%
Total	**140**	**3.5%**	**3,812**	**95.3%**	**50**	**1.2%**	**7,261**	**35.1%**	**13,077**	**63.3%**	**329**	**1.6%**
	< 6 months						6 to 59 months					
Programme	**Oedema**		**No oedema**		**Missing values**		**Oedema**		**No oedema**		**Missing values**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
DC	2	0.3%	736	99.7%	0	0.0%	1,209	58.9%	844	41.1%	0	0.0%
HT	3	2.6%	111	97.4%	0	0.0%	73	7.2%	936	92.8%	0	0.0%
SC	2	2.0%	94	94.9%	3	3.0%	43	14.1%	262	85.6%	1	0.3%
TFC	133	4.4%	2,871	94.1%	47	1.5%	5,936	34.3%	11,035	63.8%	328	1.9%
Total	**140**	**3.5%**	**3,812**	**95.3%**	**50**	**1.2%**	**7,261**	**35.1%**	**13,077**	**63.3%**	**329**	**1.6%**

DRC: Democratic Republic of the Congo;
DC: Day Centre;
HT: Home treatment;
SC: Stabilisation centre;
TFC: Therapeutic Feeding Centre.

* The percentages in this table are based on the total sample of 4002 infants <6m and 20,667 children aged 6 to 59 months.

Appendix D Interview schedules and additional tables for Chapter 6

Appendix D.1 Steering group meeting report, May 2008

Project MAMI

Management of Acute Malnutrition in Infants

A retrospective review of the current field management of acutely malnourished infants under six months of age

http://www.ucl.ac.uk/cihd/research/nutrition/mami

Implemented in a collaboration between Emergency Nutrition Network (ENN), UCL Centre for International Health and Development (CIHD) and Action Contre la Faim
Funded by the UNICEF-led Inter-Agency Standing Committee (IASC) Nutrition Cluster
(http://ocha.unog.ch/humanitarianreform/Default.aspx?tabid=74)

Report of the 1st Research Advisory Group (RAG) and Interagency Steering Group (ISG) meeting
UCL Centre for International Health and Development, London,
Wednesday 28th May 2008

1 Presentations

(Copies of PowerPoint slides are available on request – marko.kerac@gmail.com)

1. 1. Project background – Jeremy Shoham, ENN

The IFE (Infant and Young Child Feeding in Emergencies) Core Group, coordinated by ENN, has in its work since 1999 identified a lack of specific guidance for the management of acutely malnourished infants less than six months old. The MAMI project was conceived to address this need. Funding is from the UNICEF-led IASC Nutrition Cluster and is secured until December 2008.

1.2. Conceptual framework and project scope – Marko Kerac, CIHD

MAMI aims to document current practice in the management of acutely (moderate & severe) malnourished infants under six months, in emergency programmes, in order to learn from recent operational experience and identify further research needs. The immediate project outcome will be a detailed project report that will be produced at the end of 2008. Outputs planned for the longer term include interim 'Best Practice' guidelines based on currently available evidence and a research agenda suggesting studies that are needed to inform future practice. Project reports will be targeted at specific audiences:

- A technical document aimed at policy makers and researchers describing in detail the various issues related to the management of infant malnutrition (and explicit about underlying quality/grade of evidence).
- A short summary document targeted at fieldworkers.

A conceptual framework (see appendices) for defining and understanding the causes of infant malnutrition was presented. The purpose of this is to facilitate communication and common technical understanding of the classification and aetiology of malnutrition in this age group – which is often more complex than malnutrition in older ages. Challenges include the use of multiple indicators (anthropometric/clinical) and the difficulty of differentiating acute malnutrition from low birth weight (LBW) or premature infants in contexts where longitudinal growth data is often unavailable.

Main discussion points

a) Sub-categorisation of infants by age – there was discussion about:

- Usefulness of sub-categorization of 0 to 5.9m infants: rationale is to recognise that physiologically and patho-physiologically infants at different ends of this age spectrum are a very heterogenous group. To what extent, and how any such differences impact on management was discussed.
- If adopted, what cut-offs should be used: There was discussion about the choice of cut-offs and about whether to have two or three age subcategories. One option was to follow IMCI with a two phase cutoff: 0- 1.9m to identify the youngest infants; and a second group 2 to 5.9m. This was to be further discussed in the MAMI report in light of published or field evidence.

Action

- Further feedback/evidence welcome. Will be explored in detail in the MAMI literature review
- Age data to be kept as a continuous variable wherever possible to allow flexibility and exploration of the pros/cons of different cut-off options

b) Defining cases – it was ascertained that agencies use many different indicators (anthropometry, clinical status and feeding adequacy) in the field, with no current consensus on best practice in infants below six months. The difficulty of distinguishing acute malnutrition from prematurity/LBW, given the frequent lack of longitudinal patient records in the field, was highlighted. Some agencies, as well as DHS surveys, ask mothers "Was your child small at birth?", though the subjectivity of this method was acknowledged. The possibility of a pre-admission period of monitoring to ascertain risk and prioritise admission was suggested.

Action

- Pros/cons of various definitions to be explored during analysis of field data and related literature

c) Understanding aetiology – the general usefulness of a conceptual framework was acknowledged, but there was much discussion about terminology, format, and about the extent to which knowing cause changes patient management (e.g. breastfeeding support likely needed whatever other causes).

Action

- Individuals & agencies to feed back to Marko all suggestions for 'evolving' the initial draft framework

1.3. Review of progress & overview of proposed methodologies – Marko Kerac, CIHD

Progress to date includes initial literature searches, an online letter in the Lancet and workshops in Vietnam and Bali. One of the next steps will be to identify specific questions which MAMI can address using currently available evidence, including agency data. Interim 'best practice' guidelines will be written with explicit reference to the level of evidence used – graded according to the Oxford Centre for Evidence-Based Medicine (see www.cebm.net/levels_of_evidence.asp)

Action

- Marko to liaise with agencies re availability of data on 0 to 5.9m children – this will be central to determining what questions/issues MAMI can and cannot address in the initial project timeframe

1.4. Review of currently available field data – Caroline Wilkinson and Cecile Bizouerne, ACF

This presentation reviewed current field challenges in management of 0 to 5.9m malnourished infants. An example field database was also shown and discussed to help the group focus on what questions might be answerable through the review of field data. Key points included an observation that this age group is often not specifically targeted by feeding programmes and surveys (with infants <6m included in only an estimated 10% of surveys). There are therefore many unknowns both about the scale of the problem, and about how best to look after malnourished children who are identified. Adverse implications are likely

given known higher mortality rates of young infants and the specific resources/skills (e.g. staff training, time) needed to best care for mothers and infants in this group. It was postulated that the proportion of malnutrition caseload below six months might increase with the roll-out of CMAM, as more infants are identified. Lastly, psycho-social and preventative interventions were discussed, and examples reviewed.

Main discussion points

a) Availability of data –

- Asking those present at the meeting, it was established that many agencies do not routinely collate data on 0 to 5.9m infants – though it may be available by going to field records. Limitations of the data (e.g. grouping) that is available was acknowledged

Action

- Data analysis should be supported by some qualitative work to better understand the nature of that data and its' utility in informing future practice – e.g. by interviewing those who collected the data;
- Analysis of individual-level, raw data is important wherever possible

b) Determining programme impact & effectiveness: the importance of context

- There was much discussion about how context can affect programme outcomes. Which are 'universal' factors relevant everywhere; which are more 'localised' issues; is it possible / how to distinguish the two? These are important challenges when assessing programme effectiveness – especially of psychosocial and other more 'indirect' interventions.

Action

- Qualitative work & literature review will be important to try to identify 'key'/'universal' contextual factors

c) Database linking & coordination –

- Linking different databases was identified as a challenge. Some questions (e.g. the effect of supporting pregnant/lactating women so as to improve infant nutrition) are difficult to address without such linking.

Also discussed were the challenges of comparing outcomes from different management strategies – difficult if different admission criteria are used. There was some feeling that a useful outcome from MAMI would be to build agency consensus on admission criteria for malnourished infants as this would be a good basis for future work and harmonisation of practice.

The characteristics of a good admission criterion were discussed.

Action

- MAMI to be a forum for agencies to meet/ share experiences – initial steps towards database harmonization

1.5. Networking for progress: lessons from the Vermont Oxford Network

– Prof Alan Jackson, RAG

Key points included the fact that scientific literature on the feeding of infants below six months is sparse, and that standardised approaches to the 'gap' such as randomised controlled trials are unlikely to be the way forward. MAMI needs to ascertain the level of evidence needed to make judgements for better care standards, and to decide the best way of capturing such data for this purpose. The Vermont Oxford Network (VON) may be a useful model of how a related discipline has moved forward.

VON is a collaboration of health care professionals dedicated to improving the quality and safety of medical care for newborn infants and their families through a coordinated programme of research, education and quality improvement projects. It maintains a database of information about the care and outcomes of high-risk newborn infants. This can be used by participating units for quality management, process improvement, internal audit and publication in peer reviewed journals (see www.vtoxford.org).

2 Research questions/issues for MAMI to address: Summary of key areas identified:

Three working groups (+informal discussions during the day) helped identify and frame possible questions that MAMI might address.

Research question + why important	Data needed/available
Backround	
• What is the scale of the problem of 0 to 5.9m malnutrition? - *? A 'paradigm shift' that malnutrition is a problem in this age group* - *Helps determine where on the spectrum of (public health vs individual & (therapeutic vs preventative) efforts should be mainly (but not exclusively) focused*	• National DHS databases; • MICS databases
Current Guidelines	
• **What do current management protocols recommend for 0 to 5.9m malnutrition?** - *To understand the range and variety of current practices so as to be able to:* - *compare & contrast different approaches* - *better understand 'baselines' before recommending future work/research* • **What are constraints to some current programmes admitting/managing 0 to 5.9m olds**	• Review of agency protocols • Review of agency data • Qualitative work & field visits
Admission Criteria	
- *Need a criterion that is optimally sensitive & specific against programme aims (as well as taking into account likely resource constraints)* • **What is best way of identifying cases** (e.g. rapid assessments; surveys; **other)** • **(How) can LBW/prematurity/post-natal malnutrition be differentiated? (and is there a 'weight' or other cut-off below which treatment needed regardless)** • **What % of cases of malnutrition are 0 to 5.9m (in relation to 6 to 59.9m)** • **What are the 'best' admission criteria:** - Which indicators (e.g. anthropometric/clinical status/feeding adequacy)? - WHO growth standards or NHCS growth references? - Do the criteria reflect risk of mortality? (ideally preventable mortality vs just mortality alone) • **What are technical / practical limitations of different admission criteria (e.g. age assessment; weight assessment if scales only weigh to nearest 100g)**	• Literature review • Review of agency data/ agency admission criteria • Estimating expected caseload from DHS data would allow some prediction of the effects of changing admission criteria. • Reference ENN's/University of Southampton work on field equipment (weighing scales) • ROC curves constructed using field data to look at mortality predictors. (ideally supplemented by prospective work in future to look at clinical/other markers of risk)
Management Protocols	
• **What are the outcomes from 0 to 5.9m malnutrition using current protocols?** • **What nutritional treatments are currently recommended/used (& how effective are they)** *e.g. breastfeeding support/ re-lactation/ breast-milk replacements/therapeutic milks* • **What medical treatments are currently recommended/used (& how effective are they)** • **Should (and does) regimes differ for LBW/prematurity/acute malnutrition?** • **What is the role of psychosocial support? What is its effectiveness?**	- Literature review - Review of agency data - Studies comparing treatment regimens (such as ACF's study comparing F100-diluted and infant formula).

Table cont'd

Research question + why important	Data needed/available
Discharge Criteria	

- *Need a criterion that is optimally sensitive & specific against programme aims (as well as taking into account likely resource constraints)*
• **What are the 'best' discharge criteria:**
  - Which indicators (e.g. anthropometric/clinical status/feeding adequacy/% weight gain)?
  - WHO standards of NCHS norms
  - Do the criteria reflect risk of preventable mortality
• **What length of follow-up is ideal (and what is done in practice)**
• **What are longer term outcomes following an episode of malnutrition**
• **What are current default rates**
	• Literature review
	• Review of agency data / agency discharge criteria
	• Estimating expected caseload from DHS data would allow some prediction of the effects of changing discharge criteria.

Rasource & StaffF Issues/Requirements	
• **What staff skills/training is needed? (esp. for breastfeeding related interventions)** • **Is there a minimum (and/or optimal) staff: patient ratio?**	• Qualitative work / interviews with agencies
Service Organization	
• **What is coverage of present programmes** • **What is the right balance between facility-based and community based programmes/interventions** • **What is right balance btw preventative (e.g. nutritional support of pregnant & lactating women) vs treatment approaches** • **Is there a role for active community case-finding in the community? How would this be carried out?** • **Is there an 'essential minimum package' of resources/staff to be able to successfully carry out MAMI-related programmes ~ is it possible to decentralise this?** • **How can data collection be improved for future use? How can this data be shared between key players at country level?**	• compare expected numbers (e.g. from DHS surveys) vs actual numbers enrolled into feeding programmes to get very rough estimate of coverage • Literature reviews (+case examples from CTC/CMAM, BFHI etc) • ACF interviews with mothers
Cultural and Contexttual Issues	
• **What are key factors affecting the management of infant malnutrition?** • **How does contact/culture affect prevalence/ treatment/ follow-up/mortality?** • **What is the impact of maternal factors (stress, illness, community support)?**	• Qualitative work (e.g. field visits/interviews with agencies)

Appendix D.2 Introductory letter for sharing of field data

MAMI Project

Management of Acute Malnutrition in Infants

http://www.ucl.ac.uk/cihd/research/nutrition/mami

(Funded by the UNICEF-led IASC Nutrition Cluster)

(sent to participants in advance of interview)

Dear Colleague,

To understand the issues and challenges relating to MAMI, "Management of Acute Malnutrition in Infants", we are conducting telephone consultations with a number of key informants and field-based organizations. To make these focused and time-efficient, we hope it is helpful for you to see this rough agenda of points we would like to hear about.

A few things:

i) Our interest is not only in how infants 0 to 6m are managed - but also in challenges faced and in understanding reasons *why they may not* be currently admitted or actively managed.

ii) Copies of any project proposals/reports etc would be much appreciated – would save asking many 'obvious' questions!

iii) Information you give will be used in MAMI related publications only. You/your organization will have the opportunity to see and comment on relevant reports before finalisation. You will also have the option of being named co-authors representing the "MAMI Steering group" (please see 'data sharing' document)

vi) If part of our interviews includes describing a programme which has contributed past data to MAMI, it would be helpful to focus on conditions/issues *at the time data was collected* - as well as any important current/new issues.

v) Our main aim is to ***describe*** details of and outcomes from the wide variety of current patient management practices. It is ***not to 'judge'*** whether different programmes do or do not meet a 'gold standard' (which does not exist – hence the need for MAMI in the first place!)
Capturing actual experiences is critical to helping us understand how we can move forwards. Only in light of field realities can a sensible 'field ideal' be developed…

Many thanks in advance for your great help and support, I look forward to talking soon,

Best wishes,

Marko

MAMI Lead Researcher.

Appendix D.3 Interview Schedule for Chapter 6 (Key informant Interviews)

MAMI Project

Management of Acute Malnutrition in Infants

Field experiences: key informants interviews
Topics to discuss

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(Funded by the UNICEF-led IASC Nutrition Cluster)

N.B a) "Infants" refers to infants < 6m (0 to 5.9m) unless otherwise stated
b) Present tense is used ~ but if there are important past programmes, it is just as important for us to hear about those

A) Intro/General:

i) What sort of nutrition programme(s) is your organization operating i.e. NRU, CTC/CMAM, SFP, other, etc?
ii) Where (geographically) are the programmes operating?
iii) How do the programmes link with other / local health service structures?
iv) Which kind of staff are involved in your programmes (e.g. expat/local; clinicians/volunteers, etc)?

B) Infant SAM/MAM prevalence & causal factors

i) Do you consider acute malnutrition in infants (0 to <6m) to be a public health problem in the location(s) where you work?
ii) What are the main direct factors underlying infant malnutrition in your area(s) (if able to say)?
iii) Which context (indirect) factors commonly affect infant malnutrition?

Either positively (reducing disease burden) or negatively (increasing disease burden)

Does your programme currently admit or directly manage infants?
If yes:
Continue with section C
If no:
Skip direct to section E

C) Identification of malnourished infants & admission to programme

i) How are infants with possible malnutrition identified in your programme / area?
ii) How is it decided/ confirmed which children are malnourished – and which are not? What is the 'case definition'?
iii) What happens to those in whom the diagnosis is not confirmed?
iv) What are major context factors affecting how infants with malnutrition present/arrive to the programme (either positive or negative influences).

D) Programme specifics

i) What are carers'/community expectations from an infant SAM/MAM programme? (if able to say)
ii) In brief, how do you currently 'manage' a malnourished infant, & what is the basis of this? For example, written guideline (e.g. international, national; organizational; local); informal local guideline; case-by-case clinical judgement.
iii) At present, how well do you feel your current protocols / patient management practices meet the needs of infants with SAM / MAM?
- What works well and why? (e.g. which patient groups respond well to treatment?)
- Are there any specific situations / patient groups where difficulties occur?

iv) What (if any) are specific challenges relating to medical treatments for infant SAM/MAM?
v) What (if any) are specific challenges relating to nutritional treatments for infant SAM/MAM?

vi) What (if any) are specific challenges relating to psycho-social and family support?
vii) What are discharge criteria / how do you decide if an infant has been 'successfully' treated

E) Challenges & reasons for non-admission/infrequent admission

i) How/to what extent do each of the following lead to non-admission or low admission of infants <6m:
- no infants/low numbers of infants presenting for care
- insufficient programme resources (e.g. physical space, equipment, supplies, staff, budget)
- suboptimal programme processes (e.g. nothing to offer children in current guidelines)

ii) If malnourished infants do present but are not admitted to TFP/SFP, where are they referred instead?
iii) How often are infants almost 6m old treated as >6m olds, according to normal SAM/MAM protocols?
iv) Are infants <6m reported in current M&E systems?

F) Training & support for infant malnutrition

i) Have you ever had formal training on the management of infant malnutrition? What? Where? When?
ii) Which literature / whose expert advice (either in, or external to your organization) would you seek for support /advice about infant malnutrition?

G) Context

i) Which context factors would make the most difference to infant SAM/MAM if addressed?
ii) Which context factors are most easy / realistic to change (even if public health impact not be great)?

NB context is often key to many questions. Possible factors to consider in this & other context questions include:

- geographical
  - is the programme area rural/urban?
  - what is access/transport like?
- characteristics of the 'emergency' - duration, causes
- socio-cultural context (e.g. religious issues, 'traditional beliefs/customs)
  - at country/national level
  - at local level
- political context (e.g. national leadership;/political will, presence or absence of other related programmes like baby-friendly hospital initiative)
  - international level (e.g. UNICEF, WHO, etc)
  - national level
  - local level
- programme
  - nature of the programme (e.g. stand alone integrated into govt system)?

H) Finally. . . .

i) What do you see as the three biggest challenges in terms of managing malnourished infants in the field?
ii) What three (realistic) outputs would you like to see from the MAMI Project in order to make the biggest difference to malnourished infants in the field?
iii) Can you suggest any resources or literature or 'words of wisdom' from your own field experience which you think would help others in the MAMI network?

Thank you very much for your help & support!!!

Appendix D.4 Key informant interviewee

Table 45: Profile of 31 key informants interviewed
Several informants described more than one programme: hence >31 countries and projects represented

Country	Interviewee position (at the time of programme being described)	Type of organization/programme
Burundi	Nutritionist	International NGO
	Nutrition programme manager	International NGO
Ethiopia	Country programme manager (UK based)	NGO (mainly providing technical advice to government health system)
Kenya	Project officer	International NGO
	Community Health workers	Government Health Centre
	Nursing Officer in-charge	Government Health Centre
	Camp Nutritionist	UN refugee camp
	Stabilization centre supervisor	UN refugee camp
	Nutrition supervisor	UN refugee camp
	Nutritionist	UN refugee camp
	Nutrition specialist (regional advisor)	International NGO *All above programmes were CMAM-based, with combinations of inpatient & outpatient care*
Malawi	Country programme manager (UK based)	NGO (mainly providing technical advice to government health system)
	Nutritionist	International NGO
Somalia	Clinician in-charge of Nutrition project	NGO
Tanzania	Supervisor of paediatric ward (Regional referral hospital)	Paediatric ward, regional referral hospital
Uganda	Paediatrician in charge	Inpatient stabilization centre (part of CMAM Programme), set in section of general paeds ward but staffed by large international NGO
Angola	Nutrition specialist (regional advisor)	International NGO
Guinea	Nutritionist (overseas-based, in charge of several countries)	International NGO
DRC	Nutritionist (USA-based)	NGO (mainly providing capacity building/ programme support)
	Nutrition specialist (regional advisor)	International NGO
Sudan	Clinician in-charge of Nutrition project	NGO
	Nutrition specialist (regional advisor)	International NGO
	Doctor (in charge of health/nutrition programme, involving front-line clinical work)	International NGO
	Nutrition advisor	International NGO
	Nutritionist	International NGO
Lesotho	Nutritionist (overseas-based, in charge of several countries)	International NGO
Swaziland	Paediatrician	Working in MoH hospital, part of international HIV support initiative
	Nutritionist (overseas-based, in charge of several countries)	International NGO
South Africa	Paediatrician	Government Hospital
Burkina Faso	Nutrition coordinator (in-charge several countries)	International NGO
Gambia	Paediatrician In-charge	(Central Government hospital)

Table 45 cont'd

Country	Interviewee position (at the time of programme being described)	Type of organization/programme
Liberia	Nutritionist	International NGO
Mali	Nutritionist (overseas-based, in charge of several countries)	International NGO
	Nutrition coordinator (in-charge several countries)	International NGO
Niger	Programmes manager	NGO (technical advisor)
	Nutritionist (overseas-based, in charge of several countries)	International NGO
	Nutrition coordinator (in-charge several countries)	International NGO
Senegal	Nutrition coordinator (in-charge several countries)	International NGO
Sierra Leone	Nutrition advisor	International NGO
	Nutritionist	International NGO
Afghanistan	Nutritionist (USA-based)	NGO (mainly providing capacity building/ programme support)
	Nutritionist	Nutritionist
Bangladesh	Professor and Doctor	NGO-led NRU
Myanmar	Nutrition programme manager	International NGO
Nepal	Nutritionist	International NGO
	Nutritionist	International NGO
Pakistan	Nutritionist (USA-based)	NGO (mainly providing capacity building/ programme support)
	Programme manager	International NGO
	Nutritionist	International NGO

Appendix D.5 Details of key informant interviews – Prevalence and Causes of Infant <6m malnutrition

Subtheme emerging	Interviewee position (at the time of programme being described) Quotations/examples
Lack of population focusing on infant <6m to get true estimate of the problem	• No idea of prevalence of acute malnutrition in infants <6m in the community, some making assumptions based on admission numbers. • We do see occasional cases, though cannot say what the true extent of the problem is in the community. • No info on prevalence, though not uncommon on ward (approx four to five infants out of 30 on the ward at a time). • Infant <6m malnutrition not a problem here – "rare" (on basis of cases seen in programme). • There can be a bit of a mindset that infant <6m malnutrition is not a problem, so surveys don't include this age group, and we never really know whether or not the assumptions are valid. • Even if we wanted to include infants in surveys, there are important technical and practical barriers, like what sample size is needed for a valid result. • Difficult to say whether infant SAM a problem – no surveys available. Admissions of infants <6m were uncommon, perhaps 1-2% of total (Sudan). • Infant <6m admissions not common – maybe one per month or 2-3% of admissions – impossible to know how well this reflects community disease burden. • Difficult to get good guidance on how to do surveys focused on <6m infants (e.g. sample size, measurement techniques)
Infant <6m factors underlying malnutrition	• Low birth weight/preterm babies – especially those who are too weak or premature to suckle. • Twins (often because LBW, premature). • Twins, triplets seemed particularly common in some areas (impression from Democratic Republic of Congo). • Diarrhoea, respiratory disease, other acute child illness. • TB, HIV other chronic infant illness. • Cerebral palsy (including post malaria or post meningitis) or other disability • There were some cases of recurrent malnutrition – possibly due to underlying malabsorbtion
Maternal factors underlying malnutrition	• Orphan (mother died) so no chance of child being breastfed (orphaning noted by the majority of respondents as a major challenge) • Early weaning is very common and rates of EBF are very low. • "Even mothers who have been taught about the benefits of exclusive breastfeeding in practice, often introduce other foods well before 6m". • Severe maternal illness (obstetric complications, HIV noted by several respondents) leading to a prolonged period when mother cannot breastfeed. • Mother is 'dysfunctional'. • Young and inexperienced mothers were found to sometimes struggle with caring for their infant. • Some mothers just never get breastfeeding well established, and they present for malnutrition treatment with infant aged one to two months – but presumably have had some inputs (from health centre or other) previously. • Maternal depression (with range from clinical depression to poor coping strategies, to worries about other children), all contributing to likelihood of introducing complementary foods early and infant becoming malnourished. • "Mothers value their business more than their infant, and even if the infant is with her, feeds and care get neglected." • "If women have the urge and desire, breastfeeding is generally not difficult. Other women however are lazy and do not look after infants well." • "Maternal milk insufficiency" – though difficult to tell how much of this is real and how much perceived by mother. • Mother has poor knowledge about infant feeding practice • Mother does not drink enough fluids and so breastmilk production suffers.

Table cont'd

Subtheme emerging	Interviewee position (at the time of programme being described) Quotations/examples
Health services	• Current health services do very little for those infants who genuinely have no access to breastmilk (e.g. orphans). No formula is available; advice on other alternatives is limited meaning infants that are already at high risk of malnutrition become even higher risk because of lack of support. • Other services related to early feeding support are unavailable in the area (e.g. Baby Friendly Hospital Initiative) • Access to healthcare is difficult (distance too far, transport too expensive so carers either wait for too long or don't go at all). • People often go to pharmacists or private clinicians first, these prefer to sell drugs which may not be appropriate rather than to refer.
Family factors underlying malnutrition	• Dysfunctional families, (e.g. father unsupportive or in some cases even abusive of mother). • Single mothers sometimes find it difficult to cope alone, feel that breastmilk alone is insufficient and start giving complementary foods too early. • Male and female infants valued differently that affects care seeking behaviour (e.g. not spending time/money on a girl); different problems (boys given complementary foods earlier). • Women often need male family member's permission to leave house/seek medical care.
HIV	• National protocols did not allow for testing of under 18 month olds – plus did not have treatment for this age anyway. • There has been a change of policy for infants of HIV infected mothers. Previously the option to replacement feed with formula was emphasised; currently EBF is the preferred option for 0 to 6m olds. This change has led to much confusion for both mothers and staff – still perceptions persist that it is best not to breastfeed to prevent HIV transmission. • One key informant reported observing a 2008 programme in Rwanda which was providing replacement feeds to all infants of HIV infected mothers. • HIV is a sensitive issue – both for patients and organizations. • Despite the fact that mothers may die of many different causes, orphaned infants are often assumed to be AIDS orphans – can be cause of stigma. • HIV is major factor that has led to numbers of malnourished infants <6m increasing, possibly associated with replacement feeding message.
Societal factors underlying malnutrition	• Poverty and employment – mother has to go out for work, and cannot take infant with her, so breastmilk substitutes given and/or complementary foods started much too early (NB sometimes infants left with other family, sometime in care centres). • Not sure of scale of problem, but is likely given food price rises, loss of livelihoods and high chance of mothers becoming malnourished. • Infant formula has strong image of being a 'modern' way of feeding, thus becomes popular and demanded by mothers. • Mothers work on land during the day, and even though infants are often carried with the mother, she is often too busy to take time to breastfeed. • Nutritional status has improved since peace agreement signed, roads opened and health services resumed (including significant NGO services (DRC). • Mothers value their business more than their infant, and even if the infant is with her, feeds and care gets neglected. • Background conflict, insecurity and poor sanitation. • Grandmothers can provide useful support and care for infants <6m (other respondents noted that grandmothers sometimes encouraged and perpetuated practices which adversely influenced exclusive breastfeeding). • Infant feeding bottles/formula milks were available in the local market Ëno mechanism for monitoring & ensuring compliance with International Code.

Table cont'd

Subtheme emerging	Interviewee position (at the time of programme being described)Quotations/examples
Cultural practices (negative)	• Strong, deeply engrained traditions, encouraged especially by grandmothers, to introduce complementary feeds (e.g. porridges) at a few weeks of age. • Adverse care practices, including not feeding infants during illness – there is a perception that it is normal for one twin to be less well nourished than the other, so a disparity is often not noticed or acted on. • Malnutrition is NOT linked to inadequate intake of food (milk in case of infants <6m) but to breaking of cultural taboos (e.g. sex outside of marriage; sex too soon after childbirth; being cursed by the 'evil eye'). Thus is difficult to suggest a nutrition-based solution to the problem. • A senior male relative needs to give consent for a woman to receive support or treatment – this can lead to delays in seeking care, and also can contribute to making it less effective when give due to late presentation. • An 'ideal' baby is seen as engaged and beginning to acquire adult-like characteristics – hence babies are often given tea, sugar and water, and exclusive breastfeeding is difficult to promote. • Child illness is not recognised unless there are specific symptoms such as diarrhoea or vomiting, thus malnutrition alone might not get picked up • Being subdued and quiet is seen as desirable characteristic of an infant and thus an infant who is subdued due to underlying malnutrition might not be easily identified as having a problem. • Often treated beforehand by traditional healers with herbs and other local medicines, e.g. removal of infant teeth; feeding stopped during illness; as soon as mother pregnant again, stops breastfeeding current infant; mothers encouraged to discard colostrum; mothers confined to home for 40 days after delivery (though possible to go out for medical advice if needed). • Mothers perceived that breastfeeding would make their breasts 'droop' and become unattractive and so breastfeeding is not popular.
Cultural practices (positive)	- Cows milk often given at home to infants as a supplement, malnutrition seems rarer in these families (NB unknown if modified or unmodified milk – likely unmodified). • Community support programmes by local healthcare workers have done much to increase breastfeeding, so infant malnutrition not a problem here (refugee camp with active infant feeding support programme). • Breastfeeding was common in the community, and most infants presenting for care were anyway breastfeeding • Traditional healer, whilst often first attempting to treat infants with malnutrition (and other problems) do often refer for further care if their treatments are unsuccessful. Depending on the individual healer, this may/may not result in delayed presentation.

Appendix D.6 Details of key informant interviews – Identification of malnourished infants <6m and admission to programme

Subtheme	Quotations / examples
Case finding in the community	• Community health workers often don't look for the problem of infant <6m malnutrition, so won't see it even if there (NGO nutritionist). • Infants <6m not a priority group for most nutrition programmes – often not the focus of community screening either. • There was active case finding in the community by community health workers. They used hanging scales and clinical judgement to idenfity at-risk infants <6m. • No strict guidelines available for identifying infants <6m – it's a matter of judgement. • Cases normally identified if clinically obvious. • Community health workers are aware of need to consider malnutrition in all under five year old children, but definityions and criteria for infants <6m are not clear. Therefore rely a lot on clinical judgement. • Community health workers (CHW) in one place visited noted infant <6m malnutrition "not a problem" – however, no data, only clinical impressions to back up that statement. • CHWs are already overburdened from other programmes – looking for malnourished infants would further increase existing pressures. • Majority of cases referred in from active screening in community (NGO programme, DRC). • Staff in health centres helped identify and refer vulnerable infants. • Maternity services referred LBW and other vulnerable infants.
Growth charts	• Experiences variable, considered valauble but often not acted on, inaccurate measures and birth weight often not measured or a later weight taken as a proxy for birth weight. • Often filled, but not so often acted on, since infant appears to have been failing to thrive for some time before arriving at programme. Maybe not understood by community health workers. • Despite many mothers having growth charts with previous weights, these are often unreliable (e.g. different, uncalibrated scales; previously weighed with clothes or nappy on). • Growth monitoring is poor and cannot be relied on. • Birth weight often unavailable, so cannot interpret trends. • Birth weight is not always taken at birth, but as soon as possible, in 1st week of life. • Second weight is taken at ~ one month of life, when traditional birth attendant hands over care to the community outreach team (or taken sooner if infant unwell). This system seems to work OK (Kenyan refugee camp). • There is mismatch between growth monitoring, which generally looks at weight-for-age, and TFP/SFP admission which relies on weight-for-height indices. • Growth monitoring does seem to work well and infants are referred to feeding programmes having been identified through growth monitoring programmes (DRC).
Assessment logisitics and practicalities	• There were no clear 'official' criteria, so staff had to make their own decisions *(response of staff member working for NGO which did note infants <6m in some of its guidelines, though maybe not in the version used in this particular country/programme)*. • Admission is done by nurses in many programmes. • Used to admit infants for assessment (to see if growing fine – these were given vit A, folic acid but only abs if lethargic/any risk signs – assessment infants had less strict discharge criteria. • In absence of other guidelines, infants are assessed using same criteria as older children, using weight-for-height. Normally not a problem unless height is out of range of chart. Then go on clinical appearance and history. • Maternal problems (e.g. mastitis) are often assessed at programme admission. • To avoid prolonged admissions for all infants, most are admitted for one to two days 'observation' to assess directly how breastfeeding is going and avoid having to make a decision on supplementary feeds based on maternal reports of 'milk insufficiency' only. • Maternal report of difficulty breastfeeding alone is taken as valid reason for admission to programme. It does not need to be backed up by objective evidence of this fact (assessment is difficult). • Limited time is available for assessment.

Table cont'd

Subtheme	Quotations / examples
Anthropometry, measuring	• Despite clinical admission criteria, anthropometry is regarded as more of a 'gold standard' to decide about who to admit. • Weight-for-height is often used, but mainly to back up pre-existing clinical suspicions rather than routine for all infants <6m. • Scales accurate to 100g are insufficiently precise. • Scales are often not calibrated. • Scales are often not well maintained. • Length rarely measured. • Balance scales were more precise and worked well. • Many health workers weight infants clothed or with heavy nappies still on so cannot rely on previous weights. • Cannot carry scales into field so difficult to identify malnourished infants <6m (in contrast for children >6m, for whom MUAC can be used). • Length is very rarely done for infants <6m. • The use of 65cm as a proxy for <6m causes significant confusion for field staff. • Most carers of young infants WILL be able to give a relatively exact age, especially since birth is more recent. • There is a widespread 'fear of cold' – so mothers (and some healthcare staff) are reluctant to undress infants for weighing; clothes can contribute some 20% of body weight.
Reasons for presentation to feeding programme	• Most infants present sick / because of other clinical problems and the malnutrition identified during clinical assessment - Tanzania, MoH hospital, Kenya MoH, Malawi MoH hospital, Swaziland MoH hospital • Weight loss combined with adverse clinical picture. • Wanting food (from NGO). • Referred in by community health workers (including from growth monitoring programmes – DRC). • Carers had heard that feeds were available for young infants and came to see if their child might be eligible (so infants were often NOT sick at presentation) – NGO programme. Often presented at few days/weeks of age with feeding problems – had heard of service and wanted 'food' (NGO programme). • Present with breastfeeding difficulties. • Infant identified in the community on clinical grounds is referred to nutrition centre for more detailed assessment. • Infants often not admitted unless 'special cases', since programme focus is on 6 to 59.9m age group • Can be difficult to distinguish which mothers really have breastmilk insufficiency, and which are saying so in the hope of getting formula milk or other treatments.
Ward layout / assessment environment	• Malnutrition unit often next to paeds ward / a side bay of the main paediatric ward. • No set area for observation / assessment. • Assessment area was part of main ward. Infants admitted for 'assessment' were thus also at risk of nosocomial infection. Deciding whether to admit for assessment was hence very difficult.

Appendix D.7 Details of key informant interviews – Programme detail

Subtheme	Quotations / examples
Carer expectations	• Expect 'food' for the infant (but not specific about what food). • Expect infant formula (they heard it was available from the programme). • Expect some form of medication and often unhappy if given 'nothing' except advice. • Cannot say what carers expect, never asked. • Don't expect, and don't like the idea of, a long admission (beyond five to ten days is unpopular).
Guidelines	• Followed own agency guidelines. • Occasionally refer to internet for difficult cases and management challenges. • Use WHO 1999 SAM guidelines (MoH hospital, Gambia). • Was sometimes confusion about which guidelines to follow, as several different ones and several different versions were available. • Exactly which guidelines were followed was dependent on the supervising nutrition coordinator (emphasis changed with the arrival of a new coordinator).
Staff time	• Time to support BF is a 'luxury' for staff and often not possible (MoH, Tanzania). • Not an issue in our NGO programme, but was an issue with other NGOs who had less / less experienced staff. • About one member of staff per ten babies worked OK to support the needs and extra inputs required for infants admitted to programme (one per five to six infants would have been better). • one carer for five to six mothers worked well. • Field staff often complained of not enough time to look after infants properly / follow current protocols well.
Staff supervision	• Staff supervision is lacking – but "nobody trusts anybody to do a job", so work ineffecitive (MoH, Tanzania) • Having staff whose sole job it was to monitor feeds ('phase supervisors') worked well (NGO, DRC) • There was a problem of excess deaths at night, possibly due to staff sleeping/being less proactive at patient management and letting issues like rehydration after diarrhoea slip.
Medical	• Giving drugs to small infants is difficult, often no liquid medications (have to divide tables or capsules). • Can be challenging to adapt drug does to very small infants. • Drug doses seem to be very variable – some are consistently under-dosed (e.g. ceftriaxone), others frequently overdosed. • Choice of antibiotics uncertain for this age group. • No specific challenges – most treatment fairly straightforward. • Sometimes there was lack of specific pieces of equipment such as i.v. lines in the few cases where oral rehydration had failed or resuscitation needed. • Guidelines on which micronutrients to give were not clear.
Maternal issues	• Carers sometimes try to make the infant swallow by cupping milk into mouth and blocking nose. • Culturally difficult for mums to use Kangaroo care since were used to leaving infants by themselves for periods. • Mums often slept with infants to help keep them warm / encourage breastfeeding where possible. • Mothers were encouraged to drink at least 2l fluids per day whilst on ward to help with hydration and milk supply. • Providing supplementary rations to lactating mothers was popular and well received by patients. • Psychosocial support would have been ideal for women who were in shock (report from programme based in conflict situation). • Psychological support was provided through role play and group work (conflict situation, NGO programme). • Specialist staff led a programme of psychosocial support, but all staff were involved. • Same NGO ran a strong mental health programme which helped assess and care for mothers.

Table cont'd

Subtheme	Quotations / examples
Feeding methods	• If child too weak to suck, initially used syringe – later replaced with cup on advice of visiting 'expert'. • Successfully used supplementary sucking (SS) – no difficulties at all. Read about technique in book, never used before. WHY: success-culturally acceptable (though wet nursing was not the norm) nurses motivated, had time (healthcare assistants, two per 30 patients; one doctor; one nurse, one medical officer) • All tried breastfeed first, then top-up with supplementary sucking (SS)/breastmilk substitute (BMS). • Supplementary suckling was not successful – but only tried once and that mother was reluctant. • SS sounds good, but too time intensive, difficult and results in milk spillage, much mess. • SS supervision would be a problem, since staff numbers are so low that even existing tasks often are difficult to do. • SS worked very well, successful in most cases, (but needed time & support) (DRC, NGO programme; NGO programme, Niger; Tanzania Govnt Hospital) • There were difficulties with implementing the supplementary suckling technique. • Tables in the malnutrition manual were difficult to follow. • SS works reasonably well (~60% success rate in re-establishing full EBF). It is managed by a in-charge nutritionist. • Achieving weight gain criteria which are part of SS guidelines took long time to achieve. • SS is NOT practical or feasible ('often not done despite said that done'). • Tried SS and found it did not work; too complex, too much staff time. May be possible in different context. • Worked extremely well, though not always easy initially. Large part of success was down to a well motivate and highly skilled midwife who led and supervised the SS programme. • Still not sure about best feeding method – cup, spoon, syringe? • "One mother had stopped breastfeeding and started infant formula, initially saying the child was refusing breastfeeds. The baby then developed diarrhoea and had to be admitted to feeding centre for support. During this time, relactation was successfully started". • It is very difficult to get the balance between adequate, formal supply of infant formula for orphans and those who cannot breastfeed (with risk of increasing demand for the formula/'leakage' to those who could breastfeed) vs. minimizing the availability of formula, but thereby also risking inadequate supplies for those who do need it.
Type of milk used for therapy	• Sometimes confusing about which milk to use: infant formula, F75 F100 diluted? • Used diluted F100 – worked well. • When nurses busy, sometimes used to delegate making up F75 and F100 to mothers – this was not always supervised and maybe not always done well. • Good to have option to use local foodstuffs (MoH Tanzania – infant formula too expensive, supplies limited). • Occasionally F75 used, occasionally adapted cows milk. • Cost infant formula very high – not realistic to start in programme since difficult to maintain longer term. • 'Leakage of infant formula milk is a huge problem' – whenever give to targeted population, ends up in wider use among others in the community. • No problems with treatment whilst on ward (use dilute F100). Problem arises when infant who is unable to breastfeed (e.g. orphan) goes home. Family cannot afford to buy infant formula; programme provides only small quantities to small numbers of patients. • One challenge is to provide milk and safe water to those carers who are using infant formula. • Although officially discouraged, sometimes do give mothers a supply of F100 to take home. This is because breastfeeding is not possible, and infant formula or other milk is not available. • For those who could not breastfeed, a one month supply of infant formula was given on discharge (these were very small numbers). • Modified animal milks worked well, and were cheap and acceptable.
Physical space on ward	• Was a problem having the assessment unit as a bay on main paeds ward – big danger of cross infection and dilemma about whether or not to admit. No space available for assessment of borderline cases. • Having a separate area of the ward for lactating mothers worked well • Separate building away from the main feeding centre worked well
Length of stay	• Average ten days - Mothers often want to, or do, leave if try to keep for much longer. • Infants are kept in until starting to gain weight. • Stayed as inpatients until breastfeeding well and two repeated measures were >70% median (for SAM) or >80% of median (for MAM).
Follow-up	• Community health workers follow up discharged infants in the community (stable emergency, Kenya). Reinforce health education messages • Long term care of orphans difficult – go home on infant formula, but have to buy themselves. No specific follow-up of how successful this is.

Appendix D.8 Details of key informant interviews – Challenges

Subtheme	Quotations / examples
Links to other clinical services	• Infants and children often assessed initially in admissions or paediatric ward. Only referred to nutrition ward if needed. This system worked well in most places described. • If still breastfeeding, referred to paediatric ward rather than managed in nutrition centre.
Community care	• Difficult to know what to do / recommend for patients not sick enough to be admitted, but who appear vulnerable – no extra foods (e.g. supplementary feeding) that is easily available as it is for older children. Mothers feel that no treatment is being given, do not see 'advice only' as treatment.
SFP	• SFP does exist 'on paper' and is recommended in national guidelines for pregnant and lactating women, but is not active in practice.
Non-admissions	• Referred to local child health (primary healthcare) clinics. • Referred to paediatric inpatient wards. • It's difficult to say what ultimately happens to infants referred elsewhere.
Unsolicited/ poorly coordinated donations	• A batch of RUTF arrived one day, which nobody seemed to know anything about.
Treating infants <6m as if they were >6m	• Some respondees were clear that programmes never gave RUTF to infants <6m. • Others occasionally started infants approaching 6m on RUTF if breastfeeding was not available as an option. • In our NGO programme, infant <6m always treated according to infant <6m guidelines, but this was not the case for many other NGOs in area. • Sometimes do give RUTF to infant aged > five months only if no other alternative, and no breastfeeding is possible. • RUTF is used for HIV positive infants from four months of age.
Reporting issues, databases & audit	• Recording on charts is poor, so would be very difficult to do good audit. • Infants <6m were reported by the NGO, but not by local UN/MoH systems. • Infants with underlying conditions such as cleft palate are often labelled as "not malnutirition" so as to avoid adversely influencing programme statistics. • Current databases do not always separate out infants <6m, so difficult to audit and learn from the data. • Outcome codes on current databases often complex, again leading to difficulty auditing and learning from databases. • Difficult to know what long term outcomes are since follow-up is poor. • Use local government reporting systems rather than own databases – does include infant <6m.

Appendix D.9 Details of key informant interviews – Training and Support

Subtheme	Quotations / examples
Formal training	• There is very little focus on infants during nutrition related diplomas, degrees (reported by many respondents). • "Infant feeding is a bit of a 'Cinderella' subject in university nutrition courses, not a major priority within nutrition." • The majority of experience / expertise on infant <6m malnutrition is developed through field experience, and very little during training prior to going out. • In-hospital training course on WHO guidelines had significant impact on improving practice. • Refresher training during CMAM rollout was useful and mentioned infants <6m. • Most training is on-the-job rather than formal classroom training. Handovers help familiarize new staff with key protocols.
Induction	• Had brief handover from previous person who set up nutrition unit – themselves not very experienced, so not optimal handover. • NGO induction course focuses on management issues like financial systems, reporting etc – very little focus on patient management of conditions which were new to us (doctor trained in developing country, going out to emergency setting and treating SAM for the first time). • There are pre-deployment training courses run by the NGO, but it is not always possible for staff to attend since they may be required to go to emergency situations at very short notice.
Field visit by supervisior or other 'expert'	• *Several instances were desribed where a on-site visiting' expert' has big role in changing practice.* - e.g. syringe feed to spoon feed to promote more oro-motor skills - e.g. better phase transition - very limited experience, helped focus on the issue after visit of consultant who was assessing the programme. - visit from an international expert on malnutrition management made a big practical difference to daily patient care and also helped motivate.
On-job vs workshop training	• Having no specific infant training is a big consraint. • Too many staff spend time on workshops, which diverts valuable staff from the wards. • Leant a small amount during (professional) training, rest of IYCF training was delivered by international NGO with links to the centre.
Critical thinking skills, reflective learning	• Staff need to develop more critical thinking/refletive learning skills, often just ignore rather than work around challenges.
Useful materials	• Most useful materials are those which have been locally adapted (e.g. wall posters in local language). • WHO 1999 manual. • WHO pocketbook of paeds care (has useful pages on breastfeeding). • Agency protocols were useful (section dedicated to infants <6m). • National guideline followed (by international NGO). *NB No interviewee who was not involved in IYCF policy making (i.e. all the field-based respondents) had seen or was aware of IFE Module 2 – probably the most detailed manual focused on management of infants <6m available to date.*
Not useful materials	• Leaflets – often just put up on wall – may not be used or appreciated if just gave out, plus would quickly run out. • Information on infant feeding is limited in current guidelines for managing acute malnutrition.

Appendix D.10 Details of key informant interviews – Ways forward

Subtheme	Quotations / examples
Identification	• More nutrition suveys need to include infants <6m: this would help both trigger and plan specific responses. • Need better tools for assessing nutritional status (ideally not needing WH, WA) e.g. MUAC. • "Obvious (and therefore advanced) cases of infant <6m SAM do mostly get picked up, but would be good to have tools to be more proactive and better identify earlier / less severe cases. • Need clearer anthropometric guidelines (e.g. what to do about the 65cm rule; how to measure length in infants <6m) and need to eliminate confusion over weight-for-age growth monitoring and WH feeding programme admission. • Criteria need to be clearer than at present – but also flexible enough to allow for clinical judgement and occasional case-by-case decisions for particular individuals. • Need better guidance on how to identify who is really 'malnourished' and who has some other underlying condition (e.g. cleft palate). • Need to link more with other community activities, notably growth monitoring, to ensure timely and appropriate referrals for malnutrition treatment. • Link with post-natal services (e.g. routine six week post-natal check) would allow infants with problems to be identified earlier than happens now.
Protocols	• Need community-based treatment options. • Protocols need to be simple and easy to follow (especially by field-level health workers who will be delivering the front-line care). • Management protocols, especially for infants who CANNOT be breastfed need to be better defined. • Needs to be more clarity about which milk product to use (e.g. F75, F100 or F100dilute). • Needs to be more clarity about feed options for those infants for whom breastfeeding is unavailable. • Need more guidance /evidence on how programmes to support infant feeding might work in populations who are widely dispersed / living over a large geographical area.• • Need to better link with other guideline systems like IMCI – otherwise there is 'guideline overload', with several guidelines covering similar topics but all saying slightly different things and thus causing confusion at field level about which options are best for which patients. • Need a more evidence based approach. There are presently too many misconceptions e.g. one head of a nutrition department cited as stating that feeding the mother was all that was necessary to address infant <6m malnutrition. • Needs to be a broader focus with description of wider issues causing infant , 6m SAM – notably HIV • Many SFPs include ration for pregnant and lactating women – need to determine if this works/how well it works. • Should be more emphasis on general IYCF issues, including safe and effective complementary feeds. By the time they are cured, many infants will be coming up to six months of age and will need to start CF. It is a lost opportunity if this has not been discussed during programme admission.
Management of ward and staff	• Strong management and supervision would make big difference – often little space to take initiative, becomes undermining. • Staff would have regular mid-term evaluations – there was a risk of being fired if performance were seriously concerning (well performing NGO unit, where supplementary suckling went well). • Need to find better ways of motivating staff to perform well (NOT workshops, which distract and take staff away from busy wards, leaving staff levels even lower than before).
Well motivated staff	• "Everybody wanted to work for and was proud of being employed by NGO X" – things seemed to change after another agency took over (?less staff; less pay). • Also need enough staff to make the project a success.

Table cont'd

Subtheme	Quotations / examples
Staff (gereral)	• Community health workers responsible for indenitifying infants are overworked and involved in many different projects. • CHW often prioritize work for which they get incentives and are rewarded for. • Supplementary suckling is time intensive and requires staff with special experience. • Greater staff numbers are needed on nutrition programmes if more infants are to be admitted; would not be able to cope give n current resources. • Need to be more staff whose role is dedicated to infants <6m; present numbers are inadequate to start adding extra roles. • 'Task shifting' can be considered – use of support workers and other non-specialist staff to take on particular, closely defined roles and free up time for experienced clinical staff to concentrate on supervision and overall programme leadership.
Community support	• Community treatments (e.g. support groups) need to be more widely available. • Difficult to know what to offer after discharge from ward. • Community support programmes often only focus on HIV infected patients – hard to find an equivalent for HIV negative. • Would be good to develop 'ambulatory' approaches to care (similar to CMAM model). • Need to optimise coverage of infant feeding programmes (likely through community rather than purely centre-based approaches to care). • Community health workers need clearer guidelines how to promote and support breastfeeding.
HIV	• Need better and earlier identification and treatment of HIV to prevent malnutrition developing in the first place. • There is a need to clarify AFFAS criteria as lots of confustion at present. • "There are few community support groups for HIV negative patients". • Many mothers have misconceptions about HIV, and stop breastfeeding before six months despite counselling. • Standard counselling tools are needed to help convey correct messages, especially about the risks/benefit balance of replacement feeding. Maybe this would also facilitate more mother to mother communication, reinforcing key messages.
Set of SIMPLE guidelines/ flow charts	• Wall chart & simple flow charts helpful big manuals often not used so much for day-day work • Need to ensure guidelines are locally 'owned' and account for local circumstances – often seem imposed from outside without much understanding of setting and knowledge of effect on other services.
Formulas	• Would be important to have options for use when neither breastmilk or infant formula milks available. • Consider formulas using local foodstuffs, however supply of minerals for fortification would be impossible. Infant formula itself is much too expensive for most families. • If formula is used, is big challenge to avoid 'leakage.'
Links to other service	• Need to link better with other services, such as maternity – despite having maternity services in same hospital, current relationship is limited • There are too many new, vertical initiatives. Don't always link well and cause fragmented, extra work. Need to be more integration and coordination of new initiatives such as MAMI. • Need more links to maternal health programmes tackling issues like low-birth-weight in order to minimize the number of infants becoming malnourished. • Needs to be a continuum of care, joining up existing services. • Rather than separate mother/baby health patient held health records, baby information should be recorded on the child health card; this would make birth weight and other early history more easily accessible. • Need links with growth monitoring programmes (anthropometric indicators need to be harmonized, since growth monitoring uses weight-for-age whereas feeding programmes use weight-for-height). • Need closer links with health centres and other local care structures.
Overall	• Maybe need to distinguish complicated SAM who need hospital care with uncomplicated who do not. • Overall management and coordination of infant feeding issues need 'ownership' by a lead individual or agency. Else everybody's good intentions too easily drift into nobody's responsibility and the job does not get done. • More advocacy is needed for infants <6m. Having major agencies involved would strengthen calls for increased attention and increased resources. • Need to ensure that programmes have high coverage.

Appendix E The Integrated Phase Classification (IPC)

Phase Classification		Key Reference Outcomes *Current or imminent outcomes on lives and livelihoods. Based on convergence of direct and indirect evidence rather than absolute thresholds. Not all indicators must be present for classification..*		Strategic Response Framework *Objectives:* *(1) mitigate immediate outcomes,* *(2) support livelihoods, and* *(3) address underlying causes*
1A	Generally Food Secure	***Crude Mortality Rate***	< 0.5 / 10,000 / day	Strategic assistance to pockets of food insecure groups. Investment in food and economic production systems. Enable development of livelihood systems based on principles of sustainability, justice, and equity. Prevent emergence of structural hindrances to food security. Advocacy.
		Acute Malnutrition	<3 % (w/h <-2 z-scores)	
		Stunting	<20% (h/age <-2 z-scores)	
		Food Access/Availability	usually adequate (> 2,100 kcal ppp day), stable	
1B	Generally Food Secure	**Dietary Diversity**	consistent quality and quantity of diversity	
		Water Access/Avail.	usually adequate (> 15 litres ppp day), stable	
		Hazards	moderate to low probability and vulnerability	
		Civil Security	prevailing and structural peace	
		Livelihood	Assets generally sustainable utilization (of 6 capitals)	
2	Moderately/ Borderline Food Insecure	***Crude Mortality Rate***	<0.5 / 10,000 / day; U5MR<1 / 10,000 / day	Design & implement strategies to increase stability, resistance and resilience of livelihood systems, thus reducing risk. Provision of "safety nets" to high risk groups. Interventions for optimal and sustainable use of livelihood assets. Create contingency plan. Redress structural hindrances to food security. Close monitoring of relevant outcome and process indicators Advocacy
		Acute Malnutrition	>3% but <10 % (w/h <-2 z-score), usual range, stable	
		Stunting	>20% (h/age <-2 z-scores)	
		Food Access/Availability	borderline adequate (2,100 kcal ppp day); unstable	
		Dietary Diversity	chronic dietary diversity deficit	
		Water Access/Avail.	borderline adequate (15 litres ppp day); unstable	
		Hazards	recurrent, with high livelihood vulnerability	
		Civil Security	Unstable; disruptive tension	
		Coping	"insurance strategies"	
		Livelihood Assets	stressed and unsustainable utilization (of 6 capitals)	
		Structural	Pronounced underlying hindrances to food security	
3	Acute Food and Livelihood Crisis	***Crude Mortality Rate***	0.5-1 / 10,000 / day, U5MR 1-2 / 10,000 / dy	Support livelihoods and protect vulnerable groups. Strategic and complimentary interventions to immediately food access/availability AND support livelihoods. Selected provision of complimentary sectoral support (e.g., water, shelter, sanitation, health, etc.). Strategic interventions at community to national levels to create, stabilize, rehabilitate, or protect priority livelihood assets. Create or implement contingency plan. Close monitoring of relevant outcome and process indicators Use "crisis as opportunity" to redress underlying structural causes Advocacy
		Acute Malnutrition	10-15 % (w/h <-2 z-score), > than usual, increasing	
		Disease	epidemic; increasing	
		Food Access/Availability	lack of entitlement; 2,100 kcal ppp day via asset stripping	
		Dietary Diversity	acute dietary diversity deficit	
		Water Access/Avail.	7.5-15 litres ppp day, accessed via asset stripping	
		Destitution/Displacement	emerging; diffuse	
		Civil Security	limited spread, low intensity conflict	
		Coping	"crisis strategies"; CSI > than reference; increasing	
		Livelihood Assets	accelerated and critical depletion or loss of access	

Table cont'd

4	**Humanitarian Emergency**	***Crude Mortality Rate***	1-2 / 10,000 / day, >2x reference rate, increasing; U5MR > 2 / 10,000 / day	Urgent protection of vulnerable groups Urgently food access through complimentary interventions Selected provision of complimentary sectoral support (e.g., water, shelter, sanitation, health, etc.) Protection against complete livelihood asset loss and / or advocacy for access Close monitoring of relevant outcome and process indicators Use "crisis as opportunity" to redress underlying structural causes Advocacy
		Acute Malnutrition	>15 % (w/h <-2 z-score), > than usual, increasing	
		Disease	Pandemic	
		Food Access/Availability	severe entitlement gap; unable to meet 2,100 kcal ppp day	
		Dietary Diversity	Regularly 3 or fewer main food groups consumed	
		Water Access/Avail.	< 7.5 litres ppp day (human usage only)	
		Destitution/Displacement	concentrated; increasing	
		Civil Security	widespread, high intensity conflict	
		Coping	"distress strategies"; CSI significantly > than reference	
		Livelihood Assets	near complete & irreversible depletion or loss of access	
		Structural	Pronounced underlying	
5	**Famine / Humanitarian Catastrophe**	***Crude Mortality Rate***	> 2 / 10,000 / day (example: 6,000 / 1,000,000 / 30 days)	Support livelihoods and protect vulnerable groups. Strategic and complimentary interventions to immediately food access/availability AND support livelihoods. Selected provision of complimentary sectoral support (e.g., water, shelter, sanitation, health, etc.). Strategic interventions at community to national levels to create, stabilize, rehabilitate, or protect priority livelihood assets. Create or implement contingency plan. Close monitoring of relevant outcome and process indicators Use "crisis as opportunity" to redress underlying structural causes Advocacy
		Acute Malnutrition ***Disease***	> 30 % (w/h <-2 z-score) Pandemic	
		Food Access/Availability	extreme entitlement gap; much below 2,100 kcal ppp day	
		Water Access/Avail.	< 4 litres ppp day (human usage only)	
		Destitution/Displacement ***Civil Security***	large scale, concentrated widespread, high intensity conflict	
		Livelihood Assets	effectively complete loss; collapse	

(Source, FAO website)

Table 41: Research papers included in literature review on maternal depression

Authors	Types of research		Nutrition measurement when child under 6 months	Types of malnutrition				Types of maternal psychological troubles			
	Cross-sectional	Cohort		Weight for height	Weight for age	Height for age	Weight and length	Prenatal depression	Postnatal depression	Major depression	General distress
Cross-sectional studies											
Anoop and al, 2004	x		No (in files but direct measures taken at first at 6 months)		x					x	
De Miranda and al, 1996	X		No		x						x (psychiatric morbidity)
Harpham and al, 2007	x		No		x	x					
Rahman and al, 2003	x		No		x						x
Baker-Henningham and al, 2003	x		No		x				x		
Surkan and al, 2007	x		No	x	x	x				x	
Stewart and al, 2008	x		No		x	x					x (common mental disorder)
Cohort studies											
Adewuya and al, 2008		x	Yes				x		x		
Patel and al, 2003		x	Yes		x	x			x		
Rahman and al, 2004		x	Yes but no statistical analysis at 2 months, only at 6 months		x	x		x	x		
Tomlinson and al, 2005		x	2 and 18 months		x	x					x

Table 46: Cross-sectional studies

Survey	Author(s) and Date	Study design	Country setting	Sample Size and participants	Infant age in months [mean (SD)]	Infant Growth outcome measures	% of sample who were cases	Maternal mental health measure	Prevalence of maternal mental health problems	Uncorrected association between infant outcome and maternal depression	Association corrected for cofounders
ASIA											
Maternal depression and low maternal intelligence as risk factors for malnutrition in children: a comunity based case-control study from south india	Anoop and al, 2004	Case-control (matched)	India	144	Cases : 10,5 (1,6) Controls: 10,6 (1,5)	Underweight Cases: weight-for-age 50-80% of expected controls: weight-for-age >80% of expected	50% amongst the cases: 65,3% with grade I malnutrition, 25% with grade II malnutrition and 9,7% with grade III malnutrition	Structured Clinical Interview for DSM-III R (SCID, patient edition) for major depressive episode (current and recalled early postpartum) Revised Bathia's Short battery of performance test (for adult IQ)	Cases: current major depression: 14 (19,4%) postpartum depression: 9 (12,5%) Controls: current major depression: 5 (6,9%) postpartum depression: 2 (2,8%)	Current major depression: 3,2 (1,1 -9,5) Recalled postpartum major depression: 5 (1,0-24,0)	Current major depression: 3,1(0,9 -9,7) Recalled postpartum major depression: 7,4 (1,6-38,5)
Maternal mental health and child nutritional status in four developing countries	Harpham and al, 2005	Community -based survey	India	1823	12 (range 6-18)	Underweight: cases: WAZ<-2 Stunting: cases: HAZ<-2 1977 NCHS references	Underweight : 45% Stunting: 27%	SRQ Cut-off: 7/8	Overall 30%	Underweight: 1,3 (1,1-1,7) Stunting: 1,6 (1,3-1,9)	Underweight: 1,1 (0,9-1,4) Stunting: 1,4 (1,2-1,6)
Maternal mental health and child nutritional status in four developing countries	Harpham and al, 2005	Community -based survey	Vietnam	1570	12 (range 6-18)	Underweight: cases: WAZ<-2 Stunting: cases: HAZ<-2 1977 NCHS references	Underweight : 23% Stunting: 16%	SRQ Cut-off: 7/8	Overall 21%	Underweight: 1,5 (1,2-1,9) stunting: 1,4 (1,1-1,7)	Underweight 1,4 (1,1-1,8) Stunting: 1,3 (0,9-1,7)
Mother's mental health and infant growth: a case-control from Rawalpindi, Pakistan	Rahman and al, 2003	Case -control	Pakistan	172 (82 cases and 90 controls)	Cases : 9,7 (0,9) Controls: 9,7 (0,9)	Underweight: Weight for age <3rd centile Controls: weight for age>10th centile	48%	SRQ Cut-off: 11/12	Overall: 40% even with high cut-off Cases : 57% Controls: 25%	3,9 (1,9-7,8)	2,8 (1,2-6,8)
Mothers of undernourished Jamaican children have poorer psychosocial functioning and this is associated with stimulation provided in the home	Baker-Henningham and al, 2003	Case-control [matched]	Jamaica	210 : 139 undernourished children and 71 adequately nourished children	Cases : 18,5 (5,0) Controls : 19,4 (4,8)	Underweight : Cases: history of WAZ <-2 and current WAZ<-1,5 Controls: WAZ>-1, no history of malnutrition [NCHS references]	66%	CES-D (modified)	Cases: 26 (SD 0-91) Controls: 16,5 (SD 0-86)	t-test for difference between mean scores on modified CES-D P<0,01	Non-significant

Table 46 cont'd

Survey	Author(s) and Date	Study design	Country setting	Sample Size and participants	Infant age in months [mean (SD)]	Infant Growth outcome measures	% of sample who were cases	Maternal mental health measure	Prevalence of maternal mental health problems	Uncorrected association between infant outcome and maternal depression	Association corrected for cofounders
AMERICAS											
Mental health of the mothers of malnourished children	De Miranda and al., 1996	Case-control	Brazil	139	Cases : 10,9 (6,9) Controls : 8,4 (4,8)	Underweight: cases: < 75% expected weight- for-age [according to the Gomez criteria]	57%	QMPA [Adult Psyhiatric Morbidity Questionnaire, Brazilian screening instrument]	Cases: 63% Controls: 38%	2,8 (1,2-6,9)	2,6 (CI not given)
Maternal mental health and child nutritional status in four developing countries	Harpham and al, 2005	Community-based survey	Peru	1949	12 (range 6-18)	Underweight: cases: WAZ<-2 Stunting: cases: HAZ<-2 1977 NCHS references	Under-weight: 10% Stunting: 25%	SRQ Cut-off: 7/8	Overall 30%	Underweight: 1,1 (0,8-1,4) Stunting: 1,2 (1,0-1,5)	Underweight: 0,8 (0,6-1,2) Stunting: 1,1 (0,9-1,4)
Maternal Depressive Symptoms, parenting Self-Efficacy and Child Growth	Surkan and al, 2008	Case-control	Brazil	595 mothers of children aged 6 to 24 months randomly selected from 9 low-income communities representing 4 geographic areas		Prevalence of weight for height too low (0.9% n = 5) short stature and under-weight defined as less than -2 standard deviations of the WHO reference height -for-age and weight-for-age z scores respectively	Short stature: 25% of the sample and 4% under-weight	CES-D (Center for Epidemiological Studies Depression Scale) score ≥ 16 corresponding to depressive symptomatology Parenting self-efficacy assessed using a 10-items scale with a 4-point scale	56% of mothers scored as high depressive symptoms range (≥16) 49% fell into low maternal self efficacy	Added to the multivariate model: high maternal depressive symptomatology related to a nearly 2-times greater odds of short stature OR= 1.8 95% CI 1.1, 2.9 No relationship between maternal depression symptoms and underweight.	Relationship between maternal depressive symptoms and child short starure persisted after controling of socio-demographic indicators.
AFRICA											
Maternal mental health and child nutritional status in four developing countries	Harpham and al, 2005	Community-based survey	Ethiopia	1722	12 (range 6-18)	Underweight: cases: WAZ<-2 Stunting: cases: HAZ<-2 1977 NHCS references	Under-weight : 42% Stunting: 38%	SRQ Cut-off: 7/8	Overall 33%	Underweight: 1,2 (1,0-1,4) Stunting: 0,9 (0,8-1,2)	Underweight: 1,1 (0,9-1,4) Stunting: 0,9 (0,7-1,2)
Maternal common mental disorder and infant growth - a cross sectional study from Malawi	Stewart and al., 2008	Case-control	Rural malawi	501 infants and mothers	9,9 months	Lentgh-for-age Weight for age in Z-score		CMD measured by SRQ: score >=8 indicates CMD	29.9%	Length-for-age Z-score when mothers with CMD : -1.5 SD 1.24 Mothers without CMD: -1.11 SD 1.12 Student's T-test: P=0.001 Mean weight-for-age when mothers with CMD: -1.77 SD 1.16 Mothers without CMD : -1.59 SD 1.09 (difference not significant)	Association confirmed for the length for age

Table 47: Cohort studies

Survey	Impact of postnatal depression on infant growth in Nigeria	Postnatal depression and infant growth and development in low income countries: a cohort study from Goa, India
Author(s) and Date	Adewuya and al, 2008	Patel and al, 2003
Study design	Longitudinal case-control (matched)	Longitudinal case-control (matched)
Country	Nigeria	India
Country setting	Participants to a previous study on maternal postnatal depression attending the infant immunisationclinics in 5 health centres in Ilesa Township	Infant health clinic, urban/rural population Participants to a PND research and patients seen after birth of the child at 6-8 weeks postpartum
Sample Size and participants	242 women completed the study: 120 depressed and 122 matched non depressed postpartum women	171
Timing of recruitment	Participants to a postnatal depression survey at 6 weeks post-partum	6-8 weeks post-partum
Infant Growth outcome measures	Birht weight recorder ; Weight and Length	Underweight: weight-for-age<5th centile Stunting: height for age <5th centile
Infant age at follow(up (in months)	6 weeks ; 3-6 and 9 months after delivery	6
Maternal mental health measure	The non patient version of Structured Interview for DSM III-R (SCID-NP) assessed by two psychiatrists	EPDS Cut-off 11/12
Prevalence of maternal mental health problems	14,6% from the total number of women tested	22% (n=37)
Uncorrected association between infant outcome and maternal depression	Poorer growth for infants of depressed mothers. Difference statistically significative at 3 and 6 months [OR (CI)]: 6 weeks: Weight 2.60 (0.87-7.62); length 1.55 (0.43-5.65) 3rd month: Weight 3.19 (1.21-8.40); length 3.28 (1.03-10.47) 6th month : Weight 4.21 (1.36-13.20); length 3.34, (1.18-9.55) 9th month: Weight 2.84 (0.98-8.24); length 2.68 (0.82 - 8.80)	Underweight [RR (CI)] : 2,3 (1,1-4,7) Stunting [RR(CI)]: 2,9 (1,3-6,8)
Association corrected for cofounders		Reported adjusted for individual confounders. All associations remained significant

Table 47 cont'd

Survey	Impact of maternal depression on infant nutritional status and illness	Post-partum depression and infant growth in a south african peri-urban settlement
Author(s) and Date	Rahman and al, 2004	Tomlinson and al, 2005
Study design	Prospective cohort study (matched)	Longitudinal case-control (matched)
Country	Prospective cohort study (matched)	South Africa
Country setting	Rural community in Rawalpindi	Peri-urban community-based
Sample Size and participants	All the women in the area during the third trimester of their pregnancy during a 4-month period 320 women: 160 depressed prenatally matched with 160 non-depressed women. At 1 year post-partum, 129 depressed women and 136 non depressed women were still participating to the study.	147 women and complete measures for 122 infants - (At 18 months: 98 women and 96 infants)
Timing of recruitment	During the third trimester of pregnancy	2 months postpartum
Infant Growth outcome measures	Underweight: WAZ<-2 stunting: HAZ<-2 NCHS references	Weight: mean WAZ (SD) Height: mean HAZ (SD)
Infant age at follow(up (in months)	2,6, and 12 Due to the small number of children stunted and underweight at 2 months, this timing has not been considered in the multiple statistical analysis.	2 and 18
Maternal mental health measure	Schedules for clinical Assessment in Neuropsychiatry (SCAN) developed by WHO and based on ICD-10 done in the third semester of pregnancy + 2, 6 and 12 months postnatally	Structured Clinical Interview for DSM-IV
Prevalence of maternal mental health problems	25% in the total population at the third month of pregnancy 56% of mothers depressed in the postnatal period were depressed at all points of assessement in the postnatal period	34,7% at 2 months post-partum and 12% at 18 months post-partum
Uncorrected association between infant outcome and maternal depression	Underweight [RR (CI)] : 6 months: 4,0 (2,1-7,7) 12 months: 2,6 (1,7-4,1) Stunting [RR(CI]: 6 months: 4,4 (1,7-11,4) 12 months: 2,5 (1,5-4,0)	Weight [mean WAZ (SD)]: Cases: -0,8 (1,74) Non-cases: -0,31 (1,13) P=0,051 Height [mean HAZ (SD)]: Cases: -0,89 (1,91) Non-cases: -0,34 (1,28) P=0,13
Association corrected for cofounders	Underweight [OR (CI)] : 6 months: 3,5 (1,5-8,6) 12 months: 3,0 (1,5-6,0) Stunting [OR(CI]: 6 months: 3,2 (11,1-9,9) 12 months: 2,8 (1,3-6,1) When chronically depressed mothers (n=72) and mothers not depressed at any time (n=108): Underweight [RR (CI)] at 6 months: 5,9 (2,7-12,8) At 12 months: 3,5 (2,2-5,6) stunting [RR (CI)] - at 6 months: 5,5 (1,9-16,0) At 12 months: 3,2 (1,9-5,4)	Weight [mean WAZ (SD)]: Cases: -0,8 (1,29) Non-cases: -0,31 (1,13) P=0,26 Height : non significant