Table S1. Comparison of Chinese growth guidelines and the WHO growth reference.

Age	Height Boy WHO	Height Boy China	Height Girl WHO	Height Girl China	Weight Boy WHO	Weight Boy China	Weight Girl WHO	Weight Girl China	BMI Boy WHO	BMI Boy China	BMI Girl WHO	BMI Girl China	Underweight Boy WHO	Underweight Boy China	Underweight Girl WHO	Underweight Girl China	Overweight Boy WHO	Overweight Boy China	Overweight Girl WHO	Overweight Girl China	Obesity Boy WHO	Obesity Boy China	Obesity Girl WHO	Obesity Girl China
0	67.6	68.4	65.7	66.8	7.9	8.4	7.3	7.8	17.3		16.9		14.7		14.1		20.5		20.3		22.3		22.3	
1	82.3	82.7	80.7	81.5	10.9	11.3	10.2	10.7	16.1		15.7		13.9		13.3		19.0		18.8		20.8		20.8	
2	91.9	93.3	90.7	92.1	13.3	13.6	12.7	13.1	15.8		15.5		13.6		13.2		18.6		18.5		20.2		20.4	
3	99.9	100.6	99.0	99.4	15.3	15.6	15.0	15.2	15.4		15.3		13.2		12.9		18.2		18.4		19.8		20.4	
4	106.7	107.7	106.2	106.7	17.3	17.8	17.2	17.2	15.3		15.3		13.0		12.7		18.2		18.7		20.0		20.8	
5	112.9	114.7	112.2	113.5	19.4	20.2	19.1	19.3	15.3		15.2		14.1		13.9		16.7		16.9		18.4		19.0	
6	118.9	120.7	118.0	119.4	21.7	22.5	21.2	21.4	15.4	15.5	15.3	15.0	14.1	13.8	13.9	13.3	16.9	16.7	17.1	16.5	18.7	18.1	19.5	18.0
7	124.5	125.5	123.7	124.1	24.1	25.7	23.6	23.9	15.6	15.8	15.5	15.1	14.3	13.9	14.0	13.5	17.2	17.4	17.5	17.2	19.3	19.2	20.1	19.0
8	129.9	130.7	129.5	129.3	26.7	28.9	26.6	26.7	15.9	16.2	15.9	15.4	14.5	14.0	14.3	13.7	17.7	18.1	18.0	18.1	20.1	20.3	21.0	19.9
9	135.2	135.8	135.5	134.9	29.6	32.1	30.0	29.9	16.2	16.7	16.3	15.8	14.8	14.2	14.6	13.9	18.2	18.9	18.7	19.0	20.9	21.4	22.0	21.0
10	140.4	140.8	141.8	141.2	32.9	35.6	34.0	33.8	16.7	17.2	16.9	16.4	15.1	14.6	15.1	14.1	18.8	19.6	19.4	20.0	21.9	22.5	23.1	22.1
11	146.0	146.0	148.2	147.4	36.7	40.0	38.7	38.4	17.2	17.8	17.6	17.1	15.5	15.1	15.6	14.5	19.5	20.3	20.3	21.1	23.0	23.6	24.3	23.3
12	152.4	152.2	154.0	152.4	41.5	45.1	43.6	42.9	17.9	18.4	18.4	17.8	16.1	15.6	16.3	14.9	20.4	21.0	21.3	21.9	24.2	24.7	25.6	24.5
13	159.7	160.2	158.3	156.1	47.5	50.9	48.1	46.4	18.6	18.9	19.2	18.5	16.7	16.1	16.9	15.6	21.3	21.9	22.3	22.6	25.3	25.7	26.8	25.6
14	166.3	165.6	160.9	157.8	53.6	55.4	51.5	49.0	19.4	19.4	19.9	19.1	17.3	16.7	17.5	16.3	22.2	22.6	23.1	23.0	26.5	26.4	27.8	26.3
15	171.1	169.0	162.2	158.5	59.0	58.4	53.9	50.5	20.1	19.9	20.5	19.5	18.0	17.0	18.0	16.8	23.1	23.1	23.8	23.4	27.4	26.9	28.6	26.9
16	174.2	170.6	162.7	158.9	63.2	60.1	55.3	51.1	20.8	20.3	20.9	19.9	18.5	17.5	18.3	17.1	23.9	23.5	24.3	23.7	28.3	27.4	29.1	27.4
17	175.8	171.4	163.0	159.2	66.2	61.1	56.2	51.3	21.4	20.7	21.2	20.2	19.0	17.9	18.5	17.3	24.6	23.8	24.6	23.9	29.0	27.8	29.4	27.8
18	176.4	171.4	163.1	160.0	68.3	61.4	56.8	51.4	22.0	20.8	21.3	20.3	19.4	17.9	18.6	17.3	25.2	24.0	24.9	24.0	29.5	28.0	29.6	28.0

Note: Chinese Weight and BMI references are based on 2009 standard [23], while others are updated using the 2018 standard published by the NHC (National Health Commission of the People's Republic of China [24–26]). WHO growth reference are transformed from month-specific growth reference [20,21], where 0 year old refer to the 6 month reference, and 1 year old refers to the 18-month reference.

Table S2. Association between family environments and children' growth status.

	OLS			RE			Logit		
	height_sd	weight_sd	bmi_sd	height_sd	weight_sd	bmi_sd	underweight	overweight	obesity
age	0.0013***	-0.0054***	-0.0086***	0.0017***	-0.0048***	-0.0086***	0.1011***	-0.0613***	-0.1623***
	0.000	0.000	0.000	0.000	0.000	0.000	(0.004)	(0.007)	(0.009)
female	0.0019**	-0.0101***	-0.0139***	0.0020*	-0.0076**	-0.0116***	0.0376	-0.2219***	-0.5475***
	(0.001)	(0.003)	(0.002)	(0.001)	(0.003)	(0.003)	(0.039)	(0.065)	(0.100)
han	0.0138***	0.0294***	0.0047	0.0142***	0.0300***	0.0041	-0.0246	0.2572**	0.2750*
	(0.001)	(0.003)	(0.003)	(0.001)	(0.005)	(0.004)	(0.054)	(0.103)	(0.155)
Fat_share	0.0284***	0.0489***	-0.0046	0.0239***	0.0519***	0.0049	0.3889**	0.0052	0.3224
	(0.004)	(0.013)	(0.012)	(0.004)	(0.012)	(0.011)	(0.189)	(0.318)	(0.438)
Pro-tein_share	0.1545***	0.5271***	0.2533***	0.1299***	0.4163***	0.1915***	-1.8622**	3.3513***	5.4870***
	(0.017)	(0.058)	(0.050)	(0.015)	(0.048)	(0.045)	(0.833)	(1.175)	(1.641)
urban	0.0003	0.0076**	0.0065**	0.0026**	0.0123***	0.0068**	-0.2460***	0.0690	0.0396
	(0.001)	(0.003)	(0.003)	(0.001)	(0.004)	(0.003)	(0.048)	(0.075)	(0.110)
children	-0.0074***	-0.0200***	-0.0076***	-0.0055***	-0.0178***	-0.0086***	0.1433***	-0.1121**	0.0589
	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.029)	(0.056)	(0.083)
hhsize	-0.0011***	-0.0029***	-0.0005	-0.0014***	-0.0030**	0.0000	-0.0326*	-0.0882***	-0.0182
	0.000	(0.001)	(0.001)	0.000	(0.001)	(0.001)	(0.017)	(0.028)	(0.038)
ln(income)	0.0029***	0.0073***	0.0017	0.0024***	0.0063***	0.0019*	0.0079	0.0518	0.0043
	0.000	(0.001)	(0.001)	0.000	(0.001)	(0.001)	(0.018)	(0.034)	(0.050)
tapwater	0.0004	-0.0027	-0.0044*	0.0031***	0.0013	-0.0047*	0.1096**	-0.1041	-0.1316
	(0.001)	(0.003)	(0.003)	(0.001)	(0.003)	(0.003)	(0.045)	(0.078)	(0.114)
toilet	0.0038***	0.0080**	0.0005	0.0039***	0.0116***	0.0033	0.1204**	0.0790	0.2384**
	(0.001)	(0.003)	(0.003)	(0.001)	(0.003)	(0.003)	(0.051)	(0.079)	(0.112)
no excreta	0.0092***	0.0229***	0.0067***	0.0054***	0.0105***	0.0010	-0.1288***	0.0437	0.2751**
	(0.001)	(0.003)	(0.002)	(0.001)	(0.003)	(0.002)	(0.044)	(0.074)	(0.110)
Max_edu_parent	0.0022***	0.0044***	0.0004	0.0020***	0.0044***	0.0004	0.0095	0.0367***	0.0155
	0.000	0.000	0.000	0.000	0.000	0.000	(0.006)	(0.012)	(0.017)
Max_BMI_parent	0.0029***	0.0186***	0.0143***	0.0023***	0.0153***	0.0124***	-0.1993***	0.1543***	0.2135***
	0.000	(0.001)	(0.001)	0.000	(0.001)	0.000	(0.009)	(0.011)	(0.017)
Constant	0.8026***	0.3688***	0.7197***	0.8193***	0.4595***	0.7677***	2.2096***	-6.2241***	-8.0974***
	(0.005)	(0.018)	(0.016)	(0.005)	(0.017)	(0.015)	(0.257)	(0.402)	(0.599)
Obs	15259	15259	15259	15259	15259	15259	15259	15259	15259
F/chi2	262.48***	219.64***	153.72***	2783.24***	2385.17***	2104.03***	1116.77***	472.30***	626.98***

Note: p value in brackets. *, ** and *** refer to $p < 0.1$, $p < 0.05$ and $p < 0.01$ respectively. fat_share and protein_share refer to share of energy drawn from fat and protein, children refers to number of children, hhsize refers to household size, ln(income) is measured by household income per capita in logarithm, tapwater indicates in-house or in-yard tap water, toilet indicates in-house flush or in-house toilet, no excreta refers to no near house excreta removal; Max_edu_parent and Max_BMI_parent indicate the maximum education and BMI of parents.
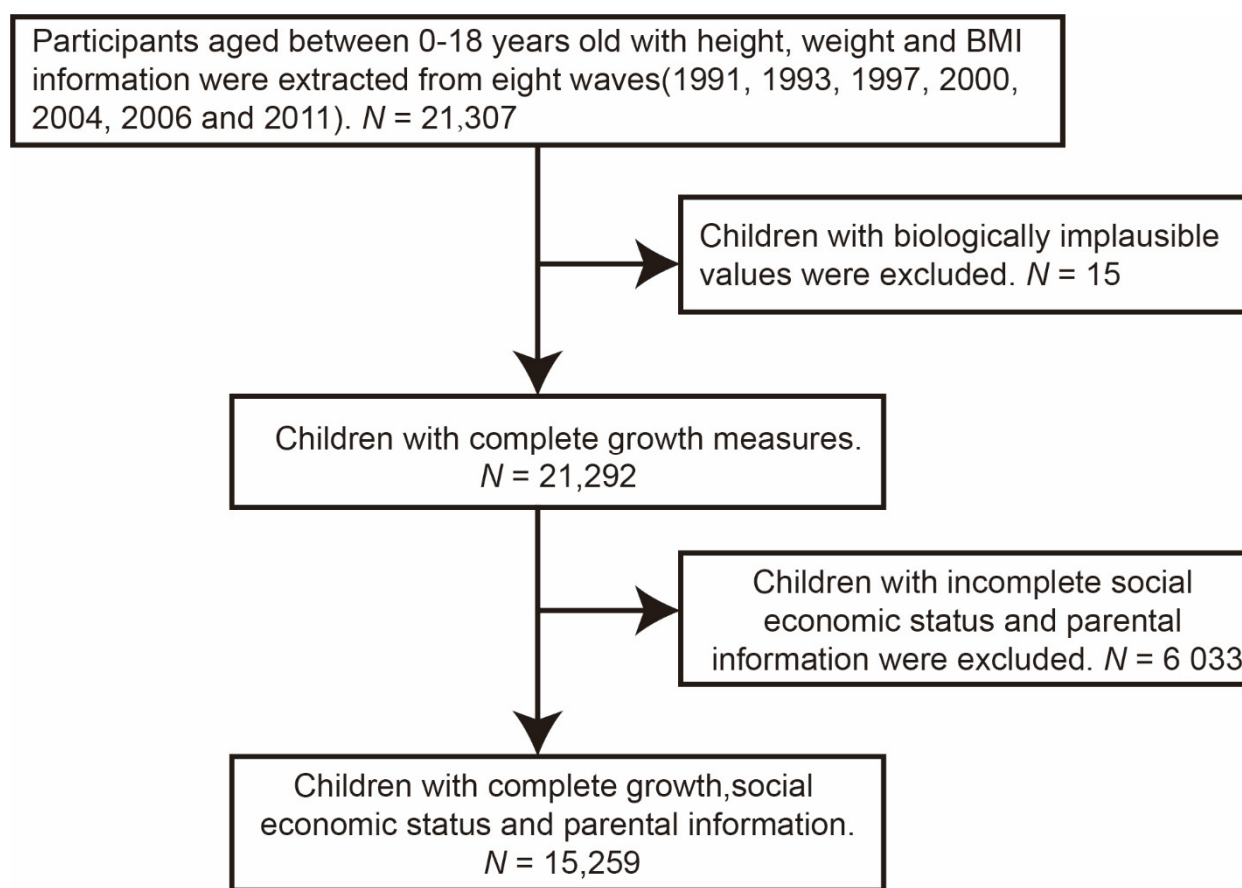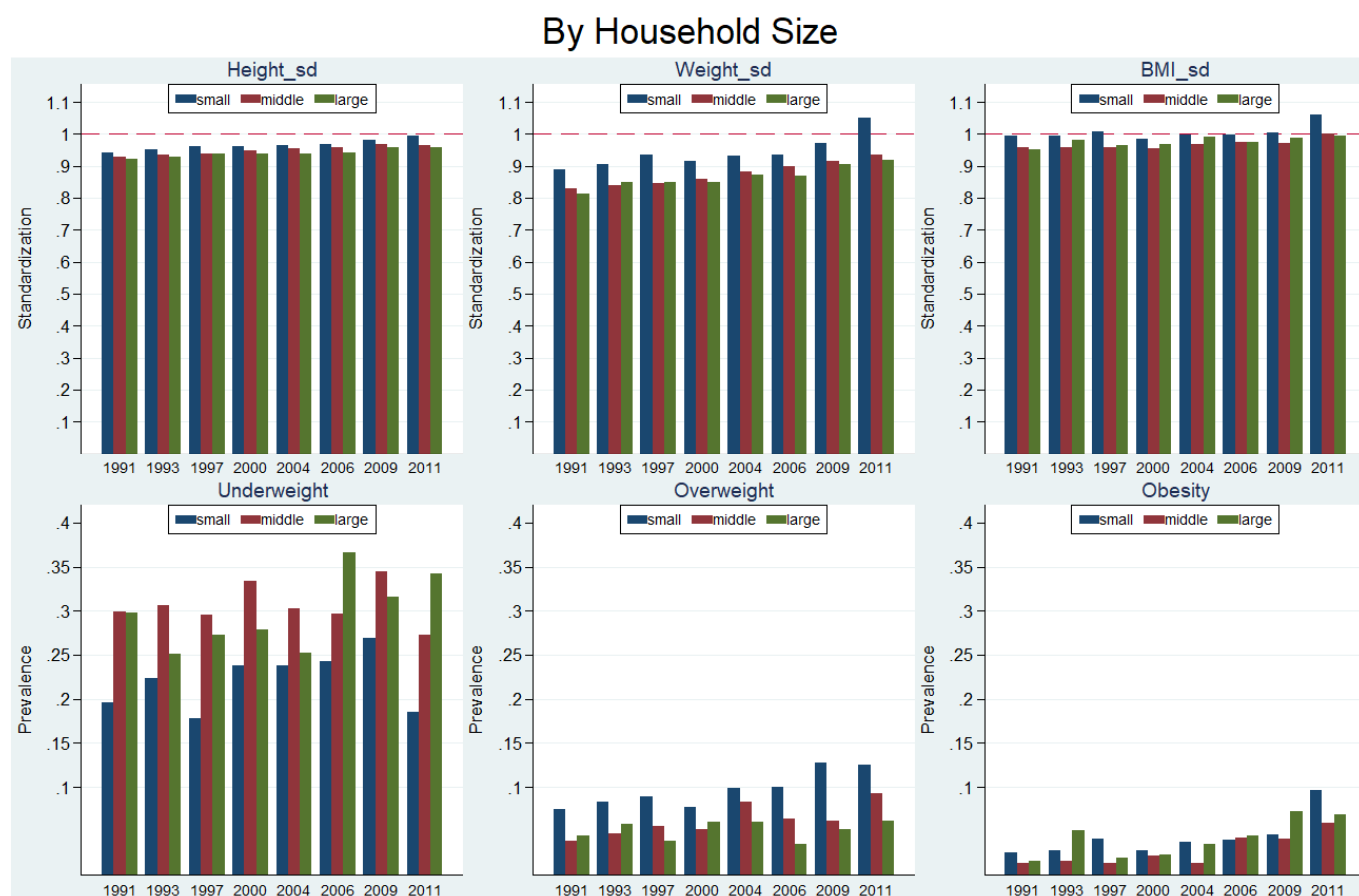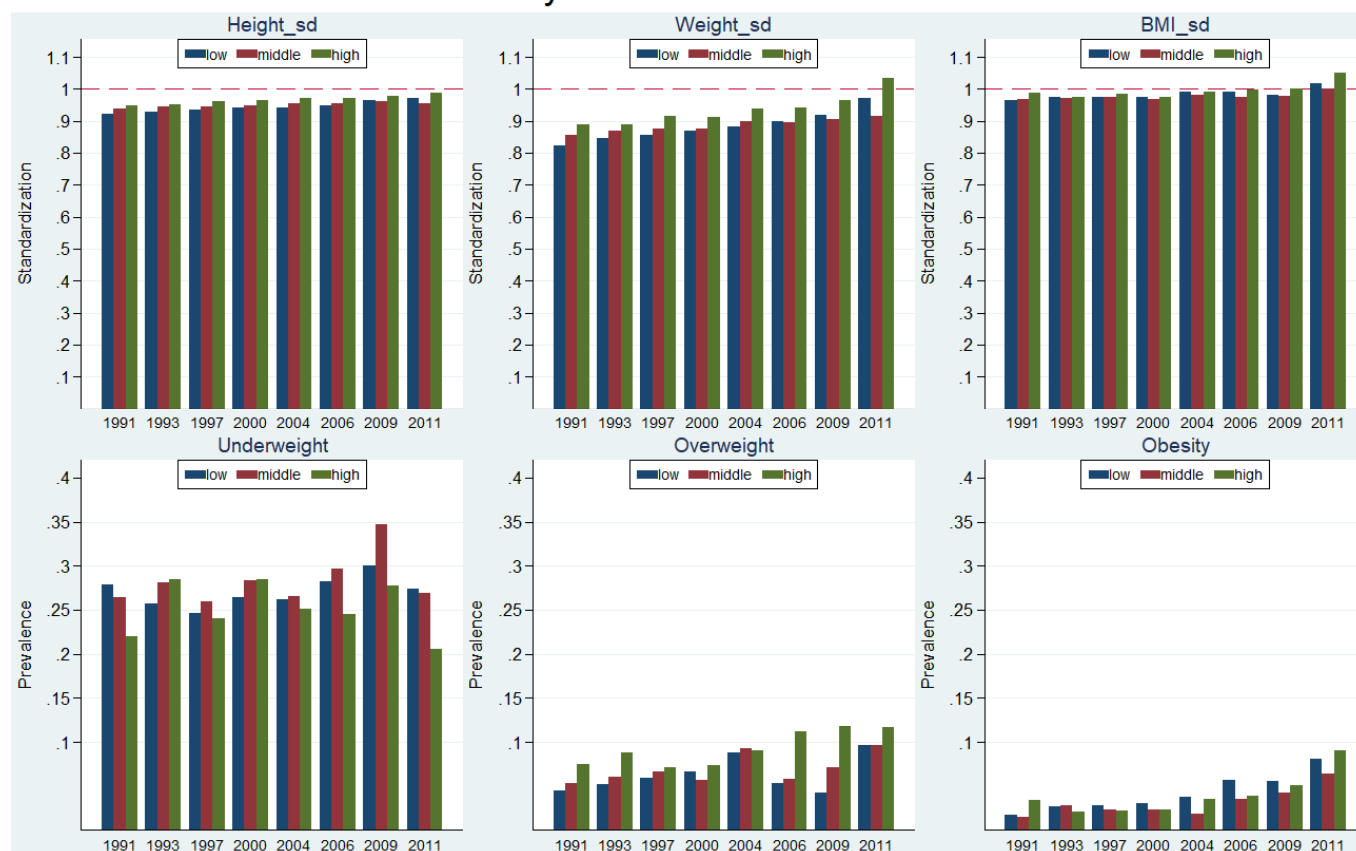
Participants aged between 0-18 years old with height, weight and BMI information were extracted from eight waves(1991, 1993, 1997, 2000, 2004, 2006 and 2011). *N* = 21,307

Children with biologically implausible values were excluded. *N* = 15

Children with complete growth measures. *N* = 21,292

Children with incomplete social economic status and parental information were excluded. *N* = 6 033

Children with complete growth,social economic status and parental information. *N* = 15,259

Figure S1. Flow chart.

By Household Size

Note: Small, middle and large refer to household with only one child, more than one children but no more than 5 members, and more than one children and more than 5 members.

Figure S2. Secular trend of children's growth indicator and weight status by household size.
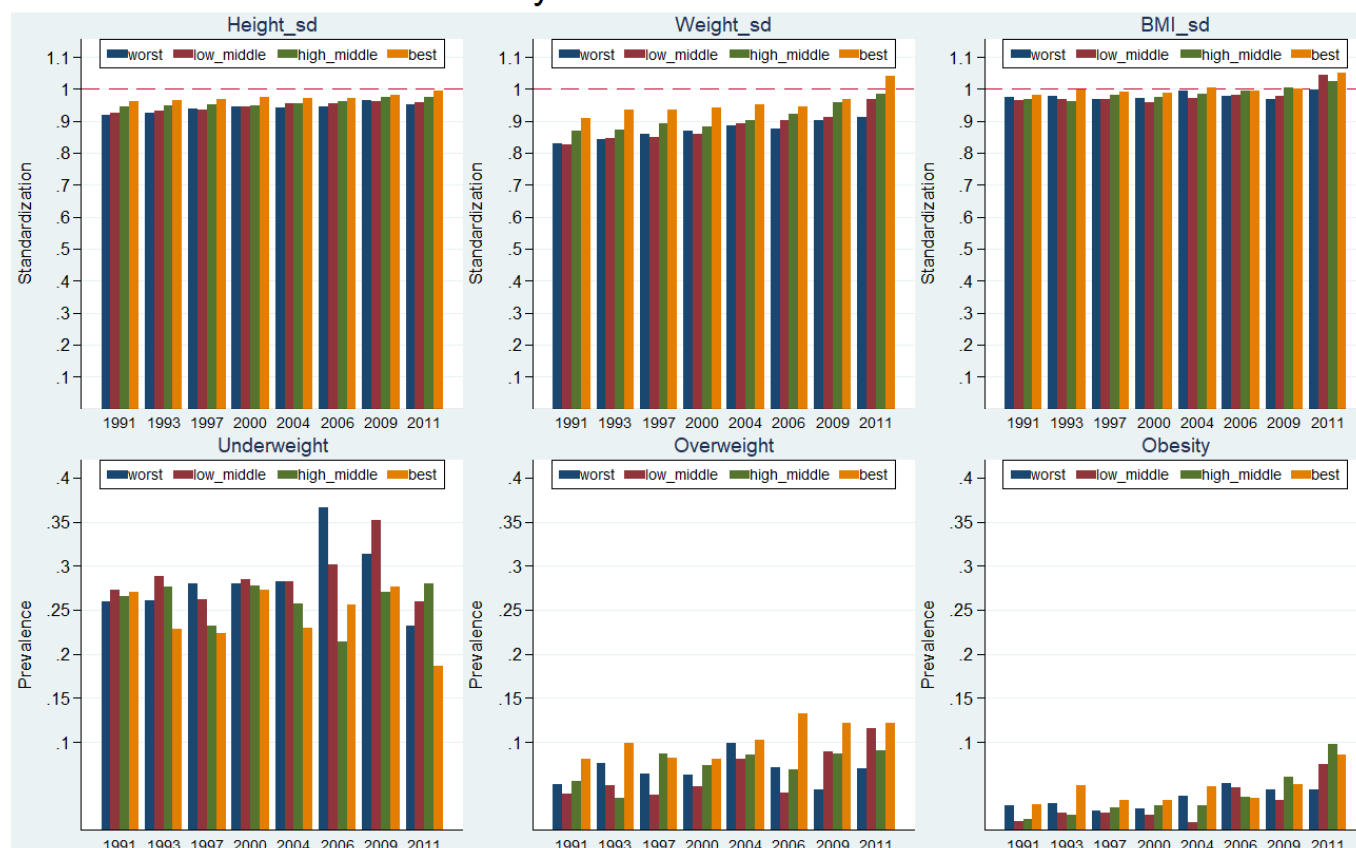
By Household Income

Note: Low, middle, and high refer to three equal income fractals.

Figure S3. Secular trend of children's growth indicator and weight status by household income.
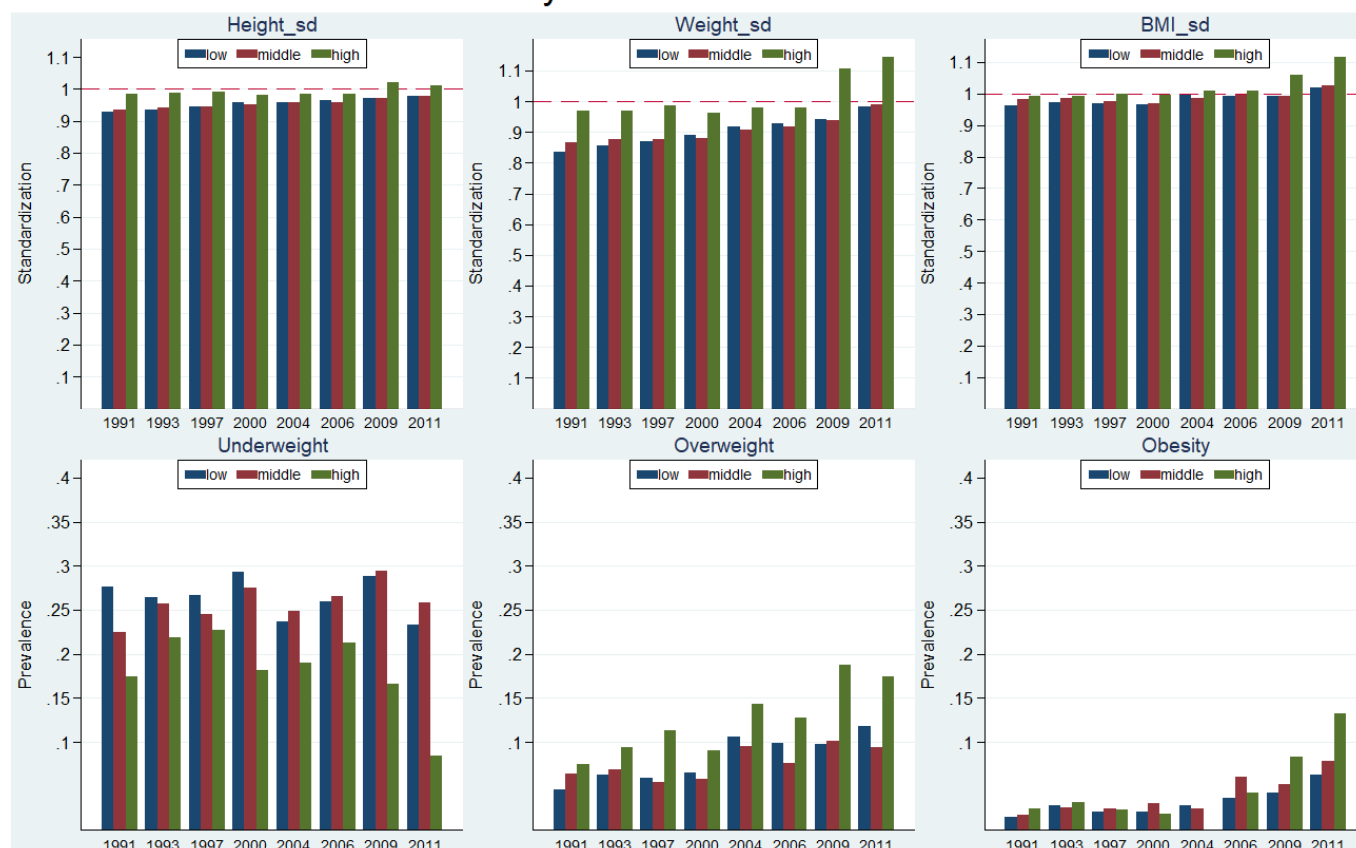
By Sanitation Condition

Note: The sanitation condition of household was measured by three variables: drinking water (in-house or in-yard tap water), toilet (in-house flush or in-house toilet) and basic sanitation (no near house excreta removal). Worst, low_middle, high_middle and best refer to families which meet 0 to 3 sanitation conditions.
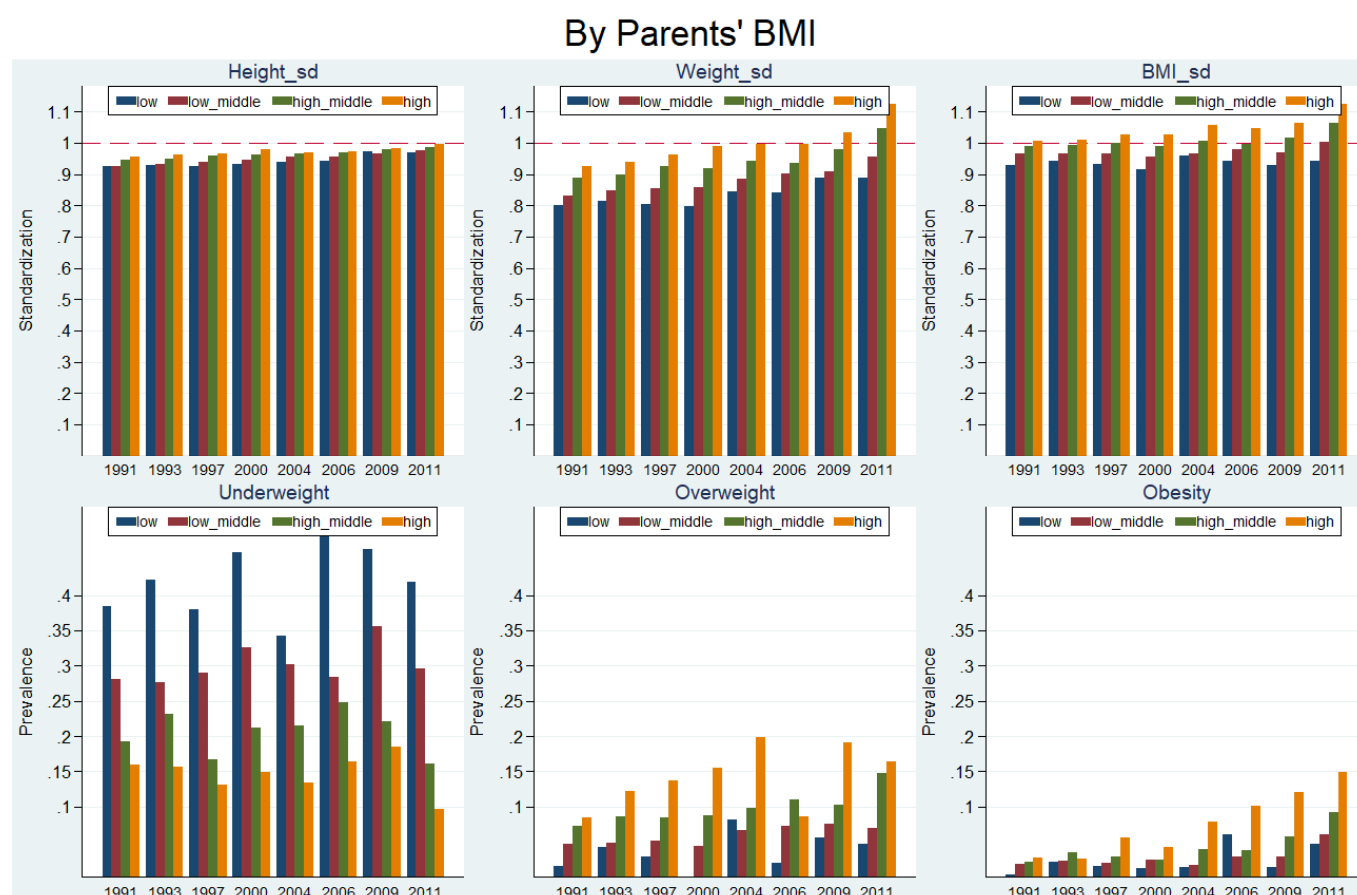
Figure S4. Secular trend of children's growth indicator and weight status by sanitation condition.

By Parents' Education

Note: Low, middle and high refer to low education family (none of parents have received more than 6 years formal education), middle education family (at least one of parents have received 6-12 years of formal education but none of them have received more than 12 years of education), and high education family (at least one of parents have received more than 12 years of education).

Figure S5. Secular trend of children's growth indicator and weight status by parents' education.

Note: Low, low_middle, high_middle and high refer to 4 family groups: group 1 (none of parents' BMI >= 24 and at least one of them < 18.5), group 2 (one parent's BMI is smaller than 18.5 but another parent's BMI locates between 24 and 28, or both parents' BMI locates between 18.5 and 24), group 3 (both parents' BMI are greater than or equal to 18.5 but smaller than 28, and at least one of them is greater than or equal to 24 but smaller than 28), and group 4 (at least one of parents' BMI >= 28).

Figure S6. Secular trend of children's growth indicator and weight status by parents' BMI categories.