Integrating cross-sectional and cohort measurement approaches in assessing exclusive breastfeeding: Lessons from Bangladesh

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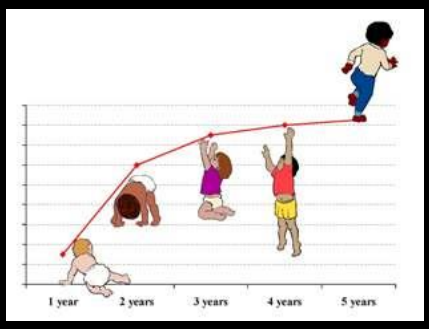
Growth and development is a longitudinal process



Source: WHO

- Prior experiences guide future investments and hence child outcomes
- Would you rather look at snapshots or watch the movie?

The ‘standard’ program evaluation design

Baseline Survey

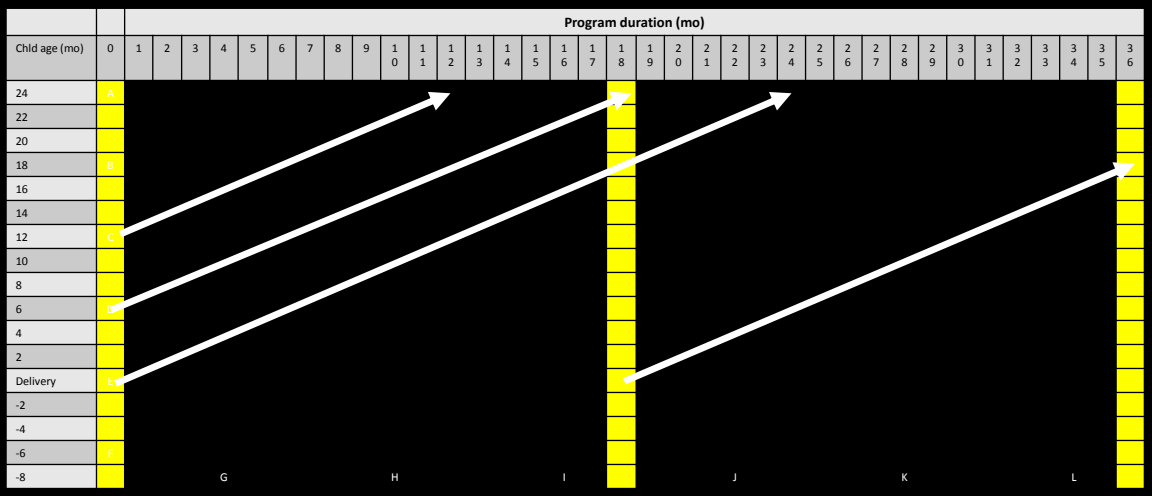
Program implementation

Midline Survey

Control

Endline Survey

Child age by program duration for a 3-yr intervention program



Birth cohorts follow arrows. Cross-sectional baseline, midline and endline surveys are highlighted in yellow

Akhony Shomay

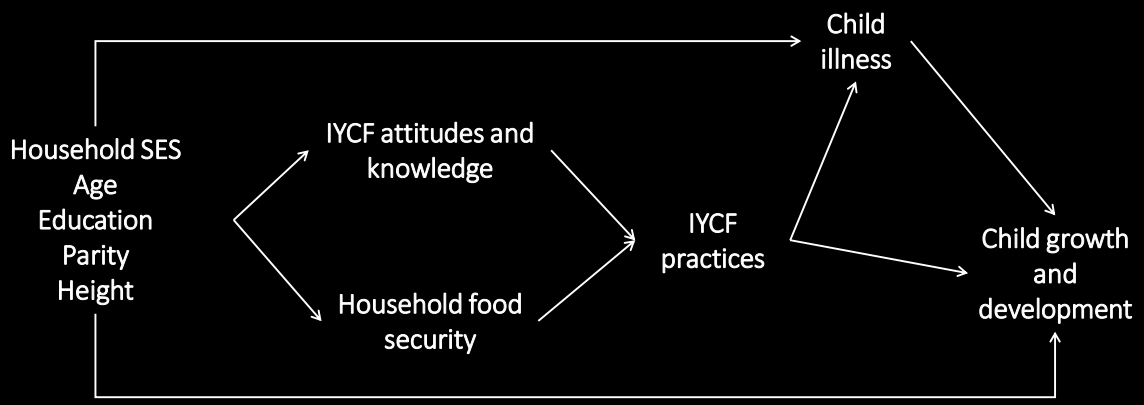
- Window of Opportunity
- Community-based IYCF and nutrition program being implemented by CARE in 5 countries
- Operated in Karimganj
  - Rural sub-district 120 km north of Dhaka
  - Population: 321,000
    - 200,000 extremely poor
  - Prone to extreme flooding
    - Economic uncertainty and food insecurity

Source: thewindowofopportunity.info

Description of intervention

- Behavior change and communication (BCC) strategies for improving IYCF practices
  - Individual maternal counseling at home
  - Promotion of mother-to-mother support groups
  - Engagement with other family members
- Direct supplementation with micronutrient powders (MNP)
  - Contains 5 nutrients (Sprinkles™)
    - Iron, Zinc, Folic Acid, Vitamin A, and Vitamin C
  - Distributed to mothers of children 6-23 months for daily use
  - Available at local health centers
  - Behavior changes messages promote use of MNP
- Key behaviors promoted
  - Breastfeeding initiation, exclusivity and maintenance
  - Age-appropriate complementary feeding
  - Handwashing with soap
  - Improved diet for pregnant and lactating women
  - Antenatal and postnatal care

Exploring impact pathways - influences on child growth



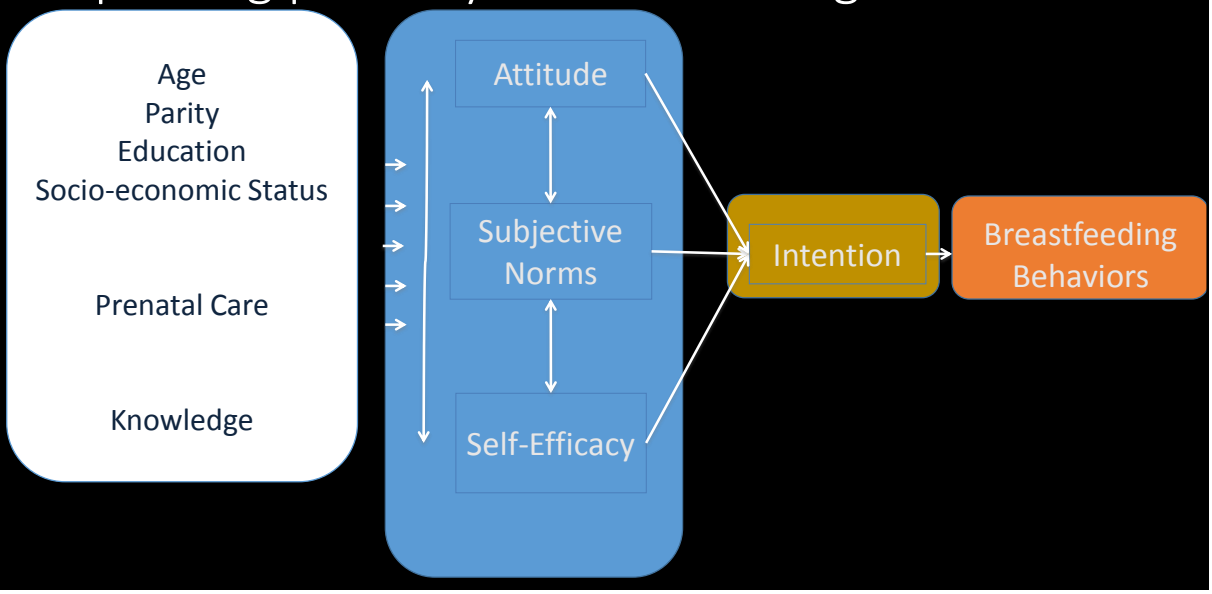
3-wave longitudinal panel study

- Waves recruited at month 0, 4 and 8
- Women recruited at pregnancy month 7 through ongoing surveillance
- Date of delivery ascertained by telephone contact soon after due date
- Follow-up visits at 3, 9, 16 and 24 mo

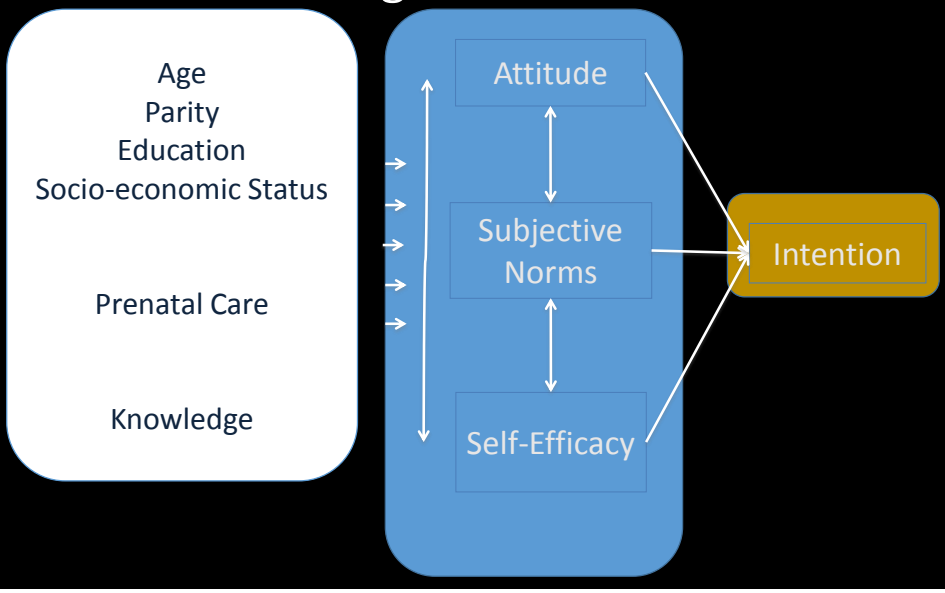
Age at data collection in relation to specificity of determinants and practices

	Late pregnancy	Child age 3 mo	Child age 9 mo
Breastfeeding behaviors	Determinants →	Practice	
Complementary feeding behaviors		Determinants →	Practice

Unpacking pathways: breastfeeding



1: breastfeeding intention



Intention to exclusively breastfeed as reported at pregnancy month 7

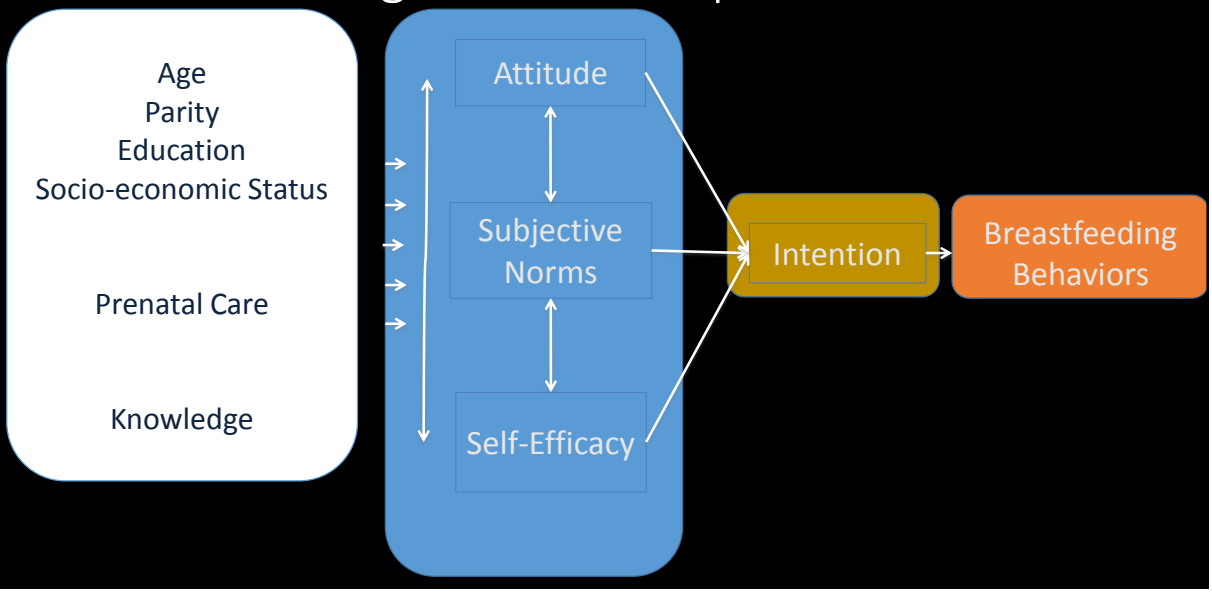
Table 4 Associations between EBF intention and knowledge, attitudes, and self-efficacy (All construct and subconstruct scores are dichotomized at the study sample median. Dependent variable is EBF intention. Estimates are adjusted for subdistrict and recruitment wave and are presented as odds ratios and 95 % CI) among 2,400 pregnant women in Kishoreganj District, Bangladesh

	Model 1†		Model 2		Model 3		Model 4	
	OR	95 % CI	OR	95 % CI	OR	95 % CI	OR	95 % CI
Knowledge	2.72	1.92, 3.85	2.47	1.74, 3.51			2.40	1.69, 3.41
Attitudes	1.95	1.53, 2.48	1.68	1.31, 2.16				
Time management					2.89	2.14, 3.90	2.49	1.81, 3.42
Privacy concerns					0.92	0.72, 1.17	0.88	0.68, 1.13
Positive perception of EBF					2.02	1.47, 2.78	1.10	0.73, 1.66
Self-Efficacy	2.11	1.53, 2.90	1.72	1.23, 2.40				
Emotional					2.47	1.78, 3.42	2.08	1.34, 3.25
Objective					1.57	1.17, 2.11	0.76	0.50, 1.16

Model 1—each construct considered individually; Model 2—all constructs entered into model simultaneously; Model 3—each subconstruct considered individually; Model 4—all subconstructs and knowledge entered simultaneously

Thomas et al, MCHJ 2014

2: breastfeeding intention to practice



Practice: exclusive breastfeeding as reported at infant age 3 mo

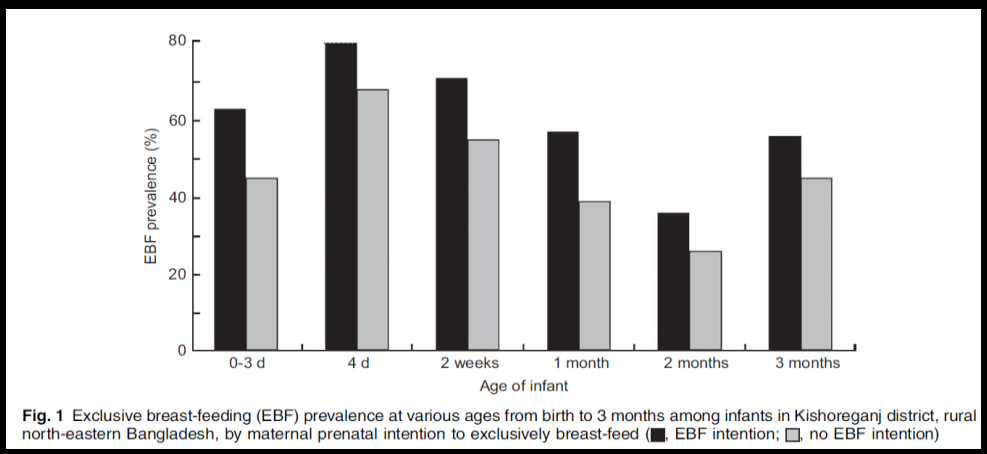


Fig. 1 Exclusive breast-feeding (EBF) prevalence at various ages from birth to 3 months among infants in Kishoreganj district, rural north-eastern Bangladesh, by maternal prenatal intention to exclusively breast-feed (■, EBF intention; □, no EBF intention)

Yu et al, PHN 2014

Predictors of exclusive breast feeding

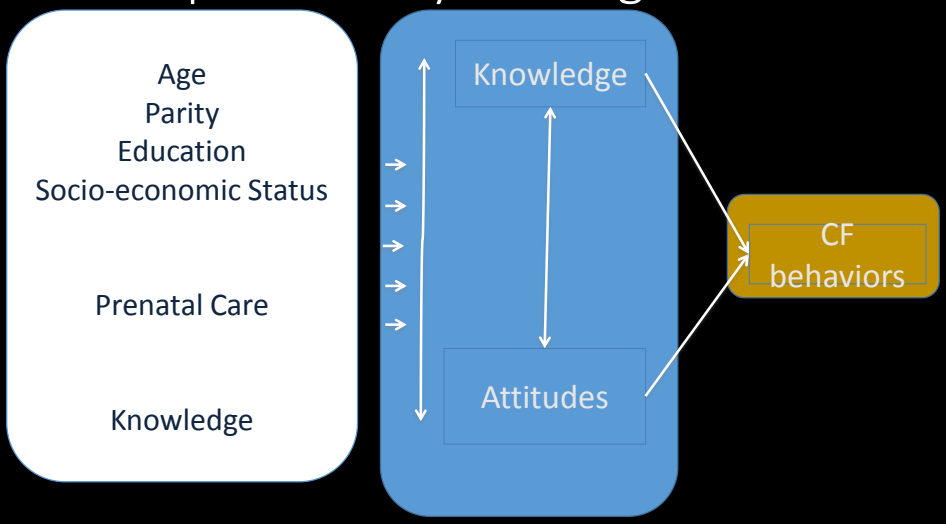
Table 3 Associations between breast-feeding pattern at 3 months and prenatal maternal intentions, attitudes, self-efficacy and knowledge among 2178 women interviewed during pregnancy and at infant age 3 months in Kishoreganj district, rural north-eastern Bangladesh

		Model 1*		Model 2*	
Outcome variable	Predictor variable	OR	95 % CI	OR	95 % CI
EBF at 3 months	EBF intention†	1·48	1·14, 1·91	1·43	1·10, 1·85
	Attitude towards breast-feeding‡	1·12	0·94, 1·34	1·09	0·90, 1·32
	Self-efficacy‡	1·01	0·84, 1·21	0·99	0·82, 1·20
	Breast-feeding knowledge	1·22	1·00, 1·50	1·17	0·95, 1·44
Full breast-feeding at 3 months	EBF intention†	1·34	1·04, 1·72	1·32	1·02, 1·70
	Attitude towards breast-feeding‡	1·06	0·88, 1·28	1·03	0·85, 1·26
	Self-efficacy‡	1·01	0·84, 1·23	1·02	0·83, 1·24
	Breast-feeding knowledge	1·14	0·92, 1·42	1·10	0·88, 1·38

EBF, exclusive breast-feeding.
*Model 1, each predictor tested separately; Model 2, all predictors entered into the model simultaneously. All models additionally control for maternal age, previous births, household wealth quintile, maternal literacy, prenatal care during pregnancy and sub-district.
†Maternal EBF intention assessed at 7 months' gestational age.
‡Indices for maternal attitudes (from fifteen items), self-efficacy (six items) and knowledge (six items) based on simple sums of relevant questions, according to factor analysis. Continuous maternal indices dichotomized at median values.

Yu et al, PHN 2014

3: complementary feeding

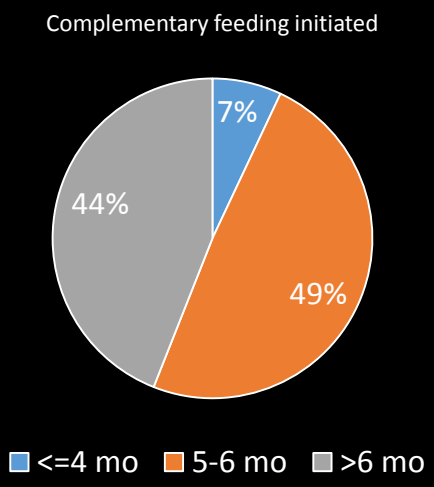


Knowledge and attitudes about introduction of complementary foods, assessed at infant age 3 mo

Knowledge	%
Knew recommended age for complementary feeding initiation	18.8
Identified ≥ 4 WHO recommended food groups for infant diet	89.6
Knew recommended ways to prepare infant's food	73.7
Identified ≥ 3 methods of responsive feeding	35.9
Attitudes [a]	
Complementary foods in addition to breastmilk are healthy for infants > 6 months	99.7
Nutritional supplements are affordable and ensure infant has adequate nutrition	28.3
Confident about continued breastfeeding	24.9
Complementary feeding is expensive	96.9
[a] Proportion includes those who 'Agreed' or 'Strongly Agreed'	

Owais et al, IJPHN submitted

Initiation of complementary feeding as reported at infant age 9 mo



Complementary feeding initiation in relation to maternal knowledge and attitudes			
Maternal knowledge score [a]	0 – 7	8 – 9	10 – 15
OR (95% CI)			
Early vs. timely	Ref.	1.02 (0.66 – 1.57)	0.77 (0.49 – 1.23)
Late vs. Timely	Ref.	1.18 (0.93 – 1.49)	1.07 (0.84 – 1.35)
Maternal attitude score [a]	18 – 25	26	27 – 34
OR (95% CI)			
Early vs. timely	Ref.	0.54 (0.35 – 0.84)	0.51 (0.33 – 0.79)
Late vs. Timely	Ref.	1.52 (1.20 – 1.91)	1.24 (0.97 – 1.58)

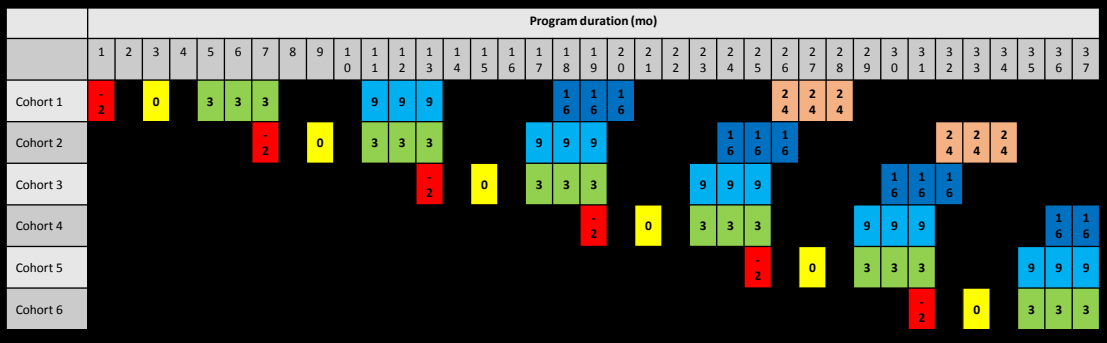
[a] Assessed at infant age 3 months; categories are tertiles
Early is age ≤ 4 months; late is > 6 mo, reference is timely (5-6 mo)
Adjusted for SES, maternal age, literacy, parity, infant gender, district and time of enrollment

Owais et al, IJPHN submitted

Challenges of longitudinal designs

- Resources
- Attrition
- Secular changes
  - Program impact

Schema for data collection to evaluate the impact of a 3-year intervention program targeted at pregnant women and mothers of infants < 24 mo.



As a result of variation in dates of delivery and scheduling of visits, each postnatal wave is conducted over a three-month window, even though it takes less than one month to recruit the women during pregnancy.

Attrition in Akhonay Shomay

Wave 1: Jan '11 – May '13

Recruitment
Jan '11 – Feb '11
N = 800

3-month
May '11 – Aug '11
N = 729 (8.9%)

9-month
Oct '11 – Feb '12
N = 672 (16.0%)

16-month
May '12 – Sep '12
N = 636 (20.5%)

24-month
Jan '13 – May '13
N = 627 (21.6%)

Wave 2: May '11 – Sep '13

Recruitment
May '11 – Jun '11
N = 800

3-month
Aug '11 – Dec '11
N = 744 (7.0%)

9-month
Feb '12 – Aug '12
N = 714 (10.8%)

16-month
Sep '12 – Jan '13
N = 676 (15.5%)

24-month
May '13 – Sep '13
N = 655 (18.1%)

Wave 3: Sep '11 – Jan '14

Recruitment
Sep '11 – Oct '11
N = 800

3-month
Dec '11 – May '12
N = 723 (8.5%)

9-month
Jun '12 – Dec '12
N = 692 (13.5%)

16-month
Jan '13 – Jun '13
N = 658 (17.8%)

24-month
Sep '13 – Jan '14
N = 622 (22.2%)

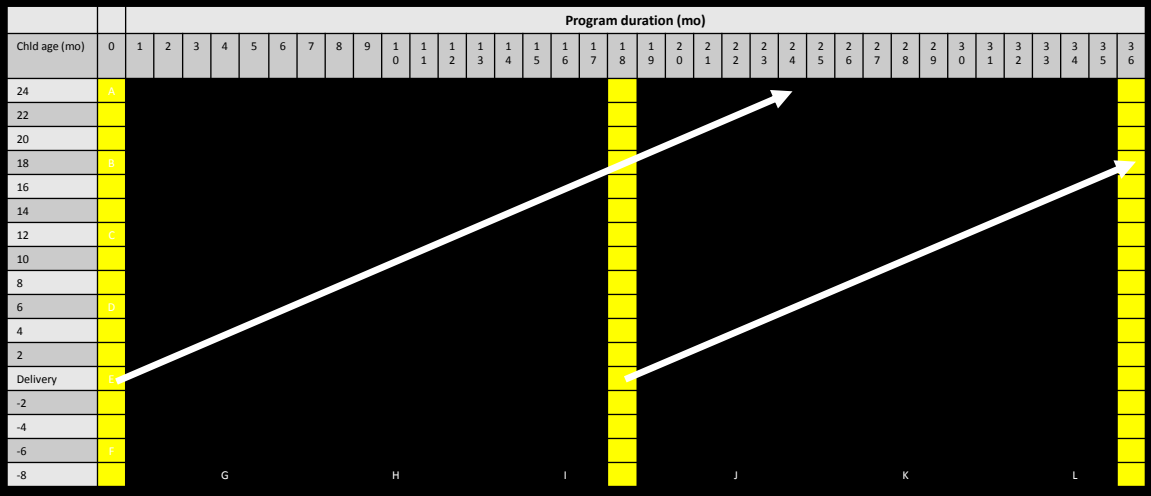
Initial sample: 2400

Final sample: 1904

Attrition: 20.7%

Reasons: Infant death, migration out, refusal

Child age by program duration for a 3-yr intervention program



Birth cohorts follow arrows. Cross-sectional baseline, midline and endline surveys are highlighted in yellow

Discussion

- Longitudinal studies have their place
  - Critical for unpacking pathways
- They are complex and resource intensive