A systematic review and meta-analysis of the prevalence of overweight and obesity among African school learners

Supplementary materials

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Table S1. Search strategy for PubMed

Search	Search terms	Hits
1	Obesity [tw] OR obese [tw] OR overweight [tw] over weight [tw] OR over-weight [tw] OR weight disorder* [tw] OR body composition [tw] OR body mass index [tw] OR body weight* [tw] OR BMI [tw] OR body fat [tw] OR percent* body fat [tw] OR body fat percent* [tw] OR body fat distribution [tw] OR adiposity [tw] OR skinfold thickness [tw] OR skinfolds [tw]	
2	Obesity [MeSH Terms]	
3	Overweight [MeSH Terms]	
4	# 1 OR # 2 OR # 3	
5	Learners [tw] OR schoolchildren [tw] OR school children [tw] OR school-children [tw] OR school going children [tw] OR school-going children [tw]	
6	# 4 AND # 5	
7	(((((("Africa"[MeSH] OR Africa*[tw] OR Algeria[tw] OR Angola[tw] OR Benin[tw] OR Botswana[tw] OR "Burkina Faso"[tw] OR Burundi[tw] OR Cameroon[tw] OR "Canary Islands"[tw] OR "Cape Verde"[tw] OR "Central African Republic"[tw] OR Chad[tw] OR Comoros[tw] OR Congo[tw] OR "Democratic Republic of Congo"[tw] OR Djibouti[tw] OR Egypt[tw] OR "Equatorial Guinea"[tw] OR Eritrea[tw] OR Ethiopia[tw] OR Gabon[tw] OR Gambia[tw] OR Ghana[tw] OR Guinea[tw] OR "Guinea Bissau"[tw] OR "Ivory Coast"[tw] OR "Cote d'Ivoire"[tw] OR Jamahiriya[tw] OR Jamahiryia[tw] OR Kenya[tw] OR Lesotho[tw] OR Liberia[tw] OR Libya[tw] OR Libia[tw] OR Madagascar[tw] OR Malawi[tw] OR Mali[tw] OR Mauritania[tw] OR Mauritius[tw] OR Mayote[tw] OR Morocco[tw] OR Mozambique[tw] OR Mocambique[tw] OR Namibia[tw] OR Niger[tw] OR Nigeria[tw] OR Principe[tw] OR Reunion[tw] OR Rwanda[tw] OR "Sao Tome"[tw] OR Senegal[tw] OR Seychelles[tw] OR "Sierra Leone"[tw] OR Somalia[tw] OR "South Africa"[tw] OR "St Helena"[tw] OR Sudan[tw] OR Swaziland[tw] OR Tanzania[tw] OR Togo[tw] OR Tunisia[tw] OR Uganda[tw] OR "Western Sahara"[tw] OR Zaire[tw] OR Zambia[tw] OR Zimbabwe[tw] OR "Central Africa"[tw] OR "Central African"[tw] OR "West Africa"[tw] OR "West African"[tw] OR "Western Africa"[tw] OR "Western African"[tw] OR "East Africa"[tw] OR "East African"[tw] OR "Eastern Africa"[tw] OR "Eastern African"[tw] OR "North Africa"[tw] OR "North African"[tw] OR "Northern Africa"[tw] OR "Northern African"[tw] OR "South African"[tw] OR "Southern Africa"[tw] OR "Southern African"[tw]	

	OR "sub Saharan Africa"[tw] OR "sub Saharan African"[tw] OR "subSaharan Africa"[tw] OR "subSaharan African"[tw]) NOT ("guinea pig"[tw] OR "guinea pigs"[tw] OR "aspergillus niger"[tw])))))	
8	# 6 AND # 7	
9	# 8 Limits: 1980/01/01 to 2017/02/28	

Table S2: PRISMA checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	3 & 4
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	4
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	4, PROSPERO, number CRD42016035248
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	4
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	4 & 5
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	5
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	5
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	5
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	1
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	5
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	5
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	5 & 6

Table S3: Summary of the quality scores of the included studies

Reference	Is the hypothesis/ aim/ objective of the study clearly described?	Are the main outcomes to be measured clearly described in the Introduction or Methods section?	Are the characteristics of the patients included in the study clearly described?	Are the main findings of the study clearly described?	Does the study provide estimates of the random variability in the data for the main outcome	Have actual probability values been reported (e.g. 0.035 rather than <0.05) for the main outcomes except where the probability value is less than 0.001?	Were the subjects asked to participate in the study representative of the entire population from which they were recruited?	Were those subjects who were prepared to participate representative of the entire population from which they were recruited?	Were the statistical tests used to assess the main outcomes appropriate?	Were the main outcome measures used accurate (valid and reliable)?	Total score
Abrahams et al,(1)	1	1	0	1	1	1	0	0	1	1	7
Amidu et al (2)	1	1	1	0	1	1	1	0	1	1	8
Armstrong et al, (3)	1	1	1	1	1	1	1	1	1	1	10
Boukthir, et al (4)	1	1	1	1	1	1	0	0	1	1	8
Caleyachetty, et al (5)	1	1	0	1	1	1	1	1	1	1	9
Chebet et al (6)	1	1	0	1	1	0	0	0	0	1	5
Daboné et al, (7)	1	1	1	1	1	1	0	0	1	1	8
Dekkaki et al, (8)	1	1	0	1	1	1	1	0	1	1	8
El-Sabely et al, (9)	1	1	0	1	1	1	0	0	1	1	7
Fetuga et al (10)	1	1	0	1	1	1	1	0	1	1	8
Hassan et al (11)	1	1	0	1	1	0	0	0	1	1	6
Jinabhai et al, (12)	1	1	1	1	1	0	1	1	1	1	9
Jinabhai et al, (13)	1	1	1	1	1	1	1	0	1	1	9
Kirsten et al (14)	1	1	1	1	0	1	1	0	1	1	8
Kyallo et al, (15)	1	1	1	0	1	1	0	0	1	1	7
Maruf et al, (16)	1	1	1	1	1	1	1	0	1	1	9
McKersie et al (17)	0	1	1	1	1	0	1	0	1	1	7
Mogre et al, (18)	0	1	0	1	1	1	1	0	1	1	7

Mohammed et al, (19)	0	1	1	0	0	1	1	0	1	1	6
Moselakgomo et al (20)	1	1	1	1	1	1	0	0	1	1	8
Mosha et al (21)	1	1	1	1	0	0	0	0	1	1	6
Mpembeni, et al (22)	1	1	1	1	1	1	1	0	1	1	9
Muhihi, et al (23)	1	1	1	1	1	1	1	0	1	1	9
Muthuri et al (24)	1	1	1	1	1	1	0	1	1	1	9
Mwaikambo et al, (25)	0	1	0	1	1	1	1	0	1	1	7
Navti et al, (26)	1	1	0	0	1	1	1	0	1	1	7
Oldewage-Theron et al (27)	1	1	0	1	1	0	0	0	1	1	6
Pangani, et al (28)	1	1	1	0	1	1	1	0	1	1	8
Pedro et al (29)	1	1	1	1	1	1	0	0	1	1	8
Pienaar, 2015 (30)	0	1	0	1	0	1	1	1	1	1	7
Prista et al (31)	1	1	0	1	1	1	0	0	1	1	7
Puckree et al, (32)	1	1	1	0	1	1	0	0	1	1	7
Regaieg, et al (33)	1	1	0	1	1	1	0	0	1	1	7
Salman et al (34)	1	1	0	1	1	0	0	0	1	1	6
Sebbani et al, (35)	1	1	0	0	1	0	1	0	1	1	6
Taleb et al, (36)	1	1	0	0	1	1	0	0	1	1	6
Tathiah et al (37)	1	1	1	1	1	0	0	0	1	1	7
Truter et al (38)	1	1	0	1	1	0	0	1	1	1	7
Van Den Ende, et al (39)	1	1	0	1	1	1	0	0	1	1	7
Wiles et al, (40)	1	0	1	1	1	0	0	0	1	1	6

Table S4. Summary statistics from meta-analyses of prevalence studies of overweight in African school going children using random effects model and arcsine transformations

Group	Subgroup	Criteria	N Studies	N participants	N Cases	Prev (95% CI)	H (95% CI)	I^2 (95% CI)	P-heterogeneity	P-dif criteria	P-dif sub-groups	P- Egger
Overall										0.0027		
		WHO	21	36981	2340	10.5 [7.1-14.3]	8.73 [8.01-9.53]	98.7 [98.4-98.9]	<0.0001			0.003
		IOTF	18	51604	3491	9.5 [6.5-13.0]	11.27 [10.41-12.20]	99.2 [99.1-99.3]	<0.0001			0.020
		CDC	4	2433	283	11.5 [9.6-13.4]	1.39 [1.00-2.41]	48.0 [0.0-82.7]	0.124			0.912
		Unspecified	2	1361	14	0.5 [0.0-4.5]	5.32 [-]	96.5 [90.4-98.7	<0.0001			-
Gender	Overall									0.0028		
		WHO	29	11028	1313	11.4 [8.4-14.9]	5.43 [4.91-6.00]	96.6 [95.9-97.2	<0.0001		0.192	0.557
		IOTF	28	25623	2884	10.3 [8.4-12.3]	5.02 [4.51-5.58]	96.0 [95.1-96.8]	<0.0001		0.175	0.425
		CDC	6	2033	239	11.5 [9.5-13.7]	1.38 [1.00-2.19]	47.6 [0.0-79.2]	0.089		0.293	0.702
		Unspecified	2	1361	14	0.5 [0.0-4.5]						
	Boys									<0.0001		
		WHO	14	4965	462	9.3 [5.6-13.8]	4.89 [4.18-5.71]	95.8 [94.3-96.9]	<0.0001			0.478
		IOTF	14	13316	1267	8.9 [7.0-11.1]	3.81 [3.18-4.57]	93.1 [90.1-95.2]	<0.0001			0.634
		CDC	3	958	104	9.8 [5.8-14.7]	1.88 [1.02-3.46]	71.7 [4.3-91.7]	0.029			0.702
		Unspecified	1	678	14	2.1 [1.1-3.3]	-	-	-			-
	Girls									<0.0001		
		WHO	15	6063	851	13.6 [9.0-19.0]	5.67 [4.94-6.50]	96.9 [95.9-97.6]	<0.0001			0.742
		IOTF	14	12307	1617	11.7 [8.4-15.4]	5.68 [4.93-6.55]	96.9 [95.9-97.7]	<0.0001			0.426
		CDC	3	1075	135	12.5 [10.6-14.6]	1.00 [1.00-1.96]	0.0 [0.0-74.1]	0.669			0.205
		Unspecified	1	683	0	0.0 [0.0-0.01]	-	-	-			-
Setting	Overall									0.115		
		WHO	24	42803	2733	10.3 [7.5-13.6]	8.62 [7.94-9.35]	98.7 [98.4-98.9]	<0.0001		0.051	0.001
		IOTF	21	50863	3315	7.7 [5.1-10.7]	10.59 [9.81-11.42]	99.1 [99.0-99.2]	<0.0001		0.119	0.088
		CDC	4	2433	282	11.5 [9.6-13.4]	1.39 [1.00-2.41]	48.0 [0.0-82.7]	0.124		0.256	0.912
	Rural									0.305		
		WHO	4	3962	256	6.9 [3.3-11.6]	2.98 [1.95-4.55]	88.8 [73.8-95.2]	<0.0001			0.706
		IOTF	7	1532	102	4.0 [1.3-8.2]	5.58 [4.52-6.89]	96.8 [95.1-97.9]	<0.0001			0.149
		CDC	0	-	-	-	-	-	-		-	-

	Urban								0.575		
		WHO	15	10689	1422	12.8 [8.7-17.5]	6.85 [6.06-7.73]	97.3 [97.3-98.3]	<0.0001		0.685
		IOTF	8	9880	964	9.4 [5.2-14.7]	7.87 [6.73-9.20]	98.4 [97.8-98.8]	<0.0001		0.592
		CDC	3	1987	238	12.0 [9.8-14.4]	1.44 [1.00-2.68]	51.8 [0.0-86.1]	0.126		0.924
	Both								0.289		
		WHO	5	30582	1209	6.6 [3.8-10.1]	7.23 [5.82-8.99]	98.1 [97.0-98.8]	<0.0001		0.197
		IOTF	6	37021	2095	10.5 [4.7-18.3]	16.83 [15.07-18.79]	99.6 [99.6-99.7]	<0.0001		0.249
		CDC	1	446	44	9.9 [7.3-12.8]	-	-	-		-
Type											
	Overall								0.177		
		WHO	27	15720	2171	13.3 [10.0-17.0]	6.51 [5.94-7.14]	97.6 [97.2-98.0]	<0.0001	0.013	0.553
		IOTF	20	53689	3656	9.1 [6.3-12.3]	10.86 [10.05-11.72]	99.2 [99.0-99.3]	<0.0001	<0.0001	0.018
		CDC	5	2529	276	10.1 [7.5-13.0]	2.10 [1.35-3.26]	77.3 [45.1-90.6]	0.001	0.107	0.431
	Public								0.499		
		WHO	13	7778	843	11.2 [7.4-15.7]	5.73 [4.94-6.63]	97.0 [95.9-97.7]	<0.0001		0.372
		IOTF	8	7493	776	7.6 [3.7-12.9]	7.57 [6.44-8.88]	98.3 [97.6-98.7]	<0.0001		0.241
		CDC	2	1483	163	8.0 [2.2-17.0]	3.68 [-]	92.6 [75.2-97.8]	0.0002		-
	Private								0.209		
		WHO	5	1648	401	22.6 [16.0-30.0]	3.22 [2.26-4.60]	90.4 [80.5-95.3]	<0.0001		0.611
		IOTF	1	692	126	18.2 [15.4-21.2]	-	-	-		-
		CDC	1	200	30	15.0 [10.4-20.3]	-	-	-		-
	Both								0.783		
		WHO	9	6294	927	11.9 [6.5-18.8]	7.57 [6.52-8.80]	98.3 [97.6-98.7]	<0.0001		0.359
		IOTF	11	45504	2754	9.5 [5.9-13.9]	12.56 [11.41-13.82]	99.4 [99.2-99.5]	<0.0001		0.057
		CDC	2	846	83	9.8 [7.9-11.9]	1.00 [-]	0.0 [-]	0.955		-
Region											
	Overall								0.0027		
		WHO	21	36981	2340	10.5 [7.1-14.3]	8.73 [8.01-9.53]	98.7 [98.4-98.9]	<0.0001	0.155	0.003
		IOTF	18	51604	3491	9.5 [6.5-13.0]	11.27 [10.41-12.20]	99.2 [99.1-99.3]	<0.0001	0.684	0.020
		CDC	4	2433	283	11.5 [9.6-13.4]	1.39 [1.00-2.41]	48.0 [0.0-82.7]	0.124	0.434	0.912
		Unspecified	2	1361	14	0.5 [0.0-4.5]	5.32 [-]	96.5 [90.4-98.7	<0.0001	-	-
	Central								-		

		WHO	1	557	82	14.7 [11.9-17.8	-	-	-		-
		IOTF	0	-	-	-	-	-	-		-
		CDC	0	-	-	-	-	-	-		-
	Eastern									0.740	
		WHO	4	3730	698	16.1 [7.7-26.8]	7.77 [6.11-9.87]	98.3 [97.3-99.0]	<0.0001		0.678
		IOTF	2	2168	260	14.1 [6.8-23.5]	4.65	95.4 [86.4-98.4]	<0.0001		-
		CDC	2	750	89	12.1 [7.7-17.3]	2.03	75.7 [0.0-94.5	0.042		-
	Northern									0.853	
		WHO	3	3276	296	11.4 [5.2-19.5]	6.16 [4.40-8.62]	97.4 [94.8-98.7]	<0.0001		0.444
		IOTF	4	7678	701	10.1 [4.7-17.3]	9.08 [7.31-11.27]	98.8 [98.1-99.2]	<0.0001		0.213
		CDC	1	1283	154	12.0 [10.3-13.8]	-	-	-		-
	Southern									0.014	
		WHO	9	27265	1140	8.7 (4.7-13.8]	6.31 [5.33-7.47]	97.5 [96.5-98.2]	<0.0001		0.032
		IOTF	11	39983	2358	8.5 [4.6-13.5]	12.72 [11.57-13.99]	99.4 [99.3-99.5]	<0.0001		0.179
		CDC	0	-	-	-	-	-	-		
		Undefined	2	1361	14	0.5 [0.0-4.5]	5.52 [-]	96.5 [90.4-98.7]	<0.0001		-
	Western									0.864	
		WHO	4	2153	124	7.7 [2.4-15.7]	5.60 [4.17-7.51]	96.8 [94.2-98.2]	<0.0001		0.136
		IOTF	1	1775	172	9.7 [8.4-11.1]	-	-	-		-
		CDC	1	400	39	9.7 [7.0-12.8]	-	-	-		-
Coverage										0.0027	
	Overall	WHO	21	36981	2340	10.5 [7.1-14.3]	8.73 [8.01-9.53]	98.7 [98.4-98.9]	<0.0001		0.003
		IOTF	18	51604	3491	9.5 [6.5-13.0]	11.27 [10.41-12.20]	99.2 [99.1-99.3]	<0.0001		0.020
		CDC	4	2433	283	11.5 [9.6-13.4]	1.39 [1.00-2.41]	48.0 [0.0-82.7]	0.124		0.912
		Unspecified	2	1361	14	0.5 [0.0-4.5]	5.32 [-]	96.5 [90.4-98.7	<0.0001	-	-
Publication year											
	<2013									0.0013	
		WHO	11	30299	1215	6.6 [4.6-8.9]	4.66 [3.88-5.59]	95.4 [93.4-96.8]	<0.0001	0.0007	0.028
		IOTF	6	40438	2385	10.9 [5.1-18.4]	18.07 [16.28-20.07]	99.7 [99.6-99.8]	<0.0001	0.585	0.180
		CDC	2	1587	199	12.9 [10.5-15.5]	1.29 [-]	39.9 [-]	0.197	0.061	-
		Unspecified	0	-	-	-	-	-		-	
	>=2013									0.0005	

		WHO	10	6682	1125	15.4 [10.6-20.9]	5.70 [4.80-6.75]	96.9 [95.7-97.8]	<0.0001			0.799
		IOTF	12	11166	1106	8.9 [6.4-11.7]	4.92 [4.15-5.82]	95.9 [94.2-97.0]	<0.0001			0.581
		CDC	2	846	83	9.8 [7.9-11.9]	1.00 [-]	0.0 [-]	0.955			-
		Unspecified	2	1361	14	0.5 [0.0-4.5]	5.32 [-]	96.5 [90.4-98.7]	<0.0001			-
Sample size										0.0027		
	<638									0.578		
		WHO	13	4555	544	11.3 [7.9-15.2]	3.93 [3.27-4.73]	93.5 [90.6-95.5]	<0.0001		0.571	0.869
		IOTF	6	2699	240	7.8 [3.1-14.3]	5.56 [4.42-7.01]	96.8 [94.9-98.0]	<0.0001		0.566	0.959
		CDC	3	1150	128	11.2 [8.4-14.4]	1.62 [1.00-3.02]	61.7 [0.0-89.1]	0.074		0.667	0.198
		Unspecified	0	-	-	-					-	
	>=638									0.0016		
		WHO	8	32426	1796	9.2 [4.3-15.7]	12.62 [11.26-14.14]	99.4 [99.2-99.5]	<0.0001			0.087
		IOTF	12	48905	3251	10.4 [6.6-15.0]	13.44 [12.32-14.67]	99.4 [99.4-99.5]	<0.0001			0.017
		CDC	1	1283	154	12.0 [10.3-13.8]	-	-	-			-
		Unspecified	2	1361	14	0.5 [0.0-4.5]	5.32 [-]	96.5 [90.4-98.7]	<0.0001			-

Note: - not computable

Table S5. Summary statistics from meta-analyses of prevalence studies of obesity in African school going children using random effects model and arcsine transformations

Group	Subgroup	Criteria	N studies	N participants	N Cases	Prev (95% CI)	H (95% CI)	I^2 (95% CI)	P-heterogeneity	P-dif criteria	P-dif sub-groups	P- Egger
Overall										<0.0001		
		WHO	18	34895	979	6.1 [3.4-9.7]	9.12 [8.32-9.99]	98.8 [98.6-99.0]	<0.0001			0.0019
		IOTF	16	50779	1120	4.0 [2.5-5.9]	8.56 [7.74-9.47]	98.6 [98.3-98.9]	<0.0001			0.003
		CDC	4	2433	158	6.9 [5.0-9.0]	1.82 [1.07-3.09]	69.8 [13.2-89.5]	0.019			0.320
		Unspecified	2	1361	8	0.5 [0.01-1.7]	2.34 [-]	81.8 [22.9-95.7]	0.019			-
Gender	Overall									<0.0001		
		WHO	25	8942	696	7.0 [4.5-10.1]	5.20 [4.65-5.81]	96.3 [95.4-97.0]	<0.0001		0.212	0.475
		IOTF	26	24798	907	4.3 [3.4-5.3]	3.53 [3.08-4.05]	92.0 [89.5-93.9]	<0.0001		0.295	0.047
		CDC	6	2033	126	6.2 [4.7-8.0]	1.44 [1.00-2.28]	51.7 [0.0-80.8]	0.066		0.128	0.743
		Unspecified	2	1361	8	0.5 [0.0-1.7]	2.34 [-]	81.8 [22.9-95.7]	0.019		0.019	-
	Boys									<0.0001		
		WHO	12	4011	241	5.3 [2.3-9.3]	4.83 [4.08-5.73]	95.7 [94.0-97.0]	<0.0001			0.655
		IOTF	13	12895	384	3.8 [2.7-5.0]	3.8 [2.7-5.0]	88.8 [82.8-92.8]	<0.0001			0.034
		CDC	3	958	49	5.1 [3.8-6.6]	1.00 [1.00-2.22]	0.0 [0.0-79.8]	0.598			0.823
		Unspecified	1	678	7	1.0 [0.4-1.9]	-	-	-			-
	Girls									<0.0001		
		WHO	13	4931	455	8.9 [4.9-13.8]	5.42 [4.66-6.32]	96.6 [95.4-97.5]	<0.0001			0.515
		IOTF	13	11903	523	4.8 [3.3-6.5]	3.81 [3.15-4.60]	93.1 [89.9-95.3]	<0.0001			0.435
		CDC	3	1075	77	7.5 [4.8-10.6]	1.72 [1.00-3.20]	66.1 [0.0-90.2]	0.052			0.540
		Unspecified	1	683	1	0.1 [0.0-0.6]	-	-	-			-
Setting	Overall									0.0.041		
		WHO	21	40717	1106	5.6 [3.4-8.3]	8.83 [8.10-9.62]	98.7 [98.5-98.9]	<0.0001		<0.0001	0.001
		IOTF	19	50038	1085	3.7 [2.3-5.4]	7.74 [7.01-8.55]	98.3 [98.0-98.6]	<0.0001		0.082	0.0056
		CDC	4	2433	158	6.9 [5.0-9.0]	1.82 [1.07-3.09]	69.8 [13.2-89.5]	0.0191		0.163	0.320
	Rural									0.757		
		WHO	4	1532	22	1.5 [0.6-2.9]	1.69 [1.00-2.91]	65.2 [0.0-88.2]	0.035			0.360
		IOTF	5	3137	70	1.8 [0.6-3.7]	3.24 [2.28-4.62]	90.5 [80.7-95.3]	<0.0001			0.880
		CDC	0	-	-			-	-		-	-
	Urban									0.076		

		WHO	12	8603	783	9.8 [6.0-14.6]	6.61 [5.74-7.60]	97.7 [97.0-98.3]	<0.0001		0.214
		IOTF	8	9880	375	4.9 [3.0-7.2]	4.73 [3.81-5.87]	95.5 [93.1-97.1]	<0.0001		0.035
		CDC	3	1987	135	7.5 [5.1-10.5]	2.05 [1.13-3.71]	76.1 [21.5-92.7]	0.015		0.207
	Both									0.013	
		WHO	5	30582	301	1.9 [0.9-3.1]	4.69 [3.52-6.24]	95.4 [91.9-97.4]	<0.0001		0.187
		IOTF	6	37021	640	4.0 [1.5-7.7]	11.92 [10.36-13.71]	99.3 [99.1-99.5]	<0.0001		0.186
		CDC	1	446	23	5.2 [3.3-7.4]	-	-	-		-
Type											
	Overall									0.009	
		WHO	24	13634	1183	8.7 [5.8-12.0]	6.47 [5.87-7.14]	97.6 [97.1-98.0]	<0.0001	0.018	0.228
		IOTF	28	52864	1212	3.7 [2.3-5.4]	8.50 [7.72-9.35]	98.6 [98.3-98.9]	<0.0001	0.003	0.004
		CDC	5	2529	156	6.2 [4.1-8.7]	2.18 [1.41-3.36]	78.9 [49.6-91.1]	0.0008	0.008	0.767
	Public									0.675	
		WHO	12	6762	807	6.2 [3.1-10.3]	5.95 [5.13-6.92]	97.2 [96.2-97.9]	<0.0001		0.446
		IOTF	6	6668	764	4.9 [2.5-8.1]	5.36 [4.23-6.78]	96.5 [94.4-97.8]	<0.0001		0.955
		CDC	2	1483	163	4.2 [1.6-7.9]	2.16 [-]	78.6 [6.8-95.1]	0.031		-
	Private									<0.0001	
		WHO	5	1648	255	16.6 [10.4-23.8]	3.49 [2.49-4.90]	91.8 [83.8-95.8]	<0.0001		0.539
		IOTF	1	692	8	1.2 [0.5-2.1]	-	-	-		-
		CDC	1	200	25	12.5 [8.3-17.4]	-	-	-		-
	Both									0.069	
		WHO	7	5224	487	8.3 [3.2-15.4]	7.93 [6.70-9.38]	98.4 [98.4-98.9]	<0.0001		0.905
		IOTF	11	45504	841	3.3 [1.8-5.3]	9.08 [8.06-10.23]	98.8 [98.5-99.0]	<0.0001		0.044
		CDC	2	846	52	6.2 [4.1-8.7]	1.40 [-]	49.2 [-]	0.160		-
Region											
	Overall									<0.0001	
		WHO	18	34895	979	6.1 [3.4-9.7]	9.12 [8.32-9.99]	98.8 [98.6-99.0]	<0.0001	0.115	0.0019
		IOTF	16	50779	1120	4.0 [2.5-5.9]	8.56 [7.74-9.47]	98.6 [98.3-98.9]	<0.0001	<0.0001	0.003
		CDC	4	2433	158	6.9 [5.0-9.0]	1.82 [1.07-3.09]	69.8 [13.2-89.5]	0.019	0.379	0.320
		Unspecified	2	1361	8	0.5 [0.01-1.7]	2.34 [-]	81.8 [22.9-95.7]	0.019	-	-
	Central									-	
		WHO	1			2.9 [1.6-4.4]	-	-	-		-

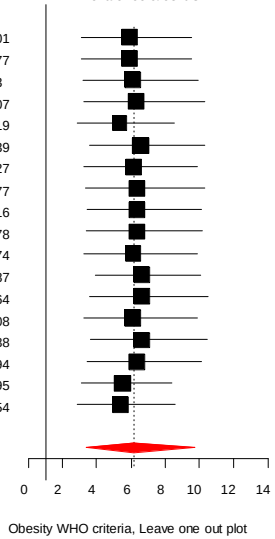
		IOTF	0	-	-	-	-	-	-		-
		CDC	0	-	-	-	-	-	-		-
	Eastern								0.125		
		WHO	4	3730	390	9.6 [3.8-17.6]	6.95 [5.38-8.99]	97.9 [96.5-98.8]	<0.0001		0.976
		IOTF	2	2168	101	4.6 [3.8-5.6]	1.00 [-]	0.0 [-]	0.428		-
		CDC	2	750	55	7.6 [3.2-13.6]	2.72 [-]	86.5 [46.6-96.6]	0.042		-
	Northern								0.219		
		WHO	3	3276	177	8.7 [2.2-19.2]	8.27 [6.25-10.94]	98.5 [97.4-99.2]	<0.0001		0.092
		IOTF	4	7678	239	3.5 [1.5-6.1]	5.43 [4.02-7.33]	96.6 [93.8-98.1]	<0.0001		0.111
		CDC	1	1283	73	5.7 [4.5-7.0]	-	-	-		-
	Southern								0.0044		
		WHO	7	26195	339	4.1 [0.7-9.9]	7.52 [6.32-8.95]	98.2 [97.5-98.8]	<0.0001		0.123
		IOTF	9	39158	766	4.6 [2.2-7.8]	10.41 [9.22-11.76]	99.1 [98.8-99.3]	<0.0001		0.043
		CDC	0	-	-	-	-	-	-		-
		Undefined	2	1361	8	0.5 [0.0-1.7]	2.34 [-]	81.8 [22.9-95.7]	0.019		-
	Western								<0.0001		
		WHO	3	1137	57	6.1 [0.4-18.0]	6.07 [4.32-8.53]	97.3 [94.7-98.6]	<0.0001		0.108
		IOTF	1	1775	14	0.8 [0.4-1.2]	-	-	-		-
		CDC	1	400	30	7.5 [5.1-10.3]	-	-	-		-
Coverage									<0.0001		
	Overall	WHO	18	34895	979	6.1 [3.4-9.7]	9.12 [8.32-9.99]	98.8 [98.6-99.0]	<0.0001		0.0019
		IOTF	16	50779	1120	4.0 [2.5-5.9]	8.56 [7.74-9.47]	98.6 [98.3-98.9]	<0.0001		0.003
		CDC	4	2433	158	6.9 [5.0-9.0]	1.82 [1.07-3.09]	69.8 [13.2-89.5]	0.019		0.320
		Unspecified	2	1361	8	0.5 [0.01-1.7]	2.34 [-]	81.8 [22.9-95.7]	0.019		-
Publication year											
	<2013								0.154		
		WHO	8	28213	360	3.3 [1.4-6.1]	5.76 [4.76-6.97]	97.0 [95.6-97.9]	<0.0001	0.037	0.039
		IOTF	6	40438	691	3.3 [1.2-6.3]	11.95 [10.39-13.74]	99.3 [99.1-99.5]	<0.0001	0.488	0.201
		CDC	2	1587	105	6.2 [4.1-8.7]	2.81 [-]	87.3 [50.5-96.8]	0.005	0.560	-
		Unspecified	0	-	-	-	-	-	-	-	-
	>=2013								<0.0001		
		WHO	10	6682	619	8.9 [4.4-14.8]	7.34 [6.36-8.49]	98.1 [97.5-98.6]	<0.0001		0.572

		IOTF	10	10341	429	4.4 [2.9-6.3]	4.25 [3.46-5.21]	94.5 [91.7-96.3]	<0.0001			0.087
		CDC	2	846	53	7.7 [3.7-13.0]	1.40 [-]	49.2 [-]	0.160			-
		Unspecified	2	1361	8	0.5 [0.0-1.7]	2.34 [-]	81.8 [22.9-95.7]	<0.0001			-
Sample size										<0.0001		
	<638									0.532		
		WHO	11	3485	310	7.1 [3.2-12.4]	5.37 [4.54-6.34]	96.5 [95.1-97.5]	<0.0001		0.461	0.952
		IOTF	12	1874	110	3.5 [1.9-5.6]	1.21 [1.00-2.02]	31.8 [0.0-75.6]	0.221		0.050	0.859
		CDC	3	1150	85	7.5 [4.8-10.7]	1.93 [1.06-3.54]	73.3 [10.3-92.0]	0.074		0.255	0.161
		Unspecified	0	-	-	-	-	-	-		-	
	>=638									<0.0001		
		WHO	7	31410	669	4.8 [1.5-9.8]	11.88 [10.45-13.50]	99.3 [99.1-99.5]	<0.0001			0.053
		IOTF	4	48905	1010	5.8 [4.6-7.2]	9.51 [8.52-10.62]	98.9 [98.6-99.1]	<0.0001			0.017
		CDC	1	1283	73	5.7 [4.5-7.0]	-	-	-			-
		Unspecified	2	1361	8	0.5 [0.0-4.5]	2.34 [-]	81.8 [22.9-95.7]	0.019			-

Note: - not computable

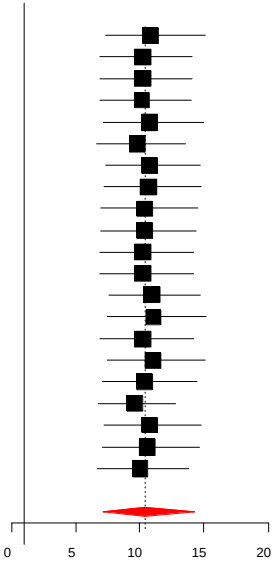
Fig S1: Forest plot showing the effect of omitting one study at a time on pooled prevalence and heterogeneity statistics from studies that used World Health Organisation (WHO) criteria to diagnose prevalent obesity (first panel) and overweight (second panel) in African school learners

Omitted study	Tau square	I square	Prevalence	95% CI
Omitting Mohammed, 2012	0.140624850434694	0.988333602972501	5.9	[3.1; 9.5]
Omitting Mogre, 2013	0.140647113821633	0.988389149307377	5.9	[3.1; 9.5]
Omitting Pangani, 2016	0.146648332365404	0.98768744166603	6.1	[3.2; 9.9]
Omitting Dekkaki et al, 2011	0.150443651566329	0.988525455180707	6.3	[3.3; 10.3]
Omitting Wiles et al, 2013	0.131683194199342	0.986670353752219	5.3	[2.8; 8.6]
Omitting Puckree et al, 2011	0.141787592395396	0.988668244442939	6.6	[3.6; 10.4]
Omitting Mosha & Fungo, 2010	0.142561151019588	0.988488733153527	6.1	[3.3; 9.8]
Omitting Sebanni et al, 2013	0.149945984217527	0.988613132358777	6.4	[3.3; 10.3]
Omitting Oldewage-Theron 2010	0.141949829567598	0.988672640977016	6.4	[3.4; 10.1]
Omitting Navti et al, 2014	0.144455598987201	0.988658385291178	6.4	[3.4; 10.2]
Omitting Muthuri 2014	0.142977134304633	0.988419257388174	6.1	[3.2; 9.9]
Omitting Jinabhai et al, 2003	0.127909910429771	0.974868246971087	6.6	[3.9; 10.0]
Omitting Daboné et al, 2011	0.144673089325608	0.988600260394364	6.6	[3.6; 10.5]
Omitting Abrahams et al, 2011	0.143050813623124	0.988349428843908	6.1	[3.2; 9.8]
Omitting Pedro 2014	0.142715019141337	0.988647524070888	6.6	[3.6; 10.4]
Omitting Pedro 2014	0.142843681480844	0.988663831553294	6.4	[3.4; 10.1]
Omitting Chebet 2014	0.119758077390724	0.982990688060695	5.5	[3.1; 8.4]
Omitting El-Sabely, 2013	0.132779444390472	0.986912573696054	5.4	[2.8; 8.6]
Random effects model			**6.1**	**[3.4; 9.7]**



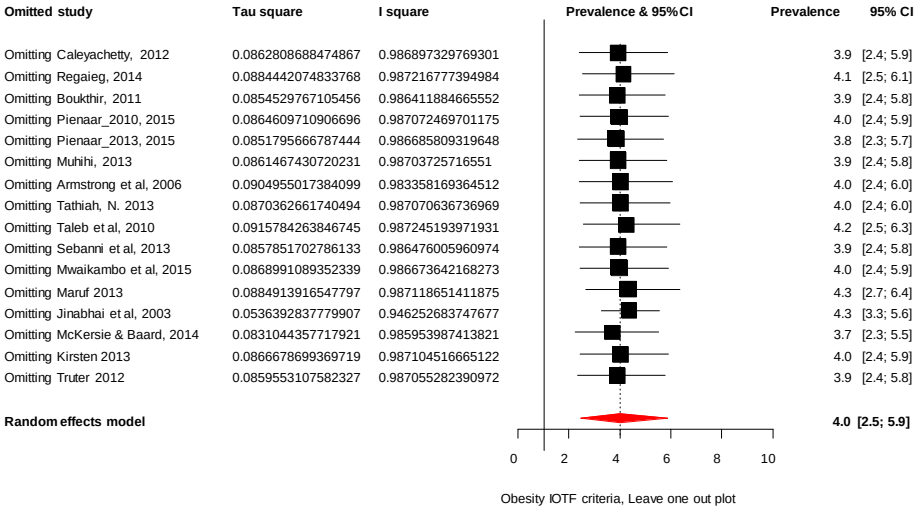
Obesity WHO criteria, Leave one out plot

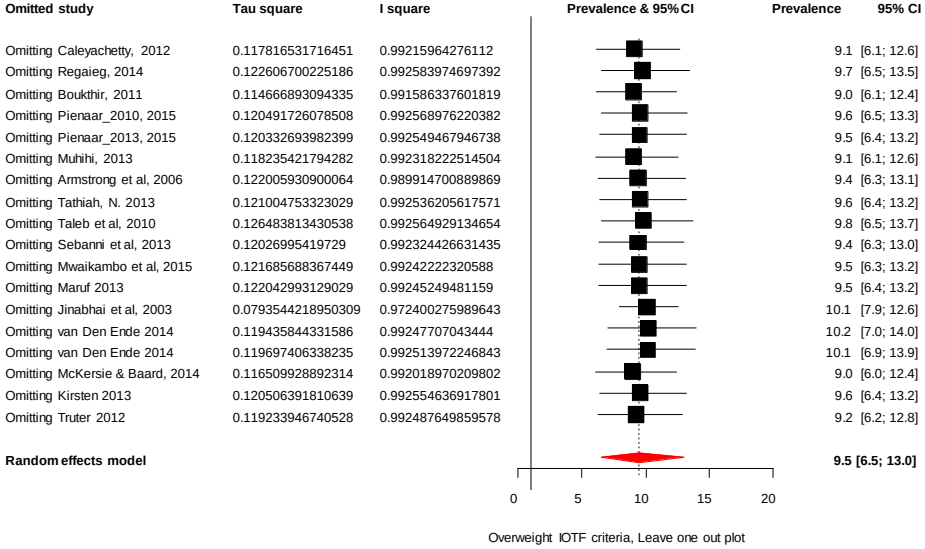
Omitted study	Tau square	I square	Prevalence	95% CI
Omitting Fetuga, 2011	0.139970651216673	0.987471431952188	10.9	[7.3; 15.1]
Omitting Mohammed, 2012	0.135154780134591	0.987272953619674	10.2	[6.9; 14.1]
Omitting Mogre, 2013	0.135259134729546	0.987338629476145	10.2	[6.9; 14.2]
Omitting Pangani, 2016	0.133268841151511	0.985390339783631	10.2	[6.9; 14.1]
Omitting Dekkaki et al, 2011	0.143325327699025	0.987543528857501	10.8	[7.1; 15.0]
Omitting Wiles et al, 2013	0.131399966397211	0.986506292397173	9.8	[6.6; 13.6]
Omitting Puckree et al, 2011	0.135929081581194	0.987547212595855	10.7	[7.3; 14.8]
Omitting Mosha & Fungo, 2010	0.137425725261507	0.987546872923286	10.7	[7.2; 14.8]
Omitting Sebanni et al, 2013	0.139619010246153	0.987030381851853	10.4	[6.9; 14.5]
Omitting Oldewage-Theron 2010	0.135685866584892	0.987483881346472	10.4	[7.0; 14.3]
Omitting Navti et al, 2014	0.1354818964701	0.987073642788591	10.3	[6.9; 14.2]
Omitting Muthuri 2014	0.135639534859542	0.987097766293894	10.3	[6.9; 14.2]
Omitting Jinabhai et al, 2003	0.127821734618399	0.975572079365681	10.9	[7.6; 14.7]
Omitting Daboné et al, 2011	0.137159967729499	0.987300821003202	11.1	[7.5; 15.2]
Omitting Abrahams et al, 2011	0.135714472591578	0.987037958067733	10.3	[6.9; 14.2]
Omitting Pedro 2014	0.136304138501495	0.987464630634985	11.0	[7.5; 15.1]
Omitting Pedro 2014	0.136313414238164	0.987462786606585	10.4	[7.0; 14.4]
Omitting Chebet 2014	0.112732480295542	0.980896317051032	9.6	[6.8; 12.8]
Omitting Prista 2003	0.137662438614095	0.987547685709672	10.7	[7.2; 14.8]
Omitting Prista 2003	0.137890848977392	0.987481849523155	10.6	[7.1; 14.6]
Omitting El-Sabely, 2013	0.133740211486703	0.986989369040468	10.0	[6.7; 13.9]
Random effects model			**10.5**	**[7.1; 14.3]**

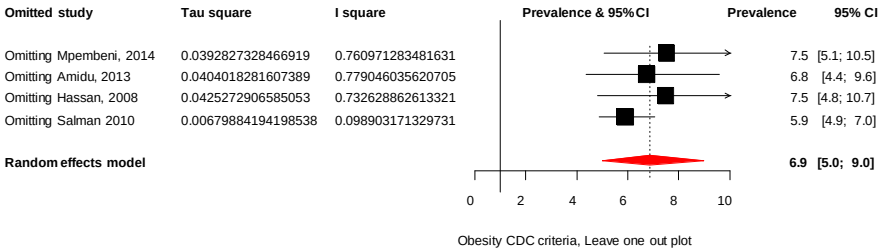


Overweight WHO criteria, Leave one out plot

Fig S2: Forest plot showing the effect of omitting one study at a time on pooled prevalence and heterogeneity statistics from studies that used International Obesity Task Force (IOTF, upper panels) and Centre for Diseases Control (CDC, lower panels) criteria to diagnose prevalent obesity (left panels) and overweight (right panels) in African school learners







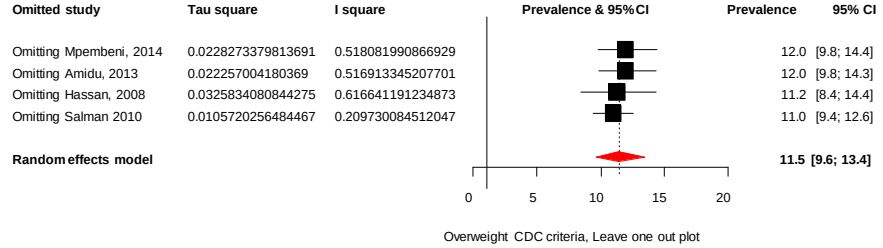


Fig S3: Funnel plots for the assessment of publication bias in studies of prevalent overweight (upper panels) and obesity (lower panels) by the World Health organisation (left column), International Obesity Task Force (middle column) and Centre for Diseases Control (right column) criteria, in African school going children, after implementation of the trim & fill methods to correct for publication bias.

For each figure panel, the dots are the arcsine transformed prevalence estimates of individual studies (horizontal axis) plotted against their standard error (vertical exist). The dotted vertical blue line is for the observed pooled prevalence estimates after imputation of missing studies. The p-value from the egger test of bias is also shown.

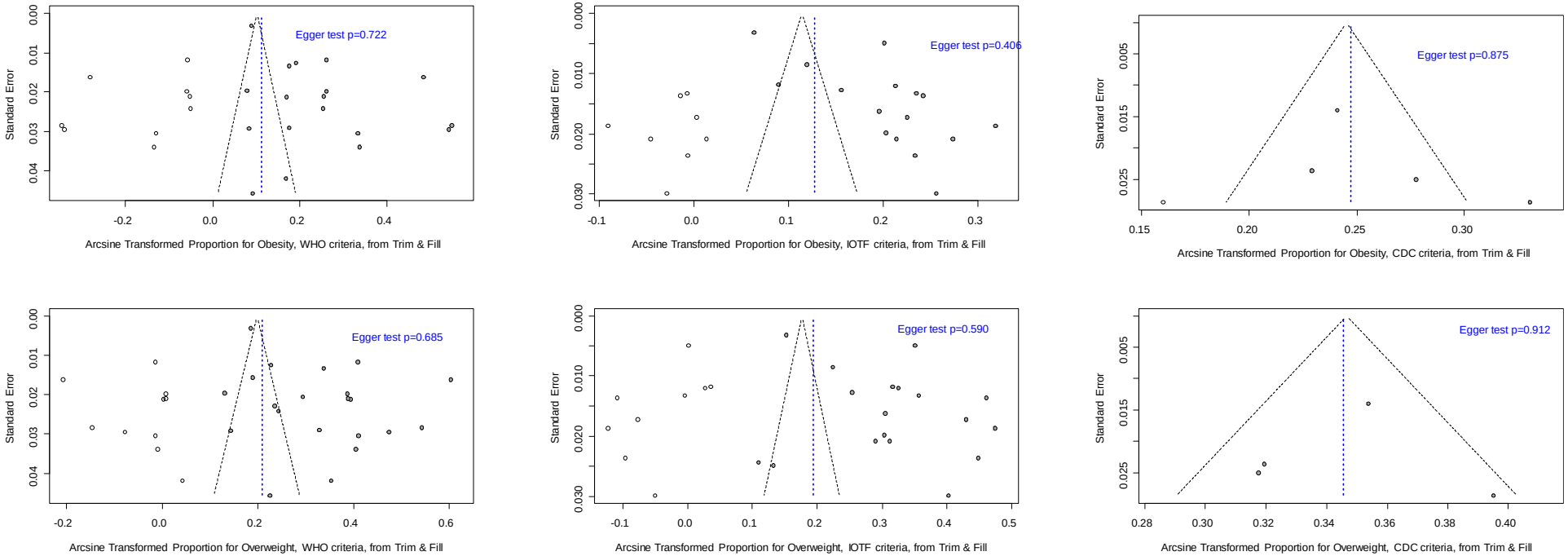
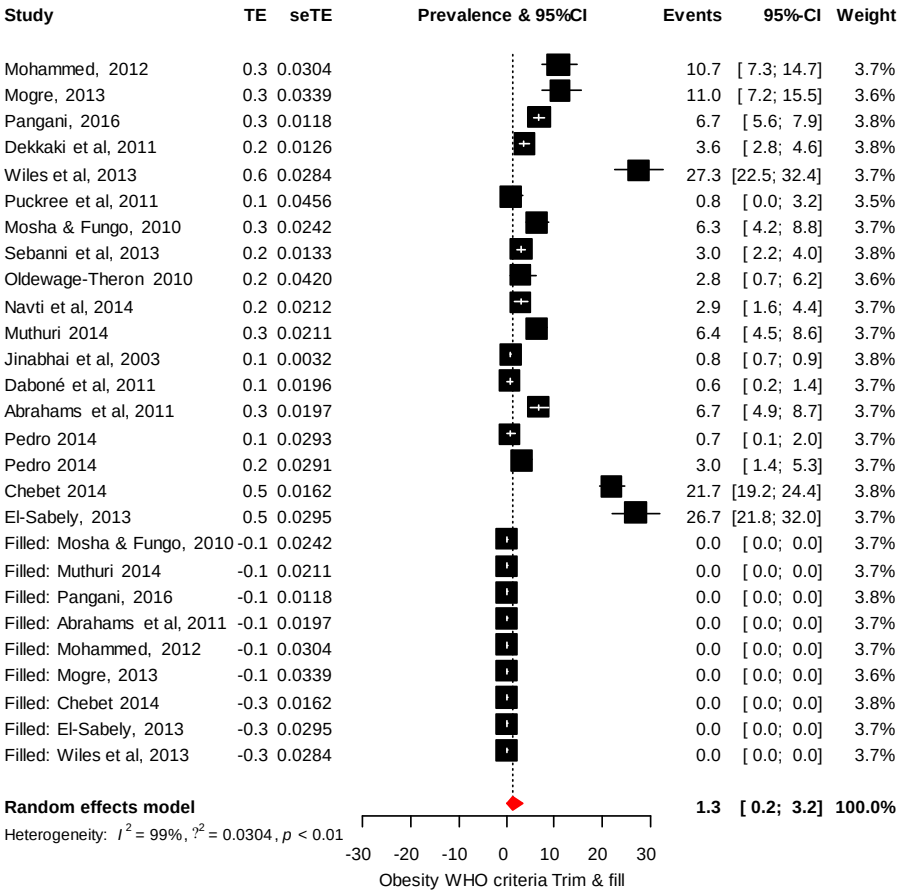


Fig. S4: Forest plots showing the effect of studies imputations on pooled prevalence estimates from trim and fill methods, for studies that used the World Health Organisation (WHO) criteria to diagnose obesity (first panel) or overweight (second panel) in African school going children



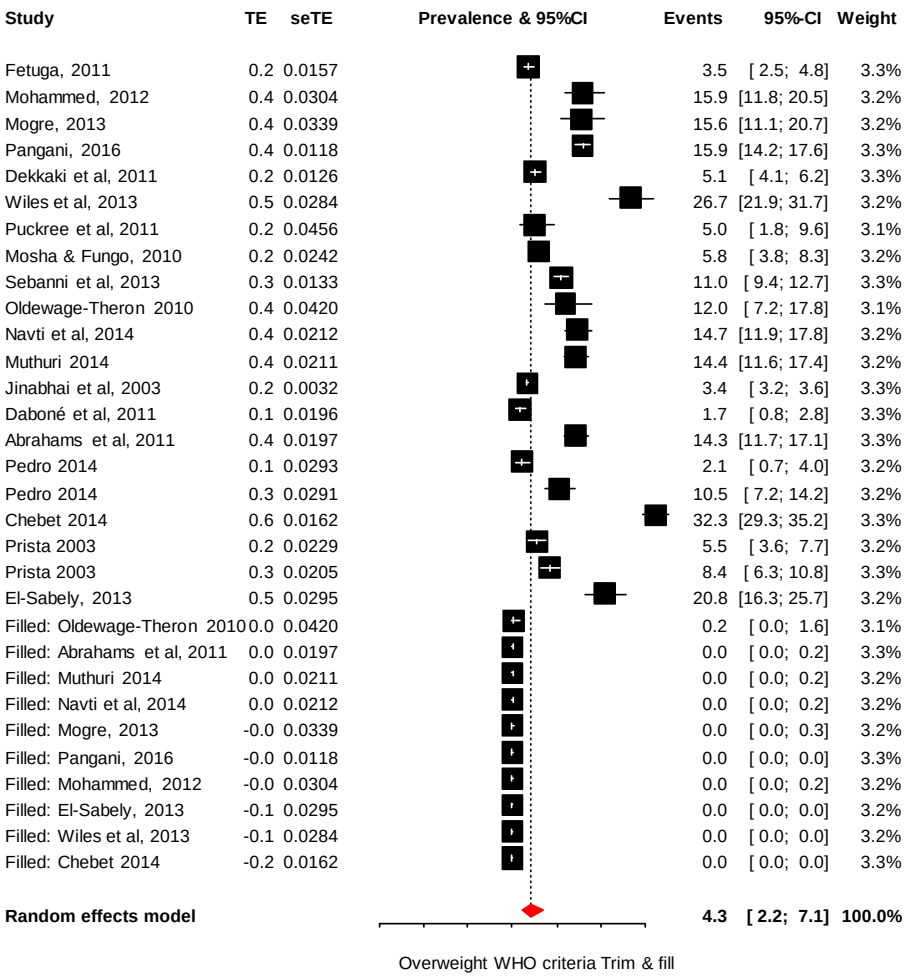
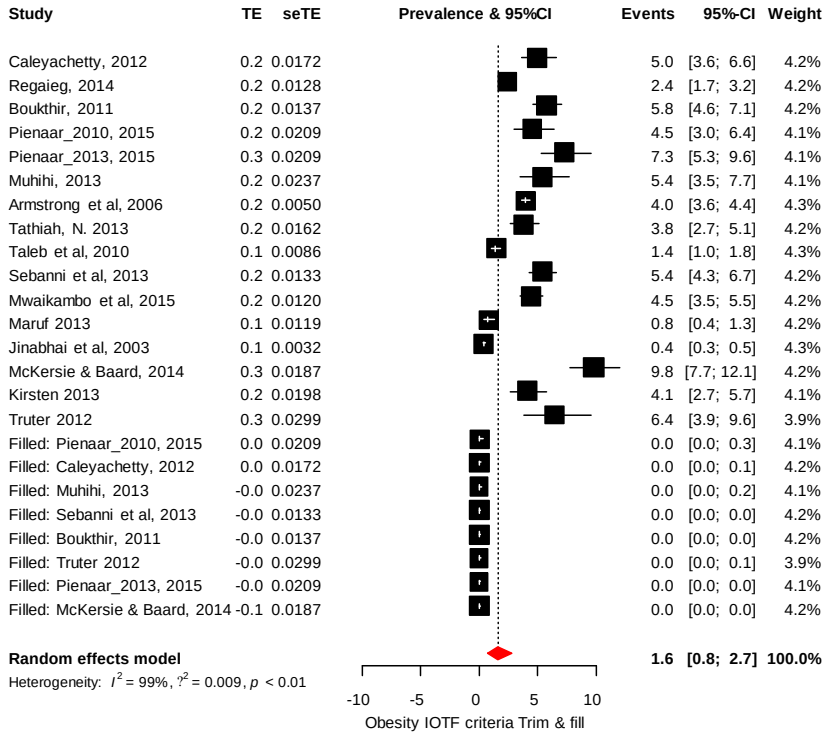
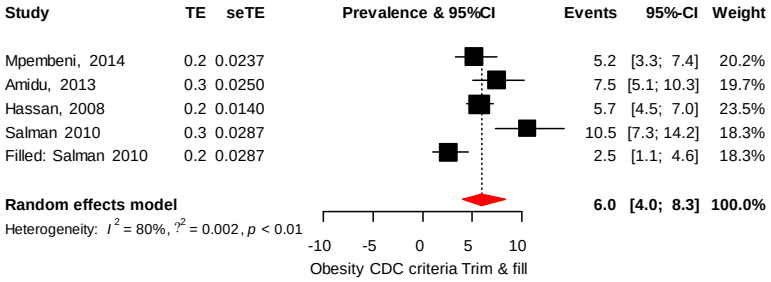
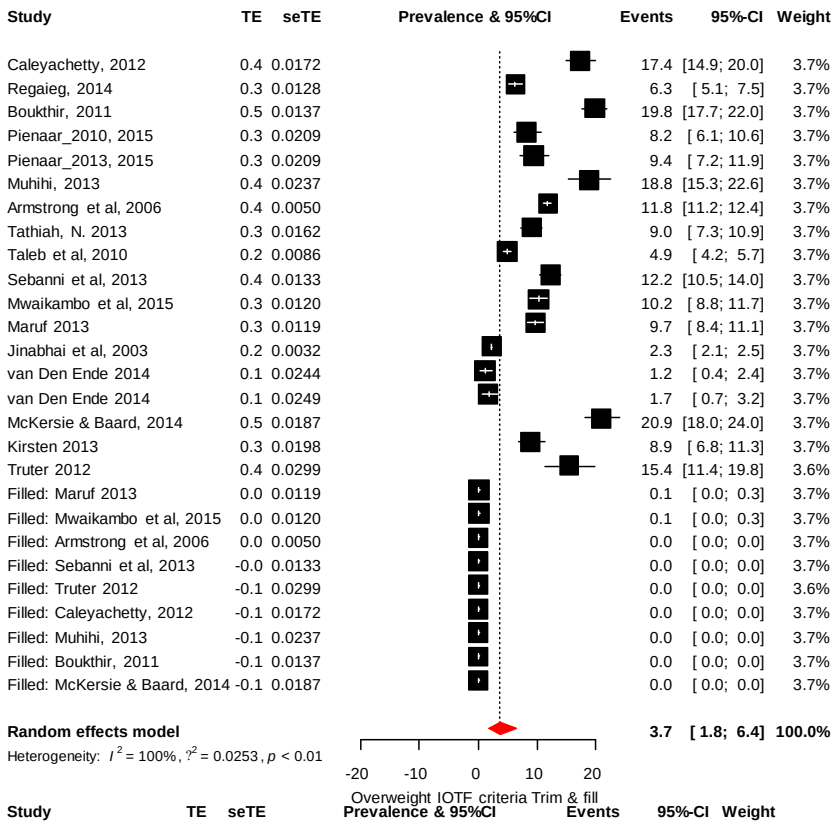


Fig. S5: Forest plots showing the effect of studies imputations on pooled prevalence estimates from trim and fill methods, for studies that used the International Obesity Task Force (IOTF, upper panels) or Centre for Diseases Control (CDC, lower panels) criteria to diagnose obesity (left panels) or overweight (right panels) in African school going children







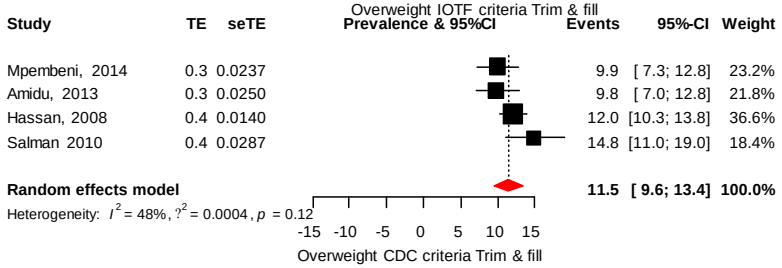


Fig. S6: Prevalence of overweight by major diagnostic criteria in boys. Black boxes represent the effect estimates (prevalence) and the horizontal bars about are for the 95% confidence intervals (CIs). The diamond is for the pooled effect estimate and 95% CI.

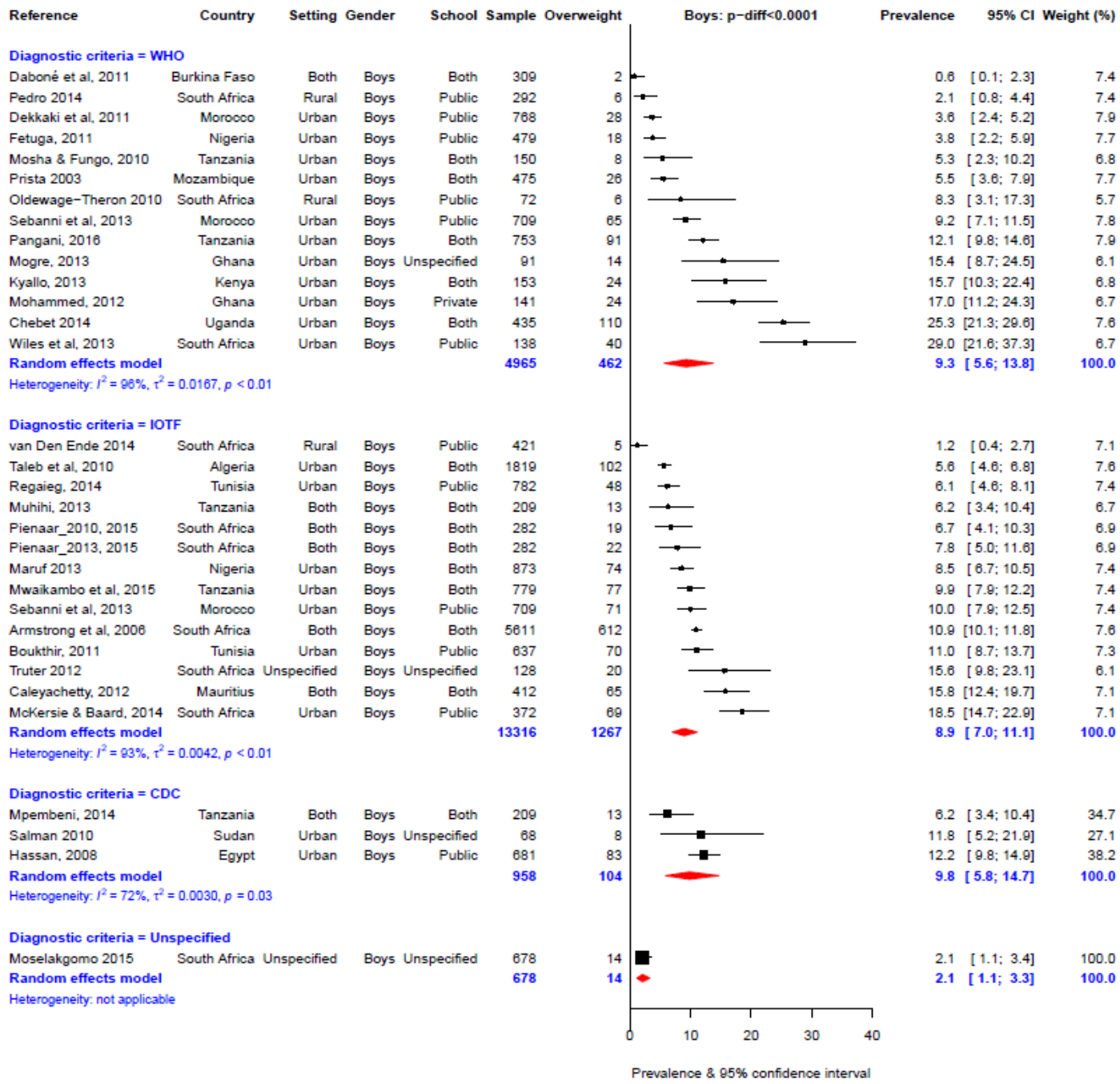


Fig.S7: Prevalence of overweight by major diagnostic criteria in girls. Black boxes represent the effect estimates (prevalence) and the horizontal bars about are for the 95% confidence intervals (CIs). The diamond is for the pooled effect estimate and 95% CI.

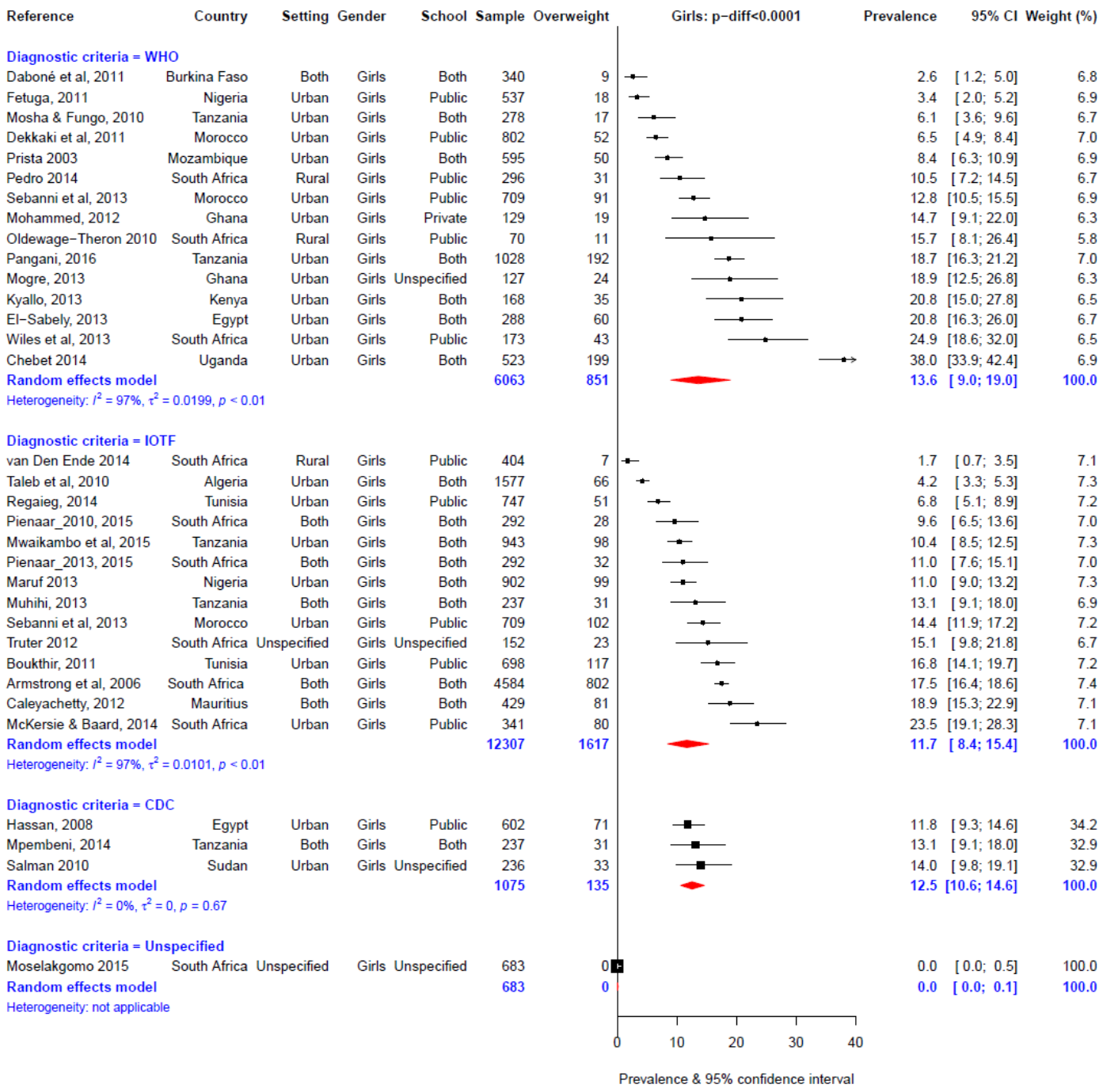


Fig S8: Prevalence of obesity by major diagnostic criteria in boys. Black boxes represent the effect estimates (prevalence) and the horizontal bars about are for the 95% confidence intervals (CIs). The diamond is for the pooled effect estimate and 95% CI.

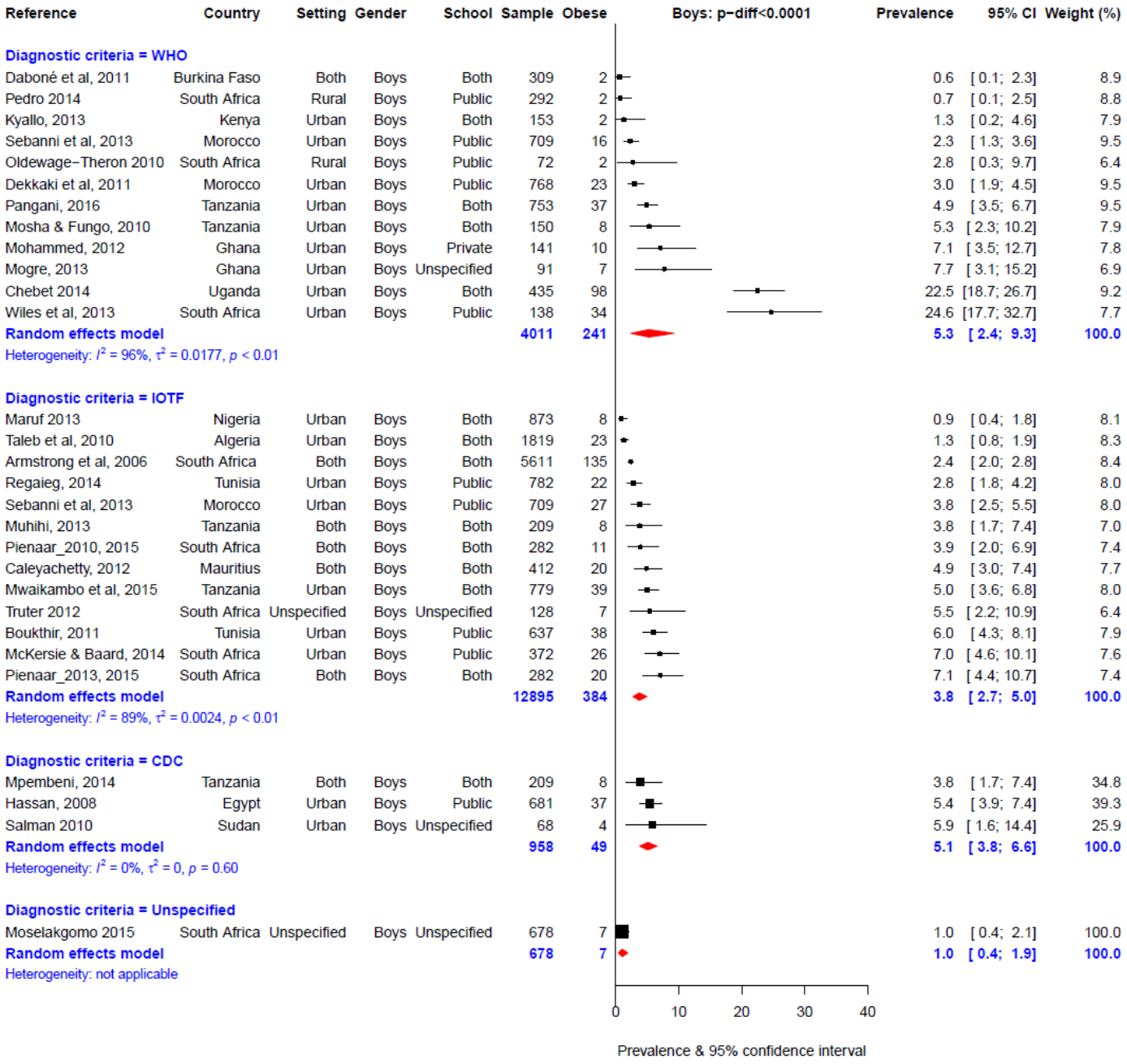


Fig. S9: Prevalence of obesity by major diagnostic criteria in girls. Black boxes represent the effect estimates (prevalence) and the horizontal bars about are for the 95% confidence intervals (CIs). The diamond is for the pooled effect estimate and 95% CI.

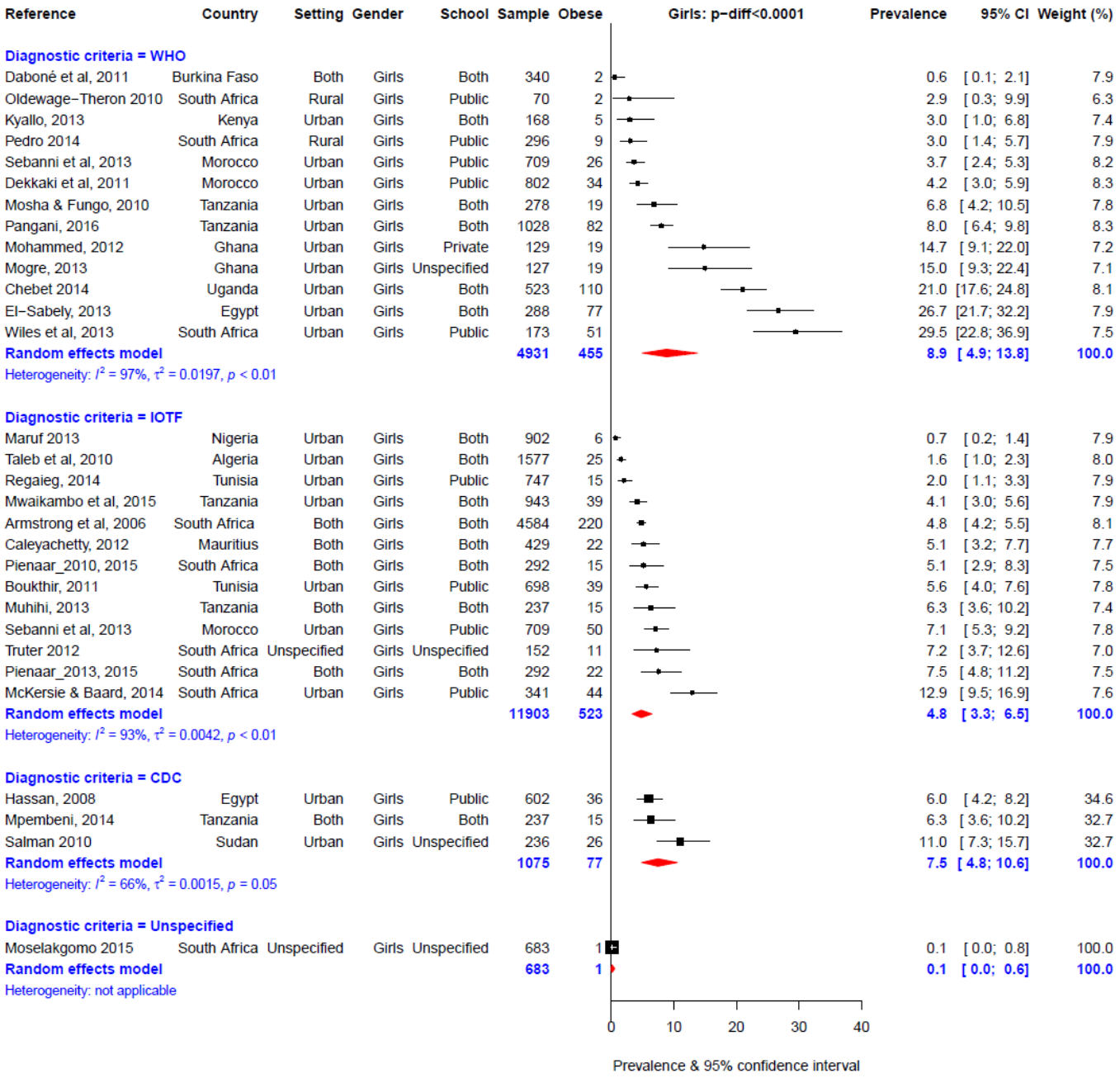


Fig. S10: Prevalence of overweight by major diagnostic criteria in urban studies. Black boxes represent the effect estimates (prevalence) and the horizontal bars about are for the 95% confidence intervals (CIs). The diamond is for the pooled effect estimate and 95% CI.

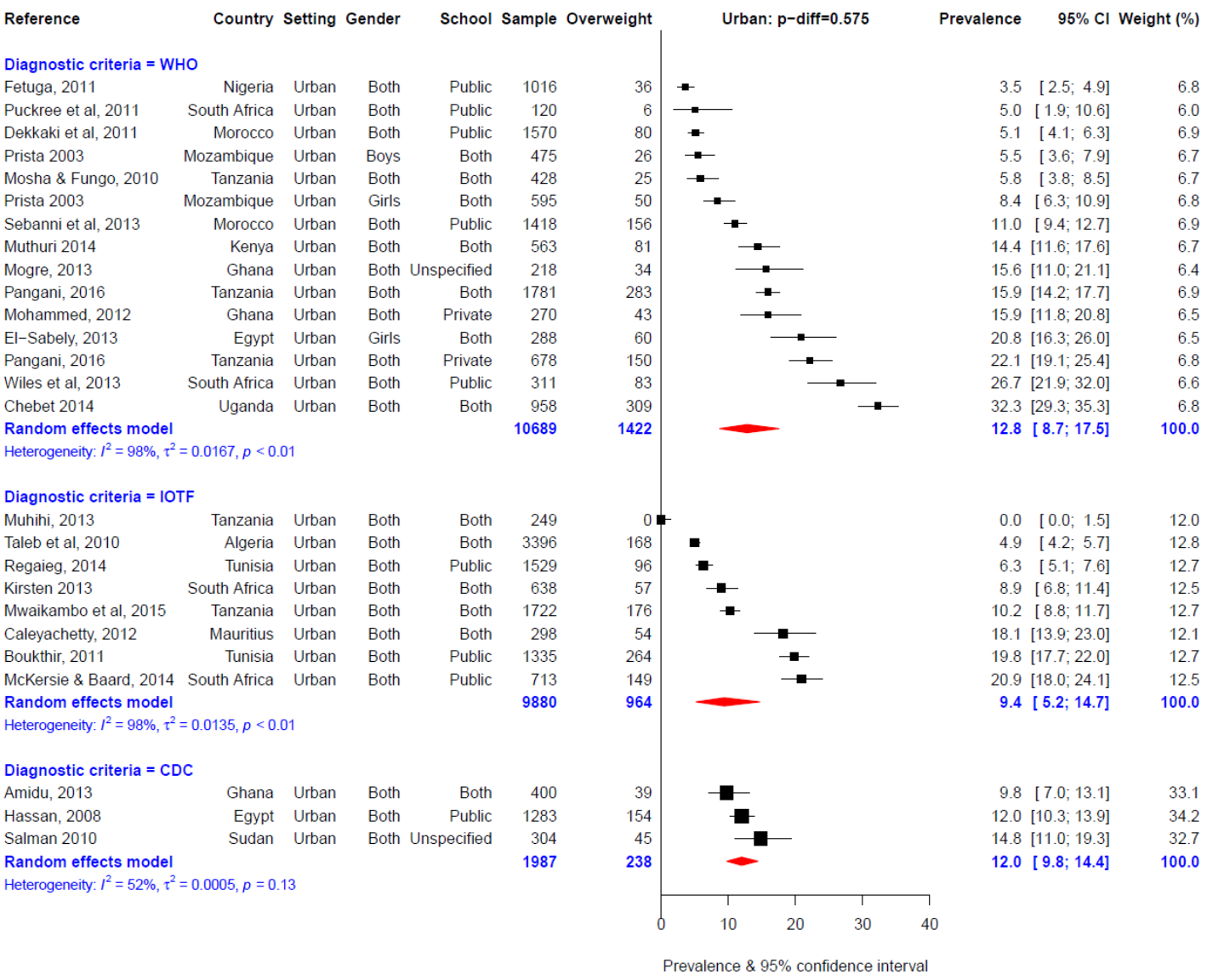


Fig. S11: Prevalence of overweight by major diagnostic criteria in rural studies. Black boxes represent the effect estimates (prevalence) and the horizontal bars about are for the 95% confidence intervals (CIs). The diamond is for the pooled effect estimate and 95% CI.

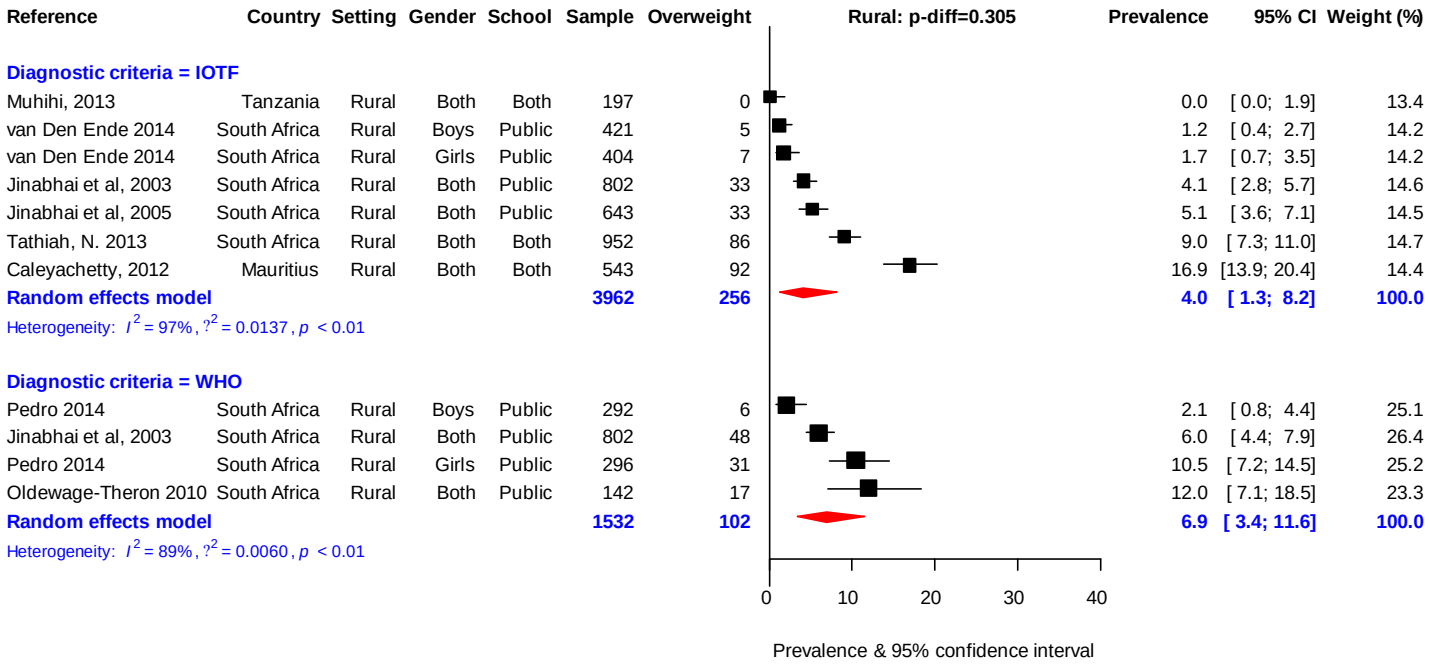


Fig. S12: Prevalence of overweight by major diagnostic criteria in urban and rural studies. Black boxes represent the effect estimates (prevalence) and the horizontal bars about are for the 95% confidence intervals (CIs). The diamond is for the pooled effect estimate and 95% CI.

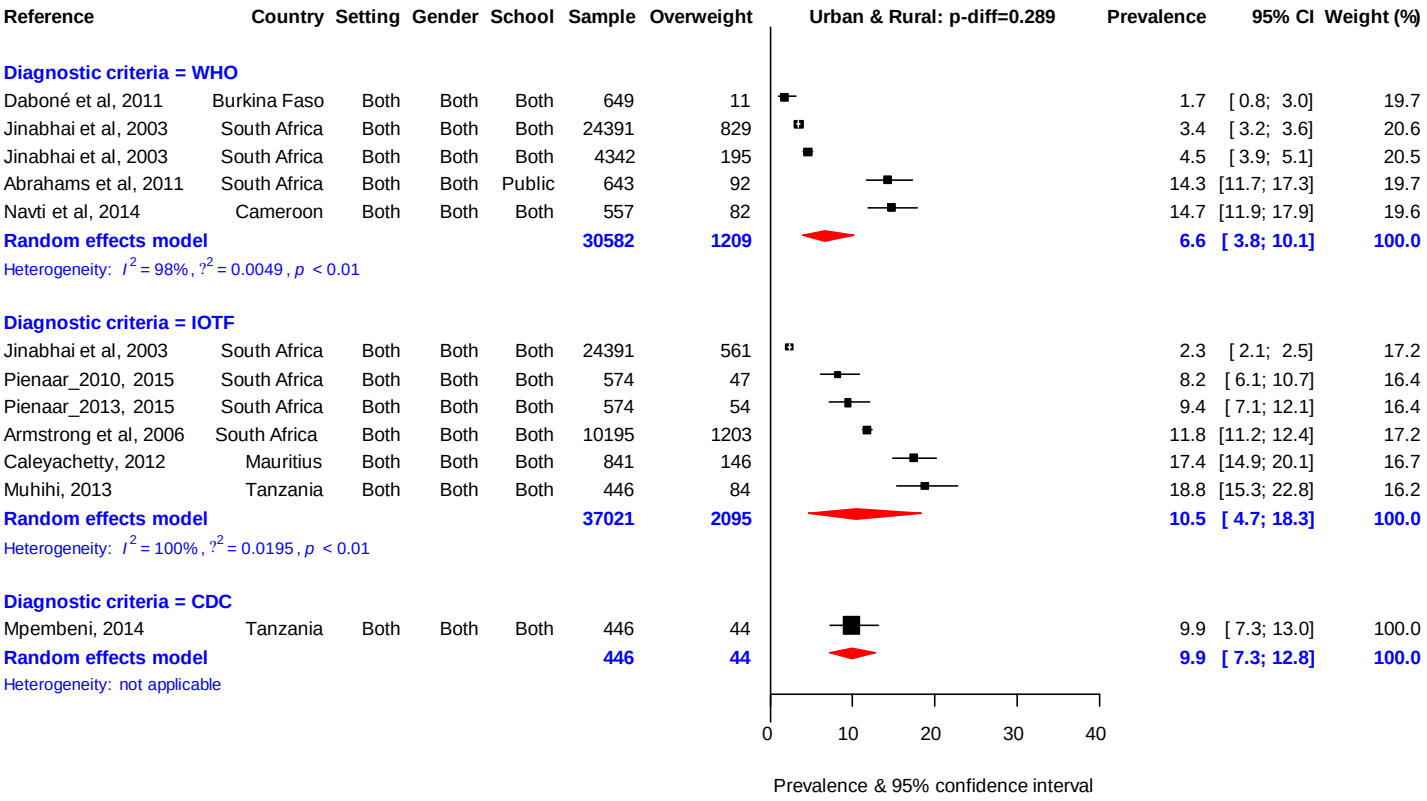


Fig. S13: Prevalence of obesity by major diagnostic criteria in urban studies. Black boxes represent the effect estimates (prevalence) and the horizontal bars about are for the 95% confidence intervals (CIs). The diamond is for the pooled effect estimate and 95% CI.

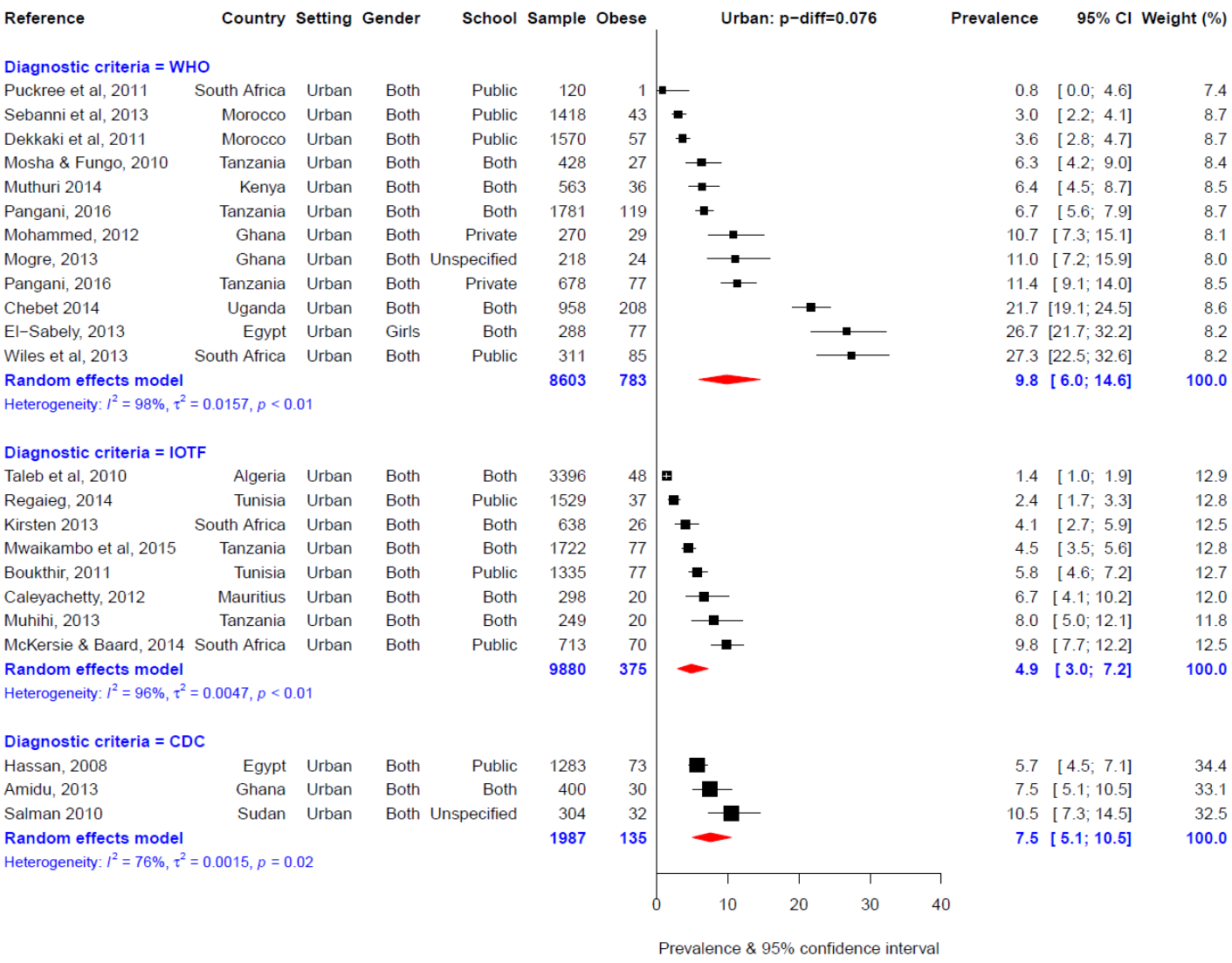


Fig. S14: Prevalence of obesity by major diagnostic criteria in rural studies. Black boxes represent the effect estimates (prevalence) and the horizontal bars about are for the 95% confidence intervals (CIs). The diamond is for the pooled effect estimate and 95% CI.

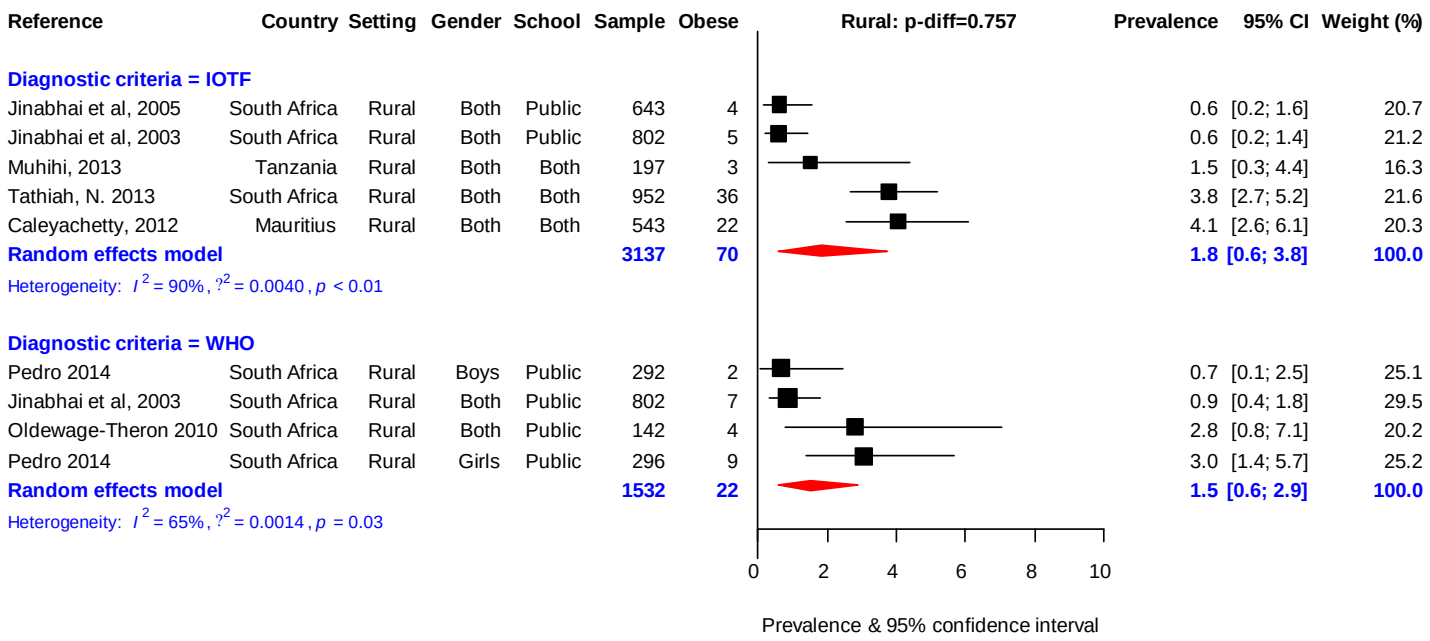


Fig. S15: Prevalence of overweight by major diagnostic criteria in public schools studies. Black boxes represent the effect estimates (prevalence) and the horizontal bars about are for the 95% confidence intervals (CIs). The diamond is for the pooled effect estimate and 95% CI.

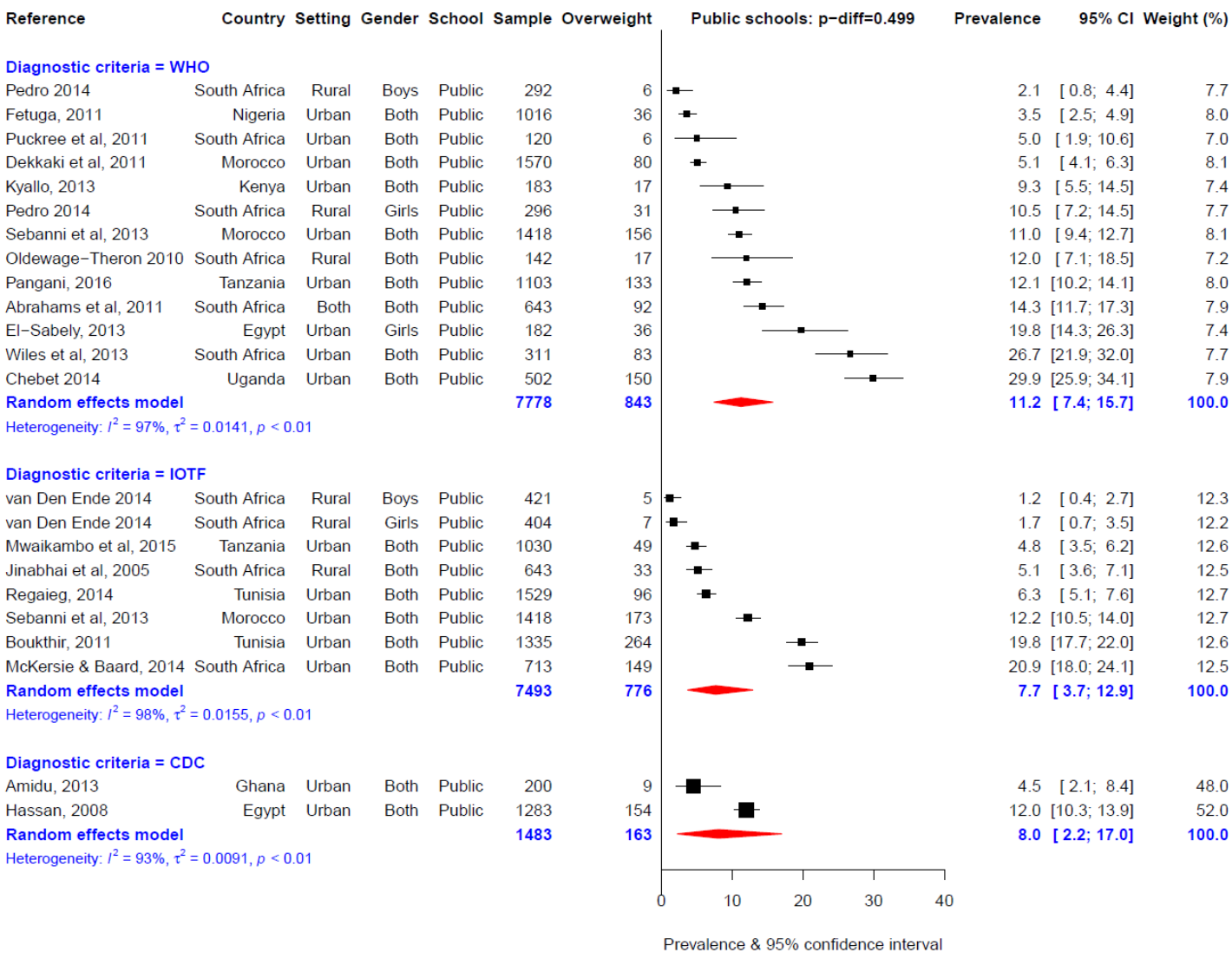


Fig. S16: Prevalence of overweight by major diagnostic criteria in private schools studies. Black boxes represent the effect estimates (prevalence) and the horizontal bars about are for the 95% confidence intervals (CIs). The diamond is for the pooled effect estimate and 95% CI.

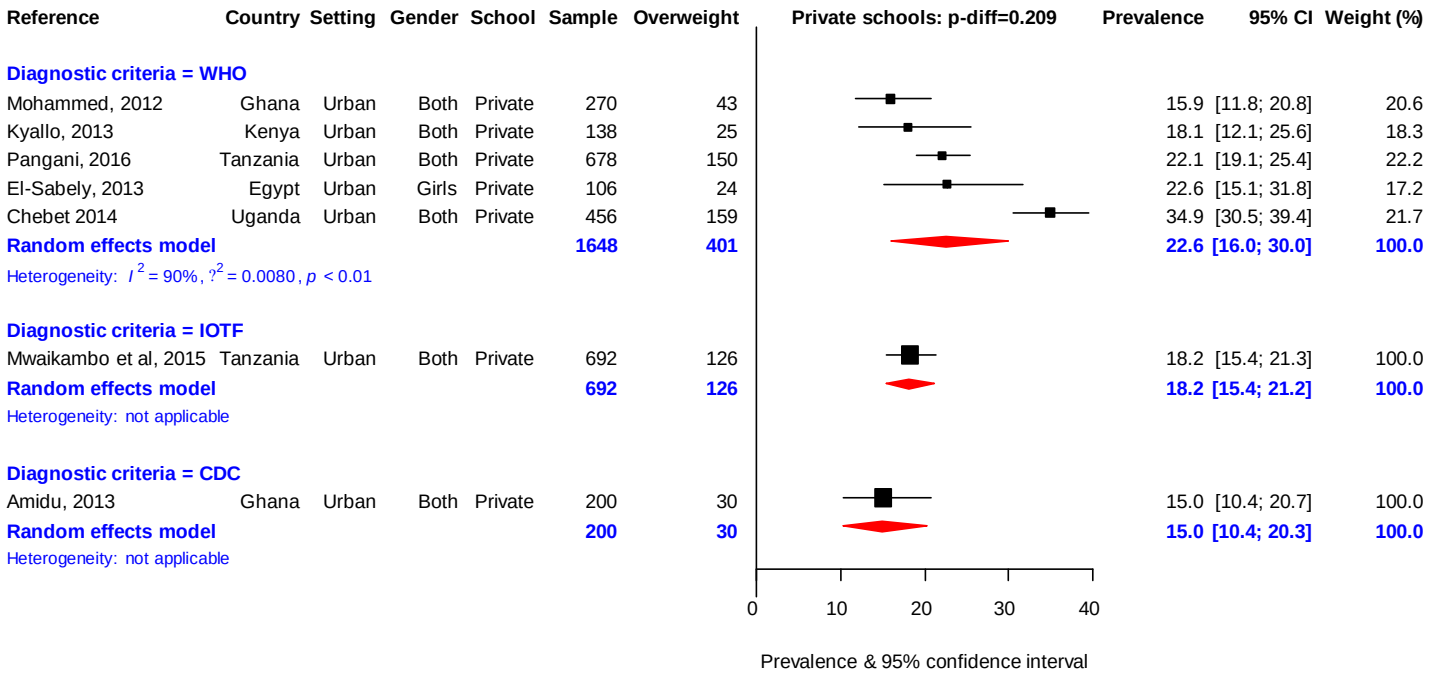


Fig. S17: Prevalence of obesity by major diagnostic criteria in public schools studies. Black boxes represent the effect estimates (prevalence) and the horizontal bars about are for the 95% confidence intervals (CIs). The diamond is for the pooled effect estimate and 95% CI.

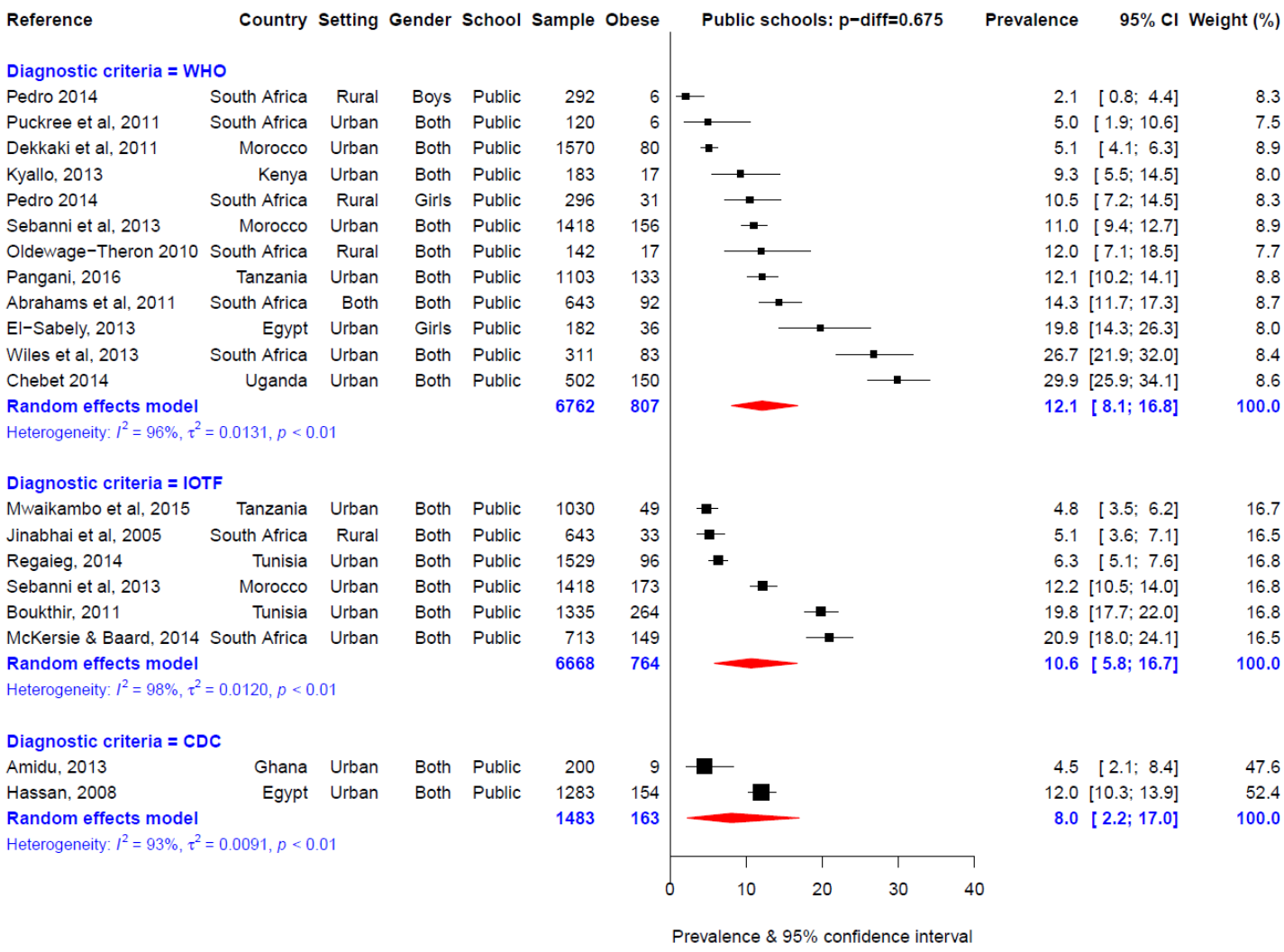


Fig. S18: Prevalence of obesity by major diagnostic criteria in private schools studies. Black boxes represent the effect estimates (prevalence) and the horizontal bars about are for the 95% confidence intervals (CIs). The diamond is for the pooled effect estimate and 95% CI.