

Supplementary Table 1. Differentials in under-five co-morbidity and sibling loss by epidemiological, child, maternal, household, and environmental factors in a cross-sectional study using the 2019–2020 Liberia Demographic and Health Survey dataset (N = 5,132).

Variables	Overall	Co-infected with at least two of ARI, malaria and diarrhea		Lost a sibling	
		No n (%)	Yes n (%)	No n (%)	Yes n (%)
Overall	5132(100)	4010(78.14)	1122(21.86)	1321(92.65)	377(7.35)
Number of infections		-	-		P=0.143
None	2850(55.53)	-	-	2659(51.81)	191(3.72)
One	1160(22.6)	-		1070(20.85)	90(1.75)
Two	820(15.98)	-	-	746(14.54)	74(1.44)
Three (ARI, fever & diarrhea)	302(5.88)			280(5.46)	22(0.43)
Lost a sibling			P = 0.079		
No	4755(92.65)	3729(72.66)	1026(19.99)	-	-
Yes	377(7.35)	281(5.48)	96(1.87)	-	-
Child had malaria			P<0.001		P=0.172
No	3695(72)	3570(69.56)	125(2.44)	3434(66.91)	261(5.09)
Yes	1437(28)	440(8.57)	997(19.43)	1321(25.74)	116(2.26)
Child had ARI			P<0.001		P= 0.091
No	3783(73.71)	3608(70.3)	175(3.41)	3519(68.57)	264(5.14)

Yes	1349(26.29)	402(7.83)	947(18.45)	1236(24.08)	113(2.2)
Child had diarrhea			P<0.001		P= 0.301
No	4212(82.07)	3692(71.94)	520(10.13)	3910(76.19)	302(5.88)
Yes	920(17.93)	318(6.2)	602(11.73)	845(16.47)	75(1.46)
Child factors					
Sex of the child			P= 0.406		P= 0.571
Male	2528(49.26)	1963(38.25)	565(11.01)	2337(45.54)	191(3.72)
Female	2604(50.74)	2047(39.89)	557(10.85)	2418(47.12)	186(3.62)
Succeeding birth intervals			P<0.001		P<0.001
Short (≤ 17 months)	107(2.08)	93(1.81)	14(0.27)	88(1.71)	19(0.37)
Long (18-33 months)	643(12.53)	565(11.01)	78(1.52)	564(10.99)	79(1.54)
Longer (≥ 34 months)	367(7.15)	334(6.51)	33(0.64)	337(6.57)	30(0.58)
Under-fives in open birth intervals	4015(78.23)	3018(58.81)	997(19.43)	3766(73.38)	249(4.85)
Preceding birth intervals			P= 0.044		P<0.001
Short (≤ 17 months)	223(4.35)	177(3.45)	46(0.9)	162(3.16)	61(1.19)
Long (18-33 months)	1289(25.12)	1044(20.34)	245(4.77)	1117(21.77)	172(3.35)
Longer (≥ 34 months)	1479(28.82)	1148(22.37)	331(6.45)	1405(27.38)	74(1.44)
Under-fives in open birth intervals	935(18.22)	723(14.09)	212(4.13)	910(17.73)	25(0.49)
Short (≤ 17 months)	1206(23.5)	918(17.89)	288(5.61)	1161(22.62)	45(0.88)

Birth order			P= 0.160		P<0.001
First born	1198(23.34)	910(17.73)	288(5.61)	1153(22.47)	45(0.88)
Second born	905(17.63)	722(14.07)	183(3.57)	845(16.47)	60(1.17)
3-5	1933(37.67)	1522(29.66)	411(8.01)	1761(34.31)	172(3.35)
6+	1096(21.36)	856(16.68)	240(4.68)	996(19.41)	100(1.95)
Birth weight			P= 0.002		P= 0.271
Large (≥ 4000 grams)	1097(21.38)	891(17.36)	206(4.01)	1030(20.07)	67(1.31)
Normal (2501-3999 grams)	3696(72.02)	2872(55.96)	824(16.06)	3411(66.47)	285(5.55)
Small (≤2500 grams)	310(6.04)	222(4.33)	88(1.71)	286(5.57)	24(0.47)
Don't know	29(0.57)	25(0.49)	4(0.08)	28(0.55)	1(0.02)
Gestation type			P= 0.122		P<0.001
Single	4967(96.78)	3873(75.47)	1094(21.32)	4624(90.1)	343(6.68)
Twins	165(3.22)	137(2.67)	28(0.55)	131(2.55)	34(0.66)
Mother's characteristics					
Age (years)			P= 0.012		P = 0.043
15-19	476(9.28)	347(6.76)	129(2.51)	450(8.77)	26(0.51)
20-24	1229(23.95)	947(18.45)	282(5.49)	1113(21.69)	116(2.26)
25-29	1165(22.7)	939(18.3)	226(4.4)	1084(21.12)	81(1.58)
30-34	888(17.3)	703(13.7)	185(3.6)	833(16.23)	55(1.07)
35-39	809(15.76)	619(12.06)	190(3.7)	750(14.61)	59(1.15)

40-44	423(8.24)	341(6.64)	82(1.6)	395(7.7)	28(0.55)
45-49	142(2.77)	114(2.22)	28(0.55)	130(2.53)	12(0.23)
Education level			P<0.001		P= 0.034
No education	2165(42.19)	1753(34.16)	412(8.03)	1993(38.83)	172(3.35)
Primary	1547(30.14)	1166(22.72)	381(7.42)	1423(27.73)	124(2.42)
Secondary	1328(25.88)	1023(19.93)	305(5.94)	1250(24.36)	78(1.52)
Post-secondary	92(1.79)	68(1.33)	24(0.47)	89(1.73)	3(0.06)
Marital status			P= 0.008		P= 0.257
Single	958(18.67)	744(14.5)	214(4.17)	902(17.58)	56(1.09)
Married	3713(72.35)	2929(57.07)	784(15.28)	3427(66.78)	286(5.57)
Widowed	62(1.21)	51(0.99)	11(0.21)	58(1.13)	4(0.08)
Separated	399(7.77)	286(5.57)	113(2.2)	368(7.17)	31(0.6)
Religion			P<0.001		P= 0.009
Christian	4324(84.26)	3328(64.85)	996(19.41)	4004(78.02)	320(6.24)
Muslim	683(13.31)	580(11.3)	103(2.01)	643(12.53)	40(0.78)
No religion or traditional	125(2.44)	102(1.99)	23(0.45)	108(2.1)	17(0.33)
Age of respondent at first birth (years)			P= 0.798		P= 0.217
10-17	2277(44.37)	1773(34.55)	504(9.82)	2095(40.82)	182(3.55)
18-29	2777(54.11)	2174(42.36)	603(11.75)	2589(50.45)	188(3.66)
30-43	78(1.52)	63(1.23)	15(0.29)	71(1.38)	7(0.14)

Currently working			P= 0.088		P= 0.692
No	3464(67.5)	2683(52.28)	781(15.22)	3213(62.61)	251(4.89)
Yes	1668(32.5)	1327(25.86)	341(6.64)	1542(30.05)	126(2.46)
Covered by health insurance			P= 0.099		P= 0.597
No	4978(97)	3898(75.95)	1080(21.04)	4614(89.91)	364(7.09)
Yes	154(3)	112(2.18)	42(0.82)	141(2.75)	13(0.25)
Household characteristics					
Place of delivery			P=0.190		P=0.005
Home	1107(21.57)	849(16.54)	258(5.03)	1004(19.56)	103(2.01)
Hospital	4025(78.43)	3161(61.59)	864(16.84)	3751(73.09)	274(5.34)
Wealth index			P=0.411		P=0.006
Poorest	1716(33.44)	1363(26.56)	353(6.88)	1578(30.75)	138(2.69)
Poorer	1428(27.83)	1105(21.53)	323(6.29)	1303(25.39)	125(2.44)
Middle	1006(19.6)	791(15.41)	215(4.19)	942(18.36)	64(1.25)
Richer	586(11.42)	450(8.77)	136(2.65)	559(10.89)	27(0.53)
Richest	396(7.72)	301(5.87)	95(1.85)	373(7.27)	23(0.45)
Number of under-fives in a household			P<0.001		P=0.006
0	243(4.73)	224(4.36)	19(0.37)	225(4.38)	18(0.35)
1	2102(40.96)	1587(30.92)	515(10.04)	1938(37.76)	164(3.2)

2	1907(37.16)	1474(28.72)	433(8.44)	1774(34.57)	133(2.59)
3	610(11.89)	500(9.74)	110(2.14)	580(11.3)	30(0.58)
4+	270(5.26)	225(4.38)	45(0.88)	238(4.64)	32(0.62)
Decision maker on the mother's own health			P= 0.001		P<0.001
Husband alone	821(16)	653(12.72)	168(3.27)	731(14.24)	90(1.75)
Herself	647(12.61)	478(9.31)	169(3.29)	610(11.89)	37(0.72)
Someone else	2245(43.75)	1798(35.04)	447(8.71)	2086(40.65)	159(3.1)
Widowed/ never married	1419(27.65)	1081(21.06)	338(6.59)	1328(25.88)	91(1.77)
All under-fives slept under mosquito nets			P<0.001		P= 0.576
No	2219(45.89)	1700(35.16)	519(10.73)	2062(42.65)	157(3.25)
Some	502(10.38)	424(8.77)	78(1.61)	460(9.51)	42(0.87)
All	2114(43.72)	1620(33.51)	494(10.22)	1964(40.62)	150(3.1)
Environmental factors					
Type of residence			P= 0.179		P<0.001
Urban	1728(33.67)	1369(26.68)	359(7)	1649(32.13)	79(1.54)
Rural	3404(66.33)	2641(51.46)	763(14.87)	3106(60.52)	298(5.81)
Region			P<0.001		P= 0.078
Northwestern	773(15.06)	589(11.48)	184(3.59)	700(13.64)	73(1.42)
South Central	1324(25.8)	1015(19.78)	309(6.02)	1237(24.1)	87(1.7)

Southeastern	1652(32.19)	1226(23.89)	426(8.3)	1529(29.79)	123(2.4)
North Central	1383(26.95)	1180(22.99)	203(3.96)	1289(25.12)	94(1.83)
Type of energy used for cooking			P= 0.848		P=0.005
Wood	3629(70.71)	2840(55.34)	789(15.37)	3338(65.04)	291(5.67)
Electricity/ LPG	32(0.62)	26(0.51)	6(0.12)	28(0.55)	4(0.08)
Kerosene/ charcoal	1471(28.66)	1144(22.29)	327(6.37)	1389(27.07)	82(1.6)
Source of water for drinking			P=0.108		P=0.018
Tap	154(3)	132(2.57)	22(0.43)	148(2.88)	6(0.12)
Well	4036(78.64)	3145(61.28)	891(17.36)	3738(72.84)	298(5.81)
Dam/ River	674(13.13)	516(10.05)	158(3.08)	611(11.91)	63(1.23)
Rainwater/ tank	18(0.35)	15(0.29)	3(0.06)	17(0.33)	1(0.02)
Mineral water	250(4.87)	202(4)	48(0.94)	241(4.7)	9(0.18)
Other source	154(3)	132(2.57)	22(0.43)	148(2.88)	6(0.12)
Stool disposal			P= 0.036		P=0.096
No facility	2727(53.14)	2156(42.01)	571(11.13)	2507(48.85)	220(4.29)
Pit latrine	1316(25.64)	995(19.39)	321(6.25)	1227(23.91)	89(1.73)
Flush toilet	1089(21.22)	859(16.74)	230(4.48)	1021(19.89)	68(1.33)
A member of the household smokes tobacco			P=0.958		P= 0.385
Yes	36(0.7)	28(0.55)	8(0.16)	32(0.62)	4(0.08)

No	5096(99.3)	3982(77.59)	1114(21.71)	4723(92.03)	373(7.27)
Household has electricity			P = 0.174		P<0.001
No	4605(89.73)	3586(69.88)	1019(19.86)	4245(82.72)	360(7.01)
Yes	527(10.27)	424(8.26)	103(2.01)	510(9.94)	17(0.33)
Ever touched wild hunted animal(s)			P<0.001		P<0.001
No	2631(51.27)	2131(41.52)	500(9.74)	2474(48.21)	157(3.06)
Yes	2366(46.1)	1767(34.43)	599(11.67)	2154(41.97)	212(4.13)
Did not answer	135(2.63)	112(2.18)	23(0.45)	127(2.47)	8(0.16)

LPG: Liquefied Petroleum Gas; ARI: Acute Respiratory Infection

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