

## Additional File 1

**Supplementary table 1:** Comparison of acute malnutrition diagnosis by WHZ and/or absolute MUAC in four Somalian livelihoods

	Livelihood				
	Total	Agro-pastoralist	Pastoralist	Riverine	IDPs
<b>Indicators for GAM</b>					
WHZ <sub>-2</sub> or/and MUAC <sub>125</sub>	51,619	9,064	16,597	5,567	20,391
WHZ <sub>-2</sub> only	61.4	55.3	69.4	57.4	58.7
MUAC <sub>125</sub> only (%)	20.5	24.2	16.3	23.5	21.5
WHZ <sub>-2</sub> & MUAC <sub>125</sub> (%)	18.1	20.5	14.4	19.1	19.9
<b>Indicators for SAM</b>					
WHZ <sub>-3</sub> or/and MUAC <sub>115</sub>	12,170	2,184	3,553	1,355	5,078
WHZ <sub>-3</sub> only (%)	67.6	66.2	75	65.8	63.6
MUAC <sub>115</sub> only (%)	22.8	23.9	17.9	24.3	25.3
WHZ <sub>-3</sub> and MUAC <sub>115</sub> (%)	9.6	9.9	7.1	9.9	11.1

Proportion of children with acute malnutrition (GAM or SAM) as defined by WHZ and/or absolute MUAC (see Methods section for definitions) that are diagnosed as malnourished by WHZ only, by absolute MUAC only, or by both criteria simultaneously.

**Supplementary table 2:** Comparison of acute malnutrition diagnosis by WHZ and/or MUACAZ in four Somalian livelihoods

	Livelihood				
	Total	Agro-pastoralist	Pastoralist	Riverine	IDPs
<b>Indicators for GAM</b>					
WHZ <sub>-2</sub> or/and MUACAZ <sub>-2</sub>	63,478	11,757	20,319	7,105	24,297
WHZ <sub>-2</sub> only (%)	36.4	30.9	41	31.9	36.5
MUACAZ <sub>-2</sub> only (%)	35.4	41.6	31.6	40.1	34.1
WHZ <sub>-2</sub> & MUACAZ <sub>-2</sub> (%)	28.3	27.5	27.4	28.1	29.4
<b>Indicators for SAM</b>					
WHZ <sub>-3</sub> or/and MUACAZ <sub>-3</sub>	15,052	3,060	4,403	1,729	5,860
WHZ <sub>-3</sub> only (%)	49.4	41.9	54.5	45.6	50.6
MUACAZ <sub>-3</sub> only (%)	37.6	45.7	33.8	40.7	35.3
WHZ <sub>-3</sub> and MUACAZ <sub>-3</sub> (%)	13.0	12.4	11.7	13.8	14.2

Proportion of children with acute malnutrition (GAM or SAM) as defined by WHZ and/or absolute MUACAZ (see Methods section for definitions) that are diagnosed as malnourished by WHZ only, by MUACAZ only, or by both criteria simultaneously.

**Supplementary table 3** Factors associated with GAM diagnosis based on WHZ, absolute MUAC and MUACAZ by livelihood

<b>S3-1</b> Factors associated with the diagnosis of GAM among agro-pastoralists (n=42 132)										
	WHZ <sub>-2</sub>			MUAC <sub>125</sub>			MUACAZ <sub>-2</sub>			
	%	n	Adj.OR	%	n	Adj.OR	%	n	Adj.OR	
Sex										
Male	18.7	3 987	Ref.	9.2	1 966	Ref.	21.5	4 583	Ref.	
Female	13.9	2 882	0.70 (0.67-0.74)	10.0	2 089	1.21 (1.13-1.29)	17.0	3 540	0.80 (0.76-0.84)	
Age										
<24 months	15.6	2 215	Ref.	17.5	2 481	Ref.	16.3	2 314	Ref.	
>=24 months	16.7	4 654	1.08 (1.02-1.14)	5.6	1 574	0.27(0.25-0.29)	20.8	5 809	1.34 (1.27-1.41)	
Stunting										
No	16.0	4 975	Ref.	7.4	2 289	Ref.	15.1	4 700	Ref.	
Yes	17.1	1 894	1.05 (0.99-1.11)	16.0	1 766	2.62 (2.45-2.81)	31.0	3 423	2.46 (2.34-2.59)	
Total	16.3	6 869		9.6	4 055		19.3	8,123		

**S3-2** Factors associated with the diagnosis of GAM in pastoralists (n=89 876)

	WHZ <sub>-2</sub>			MUAC <sub>125</sub>			MUACAZ <sub>-2</sub>			
	%	n	Adj.OR	%	n	Adj.OR	%	n	Adj.OR	
Sex										
Male	17.5	8 079	Ref.	5.1	2 353	Ref.	14.6	6 774	Ref.	
Female	13.4	5 820	0.74 (0.71-0.76)	6.3	2 729	1.36 (1.28-1.44)	12.0	5 206	0.83 (0.80-0.87)	
Age										
<24 months	12.4	3 670	Ref.	11.3	3 332	Ref.	10.1	2 968	Ref.	
>=24 months	17.0	10 229	1.44 (1.38-1.50)	2.9	1 750	0.23 (0.22-0.25)	14.9	9 012	1.61 (1.54-1.68)	
Stunting										
No	15.2	11 958	Ref.	4.7	3 688	Ref.	11.6	9 132	Ref.	
Yes	17.2	1 941	1.13 (1.07-1.19)	12.3	1 394	2.98 (2.78-3.19)	25.2	2 848	2.56 (2.44-2.69)	
Total	15.5	13 899		5.7	5 082		13.3	11 980		

**S3-3** Factors associated with the diagnosis of GAM in riverine (n=26 603)

	WHZ <sub>-2</sub>			MUAC <sub>125</sub>			MUACAZ <sub>-2</sub>			
	%	n	Adj.OR	%	n	Adj.OR	%	n	Adj.OR	
Sex										
Male	18.0	2 435	Ref.	8.1	1 103	Ref.	19.9	2 695	Ref.	
Female	14.0	1 823	0.74 5(0.69-0.79)	9.7	1 271	1.39 (1.27-1.52)	16.5	2 146	0.84 (0.79-0.90)	
Age										
<24 months	16.7	1 479	Ref.	18.1	1 600	Ref.	16.3	1 447	Ref.	
>=24 months	15.7	2 779	0.92 (0.86-0.99)	4.4	774	0.21 (0.19-0.23)	19.1	3 394	1.27 (1.18-1.36)	
Stunting										
No	16.3	3 183	Ref.	6.9	1 338	Ref.	14.8	2 877	Ref.	
Yes	15.1	1 075	0.88 (0.82-0.95)	14.5	1 036	2.33 (2.13-2.55)	27.6	1 964	2.19 (2.05-2.34)	
Total	16.0	4 258		8.9	2 374		18.2	4 841		

**S3-4** Factors associated with the diagnosis of GAM in IDPs (n=97 012)

	WHZ <sub>-2</sub>			MUAC <sub>125</sub>			MUACAZ <sub>-2</sub>		
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	%	n	Adj.OR	%	n	Adj.OR	%	n	Adj.OR
<b>Sex</b>									
Male	18.9	9 148	Ref.	7.7	3 728	Ref.	17.6	8 546	Ref.
Female	14.2	6 866	0.71 (0.69-0.74)	9.7	4 699	1.46 (1.39-1.53)	14.2	6 878	0.82 (0.79-0.85)
<b>Age</b>									
<24 months	16.4	6 194	Ref.	19.4	6 538	Ref.	17.6	5 935	Ref.
>=24 months	15.5	9 820	0.82 (0.79-0.85)	3.0	1 889	0.13 (0.13-0.14)	15.0	9 489	0.89 (0.86-0.93)
<b>Stunting</b>									
No	16.0	11 877	Ref.	6.0	4 475	Ref.	12.2	9 070	Ref.
Yes	18.1	4 137	1.11 (1.06-1.15)	17.2	3 952	3.12 (2.97-3.27)	27.7	6 354	2.69 (2.59-2.79)
Total	16.5	16,014		8.7	8 427		15.9	15 424	

**Supplementary table 4** Factors associated with SAM diagnosis based on WHZ, MUAC and MUACAZ by livelihood

**S4-1** Factors associated with the diagnosis of SAM among agro-pastoralists (n=42,132)

	WHZ <sub>3</sub>			MUAC <sub>115</sub>			MUACAZ <sub>3</sub>		
	%	n	Adj.OR	%	n	Adj.OR	%	n	Adj.OR
<b>Sex</b>									
Male	4.7	996	Ref.	1.6	331	Ref.	5.0	1 055	Ref.
Female	3.2	667	0.68 (0.62-0.76)	2.0	407	0.42 (1.22-1.65)	3.5	721	0.75 (0.68-0.82)
<b>Age</b>									
<24 months	4.3	602	Ref.	3.7	520	Ref.	3.5	499	Ref.
>=24 months	3.8	1 061	0.89 (0.80-0.98)	0.8	218	0.20 (0.17-0.23)	4.6	1,277	1.29 (1.16-1.44)
<b>Stunting</b>									
No	3.7	1 161	Ref.	1.3	390	Ref.	2.9	892	Ref.
Yes	4.5	502	1.19 (1.07-1.32)	3.2	348	2.81 (2.42-3.26)	8.0	884	2.86 (2.60-3.15)
Total	4.0	1 663		1.8	738		4.2	1 776	

**S42** Factors associated with the diagnosis of SAM in pastoralists (n=89 876)

	WHZ <sub>3</sub>			MUAC <sub>115</sub>			MUACAZ <sub>3</sub>		
	%	n	Adj.OR	%	n	Adj.OR	%	n	Adj.OR
<b>Sex</b>									
Male	3.9	1 810	Ref.	0.9	413	Ref.	2.6	1 211	Ref.
Female	2.5	1 106	0.65 (0.60-0.70)	1.1	475	1.40 (1.22-1.60)	1.8	793	0.75 (0.69-0.82)
<b>Age</b>									
<24 months	3.1	928	Ref.	2.1	621	Ref.	1.9	572	Ref.
>=24 months	3.3	1 988	1.05 (0.97-1.14)	0.4	267	0.21 (0.18-0.24)	2.4	1 432	1.27 (1.15-1.40)
<b>Stunting</b>									
No	3.1	2 468	Ref.	0.7	559	Ref.	1.7	1 316	Ref.
Yes	4.0	448	1.22 (1.10-1.35)	2.9	329	4.25 (3.70-4.89)	6.1	688	3.73 (3.39-4.10)
Total	3.2	2 916		1.0	888		2.2	2 004	

**S4-3** Factors associated with the diagnosis of SAM in riverine (n=26 603)

	WHZ <sub>3</sub>			MUAC <sub>115</sub>			MUACAZ <sub>3</sub>		
	%	n	Adj.OR	%	n	Adj.OR	%	n	Adj.OR

Sex										
Male	4.6	622	Ref.	1.6	216	Ref.	4.1	555	Ref.	
Female	3.1	404	0.67 (0.59-0.76)	1.9	247	1.39 (1.15-1.67)	3.0	386	0.78 (0.68-0.89)	
Age										
<24 months	4.6	403	Ref.	4.1	362	Ref.	3.9	348	Ref.	
>=24 months	3.5	623	0.77 (0.67-0.87)	0.6	101	0.14 (0.11-0.17)	3.3	593	0.89 (0.78-1.02)	
Stunting										
No	3.8	743	Ref.	1.2	237	Ref.	2.5	486	Ref.	
Yes	4.0	283	0.99 (0.86-1.14)	3.2	226	2.58 (2.14-3.11)	6.4	455	2.59 (2.27-2.95)	
Total	3.9	1 026		1.7	463		3.5	941		

#### S4-4 Factors associated with the diagnosis of SAM in IDPs (n=97 012)

	Weight-for-height			MUAC <sub>115</sub>			MUACAZ <sub>-3</sub>			
	%	n	Adj.OR	%	n	Adj.OR	%	n	Adj.OR	
Sex										
Male	4.7	2 266	Ref.	1.6	783	Ref.	3.5	1 698	Ref.	
Female	3.2	1 527	0.67 (0.63-0.71)	2.2	1 067	1.55 (1.41-1.71)	2.5	1 199	0.76 (0.71-0.82)	
Age										
<24 months	5.2	1 758	Ref.	4.7	1 578	Ref.	4.2	1 417	Ref.	
>=24 months	3.2	2 035	0.61 (0.57-0.65)	0.4	272	0.10 (0.08-0.11)	2.3	1 480	0.61 (0.56-0.65)	
Stunting										
No	3.7	2 738	Ref.	1.2	869	Ref.	1.9	1 384	Ref.	
Yes	4.6	1 055	1.16 (1.08-1.25)	4.3	981	3.37 (3.07-3.71)	6.6	1 513	3.48 (3.23-3.75)	
Total	3.9	3 793		1.9	1 850		3.0	2 897		