Appendix Table 1: Hypotheses

Hypotheses			Link	Unlinked
Structural (legitimate) reasons for data not to link				
Early mortality (before the child used UNRWA services or got an MFN)				
1	More deaths among the unlinked	Mortality	0.3%	6.0%
2	More multiples among the unlinked because they have higher early mortality (even if one or both are not registered as a death)	Multiple	1.4%	4.4%
3	More LBW/PT among the unlinked because LBW/PT have higher early mortality (even if not registered as a death)	Preterm (Gestational age <37 weeks)	7.7%	10.9%
		Low Birthweight <2500)	5.6%	9.3%
Child used other services (and never used UNRWA services)				
4	More mothers who are not Palestinian among the unlinked because non-refugee mothers have alternative options for child health and education	Mother RRIS missing in health	2.5%	10.3%
5	More children with a missing MFN (in the mother dataset) are unlinked because children did not use UNRWA services, so a C MFN was not generated	Missing C MFN	0.0%	49.7%
6.a	More families from Jordan and West Bank are unlinked mother and child (because they have more choices). Lebanon, Gaza, and Syria have fewer choices for other services *6ca and (6a or 6b) for in opposite directions*	% Linkage health		
		Jordan	74.8%	25.2%
		Lebanon	89.1%	10.9%
		Syria	67.8%	32.2%
		West Bank	72.8%	27.2%
		Gaza	93.9%	6.1%
6b	More children in Jordan, West Bank do not link to education services because they have more alternative options. Lebanon, Gaza and Syria have fewer choices for other education services	% Link education		
		Jordan	31.9%	68.1%
		Lebanon	63.5%	36.5%
		Syria	72.2%	27.8%
		West Bank	32.6%	67.4%
		Gaza	77.1%	22.9%
Migration (before the child used UNRWA services or got an MFN)				
6.c.	More families from Lebanon and Syria are unlinked (because they have higher migration). Cannot test but might contribute to a higher proportion of unlinked. *Cannot be distinguished from other causes in 4.a.*			

Continued

Appendix Table 1: Continued

Lack of linkage due to reporting, recording or data entry errors			
Data entry errors in any of the IDs (namely Mother/ C MFN, FRRIS.....)			
7	Linkage will improve over time as experience with electronic medical records improved	Figure 5 and Figure 6-Improvement of linkage	
8	Very recent data has more zero in CRRIS as it takes more time to register them	%Missing C RRIS	
		2010	2.0%
		2012	3.8%
		2014	5.7%
		2016	8.8%
		2018	12.0%
		2020	38.9%
Ages mis-recorded/ recorded approximately (heaped on 1 or 15^{th} or in January)			
9	Linkage based on steps +/- 90 and +/- 180 will decrease	Figure 5- decrease in linkage errors	
7	Linkage will improve over time as expertise in electronic medical records improved	Figure 5 and Figure 6- Improvement of linkage	
Sex mis-recorded			
10	Attempt to link unlinked kids to any sex.	A total of 13,683.	Error 1.4 %
Location mis-recorded			
11	Attempt to link unlinked kids to any location	A total of 477 links. Error 0.05%	
Live birth miscoded as stillbirth (so was excluded from the start)			
12	Attempt to link unlinked children to stillbirths	A total of 56 links. Error 0.006%	
Stillbirth miscoded as a live birth			
	Cannot test	Might be like step 12	
Distinguishing of duplicated records from multiples			
13	The percentage of same-sex multiples.	The sex ratio observed in the data is 1.03 male (50.7%) to 1 female (49.3%). In our dataset same sex multiples (69%); discordant multiples are 31%. This 69% is plausible if we assume that ∼30% of multiples are monozygotic (so same sex as per published reports) and around half of dizygotic multiples are same sex $(0.3+(0.7(0.5068^2+0.4932^2)) = 0.30+0.35 = 65.0\%$ of multiples expected to be same sex.	

Appendix Table 2: Multivariable logistic regression model of the association of different population characteristics of children using UNRWA services and odds of linkage (N = 892,801)

		Adjusted OR (95%CI)
Setting	Gaza (ref)	1.0
	Jordan	3.2 (3.1-3.2)
	Lebanon	1.4 (1.3-1.4)
	Syria	4.3 (4.2-4.4)
	West Bank	2.4 (2.3-2.4)
Mother ID	Refugee (ref)	1.0
	Not a refugee	2.7 (2.6-2.8)
Dead or at risk of early mortality	Normal birth weight, term and singleton and not recorded as dead (ref)	1.0
	Low birthweight, or preterm or multiple, and not recorded as dead (at risk of early mortality)	1.6 (1.6-1.6)
	Recorded as dead	47.0 (44.8-49.3)
Year of birth	2010	1.0
	2011	0.8 (0.8-0.8)
	2012	0.6 (0.5-0.6)
	2013	0.4 (0.4-0.4)
	2014	0.4 (0.4-0.4)
	2015	0.3 (0.3-0.3)
	2016	0.3 (0.3-0.3)
	2017	0.2 (0.2-0.2)
	2018	0.2 (0.2-0.2)
	2o19	0.2 (0.2-0.2)
	2020	0.2 (0.2-0.2)