STATISTICS

$$\bar{x} = \frac{x_1 + x_2 + \ldots + x_n}{n} = \frac{\sum_{i=1}^{n} x_i}{n} = \frac{1}{n}\sum_{i=1}^{n} x_i$$

$$\bar{x} = \frac{\sum_{i=1}^{n} n_i x_i}{n}$$

$$s_{x,n-1} = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}} = \sqrt{\frac{Q_{xx}}{n-1}}$$

$$s_{\bar{x}} = \frac{s_x}{\sqrt{n}}$$

$$z = \frac{x - \mu}{\sigma}$$

$$\bar{x} \pm t_{\%} s_{\bar{x}}$$

$$\bar{x} \pm t_{\%} s_x$$

$$t_{[n-1]} = \frac{\bar{x}}{s_{\bar{x}}}$$

$$t_{[n-1]} = \frac{\bar{x} - \mu_0}{s_{\bar{x}}}$$

$$t_{[n_1+n_2-2]} = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{Q_1 + Q_2}{n_1 + n_2 - 2}}} \sqrt{\frac{n_1 n_2}{n_1 + n_2}}$$

$$Q_1 = \sum_{i=1}^{n_1}(x_{1i} - \bar{x}_1)^2 \quad \text{és} \quad Q_2 = \sum_{i=1}^{n_2}(x_{2i} - \bar{x}_2)^2$$

$$F_{[n_1-1;n_2-1]} = \frac{s^2_{\text{larger}}}{s^2_{\text{smaller}}}$$

$$s_g^2 = \frac{\sum_{j=1}^{h} n_j \left(\bar{x}_j - \bar{\bar{x}}\right)^2}{h-1} = \frac{Q_g}{h-1}$$

$$s_i^2 = \frac{\sum_{j=1}^{h} Q_j}{N-h} = \frac{\sum_{j=1}^{h}\sum_{i=1}^{n_j}(x_{ij} - \bar{x}_j)^2}{N-h} = \frac{Q_i}{N-h}$$

$$t_{[n-1]} = \frac{\bar{R}}{\frac{s}{\sqrt{n}}}$$

$$Q(a,b) = \sum_{i=1}^{n}[y_i - (ax_i + b)]^2$$

$$a^* = \frac{Q_{xy}}{Q_{xx}} = \frac{s_{xy}^2}{s_x^2}$$

$$Q_{xy} = \sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})$$

$$Q_{xx} = \sum_{i=1}^{n}(x_i - \bar{x})^2$$

$$s_{xy}^2 = \frac{Q_{xy}}{n-1}$$

$$b^* = \bar{y} - a^*\bar{x}$$

$$r = \frac{Q_{xy}}{\sqrt{Q_{xx}Q_{yy}}} = \frac{s_{xy}^2}{s_x s_y}$$

$$t_{[n-2]} = r\sqrt{\frac{n-2}{1-r^2}}$$

$$\chi^2 = \sum_i \frac{(O_i - E_i)^2}{E_i}$$

$$\chi^2_{[1]} = \frac{n(ad-bc)^2}{(a+b)(c+d)(a+c)(b+d)}$$

$$\log(a \cdot b) = \log a + \log b$$

$$\log\left(\frac{a}{b}\right) = \log a - \log b$$

$$\log a^b = b \cdot \log a$$

$$H = p\log_2\left(\frac{1}{p}\right)$$

$$I = \log_2\left(\frac{1}{p}\right)$$

$$p(A) = \frac{k}{n}$$

$$p(AorB) = p(A) + p(B) - p(AandB)$$

$$p(A \mid B) = \frac{p(AandB)}{p(B)}$$

$$odds = \frac{p}{1-p} = \frac{p}{q}$$

$$p = \frac{odds}{1+odds}$$

logit (A)=ln(odds(A))

logit(not A)=-logit(A)

odds(A)=$e^{\text{logit(A)}}$

$$odds(\text{not A}) = \frac{1}{odds(A)}$$

$$\text{RR} = \frac{p\left(B_+ \middle| R_+\right)}{p\left(B_+ \middle| R_-\right)} = \frac{\frac{a}{a+b}}{\frac{c}{c+d}} = \frac{a(c+d)}{c(a+b)}$$

$$\text{OR} = \frac{\frac{p(B_+|R_+)}{p(B_- \mid \text{R}_+)}}{\frac{p(B_+ \mid R_-)}{p(B_- \mid R_-)}} = \frac{ad}{bc}$$

$$\mu = E(\xi) = \sum_i x_i p_i$$

$$\sigma^2 = D^2(\xi) = E[(\xi - E(\xi))^2] = \sum_i \left((x_i - \mu)^2 \cdot p(x_i)\right)$$

$$\eta = \xi + k \rightarrow E(\eta) = E(\xi) + k\,; Var(\eta) = Var(\xi)$$

$$\eta = \xi \cdot k \rightarrow E(\eta) = E(\xi) \cdot k\,; Var(\eta) = Var(\xi) \cdot k^2$$

$$\eta = \xi_{norm} \cdot \omega_{norm} \rightarrow E(\eta) = E(\xi) \cdot E(\omega)$$

$$\eta = \xi + \omega; E(\eta) = E(\xi) + E(\omega); Var(\eta) = Var(\xi) + Var(\omega)$$

if independent

$$\eta_{E=0;Var=1} = \left(\xi - E(\xi)\right) * \frac{1}{\sqrt{Var(\xi)}} = \frac{\left(\xi - E(\xi)\right)}{\sqrt{Var(\xi)}}$$

$$p(x_i) = \frac{1}{n} \quad \mu = \frac{n+1}{2} \quad \sigma^2 = \frac{n^2-1}{12}$$

$$f(x) = \begin{cases} \frac{1}{b-a}, & \text{if } a \le x \le b \\ 0, & \text{otherwise} \end{cases}$$

$$\mu = \frac{a+b}{2} \quad \sigma^2 = \frac{(b-a)^2}{12}$$

$$p_k = \binom{n}{k} p^k (1-p)^{n-k}$$

$$\mu = np \qquad \sigma^2 = np(1-p)$$

$$p_k = \frac{\lambda^k}{k!} e^{-\lambda} \qquad \mu = \lambda \qquad \sigma^2 = \lambda$$

$$f(x) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{(x-\mu)^2}{2\sigma^2}} = N(\mu, \sigma)$$

$$\sum \frac{(x_i)^k}{n}$$

$$\sum \frac{(x_i - \mu)^k}{n}$$

$$w = \frac{diseased}{total} = \frac{FN+TP}{TN+FP+FN+TP}$$

$$se = \frac{TP}{diseased} = \frac{TP}{FN+TP}$$

$$sp = \frac{TN}{healthy} = \frac{TN}{TN+FP}$$

$$1 - se = \frac{FN}{diseased} = \frac{FN}{FN+TP}$$

$$1 - sp = \frac{FP}{healthy} = \frac{FP}{TN+FP}$$

$$PPV = \frac{TP}{positive} = \frac{TP}{FP+TP}$$

$$NPV = \frac{TN}{negative} = \frac{TN}{FN+TN}$$

$$1 - PPV = \frac{FP}{positive} = \frac{FP}{FP+TP}$$

$$1 - NPV = \frac{FN}{negative} = \frac{FN}{FN+TN}$$

$$de = \frac{TP+TN}{total} = \frac{TP+TN}{TP+FN+TN+FP}$$

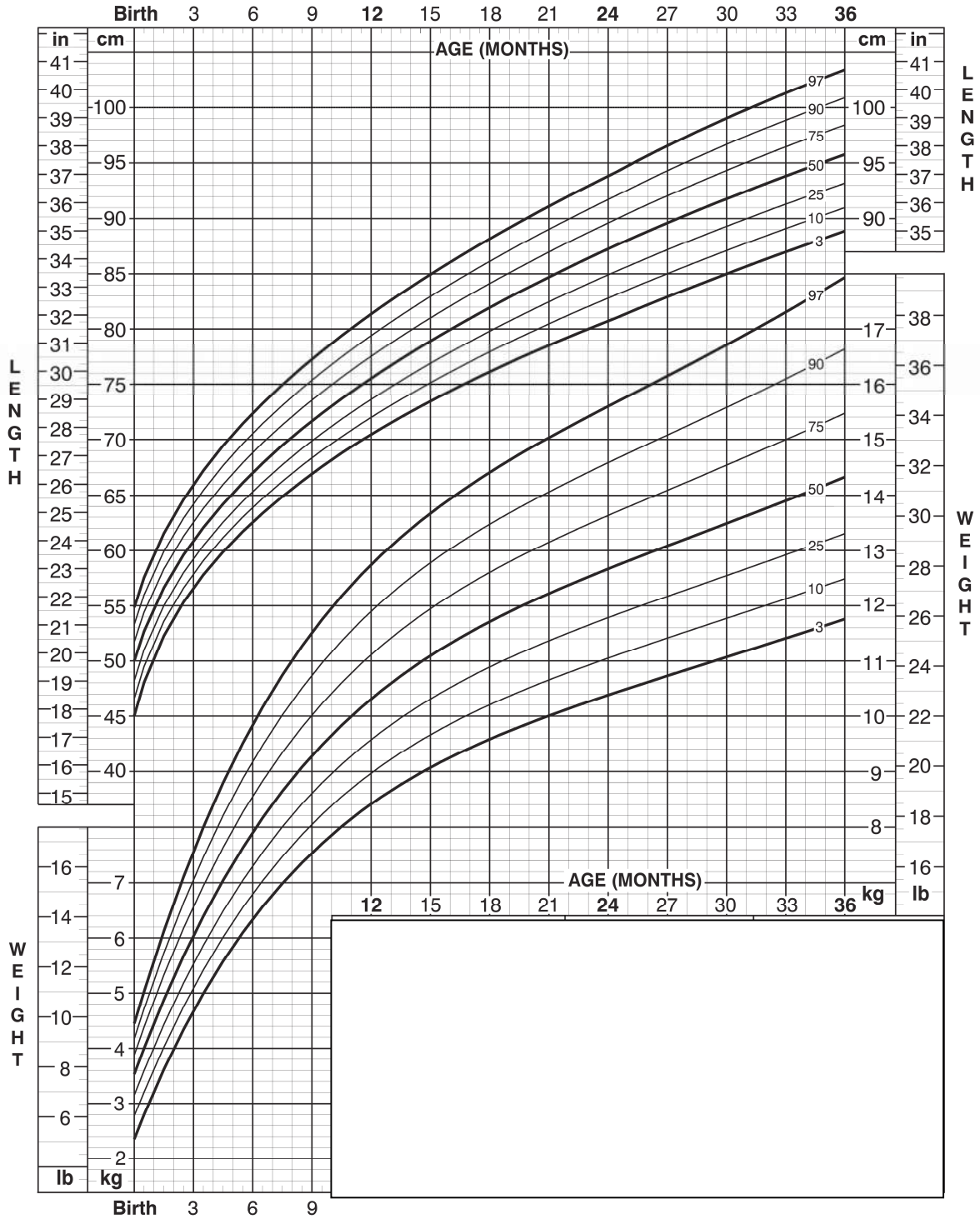
T-DISTRIBUTION

degree of freedom	*p* (probability, two-tailed)							
	0.5	0.2	0.1	0.05	0.02	0.01	0.002	0.001
1	1.00	3.08	6.31	12.7	31.8	63.7	318.3	636.6
2	0.82	1.89	2.92	4.30	6.96	9.92	22.3	31.6
3	0.76	1.64	2.35	3.18	4.54	5.84	10.2	12.9
4	0.74	1.53	2.13	2.78	3.75	4.60	7.17	8.61
5	0.73	1.48	2.02	2.57	3.37	4.03	5.89	6.87
6	0.72	1.44	1.94	2.45	3.14	3.71	5.21	5.96
7	0.71	1.41	1.89	2.36	3.00	3.50	4.79	5.41
8	0.71	1.40	1.86	2.31	2.90	3.36	4.50	5.04
9	0.70	1.38	1.83	2.26	2.82	3.25	4.30	4.78
10	0.70	1.37	1.81	2.23	2.76	3.17	4.14	4.59
11	0.70	1.36	1.80	2.20	2.72	3.11	4.02	4.44
12	0.70	1.36	1.78	2.18	2.68	3.05	3.93	4.32
13	0.69	1.35	1.77	2.16	2.65	3.01	3.85	4.22
14	0.69	1.35	1.76	2.14	2.62	2.98	3.79	4.14
15	0.69	1.34	1.75	2.13	2.60	2.95	3.73	4.07
16	0.69	1.34	1.75	2.12	2.58	2.92	3.69	4.01
17	0.69	1.33	1.74	2.11	2.57	2.90	3.65	3.97
18	0.69	1.33	1.73	2.10	2.55	2.88	3.61	3.92
19	0.69	1.33	1.73	2.09	2.54	2.86	3.58	3.88
20	0.69	1.33	1.72	2.09	2.53	2.85	3.55	3.85
21	0.69	1.32	1.72	2.08	2.52	2.83	3.53	3.82
22	0.69	1.32	1.72	2.07	2.51	2.82	3.51	3.79
23	0.69	1.32	1.71	2.07	2.50	2.81	3.49	3.77
24	0.68	1.32	1.71	2.06	2.49	2.80	3.47	3.75
25	0.68	1.32	1.71	2.06	2.49	2.79	3.45	3.73
30	0.68	1.31	1.70	2.04	2.46	2.75	3.39	3.65
40	0.68	1.30	1.68	2.02	2.42	2.70	3.31	3.55
60	0.68	1.30	1.67	2.00	2.39	2.66	3.23	3.46
120	0.68	1.30	1.66	1.98	2.36	2.62	3.16	3.37
∞	0.68	1.29	1.64	1.96	2.33	2.58	3.09	3.29

χ^2 (CHI-SQUARE)-DISTRIBUTION

degree of freedom	*p* (probability, right)						
	0.99	0.975	0.95	0.05	0.025	0.01	0.001
1	0.0000157	0.0000982	0.000393	3.84	5.02	6.63	10.83

LEGTH- AND WEIGHT-FOR-AGE PERCENTILES; BOYS



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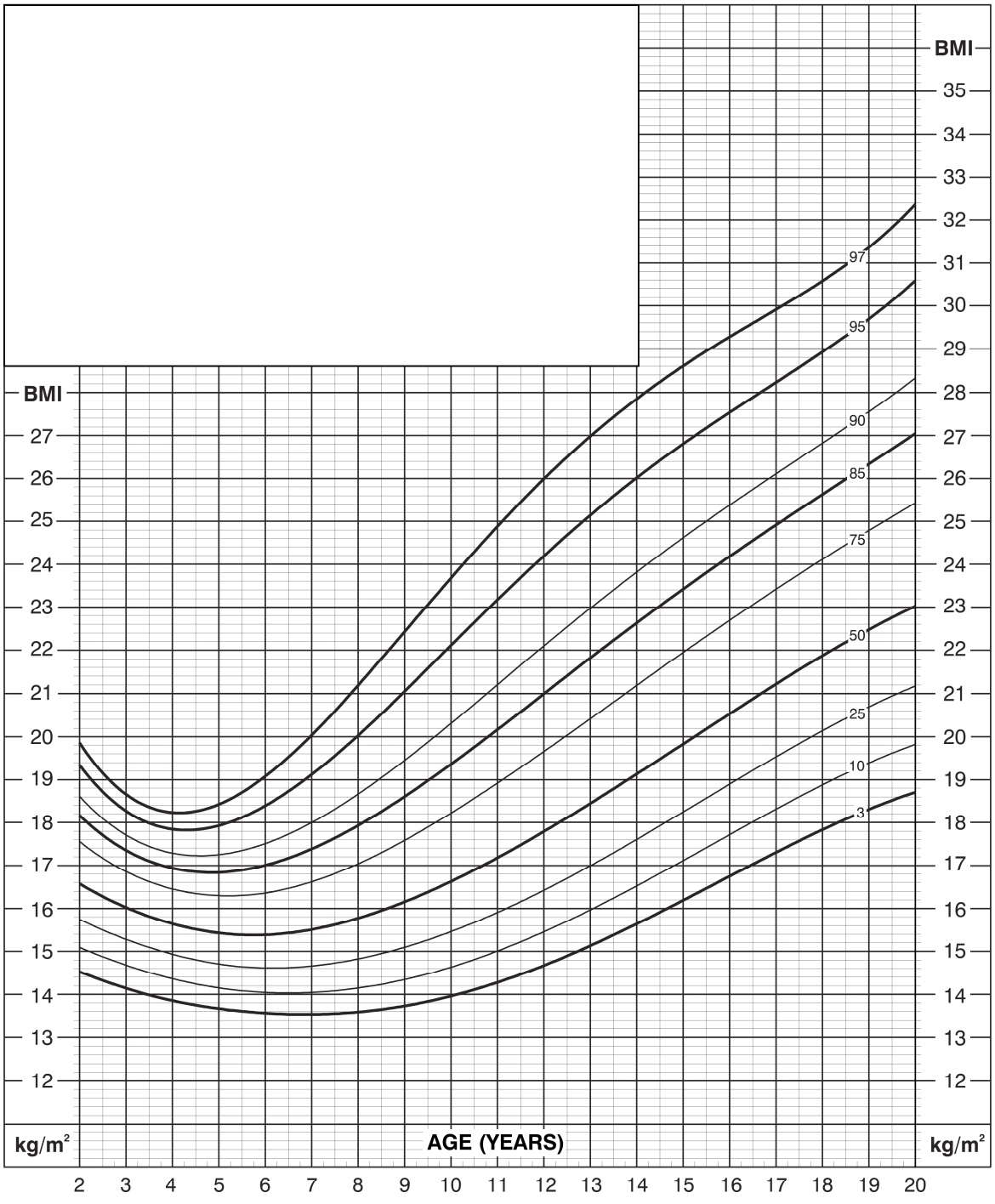
BMI – AGE PERCENTILES; BOYS



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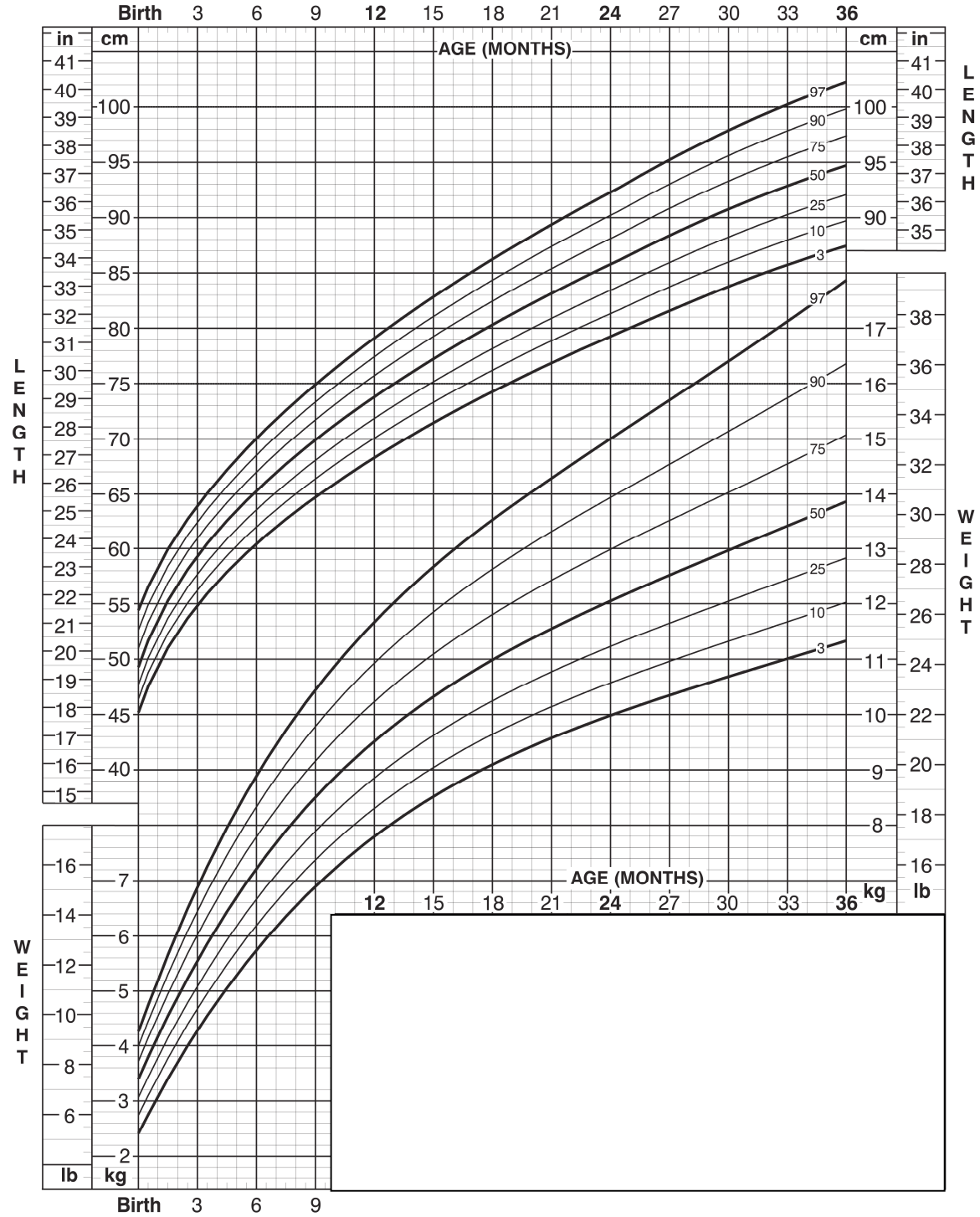
LEGTH- AND WEIGHT-FOR-AGE PERCENTILES; GIRLS



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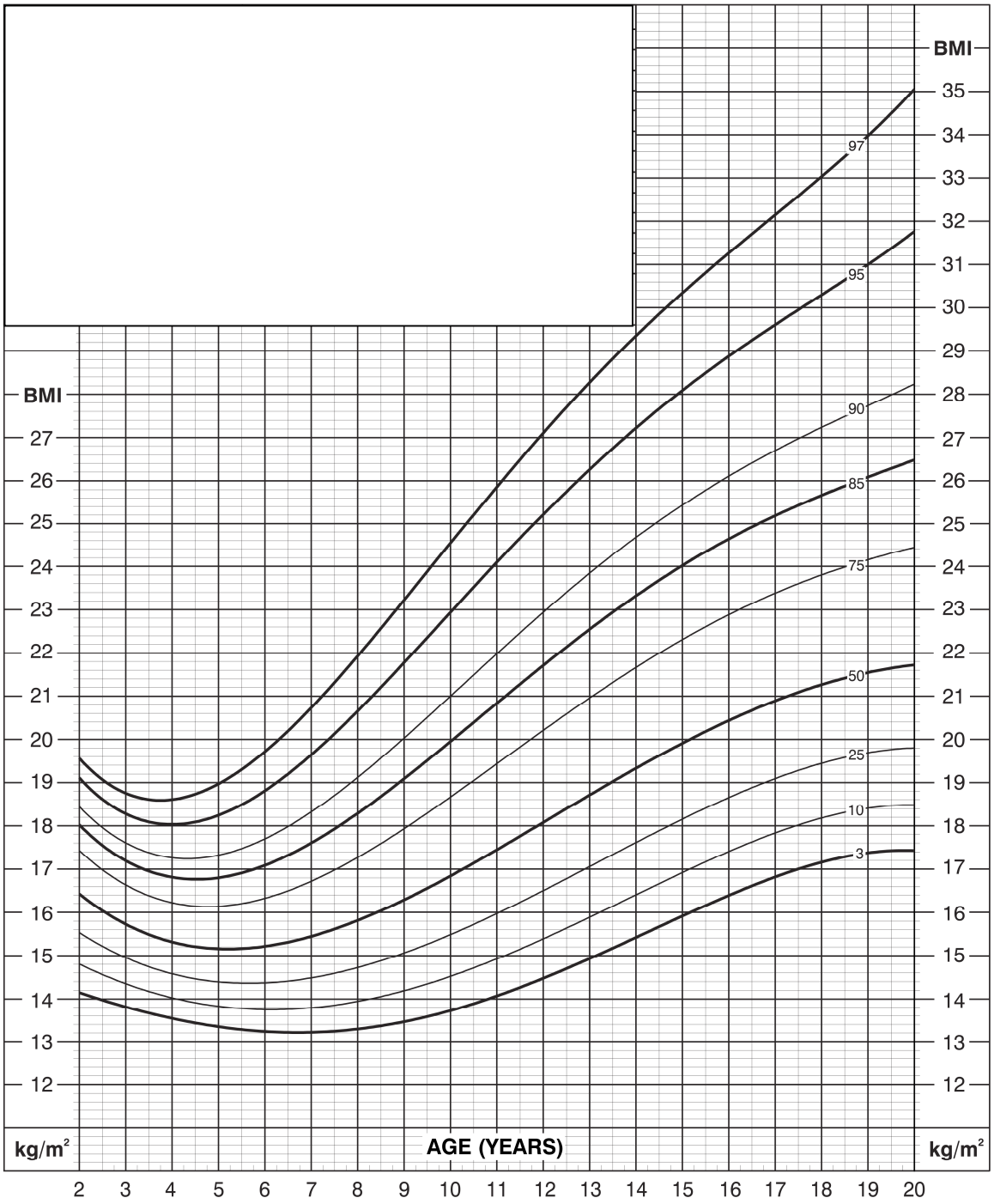
BMI – AGE PERCENTILES; GIRLS



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