Supplementary Tables

Supplementary Table 1. Re-classification of publications using more than one category to define urban or rural settings in asthma studies.

Publication	Asthma definition (AD)	Categories	New Categories	AD 1 (%)	AD 2 (%)	AD 3 (%)	Urban vs rural Prevalence (%)
Addo-Yobo et al. (10) Ghana, 2007	AD1. Exercise challenge test	Urban Rich	Urban	8.3			5.65 vs 3.9
		Urban Poor	Urban	3			
		Rural	Rural	3.9			
Addo-Yobo et al. (28) Ghana, 1997	AD1. Exercise challenge test	Urban Rich	Urban	4.2			3.42 vs 2.2
		Urban Poor	Urban	1.4			
		Rural	Rural	2.2			
Bouayad et al. (59) Morroco, 2006	AD1. Current wheeze	Casablanca city	Urban	16.2	23.9		9.91 vs 6.44
	AD2. Wheezing ever	Marrakech city	Urban	4.6	10.3		16.13 vs 12.9
		Ben Slimane city	Urban	8.9	14.2		
		Boulmane rural area	Rural	6.4	12.9		
El-Sharif et al. (33) Palestine, 2002	AD1. Current wheeze	Refugee camps	Urban	12.6	22.1	15.6	9.9 vs 7.46
	AD2. Wheeze ever	Cities	Urban	7.2	16.5	7.3	19.3 vs 16.6
	AD3. Doctor diagnosis	Semi urban	Rural	6.3	12.9	5.6	11.45 vs 8.5
		Typical rural	Rural	10.2	18.1	10	
		Primitive	Rural	5.9	15.8	9.9	
Keeley rt al. (32) Zimbabwe, 1991	AD1. Exercise challenge test	Urban North	Urban	5.8			4.45 vs 0.15
		Urban South	Urban	3.1			
		Rural	Rural	0.01			
Steiman et al. (31) South Africa, 2003	AD1. Exercise challenge test	Urban School	Urban	32.9			33.65 vs 17
		Recently urbanized	Urban	34.4			
		Rural school	Rural	17			
Viinamen et al. (24) Mongolia, 2005	AD1. Questionnaire diagnosis	City	Urban	2.1			2.1 vs 1.75
		Rural towns	Rural	2.4			
		Villages	Rural	1.1			
Gaur et al. (29) India, 2006	AD1. Exercise challenge test	Urban city	Urban	7.7			10.21 vs 13. 3
		Urban slum	Urban	11.9			
		Rural	Rural	13.3			
Mavale-Manuel et al (27) Mozambique, 2007	AD1. Current wheeze	Urban	Urban	13.6	25.15		13.5 vs 12.8
	AD2. Wheeze ever	Suburban	Urban	13.5	24		24.58 vs 22.6
		Semirural	Rural	12.9	22.6		
Kausel et al.(26) Chile, 2013	AD1. Current wheeze	Urban	Urban	16	15.8		15.69 vs 6
	AD2. Self-reported asthma	Semiurban	Urban	10	17.6		16 vs 20
		Rural	Rural	6	20		
Gaviola et al.(24) Peru, 2016	AD1. Current wheeze	Urban_Lima	Urban	9.9	8.2		5.85 vs 1.85
	AD2. Doctor diagnosis	Urban_Puno	Urban	1.8	2.6		5.4 vs1.15
		Semiurban_Tumbes	Rural	2.5	1.7		
		Rural_Puno	Rural	1.2	0.6		

Supplementary Table 2. Differences in asthma prevalence between urban and rural populations by asthma definition.

		Wheeze ever		Current Wheeze		Doctor diagnosis		Exercise test		Self-reported		Questionnaire	
Author (reference)	**Country, year**	**Urban vs Rural**	**diff**	**Urban vs Rural**	**diff**	**Urban vs Rural**	**diff**	**Urban vs Rural**	**diff**	**Urban vs Rural**	**diff**	**Urban vs Rural**	**diff**
Addo-Yobo et al.(10)	Ghana, 2007							5.7 vs 3.9	**				
Selcut et al. (11)	Turkey, 2010			6 vs 5.2	**							5.8 vs 5.2	**
Selcut et al. (11)	Turkey, 2010			12.6 vs 9.7	***							12.1 vs 8.6	***
Oluwole et al.(57)	Nigeria , 2013											8 vs 7.5	**
Yang et al. (73)	China , 2015											6.6 vs 2.5	***
Kahwa et al. (77)	Jamaica, 2012			18.5 vs 20.5	*	18.3 vs 15.4	**						
Mavale-Manuel et al. (27)	Mozambique. 2007	24.6 vs 22.4	**	13.5 vs 12.8	**								
Hijazi et al. (67)	Saudi Arabia, 1998	17.8 vs 7.3	***	13.2 vs 6.4	***					14.9 vs 5.4	***		
Walraven et al. (54)	Gambia, 2001			4.2 vs 3.3	**	3.6 vs 0.7	***						
Solis et al. (78)	Bolivia, 2014	27.4 vs 34.9	*	16.4 vs 21.7	*			19.2 vs 13.1	**				
Solé et al. (22)	Brazil, 2007	32.6 vs 23	***	18.6 vs 12.5	***					21.1 vs 8.5	***		
Solé et al. (22)	Brazil, 2007	42.1 vs 37.4	***	16.7 vs 15.3	**					14.9 vs 11.1	***		
Steiman et al. (31)	South Africa, 2003							33.7 vs 17	***				
Kausel et al. (26)	Chile, 2013			15.7 vs 6	***					16 vs 20	*		
Zhang et al. (68)	China, 2014											1.1 vs 0.5	***
Keeley et al. (32)	Zimbabwe, 1991							4.5 vs 0.2	***				
Robinson et al. (79)	Peru, 2011			10.1 vs 2.8	***	13 vs 2.2	***			11.6 vs 3.1	***		
Abdalla et al. (55)	Egypt, 2012					6.4 vs 5.2	**						
Yemaneberhan et al. (56)	Ethiopia, 1997			3.7 vs 1.2	***					3.6 vs 1.3	***		
Addo-Yobo et al . (28)	Ghana,1997							3.4 vs 2.2	**				
Vlaski et al. (85)	Macedonia, 2014			7.2 vs 4.9	***					1.9 vs 1.2	**		
El-Sharif et al. (33)	Palestine, 2002	19.3 vs 15.6	***	9.9 vs 7.5	***	11.5 vs 8.5	***						
Adetoun et al.(43)	Nigeria,2013			5.7 vs 4.1	**	0.4 vs 2.9	*						
Viinanen et al. (30)	Mongolia, 2005											2.1 vs 1.8	**
Gaur et al.(29)	India, 2006							10.2 vs 13.3	*				
Ng'ang'a et al. (44)	Kenya, 1998							22.9 vs 13.2	***				
Musafiri et al. (45)	Rwanda, 2011			11.9 vs 13.1	*	7.3 vs 5.7	**					19.3 vs 8.3	***
Calvert et al. (46)	South Africa, 2015							14.9 vs 8.7	***				
Shimwela et al. (47)	Tanzania, 2014			23.1 vs 12.1	***			6.3 vs 2.4	***	17.1 vs 6.6	***		
Guner et al. (69)	Turkey, 2011			5.6 vs 6.3	*	10.5 vs 7.1	**					12.7 vs 9.9	**
Fedortsiv et al. (70)	Ukraine, 2012			12.4 vs 10.6	**	2.6 vs 1.3	***						
Lâm et al. (71)	Vietnam, 2011	5.6 vs 3.9	***	4.3 vs 5.1	*	3.9 vs 3.8	**						

Dagoye et al. (48)	Ethiopia, 2003			4.4 vs 2	***								
Ekici et al. (72)	Turkey 2009			6.9 vs 9.9	*							11.4 vs 14.1	*
Rodriguez et al. (80)	Ecuador, 2015			9.4 vs 10.1	*								
Van Niekerk et al.A (49)	South Africa, 1979							3.2 vs 0.1	***				
Hasan et al. (58)	Palestine, 2000	16.4 vs 12	**	10.5 vs 5.5	***					4.2 vs 2.8	**		
Odhiambo et al. (50)	Kenya, 1998	13.4 vs 3.2	***	9.5 vs 2.5	***	4.2 vs 0.2	***						
Feng et al. (59)	China, 2016	14.6 vs 4.2	***	6.1 vs 1.5	***	6.9 vs 3.4	***						
Paranesh et al. (60)	India, 2002											16.6 vs 5.7	***
Soares et al. (81)	Brazil, 2004	37 vs 23.6	***	16.2 vs 10.9	***					24.7 vs 15.2	***		
Ma Y et al. (61)	China, 2009			7.2 vs 1	***	6.3 vs 1.1	***						
Huang et al. (62)	China, 2014	6.6 vs 3.2	***	2.8 vs 1.5	***								
Cooper et al. (82)	Ecuador, 2016	27 vs 23	**										
Bedolla et al. (83)	Mexico, 2017	23.5 vs 24.9	*	9.5 vs 10.1	*	8.5 vs 5.8	**						
Zhu et al. (63)	China, 2015											3.7 vs 1.3	***
Chakravarthy et al. (64)	India, 2002	19.6 vs 14.4	**			5.4 vs 4.5	**						
Menezes et al. (74)	Brasil, 2015					4.6 vs 3.1	***						
Tug et al. (65)	Turkey, 2002	25.8 vs 29.6	*	19.3 vs 27.3	*								
Zedan et al. (51)	Egipt, 2009											8 vs 7	**
Mugusi et al. (23)	Cameroon, 2004	5.6 vs 2.9	***	3.4 vs 2.9	**					3.7 vs 3.2	**		
Mugusi et al. (23)	Cameroon, 2004	2.3 vs 3.7	*	1 vs 3.3	*					1.2 vs 3.3	*		
Gaviola et al. (24)	Peru, 2016			11 vs 3.1	***	6.3 vs 1.3	***						
Yakubovich et al.E (52)	South Africa, 2016									5.9 vs 4	***		
Kumar et al. (66)	India, 2017											11.9 vs 9.8	**
Han et al. (75)	Argentina, 2017			13 vs 7.1	***	4.3 vs 4.8	*						
Ehrlich et al. (53)	South Africa, 2005			15.3vs17.9	*	4.2vs3.1	***						
Lynch et al. (76)	Venezuela, 1984					5.8 vs 1.8	***						
Bouayad et al. (25)	Morroco, 2006	16.13 vs12.9	***	9.9 vs 6,4	***								

*****Higher in urban area and statistical significant. ** Higher in urban area and no statistical significant, * Higher in rural area.**

Supplementary Table 3. Methodological quality of studies included in systematic review

Author (Country-year of publications)	Area description	Population description	Sample method	Sample size	Urban definition	Response rate	Overall quality
Van Niekerk et al. (South Africa-1979)	+	+	-	+	+	unk	Low
Lynch et al. (Venezuela-1984)	+	+	-	-	+	unk	Low
Keeley et al. (Zimbabwe-1991)	+	+	-	+	+	unk	Low
Addo-Yobo et al. (Ghana*-1997)	+	+	-	+	+	unk	Low
Yemaneberhan et al. (Ethiopia-1997)	-	-	+	+	+	unk	Low
Hijazi et al. (Saudi Arabia-1998)	+	-	+	+	+	unk	Low
Ng'ang'a et al. (Kenya-1998)	+	+	+	+	+	+	High
Odhiambo et al. (Kenya-1998)	+	+	+	+	+	+	High
Hasan et al. (Palestine-2000)	+	+	+	+	+	+	High
Walraven et al. (Gambia-2001)	+	+	+	+	+	+	High
Chakravarthy et al. (India-2002)	+	-	-	+	-	+	Low
El-Sharif et al. (Palestine-2002)	+	+	+	+	-	+	Medium
Paranesh et al. (India-2002)	+	+	-	+	-	unk	Low
Tug et al. (Turkey-2002)	+	+	-	+	+	+	Medium
Dagoye et al. (Ethiopia-2003)	-	-	-	+	+	unk	Low
Steiman et al. (South Africa-2003)	+	+	-	-	+	+	Low
Mugusi et al. (Tanzania-2004)	+	+	+	+	+	unk	Medium
Mugusi et al. (Cameroon-2004)	+	+	+	+	+	unk	Medium
Maia et al. (Brazil-2004)	+	+	+	+	+	unk	Medium
Ehrlich et al. (South Africa-2005)	-	+	+	+	+	+	Medium
Viinanen et al. (Mongolia-2005)	+	+	+	+	+	+	High
Bouayad et al. (Morroco-2005)	+	+	-	+	+	-	Low
Gaur et al. (India*-2006)	+	+	-	+	+	unk	Low
Addo-Yobo et al. (Ghana*-2007)	+	+	-	+	+	unk	Low
Cunha et al. (Brazil-2007)	-	+	+	+	+	na	Medium
Mavale-Manuel et al. (Mozambique-2007)	+	+	+	+	+	+	High
Solé et al. (Brazil^-2007)	+	+	+	+	+	unk	Medium
Solé et al. (Brazil^-2007)	+	+	+	+	+	unk	Medium
Ekici A et al. (Turkey-2009)	+	-	+	+	-	+	Low
Ma Y et al. (China-2009)	-	+	+	+	-	unk	Low
Zedan et al. (Egipt-2009)	-	-	+	+	+	+	Low
Calvert et al. (South Africa-2010)	+	+	+	+	+	unk	Medium
Selcuk et al. (Turkey*-2010)	+	+	+	+	+	+	High
Selcuk et al. (Turkey*-2010)	+	+	+	+	+	+	High
Guner et al. (Turkey-2011)	-	-	+	-	-	+	Low
Oluwole et al.(Nigeria-2013)	-	-	-	+	+	unk	Low
Yang et al. (China-2015)	-	-	-	+	+	unk	Low
Lam et al. (Vietnam-2011)	+	+	+	+	+	+	High
Musafiri et al. (Rwanda-2011)	+	+	+	+	+	+	High
Robinson et al. (Peru-2011)	+	+	-	+	+	+	Medium
Rodriguez et al. (Ecuador-2011)	+	+	+	+	+	na	High
Abdallah et al. (Egypt-2012)	+	+	+	+	+	+	High
Fedortsiv et al. (Ukraine-2012)	-	-	+	+	-	+	Low
Kahwa et al. (Jamaica-2012)	+	+	+	+	+	+	High
Adetoun Mustapha et al. (Nigeria-2013)	+	+	+	+	+	+	High
Kausel et al. (Chile-2013)	+	-	-	+	+	unk	Low
Antunes et al (Brazil-2014)	-	-	+	+	+	na	Low
Fatore et al. (Latin America-2014)	+	+	+	+	+	na	High
Huang et al. (China-2014)	+	+	-	+	+	unk	Low
Shimwela et al. (Tanzania-2014)	+	+	+	+	+	+	High
Solis et al. (Bolivia-2014)	+	+	+	+	+	+	High
Vlaski et al. (Macedonia-2014)	+	+	+	+	+	+	High
Zhang et al. (China-2014)	-	+	+	+	+	+	Medium

Menezes et al. (Brasil-2015)	-	-	+	+	-	unk	Low
Rodriguez et al. (Ecuador-2015)	+	+	-	+	+	+	Medium
Cooper et al. (Ecuador-2016)	+	+	-	+	-	+	Low
Tabalipa et al. (Brazil-2015)	+	+	+	+	+	na	High
Feng, et al. (China-2015)	+	+	+	+	+	+	High
Zhu et al. (China-2015)	+	+	+	+	+	+	High
Yakubovich et al. (South Africa-2016)	+	+	+	+	+	unk	Medium
Dias et al. (Brazil-2016)	+	+	+	+	+	na	High
Ponte et al. (Brazil-2016)	-	+	+	+	+	na	Medium
Gaviola et al. (Peru-2016)	+	+	+	+	+	+	High
Bedolla-Barajas et al. (Mexico-2017)	+	+	+	+	+	+	High
Han et al. (Argentina-2017)	+	+	-	+	+	+	Medium
Kumar et al. (India-2017)	-	+	+	+	-	+	Low

(na) not applicable; (unk) unknown; (+) adequate; (-) not adequate