

NORMATIVE-REFERENCED VALUES FOR HEALTH-RELATED FITNESS AMONG CZECH YOUTH: PHYSICAL FITNESS DATA FROM THE STUDY IPEN ADOLESCENT CZECH REPUBLIC

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Table S1. Height (cm) percentile values by sex and age

	Age (year)	n	P ₁₀	P ₂₀	P ₃₀	P ₄₀	P ₅₀	P ₆₀	P ₇₀	P ₈₀	P ₉₀
Boys	12.0–12.9	26	147.9	152.5	155.7	158.3	160.8	163.2	165.7	168.6	172.5
	13.0–13.9	108	154.5	158.8	161.8	164.3	166.6	168.8	171.2	174.0	177.7
	14.0–14.9	106	160.5	164.5	167.2	169.6	171.7	173.8	176.1	178.6	182.1
	15.0–15.9	33	166.0	169.6	172.1	174.2	176.2	178.2	180.2	182.6	185.8
	16.0–16.9	76	170.1	173.3	175.5	177.4	179.2	181.0	182.8	184.9	187.9
	17.0–17.9	118	172.0	174.8	176.9	178.6	180.2	181.8	183.5	185.4	188.1
	18.0–18.9	118	172.8	175.5	177.4	179.1	180.5	182.0	183.6	185.4	187.9
Girls	12.0–12.9	41	153.4	156.4	158.5	160.4	162.0	163.7	165.5	167.6	170.5
	13.0–13.9	132	154.8	157.5	159.5	161.2	162.8	164.5	166.2	168.2	171.0
	14.0–14.9	85	155.4	158.1	160.0	161.6	163.2	164.8	166.5	168.6	171.4
	15.0–15.9	18	156.7	159.3	161.3	163.0	164.6	166.2	168.0	170.1	173.2
	16.0–16.9	37	158.2	160.8	162.8	164.5	166.2	167.9	169.8	172.0	175.3
	17.0–17.9	154	158.9	161.5	163.4	165.2	166.9	168.6	170.5	172.9	176.4
	18.0–18.9	100	159.5	162.0	163.9	165.6	167.3	169.1	171.1	173.5	177.2

Table S2. Body mass (kg) percentile values by sex and age

	Age (year)	n	P ₁₀	P ₂₀	P ₃₀	P ₄₀	P ₅₀	P ₆₀	P ₇₀	P ₈₀	P ₉₀
Boys	12.0–12.9	26	36.3	39.8	42.6	45.2	47.8	50.6	53.8	57.8	64.0
	13.0–13.9	108	42.6	46.5	49.6	52.5	55.3	58.4	61.9	66.3	73.2
	14.0–14.9	106	47.5	51.6	54.8	57.8	60.8	64.0	67.7	72.3	79.5
	15.0–15.9	33	52.0	56.2	59.6	62.6	65.7	69.0	72.7	77.5	84.9
	16.0–16.9	76	56.6	60.9	64.3	67.4	70.5	73.8	77.6	82.5	90.0
	17.0–17.9	118	59.4	63.5	66.8	69.8	72.9	76.1	79.8	84.5	91.9
	18.0–18.9	118	60.6	64.5	67.6	70.4	73.3	76.3	79.9	84.3	91.3
Girls	12.0–12.9	41	41.6	44.9	47.5	50.0	52.5	55.2	58.4	62.6	69.3
	13.0–13.9	131	43.3	46.4	48.8	51.1	53.4	56.0	58.9	62.7	68.8
	14.0–14.9	85	45.4	48.4	50.7	52.8	55.0	57.3	60.1	63.6	69.2
	15.0–15.9	18	47.7	50.5	52.8	54.9	57.0	59.3	61.9	65.4	70.8
	16.0–16.9	37	49.4	52.2	54.5	56.6	58.7	61.0	63.6	67.1	72.5
	17.0–17.9	153	50.2	53.0	55.3	57.4	59.5	61.8	64.5	68.0	73.6
	18.0–18.9	100	50.6	53.5	55.7	57.9	60.0	62.4	65.1	68.7	74.5

Table S3. Body mass index (kg/m²) percentile values by sex and age

	Age (year)	n	P ₁₀	P ₂₀	P ₃₀	P ₄₀	P ₅₀	P ₆₀	P ₇₀	P ₈₀	P ₉₀
Boys	12.0–12.9	26	15.8	16.7	17.4	18.1	18.8	19.6	20.5	21.8	23.8
	13.0–13.9	108	16.7	17.6	18.4	19.1	19.9	20.7	21.6	22.9	25.1
	14.0–14.9	106	17.2	18.1	18.9	19.6	20.4	21.2	22.2	23.5	25.7
	15.0–15.9	33	17.7	18.6	19.4	20.2	20.9	21.8	22.8	24.1	26.2
	16.0–16.9	76	18.4	19.4	20.2	21.0	21.7	22.6	23.6	24.9	27.1
	17.0–17.9	118	18.9	19.9	20.7	21.5	22.3	23.2	24.2	25.5	27.7
	18.0–18.9	118	19.1	20.1	20.9	21.7	22.5	23.3	24.3	25.7	27.8
Girls	12.0–12.9	41	16.5	17.6	18.4	19.2	20.0	20.9	21.9	23.1	25.1
	13.0–13.9	131	16.9	18.0	18.8	19.6	20.3	21.1	22.1	23.3	25.3
	14.0–14.9	85	17.4	18.4	19.2	19.9	20.6	21.4	22.4	23.6	25.5
	15.0–15.9	18	17.9	18.8	19.6	20.2	20.9	21.7	22.6	23.8	25.6
	16.0–16.9	37	18.3	19.2	19.8	20.5	21.2	21.9	22.7	23.8	25.6
	17.0–17.9	153	18.6	19.4	20.0	20.6	21.2	21.9	22.7	23.8	25.5
	18.0–18.9	99	18.7	19.5	20.1	20.7	21.2	21.9	22.6	23.6	25.2

Table S4. Sum of skinfolds (mm) percentile values by sex and age

	Age (year)	n	P ₁₀	P ₂₀	P ₃₀	P ₄₀	P ₅₀	P ₆₀	P ₇₀	P ₈₀	P ₉₀
Boys	12.0–12.9	26	13.1	15.4	17.4	19.4	21.5	23.9	26.8	30.8	37.5
	13.0–13.9	107	12.9	15.1	17.1	19.1	21.1	23.4	26.3	30.2	36.8
	14.0–14.9	105	12.3	14.5	16.4	18.3	20.2	22.5	25.2	28.9	35.3
	15.0–15.9	33	11.7	13.8	15.6	17.3	19.2	21.3	23.9	27.5	33.5
	16.0–16.9	75	11.2	13.2	14.9	16.6	18.4	20.4	22.9	26.3	32.0
	17.0–17.9	115	10.8	12.7	14.3	16.0	17.7	19.6	22.0	25.3	30.9
	18.0–18.9	118	10.3	12.2	13.8	15.3	17.0	18.8	21.1	24.3	29.6
Girls	12.0–12.9	41	18.5	21.1	23.3	25.5	27.9	30.6	34.0	38.7	47.2
	13.0–13.9	129	18.9	21.4	23.5	25.6	27.7	30.2	33.1	37.2	44.0
	14.0–14.9	81	19.1	21.5	23.6	25.5	27.5	29.8	32.4	35.9	41.6
	15.0–15.9	17	19.2	21.6	23.6	25.5	27.4	29.5	32.0	35.2	40.3
	16.0–16.9	37	19.3	21.8	23.8	25.7	27.6	29.7	32.1	35.2	40.0
	17.0–17.9	151	19.4	22.0	24.2	26.2	28.2	30.3	32.8	36.0	40.9
	18.0–18.9	101	19.3	22.2	24.6	26.9	29.1	31.5	34.2	37.7	43.0

Table S5. Body fat (%) percentile values by sex and age

	Age (year)	n	P ₁₀	P ₂₀	P ₃₀	P ₄₀	P ₅₀	P ₆₀	P ₇₀	P ₈₀	P ₉₀
Boys	12.0–12.9	26	10.3	11.9	13.3	14.7	16.1	17.7	19.7	22.4	27.1
	13.0–13.9	107	10.7	12.4	13.8	15.2	16.7	18.4	20.5	23.3	28.2
	14.0–14.9	105	10.2	11.8	13.2	14.5	16.0	17.6	19.6	22.3	26.9
	15.0–15.9	33	9.5	11.0	12.2	13.5	14.8	16.3	18.2	20.7	25.0
	16.0–16.9	75	9.1	10.6	11.8	13.0	14.3	15.8	17.5	20.0	24.1
	17.0–17.9	115	9.0	10.4	11.6	12.8	14.1	15.5	17.2	19.6	23.7
	18.0–18.9	118	8.6	10.0	11.2	12.3	13.5	14.9	16.6	18.9	22.8
Girls	12.0–12.9	41	16.4	18.0	19.4	20.7	22.1	23.8	25.8	28.6	33.7
	13.0–13.9	129	16.7	18.2	19.5	20.8	22.1	23.6	25.3	27.8	31.9
	14.0–14.9	81	16.7	18.3	19.5	20.7	21.9	23.2	24.8	27.0	30.5
	15.0–15.9	17	16.6	18.1	19.3	20.4	21.6	22.9	24.3	26.3	29.4
	16.0–16.9	37	16.7	18.2	19.4	20.6	21.7	23.0	24.4	26.3	29.2
	17.0–17.9	151	16.9	18.5	19.8	21.0	22.2	23.5	25.0	26.9	29.9
	18.0–18.9	101	17.0	18.8	20.3	21.6	23.0	24.4	26.1	28.2	31.5

Table S6. Peak oxygen uptake (ml/kg/min) percentile values by sex and age

	Age (year)	n	P ₁₀	P ₂₀	P ₃₀	P ₄₀	P ₅₀	P ₆₀	P ₇₀	P ₈₀	P ₉₀
Boys	12.0–12.9	26	39.4	42.6	44.9	47.0	49.0	51.0	53.2	55.9	59.6
	13.0–13.9	104	39.2	42.4	44.8	46.9	48.9	51.0	53.2	55.9	59.7
	14.0–14.9	99	40.2	43.5	46.0	48.2	50.3	52.4	54.7	57.5	61.5
	15.0–15.9	33	41.4	44.8	47.4	49.7	51.9	54.1	56.6	59.5	63.6
	16.0–16.9	70	42.0	45.6	48.2	50.6	52.8	55.1	57.6	60.6	64.9
	17.0–17.9	111	41.1	44.6	47.2	49.6	51.8	54.0	56.5	59.5	63.7
	18.0–18.9	112	37.1	40.3	42.7	44.9	46.9	48.9	51.2	53.9	57.8
Girls	12.0–12.9	40	31.2	33.6	35.4	37.0	38.6	40.2	41.9	44.1	47.2
	13.0–13.9	124	32.1	34.6	36.4	38.0	39.6	41.2	43.0	45.2	48.3
	14.0–14.9	73	32.8	35.3	37.1	38.7	40.3	41.9	43.7	45.9	49.0
	15.0–15.9	16	33.7	36.5	38.0	39.6	41.2	42.8	44.6	46.8	49.9
	16.0–16.9	35	34.5	36.9	38.8	40.4	42.0	43.6	45.4	47.6	50.7
	17.0–17.9	132	33.7	36.0	37.8	39.3	40.8	42.4	44.1	46.1	49.1
	18.0–18.9	92	29.8	31.8	33.4	34.7	36.0	37.3	38.8	40.6	43.1

Table S7. LMS summary statistics for anthropometric tests

	Age (year)	Height (cm)			Body mass (kg)			Body mass index (kg/m ³)			Sum of skinfolds (mm)			Body fat (%)		
		L	M	S	L	M	S	L	M	S	L	M	S	L	M	S
Boys	12.0–12.9	2.142	160.757	0.059	-0.173	47.844	0.222	-1.404	18.816	0.157	-0.218	21.502	0.409	-0.310	16.096	0.375
	13.0–13.9	2.142	166.569	0.054	-0.241	55.308	0.211	-1.404	19.851	0.155	-0.218	21.101	0.409	-0.310	16.735	0.376
	14.0–14.9	2.142	171.704	0.049	-0.313	60.789	0.201	-1.404	20.395	0.153	-0.218	20.231	0.409	-0.310	15.958	0.376
	15.0–15.9	2.142	176.201	0.044	-0.393	65.679	0.190	-1.404	20.936	0.151	-0.218	19.192	0.409	-0.310	14.812	0.376
	16.0–16.9	2.142	179.208	0.039	-0.486	70.463	0.180	-1.404	21.742	0.148	-0.218	18.360	0.409	-0.310	14.300	0.376
Girls	17.0–17.9	2.142	180.210	0.035	-0.582	72.850	0.169	-1.404	22.286	0.146	-0.218	17.687	0.409	-0.310	14.060	0.377
	18.0–18.9	2.142	180.540	0.033	-0.678	73.286	0.159	-1.404	22.477	0.143	-0.218	16.969	0.409	-0.310	13.520	0.377
	12.0–12.9	1.499	162.035	0.041	-0.700	52.505	0.197	-0.657	20.017	0.163	-0.537	27.887	0.357	-0.962	22.124	0.270
	13.0–13.9	0.707	162.843	0.039	-0.791	53.437	0.178	-0.900	20.314	0.155	-0.426	27.718	0.327	-0.826	22.085	0.248
	14.0–14.9	-0.093	163.214	0.038	-0.882	54.991	0.162	-1.143	20.638	0.146	-0.315	27.525	0.303	-0.690	21.896	0.230
	15.0–15.9	-0.899	164.557	0.039	-0.973	56.995	0.152	-1.386	20.938	0.137	-0.204	27.398	0.289	-0.555	21.593	0.221
	16.0–16.9	-1.697	166.152	0.040	-1.063	58.694	0.148	-1.629	21.155	0.129	-0.094	27.583	0.285	-0.419	21.703	0.218
	17.0–17.9	-2.483	166.862	0.040	-1.154	59.483	0.147	-1.872	21.238	0.120	0.017	28.161	0.292	-0.283	22.196	0.223
	18.0–18.9	-3.261	167.316	0.041	-1.245	60.017	0.148	-2.115	21.230	0.111	0.128	29.075	0.313	-0.147	22.992	0.240

L – skewness; M – median; S – coefficient of variation

Table S8. LMS summary statistics for performance tests

	Age (year)	20-m shuttle run (laps)			Peak oxygen uptake (ml/kg/min)			Modified push-ups (reps)			V sit-and-reach (cm)		
		L	M	S	L	M	S	L	M	S	L	M	S
Boys	12.0–12.9	0.399	42.677	0.445	0.492	48.989	0.161	0.310	9.879	0.781	1.130	28.778	0.332
	13.0–13.9	0.420	44.878	0.451	0.492	48.937	0.163	0.370	11.466	0.724	1.130	28.441	0.332
	14.0–14.9	0.441	49.825	0.452	0.492	50.281	0.165	0.429	13.198	0.667	1.130	28.463	0.331
	15.0–15.9	0.463	54.856	0.443	0.492	51.895	0.167	0.488	14.960	0.610	1.130	28.895	0.331
	16.0–16.9	0.484	59.422	0.425	0.492	52.823	0.169	0.548	16.911	0.553	1.130	29.575	0.330
	17.0–17.9	0.505	63.668	0.397	0.492	51.765	0.171	0.607	19.040	0.496	1.130	30.323	0.329
	18.0–18.9	0.526	66.389	0.369	0.492	46.872	0.172	0.666	21.159	0.439	1.130	30.930	0.329
	12.0–12.9	0.351	29.570	0.493	0.230	38.550	0.162	0.121	4.136	0.856	1.498	38.698	0.211
	13.0–13.9	0.351	31.706	0.485	0.230	39.595	0.159	0.121	4.350	0.863	1.498	38.108	0.228
	14.0–14.9	0.351	33.590	0.477	0.230	40.298	0.156	0.121	4.563	0.870	1.498	38.117	0.240
Girls	15.0–15.9	0.351	35.527	0.470	0.230	41.212	0.153	0.121	4.769	0.877	1.498	38.490	0.246
	16.0–16.9	0.351	37.525	0.463	0.230	41.996	0.150	0.121	4.996	0.885	1.498	38.912	0.245
	17.0–17.9	0.351	39.106	0.456	0.230	40.834	0.147	0.121	5.136	0.892	1.498	38.875	0.241
	18.0–18.9	0.351	39.885	0.450	0.230	36.001	0.144	0.121	5.060	0.899	1.498	37.659	0.236

L – skewness; M – median; S – coefficient of variation