SUPPORTING MATERIAL

Table S1. Comparing measured RMR to estimated RMR from six prediction equations. All prediction equations substantially underestimate RMR obtained from the Cosmed Fitmate MED.

Difference (RMR - estimated RMR)	Female				Male			
	Mean ± SD	% Above Predicted	Pearson r	p-value	Mean ± SD	% Above Predicted	Pearson r	p-value
Oxford	451 ± 299	37.9	0.393	<0.0001	546 ± 324	37.9	0.401	<0.0001
FAO	361 ± 302	28.2	0.365	<0.0001	408 ± 335	25.8	0.350	<0.0001
Cunningham	253 ± 306	18.1	0.330	<0.0001	365 ± 336	22.5	0.322	<0.0001
Harris-Benedict	380 ± 302	30.1	0.367	<0.0001	562 ± 327	39.4	0.391	<0.0001
Mifflin-St. Jeor	528 ± 302	47.4	0.372	<0.0001	571 ± 325	40.4	0.396	<0.0001
Owen Wt	412 ± 303	33.4	0.411	<0.0001	470 ± 330	30.9	0.384	<0.0001

TABLE S2. Predictors of RMR in cross-population sample. Multiple linear regression analysis of RMR as a function of sex, mean age, weight and physical activity level (PAL). Model $F_{(6, 141)}=183.86$, $p<0.0001$, Adj. $R^2=0.882$. Low HDI refers to developing populations as defined by "low" or "middle" human development indices. Baseline is "high" HDI populations.

Variable	Estimate	s.e.	t Value	Pr > |t|	Std. β
Intercept	1268.1	90.2	14.07	<.0001	
Age (years)	-5.5	0.4	-13.12	<.0001	-0.39
Sex (1=male)	249.2	15.1	16.51	<.0001	0.51
Weight (kg)	9.7	0.5	21.36	<.0001	0.65
PAL	-204.8	44.1	-4.64	<.0001	-0.14
Low HDI (1=yes)	-2.4	20.7	-0.11	0.910	-0.00
Tsimane (1=yes)	482.2	59.7	8.07	<.0001	0.23

TABLE S3. Predictors of TEE in cross-population sample. Multiple linear regression analysis of TEE as a function of (a) sex, mean age, weight, and development (Model 1), and (b) same as Model 1 and physical activity level (PAL). Model 1: Model $F(5, 177)=123.25$, $p<0.0001$, Adj. $R^2=0.771$. Model 2: $F(6,141)=96.92$, $p<0.0001$, Adj. $R^2=0.797$. Low HDI refers to developing populations as defined by "low" or "middle" human development indices. Baseline is "high" HDI populations.

Variable	Model 1				Model 2			
	Estimate	s.e.	Pr > |t|	Std. β	Estimate	s.e.	Pr > |t|	Std. β
Intercept	1671.6	104.8	<.0001		1177.0	219.6	<.0001	
Age (years)	-11.6	1.1	<.0001	-0.38	-9.3	1.5	<.0001	-0.32
Sex (1=male)	570.8	39.2	<.0001	0.54	427.2	62.8	<.0001	0.42
Weight (kg)	16.6	1.2	<.0001	0.51	9.4	2.5	.0002	0.30
RMR					0.6	0.2	0.003	0.31
Low HDI (1=yes)	-7.3	57.8	0.899	-0.00	23.5	56.8	0.680	0.02
Tsimane (1=yes)	284.1	176.2	0.104	0.06	-28.8	196.7	0.884	-0.01

Variable	Model 3			
	Estimate	s.e.	Pr > |t|	Std. β
Intercept	-432.7	152.9	0.005	
Age (years)	-9.7	0.7	<.0001	-0.33
Sex (1=male)	443.4	26.7	<.0001	0.43
Weight (kg)	16.4	0.8	<.0001	0.53
PAL	1184.5	74.8	<.0001	0.40
Low HDI (1=yes)	-17.1	35.1	0.629	-0.01
Tsimane (1=yes)	177.1	101.3	0.083	0.04

TABLE S4. Predictors of "excess" RMR, defined as measured RMR – estimated RMR from six different prediction equations. Models are equivalent to Model 4 from Table 2. Each model employs stepwise selection method with AIC selection criterion. Other variables entered but dropped from model selection procedure: average daily ambient temperature, hemoglobin, fever, erythrocyte sedimentation rate, giardia (1=yes), respiratory ailment (1=yes), gastrointestinal ailment (1=yes).

RMR - estimated RMR	Cunningham BMR (n=691)			Oxford RMR (n=691)			FAO/WHO RMR (n=691)			Harris-Benedict (n=691)			Mifflin-St Jeor (n=691)			Owen Wt (n=691)		
Parameter	Est.	β	p	Est.	β	p	Est.	β	p	Est.	β	p	Est.	β	p	Est.	β	p
Intercept	-927.9	0.00	0.0017	-144.6	0.00	0.2556	-779.9	0.00	0.0015	-375.2	0.00	0.2337	-156.1	0.00	0.1958	-669.1	0.00	0.004
Sex (1=Male)	178.3	0.28	<.0001	70.1	0.11	0.0038				144.3	0.22	<.0001						
Age (yrs)				1.4	0.07	0.0937	3.7	0.17	<.0001	4.5	0.19	<.0001	4.1	0.19	<.0001			
Time (<8:00 vs. 8-12pm)	62.9	0.03	0.3342	63.8	0.04	0.328	57.0	0.03	0.3924	41.5	0.02	0.5167	63.6	0.04	0.3285	65.2	0.04	0.325
[12-2pm vs. 8-12pm)	123.3	0.09	0.0178	136.0	0.10	0.0091	136.9	0.10	0.0102	123.9	0.09	0.0165	121.9	0.09	0.0188	117.1	0.08	0.0267
[2-5pm vs. 8-12pm)	58.8	0.08	0.0311	55.3	0.08	0.0427	39.8	0.05	0.1535	64.7	0.09	0.0171	58.7	0.08	0.0314	56.3	0.08	0.0422
(>5pm vs. 8-12pm)	40.5	0.03	0.5074	49.3	0.04	0.4189	59.7	0.04	0.3386	-27.2	-0.02	0.5985	38.9	0.03	0.5229	39.1	0.03	0.5281
Hrs ago ate (0-4 vs. 5-9)	146.6	0.19	0.0257	147.2	0.20	0.0251	160.3	0.21	0.0169				139.8	0.19	0.0326	151.7	0.20	0.0231
(10+ vs. 5-9)	128.4	0.15	0.0598	127.3	0.16	0.0621	130.3	0.16	0.0616				124.4	0.15	0.0671	132.2	0.16	0.0565
Season (Dry vs. wet)	122.0	0.19	0.0007	114.5	0.19	0.0014	105.3	0.17	0.004	120.1	0.19	0.0008	123.5	0.20	0.0006	129.3	0.21	0.0004
(Other vs. wet)	85.4	0.13	0.0162	75.5	0.12	0.0343	71.0	0.11	0.0504	70.8	0.11	0.0478	79.3	0.13	0.0256	77.7	0.12	0.0305
Fat-free mass (kg)	-8.7	-0.20	0.0002										3.7	0.09	0.0153			
Fat mass (kg)	12.7	0.24	<.0001													-4.8	-0.09	0.0116
Height (cm)	6.5	0.17	0.0017				3.0	0.08	0.0634	3.2	0.08	0.0927				5.1	0.14	0.0002
Weight (kg)				3.2	0.10	0.0116	2.7	0.08	0.0507									
Mean Daily Humidity (%)										-1.8	-0.06	0.0997						
Daily Precipitation (mm)	-144.2	-0.08	0.0294	-163.2	-0.09	0.0136	-146.4	-0.08	0.0305	-139.5	-0.07	0.0409	-150.7	-0.08	0.0223	-143.9	-0.08	0.032
WBC (x10³ cells/uL)	10.1	0.09	0.0142	9.7	0.09	0.0206	10.9	0.10	0.0108	8.8	0.08	0.0349	9.1	0.08	0.0291	9.8	0.09	0.0183
Helminths (1=yes)	131.3	0.13	0.0008	133.3	0.13	0.0008	134.9	0.13	0.001	116.9	0.11	0.0031	138.1	0.14	0.0005	138.8	0.14	0.0005
Back pains (1=yes)	50.7	0.08	0.0347	45.2	0.07	0.0597	42.1	0.07	0.0841	50.9	0.08	0.0351	51.8	0.08	0.0294	57.1	0.09	0.0183
Model Fit	Adj R^2=0.1732			Adj R^2=0.0977			Adj R^2=0.0933			Adj R^2=0.1869			Adj R^2=0.103			Adj R^2=0.0976		

TABLE S5. The effects of 1 standard deviation unit change in demographic, anthropometric, weather and medical variables on excess RMR (in kcals/day), based on full model of Table 2 using Cunningham estimation equation.

Category	Variable	Direction	Male		Female	
			20-39	**40+**	**20-39**	**40+**
Demog	Sex bias	male	178	178	0	0
Anthropom	Height	higher	41	36	41	40
	FFM	lower	53	51	40	43
	Fat Mass	higher	51	69	83	80
	SUBTOTAL		145	155	164	162
Weather	Precipitation	lower	37	13	34	21
Medical	WBC	higher	31	26	27	27
	Helminths	higher	19	48	32	49
	Back Pain	higher	25	25	21	23
	SUBTOTAL		75	99	80	99

TABLE S6. Rate of age-specific RMR decline for adults age 40+. Effects of adding additional covariates to regression models on the rate of RMR decline with age. Model 1 is the baseline model controlling only for age. "Step" model is a stepwise regression with AIC stop criterion starting with all variables from Model 9. Given missing data on several variables, the sample size (n) changes for each model.

Model	Parameter estimate: AGE	Std. error	Pr > |t|	β	% Reduction from Model 1	% Decline per Decade	Adj R^2	Controlling for:
1 (n=855)	-6.85	1.05	<.0001	-0.194	-------	3.7	0.246	Sex
2 (n=783)	-6.25	1.08	<.0001	-0.178	8.7	3.4	0.269	+ time since last ate, time of day, mean ambient temperature that day, mean precipitation that day
3 (n=749)	-2.30	1.12	0.0405	-0.066	66.4	1.3	0.350	+ FFM
4 (n=749)	-1.96	1.12	0.0822	-0.056	71.4	1.1	0.355	+ ht
5 (n=669)	-0.89	1.22	0.4674	-0.025	87.0	0.5	0.353	+ Hb
6 (n=520)	-0.74	1.40	0.5977	-0.021	89.2	0.4	0.351	+ ESR, WBC
7 (n=476)	-2.08	1.44	0.1486	-0.060	69.6	1.1	0.367	+ helminth
8 (n=471)	-2.29	1.45	0.1151	-0.066	66.6	1.3	0.368	+ fever
9 (n=471)	-2.28	1.45	0.1161	-0.066	66.7	1.2	0.368	+ respiratory, giardia, back pains
step (n=471)	*-2.18*	*1.44*	*0.1311*	*-0.063*	*68.1*	*1.2*	*0.367*	*(+ sex, FFM, ht, Hb, WBC, helminths, respiratory infection, precipitation, time since last eaten)*

TABLE S7. Rate of age-specific RMR decline for adults age 40+. Effects of adding additional covariates to regression models on the rate of RMR decline with age. Model 1 is the baseline model controlling only for age. "Step" model is a stepwise regression with AIC stop criterion starting with all variables from Model 9. Missing data were imputed using stochastic regression (n=855 for all models).

Model	Parameter estimate: AGE	Std. error	Pr > |t|	β	% Reduction from Model 1	% Decline per Decade	Adj R^2	Controlling for:
1	-6.85	1.05	<.0001	-0.194	-------	3.7	0.246	sex
2	-6.70	1.05	<.0001	-0.190	2.1	3.7	0.262	+ time since last ate, time of day, mean ambient temperature that day, mean precipitation that day
3	-2.76	1.05	0.009	-0.078	59.7	1.5	0.347	+ FFM
4	-2.27	1.06	0.032	-0.064	66.8	1.2	0.354	+ ht
5	-1.85	1.06	0.0822	-0.052	72.9	1.0	0.359	+ Hb
6	-1.75	1.07	0.1014	-0.049	74.5	1.0	0.360	+ ESR, WBC
7	-2.00	1.06	0.0586	-0.057	70.7	1.1	0.371	+ helminth
8	-2.01	1.06	0.0587	-0.057	70.7	1.1	0.370	+ fever
9	-2.11	1.06	0.046	-0.060	69.1	1.2	0.374	+ respiratory, giardia, back pains
step	*-1.80*	*1.01*	*0.074*	*-0.051*	*73.7*	*1.0*	*0.370*	*(+ FFM, ht, Hb, helminths, back pains, mean temperature, time since last eaten)*

TABLE S8. Rate of age-specific RMR decline for adults age 40+. Effects of adding additional covariates to regression models on the rate of RMR decline with age. Model 1 is the baseline model controlling only for age. "Step" model is a stepwise regression with AIC stop criterion starting with all variables from Model 9. Missing data were imputed using Markov Chain Monte Carlo (MCMC) with multiple chain imputation, yielding 5 imputed datasets, each with 200 burn-in iterations (n=855 for all models).

Model	Parameter estimate: AGE	Std. error	Pr > |t|	β	% Reduction from Model 1	% Decline per Decade	Adj R^2	Controlling for:
1	-6.85	1.05	0.0000	-0.194	-------	3.7	0.246	sex
2	-6.65	1.05	0.0000	-0.188	2.9	3.6	0.271	+ time since last ate, time of day, mean ambient temperature that day, mean precipitation that day
3	-2.80	1.05	0.0080	-0.079	59.0	1.5	0.353	+ FFM
4	-2.31	1.06	0.0296	-0.065	66.3	1.3	0.362	+ ht
5	-1.88	1.07	0.0790	-0.053	72.6	1.0	0.367	+ Hb
6	-1.83	1.07	0.0880	-0.052	73.3	1.0	0.369	+ ESR, WBC
7	-2.18	1.06	0.0413	-0.062	68.2	1.2	0.383	+ helminth
8	-2.18	1.06	0.0414	-0.062	68.2	1.2	0.383	+ fever
9	-2.26	1.06	0.0341	-0.064	67.0	1.2	0.387	+ respiratory, giardia, back pains
step	*-2.22*	*1.04*	*0.0367*	*-0.063*	*67.6*	*1.2*	*0.372*	*(+ sex, FFM, ht, Hb, helminths, respiratory, back pains, precipitation, mean temperature, time of day)*

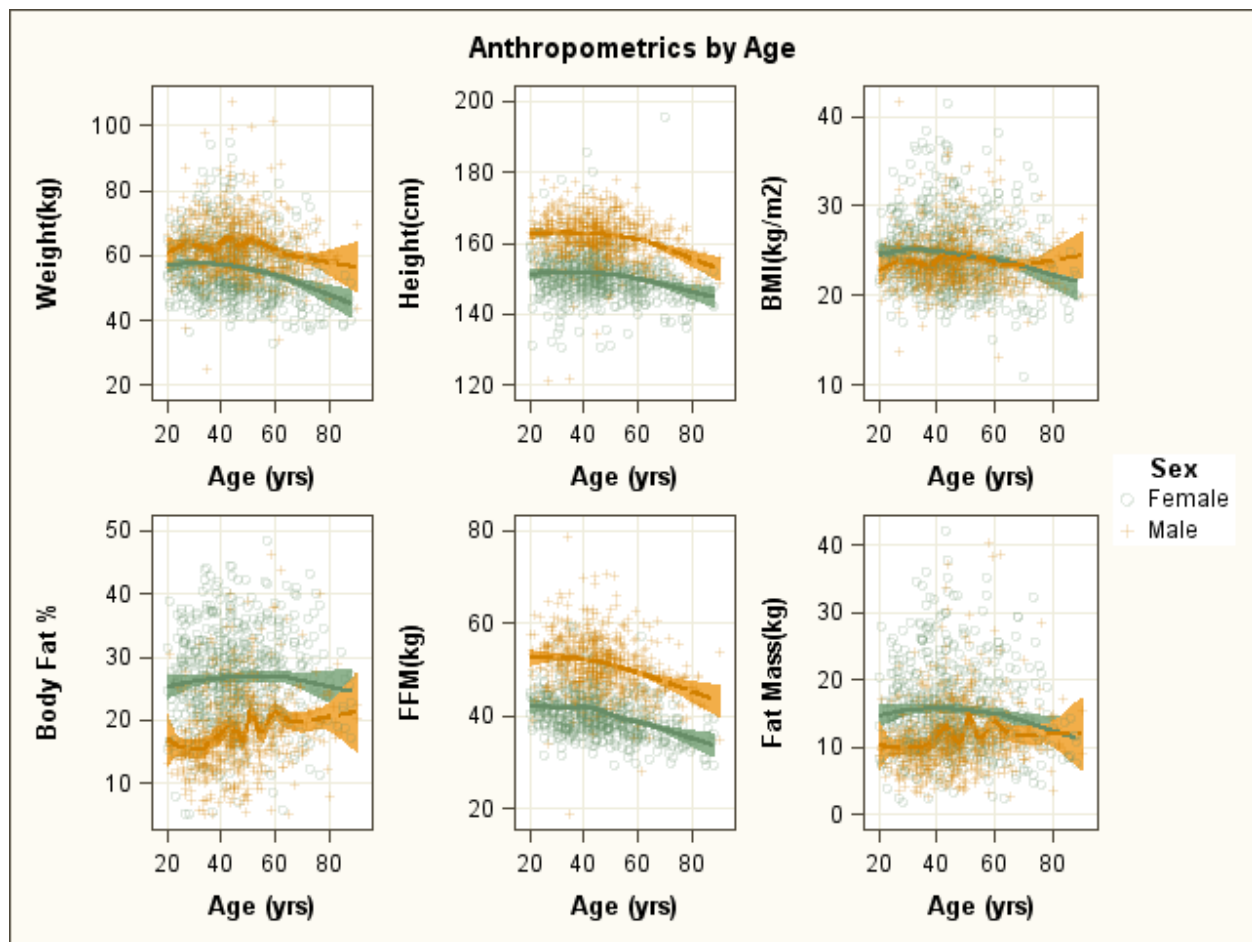**FIGURE S1.** Anthropometric variables by age and sex.

FIGURE S2. Biomarkers of nutritional status and infection/immune activation by age and sex.