



BOOK OF PAEDIATRIC EMERGENCIES

1.2



TABLE OF CONTENTS

	<i>Page</i>		<i>Page</i>		<i>Page</i>
ANTIBIOTICS	1	ANTI-THYROID		NORMAL VITAL SIGNS IN CHILDREN	
Amoxicillin		Carbimazole		Respiratory Rate	
Amoxiclav (Augmentin)				Pulse	
Azithromycin (Zithromax)		MINERALS AND VITAMINS		Blood Pressure (measurement and interpretations)	
Cefixime		Magnesium Sulphate (MgSO ₄)		WEIGHT ESTIMATION FROM AGE	11
Cefotaxime		Potassium Chloride (KCl)		HEIGHT ESTIMATION FROM AGE	
Cefpodoxime (Orelox)		Vitamin C		DEVELOPMENTAL MILESTONES WITH LIMIT AGES	
Ceftriaxone (Rocephin)		Zinc tab		Gross motor	
Cefuroxime (Zinnacef)		ORS		Vision and Fine motor	
Ciprofloxacin	2	Vitamin K (in neonates) [*page 7]		Social behaviour	
Co-trimoxazole (Septrin)		Iron (oral syrup/suspension) [*page 7]		ANTHROPOMETRY (Measurement and interpretations)	
Flucloxacillin		PROTON PUMP INHIBITORS		Concept of Anthropometry	
Gentamicin		Esomeprazole (Nexium)		Weight-for-Age	
Metronidazole		Omeprazole	6	Length/Height-for-Age	
Penicillin V (Phenoxymethylpenicillin)		PEPTIC ULCER TRIPLE THERAPY FOR CHILDREN		Weight-for-Age	
ANTIVIRAL		DIURETICS		Weight-for-Height	
Acyclovir		Furosemide		MUAC (Mid Upper Arm Circumference)	12
ANTI-HELMINTHICS (DEWORMERS)	3	Spirolactone		Head Circumference	
Albendazole (Zentel)		ANAESTHETIC DRUGS	7	HYPOGLYCEMIA MANAGEMENT	
Mebendazole (Vermox)		Ketamine		SEIZURE MANAGEMENT	
Praziquantel		Lidocaine		MAINTENANCE FLUID CALCULATION (BASED ON DAILY REQUIREMENTS)	13
ANTIFUNGAL		ADRENEGIC MEDICATIONS (FOR SHOCK)		SHOCK MANAGEMENT IN CHILDREN	
Nystatin		Norepinephrine		Signs	
Clotrimazole		Adrenaline		Management	
Fluconazole (Diflucan)		Atropine		HYPOTHERMIA	14
Griseofulvin		ANALGESICS	8	Definition	
ANTIMALARIALS		Paracetamol		Prevention	
Artesunate (IV)		Ibuprofen		Management	
Artemeter/Lumefantrine (Coartem)	4	Morphine		SOME EMERGENCY EXAMINATION FINDINGS AND THEIR INTERPRETATIONS	
Primaquine		DRUG OVERDOSE AND THEIR ANTIDOTES		Pupils (including drug effects on pupils)	
ANTIHISTAMINES		TRANFUSION OF BLOOD PRODUCTS		Hepatomegaly and splenomegaly differentials	15
Cetirizine		Blood products and Amounts			
Promethazine		Threshold for blood transfusion	9		
STEROIDS:		PAEDIATRIC AGE GROUPS AND TERMINOLOGIES			
Hydrocortisone					
Prednisolone					
SOMATOSTATIN ANALOGUES	5				
Octreotide					

ANTHROPOMETRY CONTINUATION (Taking Measurements Properly)**16**Weight
Height
Head Circumference**ANTHROPOMETRY CHARTS**

Head circumference-for-Age	17-18
Weight-for-Age	19-25
Length/Height-for-Age	26-31
Weight-for-Length/Height	32-35
BMI-for-Age	36-37
Length/Height –for-Age	38-41
Blood pressure Centile Chart	42-45
Symptoms of Organophosphate poisoning	46
Length –for-Age (birth to 36months) Girls	47
Stature-for-Age (2years to 20years) Girls	48
Length –for-Age (birth to 36months) Boys	49
Stature-for-Age (2years to 20years) Boys	50

BOOK OF PAEDIATRICS

*This book took 7 months from Idea conception to full compilation
It has undergone 2 minor reviews so far
It serves mainly as a reference for day-to-day management of paediatric cases (not ideal for neonates)
However, most of the ideas have been simplified to help you manage patients quickly
I hope it will help you manage patients properly*

Acknowledgement: Much thanks to Dr. Felicia Okyere for reviewing part of this book at the very inception

ANTIBIOTICS:**Amoxicillin:****Oral:****ENT Infection:****Mild:**

< 3month: 15mg/kg bid x 2-3days

>3months and <40KG: 25mg/kg/day divided bid **OR**
20mg /kg/day divided tid

>40kg: 500mg bid or 250mg tid

Severe:

< 3month: 15mg/kg bid

>3months and <40KG: 45mg/kg/day divided bid **OR**
40mg/kg/day divided tid

>40kg: 875mg PO bid or 500mg PO tid

*Treat for 2-3days in mild cases; 10-14days in severe cases

* Doses used in severe ENT infection can be used in pneumonia treatment

Amoxiclav [Quality Brand – Augmentin]**IV**

1-2months- 30mg/kg bid

3months- 17years - 30mg/kg tid (max 1.2g/dose)

Oral:

125/31(suspension)

1months-11months - 0.25ml/kg tid

1year-5years - 0.25ml/kg (alternatively 5mls tid)

250/125(tab)

12-17years - 1tab tid

500/125(tab)

12-17years - 1tab 8hrly

Azithromycin [Quality Brand – Zithromax]**Oral**

6months - 17years: 10mg/kg od (round to closest dose as
200,300,400,500mg)

wt (15-25kg) - 200mg bid x 3/7

wt (26-35kg) - 300mg od x 3/7

wt (36-45kg) - 400mg od x 3/7

>45kg - 500mg od x 3/7

* Not recommended for age <6/12

Cefixime 3rd gen cephalosporin**Oral:**

< 6months: not recommended

6months-12years, < 45kg: 8mg/kg/day oral in single daily dose or divided bid

>12years or >45kg: 400mg/day oral in single daily dose or divided bid
(Otitis Media, uncomplicated UTI, typhoid fever,
uncomplicated Gonorrhoea, Pharyngitis/tonsillitis, acute bronchitis)

Cefotaxime: 3rd gen. cephalosporin**Oral:**

Uncomplicated Gonorrhoea (12years-17years) - 500mg IM STAT

Severe infection (>1month age): 50mg/kg tid/qid (max 12g/day)

Cefpodoxime–3rd gen. cephalosporin: [Quality Brand – Orelox]**Oral:**

< 2months: not recommended

2months to 12years: 5mg/kg oral bid for 10days (not to exceed
200mg/dose)

>12years: 100-400mg PO bid
(Sinusitis/otitis media - 200mg bid; otitis media 200mg bid x 5)

Ceftriaxone (IV or IM) - 3rd gen. cephalosporin [Quality Brand – Rocephin]

50-100mg/kg based on severity of infection

For meningitis - 100mg/kg/day iv in single daily dose (preferred) x 7days
(not to exceed 4g/day) or divided bid

Cefuroxime- 2nd gen. cephalosporin [Quality Brand – Zinnacef]**IV**

Neonate: 50/kg tid

Children- 100mg/kg in 3divided doses

Oral

>3months-12years: 15mg/kg bid [round to the closest dosage as (125mg -

250mg bid)]

> **12years:** 15mg/kg bid

Round to the closest dosage as (250-500mg bid) x 10/7

Ciprofloxacin

<**1year:** not recommended

>**1year**

IV - 10/kg tid (max per dose 400mg)

Oral- 15mg/kg (10-20mg/kg) bid (max per dose 750mg)

Co-trimoxazole (Septrin)

0.5 x weight of patient (in mls) – divide dose bid

OR

< **5years:** 2.5mls bid

6years-12years: 5mls bid

*Avoid in G6PD patients (*sulfur containing drug*)

Flucoxacin:

>= **1months- 25mg/kg** qid all routes (100mg/kg divided qid or tid)

IV - (max 2g per dose)

IM - (max 500mg per dose)

Oral - (max 1g per dose) - (round dosage to closest value as 62.5mg, 125mg, 250mg, 500mg)

Gentamicin:

Preterm - 4mg/kg daily

Neonate- 5mg/kg daily

Children - 6mg/kg daily (divide dosage bid if >80MG/DOSE)

Metronidazole:

IV

>**1MONTH**

7.5mg/kg 8hrly

2-17years

7.5mg/kg 8hrly (max per dose 500mg)

Oral:

1month - 7.5mg/kg bid

2months-11years - 7.5mg/kg tid

Child 12-17years: 400mg 8hrly

Penicillin V (Phenoxymethylpenicillin)

(Oral)

Prevention of pneumococcal infection in Asplenia or in patients with Sickle-Cell Disease

Child 1-11months: 62.5mg

Child 1-4years: 125mg bid

Child 5-17years: 250mg bid

Tonsillitis, otitis media, cellulitis, oral infections

Generally 12.5mg/kg qid

1-11months: 62.5mg qid

1-5years: 125mg qid

6-11 years: 250mg qid

12-17years: 500mg qid; increase to 1g qid if necessary

ANTIVIRAL

Acyclovir:

Herpes Simplex Virus Encephalitis:

3months- 12years: 20mg/kg iv tid x 10adys (up to 14-21days reported)

>= **12years:** 10-15mg/kg iv for 14-21days

Mucocutaneous Herpes Simplex Virus Infection:

<**12years:** 10mg/kg iv tid x 7days

>**12years:** 5-10mg/kg/day iv tid for 5-7days (up to 14days)

Herpes Zoster (Shingles):

<**12years (immunocompromised):** 20mg/kg iv tid x 7days

>**12years (immunocompetent):** 800mg PO qid while awake (5x daily for 7-10days)

>**12years (immunocompromised):** 30mg/kg/day iv divided tid x 7-10days

Varicella Zoster (Chickenpox)

>**2years and <40kg:** 20mg/kg/dose PO qid x 5days; not to exceed 800mg/dose

>40kg: 300mg PO qid x 5days
 Immunocompromised Patients
<12years: 20mg/kg/dose IV tid x 7days
≥12years: 10mg/kg/dose IV tid x 7days

ANTI-HELMINTHICS:

Albendazole(oral): [Quality Brand- Zentel]

<2years - not recommended
 (2years-17years)
 Hookworm infection: 400mg for 1dose
 Chronic strongyloides (hookworm) infection - 400mg bid x 3days (repeat dose after 3weeks if necessary)

Mebendazole(oral): [Quality Brand – Vermox]

Hookworm/Roundworm (1-17years) - 100mg bid x 3days
 Alternative: **Roundworm Infestation (2-17years)** - 500mg stat

Praziquantel(oral):

<4years - not recommended
 (4-17years)
Tapeworm Infection - 5-10mg/kg x 1dose (to be taken after light breakfast)
Schistosoma haematobium/Mansoni Infection- 20mg/kg stat, then 20mg/kg after 4-6hrs

ANTIFUNGALS:

Nystatin oral suspension:

Oropharyngeal Candidiasis
 Paint suspension into recesses of the mouth
Infants: 200,000units PO qid
Children: 400,000- 600,000 units
 *powder and oral tablets used in intestinal candidiasis

Clotrimazole: (oral)

Oropharyngeal Candidiasis:

<3years- safety not established
 >3years- *prophylaxis:* 10mg tid (to slowly dissolve in mouth)
Treatment: 20mg 5x daily x 7-14days (to slowly dissolve in mouth)

Fluconazole: [Quality brand- Diflucan]

Oropharyngeal Candidiasis:

6mg/kg ORAL on day1, then 3mg/kg od (not to exceed 600mg/day)

Oesophageal candidiasis:

Same as for oropharyngeal (but up to 12mg/kg/day ORAL depending on response.)

Treat for at least 3weeks (and for at least 2weeks following symptoms resolution)

Systemic Candidiasis:

6-12mg/kg/day ORAL/IV (not to exceed 600mg/day)

Cryptococcal Meningitis:

Treatment -12mg/kg PO/IV on day 1; then 6mg/kg od
 As prophylaxis- in patients with RVI (6mg/kg od)

Griseofulvin:

Fungal Infection Of Skin, Scalp, Hair Nails Where Topical Therapy Fails Oral

1month-11years: 10mg/kg (max 500mg) od or in divided doses
In severe infection - 20mg/kg (max 1g) od or in divided doses
 [reduce dose when response occurs]

12-17years: 500mg od;
In severe infection - 1g od (reduce dose when response occurs)

ANTIMALARIAL

IV Artesunate

1. <20kg: 3mg/kg per dose (serve at 0, 12, 24hrs)
2. wt ≥20mg - 2.4mg/kg per dose (at 0, 12, 24hrs)

Artemether with Lumefantrine: [QUALITY BRAND – COARTEM]

Oral

[Each tab is **20/120mg**] to be taken at **0, 8, 24, 36, 48, 60hrs**

WEIGHT	TABS TO TAKE
5-< 15kg	1 tab
15-<25kg	2 tabs
25-<35kg	3tabs
≥ 35kg	4tabs (adult dose)

Primaquine (oral)

(6months-17years)

Adjunct in treatment of non-falciparum malaria

500micrograms/kg daily (max 30mg/dose) x 14days

250micorgrams/kg daily (max 15mg/dose) x 14days

**Causes dose dependent hemolysis in patients with G6PD*

ANTI-HISTAMINES:

Cetirizine: oral

Allergy, Hayfever, Urticaria:

<2years - not recommended

2-6years = 2.5mg od; increase to max 2.5mg bid or 5mg od (based on severity)

>6years = 5-10 od (not to exceed 10mg od)

[egfr ≥30 - no dose adjustment required

egfr 10-29 or on dialysis = decrease dose by 50%

egfr <10 - not recommended]

Promethazine:

Allergy

<2 years: contraindicated

≥2years: 25mg PO/PR nocte **OR** 12.5mg qid **OR** 6.25-12.5mg tid

Nausea and Vomiting

<2 years: contraindicated

≥2 years: 0.25-1mg/kg PO/PR 4-6hrly; (not >25mg per dose)

Motion sickness:

<2years: contraindicated

>2years: 12.5-25mg PO/PR administered 30-60min before departure then 8-12hrly. *Alternatively* 0.5mg/kg bid (on subsequent days take 12.5-25mg bid upon waking from bed or before evening meal)

Sedation:

<2years: contraindicated

>2years: 12.5-25mg PO/IM/PR at bedtime

**Avoid giving routinely via IV route (if IM dosing not possible iv dose should be given through large vein over 20-40mins to avoid extravasation)*

STEROIDS:

Hydrocortisone:

Inflammation:

<12years: 1-5mg/kg/day IM/IV od or divided bid

≥12years: 100-500mg/dose IV/IM 2-6hrly

Status Asthmaticus:

iv 2mg/kg qid

Acute Adrenal Crisis:

>1month-1year:

1-2mg/kg iv bolus then 25-150mg/day divided tid/qid

1-12years:

1-2mg/kg iv bolus, then 150-250mg/day tid/qid

Prednisolone

1month-11years: 1-2mg/kg once daily (max per dose 40mg)

12-17years: 40-50mg daily

Indications - asthma, arthritis, croup, autoimmune hepatitis, ITP (idiopathic thrombocytopenic purpura) etc.

-Nephrotic Syndrome(max 80mg/day) - 60mg/m² od x 4-6weeks until proteinuria stops; then, reduce to 40mg/m² od on alternative days x 4-

6weeks; then, withdraw by reducing dose gradually
prevention of relapse: 0.5-1mg/kg od or on alternative days

PJP In HIV Patients: 2mg/kg for 5days (started together with Anti-PJP drugs; then reduce dose over 16days to stop; to be stopped before PJP drugs are stopped)

SOMATOSTATIN ANALOGUES:

Octreotide:

By Continuous IV Infusion - 1micgrm/kg/hour (max 50ug/hour); dose can be adjusted higher; if no bleeding, reduce dose over 24hrs

ANTI-THYROID:

Carbimazole:

Hyperthyroidism (Including Grave's Disease):

1month-11years: initially 750ug/kg od until euthyroid (ie 4-8weeks),

Child 12-17years: initially 30mg od until euthyroid (ie 4-8weeks)

* Then gradually reduce carbimazole to maintenance dose of 30-60% of initial dose (occasionally higher doses may be required eg. thyrotoxic crises)

MINERALS AND VITAMINS:

Magnesium Sulphate:

-In Severe Acute Asthma; Respiratory Deterioration In Anaphylaxis

IV infusion 40mg/kg (max 2g/dose) given over 20mins

- In Hypomagnesaemia:

1month-11years: IV 50mg/kg bid (to be given over 10mins)

12-17years: 1g bid (to be given over 10mins)

Potassium Chloride:

Prevention of hypokalaemia: oral 1-2mmol/kg daily (max 50mmol/day)

Electrolyte Imbalance: IV infusion 1mmol/kg/day (maintenance)

Potassium Depletion: 0.5-1mmol/kg = total dose to be given in 3 divided doses

Vitamin C:

Oral:

1month-3years = 125-250mg od in 1-2divided doses

4-11years: 250-500mg od in 1-2 divided doses

12-17years: 0.5-1g od in 1-2 divided doses

Oral Zinc tab

<6months - 10mg od x 10-14days

>6months - 20mg 10-14

ORS

(To be given after each loose stool or vomitus)

<1year - 50-100mls

>1year - 100-200mls

PROTON PUMP INHIBITORS:

Esomeprazole:

Oral:

1-11years (wt 10-19kg): 10mg od

(wt \geq 20kg): 10-20 mg od

12-17years: 40mg od x 4-8weeks; maintenance 20mg od

IV injection/infusion: (give over \geq 3mins)

1-11years (body-weight up to 20kg): 10mg od (given over \geq 3mins)

1-11years: (\geq 20kg): 10-20mg od

12-17years: 40mg od

Omeprazole:**H-pylori eradication**

Oral

<1year not recommended**1-11years:** 1-2mg/kg od (max 40mg od)

(Approximate dose to 2.5mg, 5mg, 10mg, 20mg, 40mg)

12-17years: 40mg od

IV (to be given over 5mins)

<1month not recommended**1month-11years:** 0.5mg/kg od (up to 2mg/kg/od)**12-17years:** 40mg od**Peptic ulcer: triple therapy table for children**

Recommended regimens for <i>Helicobacter pylori</i> eradication				
Age range	Acid suppressant	Antibacterial		
		Amoxicillin	Clarithromycin	Metronidazole
Child 1-5 years	Omeprazole 1-2 mg/kg once daily (max. per dose 40 mg)	250 mg twice daily	7.5 mg/kg (max. 500 mg) twice daily	–
		125 mg 3 times a day –	– 7.5 mg/kg (max. 500 mg) twice daily	100 mg 3 times a day 100 mg twice daily
Child 6-11 years	Omeprazole 1-2 mg/kg once daily (max. per dose 40 mg)	500 mg twice daily	7.5 mg/kg (max. 500 mg) twice daily	–
		250 mg 3 times a day –	– 7.5 mg/kg (max. 500 mg) twice daily	200 mg 3 times a day 200 mg twice daily
Child 12-17 years	Omeprazole 40 mg once daily	1 g twice daily	500 mg twice daily	–
		500 mg 3 times a day –	– 500 mg twice daily	400 mg 3 times a day 400 mg twice daily

DIURETICS:**Furosemide:****Oedema (CHF, renal /hepatic disease, pulmonary oedema)/Hypertension**

Oral:

1month-11years: 0.5-2mg/kg od (max 80mg/day)

Alternatively 0.5-2mg/kg bid/tid (max 12mg/kg/day)

12-17years: 20-40mg od (max 80-120mg in resistant oedema)

Slow IV injection:

1month-11years: 0.5-2mg/kg tid (max 40mg/dose)**12-17years:** 20-40mg tid (increase dose in resistant oedema)

(max 6mg/kg/day)

IV infusion:

0.1-2mg/kg/hour (dose to be started at 0.1mg/kg/hour and doubled every 2hrs until urine output >1ml/kg/hour)

Resistant Hypertension:**<1year:** not recommended (for hypertension)**1-17years:** 0.5-2mg/kg PO od or bid

(Not > 6mg/kg/day)

Oliguria Due To Acute/Chronic Renal Insufficiency (egfr <20ml/min)

Oral:

Child 12-17years: 250mg od, then increase in steps of 250mg qid/4hrly if required (max per dose 2g)

IV infusion:

1month-11years: 2-5mg/kg 1-4x daily (max 1g/day)**12-17years:** 250mg over 1hour, then 500mg over 2hrs, then 1g over 4hrs (Incremental doses are given until urine obtained. If no response after 1g dose, consider dialysis)

If effective, dose of up to 1g (given at max rate of 4mg/min) can be repeated every 24hrs

Spiroinolactone (oral)**Oedema(CHF, Cirrhosis, Ascites, Nephrotic Syndrome)/Hypertension**

1-3.3mg/kg od or divided bid (not > 3.3mg/kg/day; up to 100mg/day)

ANAESTHETIC DRUGS:**Ketamine (vial often comes as 50mg/ml)****≥ 3months:**

4-5mg/kg IM OR

0.5-2mg/kg slow iv over 30-60seconds

*Administer incremental doses of 0.5-2mg/kg every 5-15mins if sedation inadequate***Side effects:** hallucinations, nightmares, transient psychotic effects;*Can be reduced adding benzodiazepine eg. diazepam or midazolam***Pros-** causes hypotension but less compared to other anaesthetic drugs; good for patients who need repeat anesthesia**Cons-** recovery is slow; high incidence of extraneous muscle movements**Lidocaine:****For Local Infiltration:****0-11years** - up to 3mg/kg - (equivalent - 0.3mL/kg of 1% lidocaine)*(Choice of dose according to patient's weight and nature of procedure)**Repeat dose if necessary after every 4hrs***12-17 years** (max per dose 200mg) repeat after every 4hrs if necessary**Vitamin K (in neonates)***In vitamin K deficiency: prophylaxis 1mg stat**Therapeutic 1mg 8hrly x 24hrs***Iron (oral syrup/suspension)-[some suspensions come as 15mg/ml]****Treatment of Iron Deficiency Anaemia**

3mg/kg divided tid

Prophylaxis:**4months and older** - 1mg/kg/day**6-2years:** 2mg/kg/day**2-5years:** 2mg/kg/day (not to exceed 30mg/day)**>5years:** 30mg/day with folic acid**Adolescents:** 60mg/day with folic acid**ADRENERGIC MEDICATIONS (FOR SHOCK):****Norepinephrine:**

Shock/cardiac arrest/acute hypotension - 0.05-0.1ug/kg/min (max 1-2ug/kg/min)

Adrenaline:**Anaphylaxis :(sc/im)**

<30kg = 0.01mg/kg (max 0.3mg per dose) - repeat ever 5-10mins if required

>=30kg = 0.3-0.5mg per dose - repeat every 5-10mins if required

Cardiac arrest/symptomatic bradycardia:**IV/interosseous** - 0.01mg/kg (not >1mg/kg) repeat every 3-5mins until spontaneous circulation restored**Atropine:****Sinus bradycardia:**

0.02mg/kg iv/io every 5mins for 2-3doses prn

max per dose = 0.5mg for children; 1mg - adolescents

max per day = 1mg for children; 2mg - adolescents

Bronchospasms: 0.025-0.05mg/kg in 2.5mL n/s tid/qid via nebulizer; no more than 2.5mg/dose

Organophosphate Poisoning:*Treatment based on severity*

SEVERITY	DOSE	OUTCOME	
		RESOLVED AFTER 10-15MINS	NOT RESOLVED OR SEVERE SYMPTOMS DEVELOP
2 or more mild symptoms	1 dose	No additional inj required	Give 2 additional doses in rapid succession
Severe symptoms/unconscious	3 doses in rapid succession	-	-

***Refer to page 46 for symptoms of Organophosphate Poisoning**

Dose according to weight:**<6.8kg:** 0.05mg/kg/dose IM**6.8-18kg:** 0.5mg/dose IM**18-41kg:** 1mg/dose IM**>41kg:** 2mg/dose IM**Dose to be given in mid-lateral-outer thigh***Dose can be repeated in successions PRN***ANALGESICS****Paracetamol**

* avoid iv paracetamol in children under 5years

* give rectal paracetamol or suppository

Rectal:

15mg/kg 4-6hrly (maximum 4doses/day)

(Round to closest value as 64.5, 125mg, 250mg, or 500mg)

Syrup:

15mg/kg 4-6hrly (maximum 4doses/day)

rough guide*1-2months-** 30-60mg 8hrly**3-5months-** 60mg 4-6hrly**6months-** 1year - 120mg 4-6hrly**2-3years -** 180mg 4-6hrly**4-5years -** 240mg 4-6hrly**6-7years-** 240-250mg 4-6hrly**8-9years-** 360-375mg 4-6hrly**10-11years -** 480-500mg 4-6hrly**12-15years -** 480-750mg 4-6hrly**16-17years-** 500-1g 4-6hrly**Ibuprofen: (NSAID)****Indication:** fever and pain**< 6months:** no recommended**≥ 6months:** 4-10mg/kg 6-8hrly

(Not to exceed 40mg/kg/day; or 400mg/dose)

Morphine: (Opiod)**Infant and Children:**

Oral: 0.2-0.5mg/kg Po q4-6hr

IM/SC – 0.05-0.2mg/kg q2-4hr (not to exceed 15mg/dose)

Infusion: 0.01-0.04mg/kg/hr (increase up to 0.07mg/kg/hr in sickle cell disease/cancer)

DRUG OVERDOSE AND ANTIDOTES:

Drug	Antidotes
Benzodiazepines: -Diazepam -Lorazepam -Midazolam -Chlordiazepoxide	Flumazenil 0.01mg/kg iv x 1dose serve over 15seconds (repeat after 45 sec, then every minute; not to exceed 4doses Max per day (0.05mg/kg or 1mg whichever is lower)
Opiods: -morphine -heroin -codeine -fentanyl	Naloxone <20kg or 5years: 0.1mg/kg/dose iv/im/sc (not to exceed 20mg/dose) repeat every 2-3mins PRN >20kg or > 5years: 2mg IV/IM/SC every 2-3mins PRN

TRANSFUSION OF BLOOD PRODUCTS:**Blood products and amounts****FFP -** 15ml/kg**Platelets-** 10ml/kg**Blood (generally 15ml/kg)**

- packed cells- 20ml/kg
- whole blood- 15ml/kg

Threshold for blood transfusion:

Patient without SAM

Hb \leq 5

Patient with SAM

Hb- <4g/dl or

Hb- <6g/dl + signs of respiratory distress,

*give furosemide if patient has signs of heart failure.

* If hb is not readily available, use clinical signs of severe anaemia and transfuse

PAEDIATRIC AGE GROUPS AND TERMILOGIES:

Neonate < 4weeks (1month)

Infant < 1year

Toddler - 1-2years

Preschool - 2-5years

School age - 5-12years

>12years – Adolescent

NORMAL VITAL SIGNS IN CHILDREN:

Respiratory Rate in Children

Age	Normal	Tachypnoea
Neonate	30-50	>60
Infant	20-30	>50
Young child (1-5years)	20-30	>40
Older children (>5years)	15-20	>30

Pulse:

Age	Pulse at rest
<1year	110-60
2-5year	95-140
5-12years	80-120
>12years	60-100

Blood Pressure:

Appropriate size cuff should cover >2/3 length of upper arm

Smaller size cuffs give false high readings; larger cuffs give false low

Age: **Upper limit of normal**

1-5years 110mmhg

6-10years 120mmhg

Quick Estimation Of Normal And Hypotension Systolic BP Levels Under Emergency Conditions Can Be Obtained Using:

90+ (2xage) – normal

70+ (2xage) – hypotension

Interpreting BP checked:

BP measurement in children should be appropriate for the sex, age, height before interpretations can be made.

Precisely interpret BP checked in a child use the following steps:

Step 1:

Obtain patient's sex, age, height (or length if <2years)

Step 2:

Use *height for age* chart (provided in pages 47-50 - use right one based on gender) to determine the height percentile

Step 3:

Measure and record the child's SBP and DBP

Step 4

- Use the correct gender table for SBP and DBP (*** pages 42-45**)
- On the table, find the 50th, 90th, and 95th and 99th percentiles for SBP in the left columns and for DBP in the right columns.
- Interpret final result as eg. Systolic is between 50th and 90th centile; diastolic is between 95th and 99th centile etc

Step 5

Give final info as: normal, pre-hypertension, hypertension (stage I, stage II)

Management:

Normal BP- recheck in 1 year

Prehypertension: Recheck in 6months; begin weight management

Hypertension:**Stage I:**

Recheck in 1 to 2weeks;

If BP remain at this level on recheck, begin evaluation and treatment including weight management, if appropriate

Stage II:

Begin evaluation and treatment within 1 week; immediately if symptomatic

Hypertensive urgency

If medically stable, consider short acting orals while investigating cause eg. Nifedipine 0.25–0.5 mg/kg/day (max 20 mg) and titrate up as required to a maximum of 3 mg/kg/day (max 120 mg)

Hypertensive emergency

- Intravenous therapy; discuss with specialist (labetalol/hydralazine)
- Aim to gradually reduce BP to the patient's estimated 95th centile
- Decrease BP by 25% of the original value every 24 hours till target BP reached.
- Reduce rate of decrease if patient becomes symptomatic

First-line investigations

- urinalysis +/- renal ultrasound
- Consider LFT, Hb1Ac, fasting lipids particularly in children with BMI >95th centile

Further Investigations

- Bloods: FBE, Bicarbonate, renin/aldosterone ratio, TFT, plasma metanephrens, cortisol, fasting glucose
- Urine: microscopy, protein/creatinine ratio, catecholamines, drug screen
- Imaging: renal doppler ultrasound, DMSA, CTA/MRA
- Other: echocardiogram, sleep study

Blood pressure classification in children and adolescents

	For children aged 1 to 13 years	For children aged 13-17 years (Adolescents)
Normal blood pressure	<90th centile	<120/<80 mmHg
Elevated blood pressure	≥90th centile to <95th centile or 120/80 mmHg to <95th centile (whichever is lower)	120/<80 to 129/<80 mmHg
Stage 1 Hypertension	≥95th centile to <95th centile + 12 mmHg or 130/80 to 139/89 mmHg (whichever is lower)	130/80 to 139/89 mmHg
Stage 2 Hypertension	≥95th centile + 12 mmHg, or ≥140/90 mmHg (whichever is lower)	≥140/90 mmHg
Severe Hypertension		
Hypertensive Urgency	>95th centile + 30 mmHg without symptoms/signs of target end organ damage (See Examination)	>180/120 without symptoms/signs of target end organ damage (See Examination)
Hypertensive Emergency	>95th centile + 30 mmHg associated with encephalopathy, eg headache vomiting, vision changes and neurological symptoms (facial nerve palsy, lethargy, seizures, coma) +/- target-end organ damage	>180/120 associated with encephalopathy, eg headache vomiting, vision changes and neurological symptoms (facial nerve palsy, lethargy, seizures, coma) +/- target-end organ damage

WEIGHT ESTIMATION FROM AGE:

Try to get patient's weight at all cost. But if not possible eg. Unconscious patient on oxygen, then consider weight estimation

Age group	Weight
Infant (<12months)	(age in month +9) /2
Child age 1-5years	2x(age in years + 5) Alternatively 2x (age in years) + 8
Children age 5-14 years	4x age in years

HEIGHT ESTIMATION FROM AGE

If a stadiometer is not readily available or under emergency conditions, height for patients >2years can be estimated using the formula below

$$\text{Height} = (\text{age in years} \times 2) + 80\text{cm}$$

DEVELOPMENTAL MILESTONES WITH LIMIT AGES

**Limit age: age beyond which patient is said to have developmental delay*

Gross motor:

Head control - 6months

Sits unsupported - 9months

Stands independently - 12months

Walks independently - 18months

Vision and Fine motor:

Fixes and follows objects visually- 3months

Reaches for objects- 6months

Transfers objects from one hand to another - 9months

Pincer grip - 12months

Social behaviour:

Smile - 8 weeks

Fear of strangers- 10months

Feeds self with spoon- 18months

ANTHROPOMETRY

- Anthropometry: The measurement of an individual's physical parameters in comparison to standard measurements
- Several measurements available. Measurements often plotted on charts (**refer to page 16 for further details*)
- Different charts exist for different gender and age ranges.
- Charts can come as either **z-score** or **percentiles** (*refer to pages 17-41*)
- Appropriate chart should be obtained before plotting is done.

Measurements:

Weight-for- Age:

- Takes into Account both acute and Chronic malnutrition

Plotting: Find weight on y-axis and Age on x-axis; plot intersection

Nutritional status	Z-Score
Normal	≥ -2 to $\leq +1$
Moderately underweight	≥ -3 to < -2
Severely underweight	< -3

Length for age or Height-for-Age:

- Measures Linear growth
- Determines Chronic malnutrition (**stunting** ie. Linear growth retardation)
- Is an indicator of long term effect of malnutrition in an individual

Plotting: Find patient's length on y-axis, age on x-axis; plot the intersection

Nutritional status	Z-Score
Normal	≥ -2 to $\leq +3$
Moderately stunted	≥ -3 to < -2
Severely stunted	< -3

Weight for Height

- Measures body mass in relation to body height or length
- An indicator of acute starvation (**wasting**)
- It is a ratio hence independent of age

- Helps distinguish acute malnutrition (wasting) from chronic malnutrition (stunting)
 - Normal weight-for-height z-score: ≤ -1
- Plotting: Find weight on y-axis, length/height on x-axis; plot the intersection

Nutritional status	Z-Score
Obese	$>+3$
Overweight	$>+2$ to $\leq +3$
Risk of overweight	$>+1$ to $\leq +2$
Normal	≥ -2 to $\leq +1$
Moderately wasted	≥ -3 to < -2
Severely Wasted	< -3

MUAC (Mid Upper Arm circumference): (For ages 6-59months (<5years))

- Circumference of upper arm, measured at midpoint.
- To assess nutritional status primarily **wasting**
- A special MUAC tape with colour code is available; tape measure can also be used
- Does not require plotting unlike other anthropometric measurements

Nutrition Status	MUAC
severe acute malnutrition (SAM)	MUAC $< 11.5\text{cm}$
Moderate Acute Malnutrition (MAM)	11.5-12.5cm
At Risk of Malnutrition	12.5-13.5cm
Normal	$> 13.5\text{cm}$

Head Circumference:

- To assess brain growth
- Measurements is from birth to 5years
- Use **a tape measure** to measure from the supraorbital ridge to the occiput circumferentially. Take 2-3 measurements and find average
- Normal at birth- 35cm (33-37cm)
- $>97\text{th}$ percentile is macrocephaly; $<3\text{rd}$ percentile is microcephaly**

Plotting: Find head circumference on y-axis, age on x-axis; plot intersection

Nutritional status	Z-Score
Large head	$>+2$
Normal	≥ -2 to $\leq +2$
Small head circumference	≥ -3 to < -2
Very small head circumference	< -3

HYPOGLYCEMIA MANAGEMENT:

Diagnosis: RBS/FBS < 2.2 (*also < 3 and symptomatic)

Target for Management: RBS/FBS ≥ 4

Choice of route of rbs correction:

Oral route - rbs > 2.2 but < 3 and conscious

IV route -

1. Patient is unconscious;
2. unable to swallow;
3. Or rbs < 2.2 and conscious

Treatment:

A. oral route- give sugar sweet food/drink - 15g stat (if $< 1\text{year}$ 0.2g/kg)

B. IV route-

1. **Bolus** - **2mL/kg 10% dextrose stat**

Repeat after 10-15mins if rbs check does not reach target for management

2. Choice of Maintenance IV Fluids –

- **Neonate** - 10% dextrose in 0.18% n/s

- **Infant and adults** - DNS or 5% dextrose

Avoid use of 50% dextrose in children

1. Leads to hyperglycemia--> insulin surge--->further hypoglycemia
2. Causes veins to clog

SEIZURE MANAGEMENT:

1st line:

Rectal diazepam

By age-

2-6yrs (0.5mg/kg)

6-12yrs (0.3mg/kg)

$\geq 12\text{yrs}$ (0.2mg/kg)

- draw injection diazepam and give via rectal route
- repeat same dose once if seizure recurs
- * avoid giving diazepam via iv route in children

13 :

Phenobarbital:

Use if seizure recurs after 2 doses of diazepam

Loading dose: 20mg/kg (not to exceed 1g/dose)

(infuse at not greater than 2mg/kg/min) i.e.

Minimum time for giving loading dose = $\frac{\text{Total calculated dose (20mg/kg)}}{[2 \times \text{patient weight}]}$

Usually minimum time is 10mins

* If seizure recurs after loading dose, repeat with half of loading dose (10mg/kg)

Maintenance:

- To be given after loading dose
- Preferably serve as single daily dose rather than divided doses
- <1yr - 5mg/kg (in 1-2 divided doses)
- 1-12years - 6mg/kg (1-2 divided doses)
- >12years - 5mg/kg (1-2 divided doses)

MAINTENANCE FLUID CALCULATION (BASED ON DAILY REQUIREMENTS)

Calculation for children:

100-50-20 rule

1st 10kg - 100ml/kg

Next 10kg- 50ml/kg

Any additional weight - 20ml/kg

Examples:

Pat. Weight	Calculation	Fluid requirement
3.5kg	3.5 x 100	350mls
10kg	10x100ml	1000mls (1L)
15kg	10x 100 5 x 50	1250ml

23kg	10x100ml	1,560ml
	10x50ml	
	3x20	
32kg	10x100ml	1,740ml
	10x50ml	
	12x20	

Give total maintenance fluid over 24hrs

Infusion rate (using dosiflow) = Total maintenance ÷ 24hrs (ml/hr)

If dorsiflow not ready available convert dorsiflow rate to drop rate

Infusion in drops/min = dorsiflow rate ÷ 3

SHOCK MANAGEMENT IN CHILDREN:

SIGNS:

- Lethargy, unconsciousness, cold hands and feet **PLUS**
- Slow capillary refill and/or weak and fast pulse*

* CHECKING CAPILLARY REFILL

- press nail of thumb or big toe for 2 seconds to produce blanching of the nail bed.

- Release and observe for time to turn pink again. If >3seconds implies capillary refill is delayed

*NB: shock from dehydration and septic shock can co-exist (esp. in malnourished patients)

Management:

- Give oxygen 1-2L/min (*hypoxia*)
 - Give 10% dextrose at 2ml/kg (if hypoglycemia present) (*hypoglycemia*)
 - Give **IVF for shock** at 15-20ml/kg bolus (5% R/L or 5%glucose in 0.45% N/S) (*hypovolaemia*)
 - Keep warm (warm blanket, bottles etc.) (*hypothermia*)
- When managing shock in children remember to cover for the 4-H: Hypoxia, Hypothermia, Hypovolaemia, Hypothermia*

Preparing ivf for shock:

5% Ringers Lactate- Take 50mls out of 500mls r/l and discard.

Replace with 50mls of 50% dextrose

5% glucose in 0.45% n/s- take 50mls out of 500mls r/l and discard.

Replace with 50mls of 50% dextrose

Giving iv fluids in shock patients (considerations):

- Check RR, Pulse and record starting values
- Auscultate chest for signs of fluid overload
- Infuse ivf for shock* at 15ml-20ml/kg over 1hr
- Pass catheter (consider using feeding tube as catheter in infants if catheter not available)
- Monitor RR, pulse, auscultate chest every 10mins
(If RR increase by ≥ 5 cpm and/or pulse rate increase by ≥ 25 bpm or signs of new onset crepitations, stop IVF)
- If RR and Pulse are slower after 1hr, then child is improving. Repeat fluid bolus again at 15-20ml/kg for another 1hr
- Check for resolution of other signs of shock (capillary refill, lethargy, cold hands)

If Shock Resolves

After 2hrs of ivf,

- Pass NG tube and continue rehydration with ORS (OR RESOMAL IN MALNOURISHED)- 5ml/kg (up to 10ml/kg)

If Shock Does Not Resolve

- Assume septic shock. Give maintenance IVF (4ml/kg/hr).
Give blood (over 3hrs) if patient is severely pale or hb < 4 or < 6 g/dl with signs of respiratory distress
*consider giving furosemide (1ml/kg) midway through transfusion to give way for the blood

Follow-up:

1. Put on monitor for continuous monitoring of vitals (or at least every 15-30mins) including rbs monitoring
2. Use appropriate size cuff to check and monitor blood pressure and plot on centile chart (*refer to x on how to monitor bp)

HYPOTHERMIA

Definition

Axillary temp $< 35.0^{\circ}\text{C}$ (or rectal temp $< 35.5^{\circ}\text{C}$)

**Hypothermia often co-exist with hypoglycemia (both are signs of severe systemic infections)*

Ways to prevent hypothermia:

- Cover child well (including head, hands and feet)
- Move child away from windows
- Keep child covered at night
- Warm hands before touching baby
- Quickly change wet clothing and beddings
- dry child thoroughly after bathing
- avoid leaving child uncovered while being examined/weighed

Active management for hypothermia:

- Mother to hold baby to her skin and cover baby with cloth (kangaroo mother care)
- Place baby under radiant warmer/heater

**avoid direct contact of hot water or hot water bottles to baby's skin*

SOME EMERGENCY EXAMINATION FINDINGS AND THEIR INTERPRETATIONS

Pupils:

Bilateral pinpoint, fixed

- drugs: opiates (eg. morphine); barbiturates eg. Phenobarbital;
- Brain disease: pontine lesions

*[*diazepam has no significant effect on pupil size]*

Bilateral dilated, fixed

- Severe hypoxia;
- Post-seizures (post-ictal phase)
- Drugs; anticholinergic drugs
- Hypothermia

Unilateral dilated pupil

- Expanding ipsilateral lesion
- tentorial herniation
- 3rd nerve lesion (occulomotor nerve)
- Seizures

Drug effect on Pupils**MYDRIASIS (PUPIL DILATION)**

Atropine
 Scopolamine
 Amphetamine
 Marijuana
 LSD
 Adrenaline
 Cocaine
 Caffeine

MIOSIS (PUPIL CONSTRICTION)

Opioids (eg. Heroine, morphine etc)
 Barbiturates (eg. Phenobarbital)
 Organophosphates

DIAZEPAM HAS NO SIGNIFICANT EFFECT ON PUPIL SIZE AT ANY LUMINANCE LEVEL

Hepatomegaly and splenomegaly differentials:**Hepatomegaly:** differential diagnosis

- Infection - congenital, infectious mononucleosis, malaria, hepatitis,
 - Haematological - sickle cell anemia; thalassemia
 - Liver dx - chronic active hepatitis, portal hypertension, polycystic disease
 - Malignancy - leukaemia, lymphoma, neuroblastoma, wilms' tumour, hepatoblastoma
 - Metabolic - glycogen and lipid storage disorders, mucopolysaccharidoses
 - Cardiovascular - heart failure
- Others: chest hyperexpansion from bronchiolitis

Splenomegaly:

- Infection: viral, bacterial(protozoa eg. malaria, leishmaniasis; infective endocarditis)
- Haematological - haemolytic anaemia
- Malignancy - leukaemia, lymphoma
- Other - portal hypertension, systemic juvenile idiopathic arthritis (still's disease)

ANTHROPOMETRY

Anthropometry: The measurement of an individual's physical parameters in comparison to standard measurements

Anthropometric measurements are set of non-invasive techniques that quantify the dimensions of an individual's body. It is used widely to assess nutrition in children (under, normal or over-nutrition)

Several measurements are available. Commonly used ones are:

There are different charts for different gender and age ranges.

Charts can come as either z-score or percentile charts

Right chart should be obtained before plotting is done:

Weight:

Birth weight: normal – 3.5kg (2.5-4kg)

5-10% loss of birth weight in 1st week of life; weight recovered by day 7-10 of life

Birth weight doubles at 4-5months of age

Birth weight triples by 1year

Normal weight gain – 20-30g/day (first 3-4months); 15-20g for rest of 1st year

BW recorded and plotted on growth chart

Height:

Length is measured for baby's from 0-2years in a supine position using infantometer

Height is measure for >2years in a standing position using a stadiometer (movable headboard)

Length at birth: averagely – 50cm;

Increases to around 76cm by age 1; birth length doubles by age 4

(Increases faster in 1st 6months of life and in early puberty)

Parent's height should be taken into consideration when interpreting height of a child

Head Circumference:

To assess brain growth

Very useful in patient with LBW and CNS abnormalities

Measurements is from birth to 3years

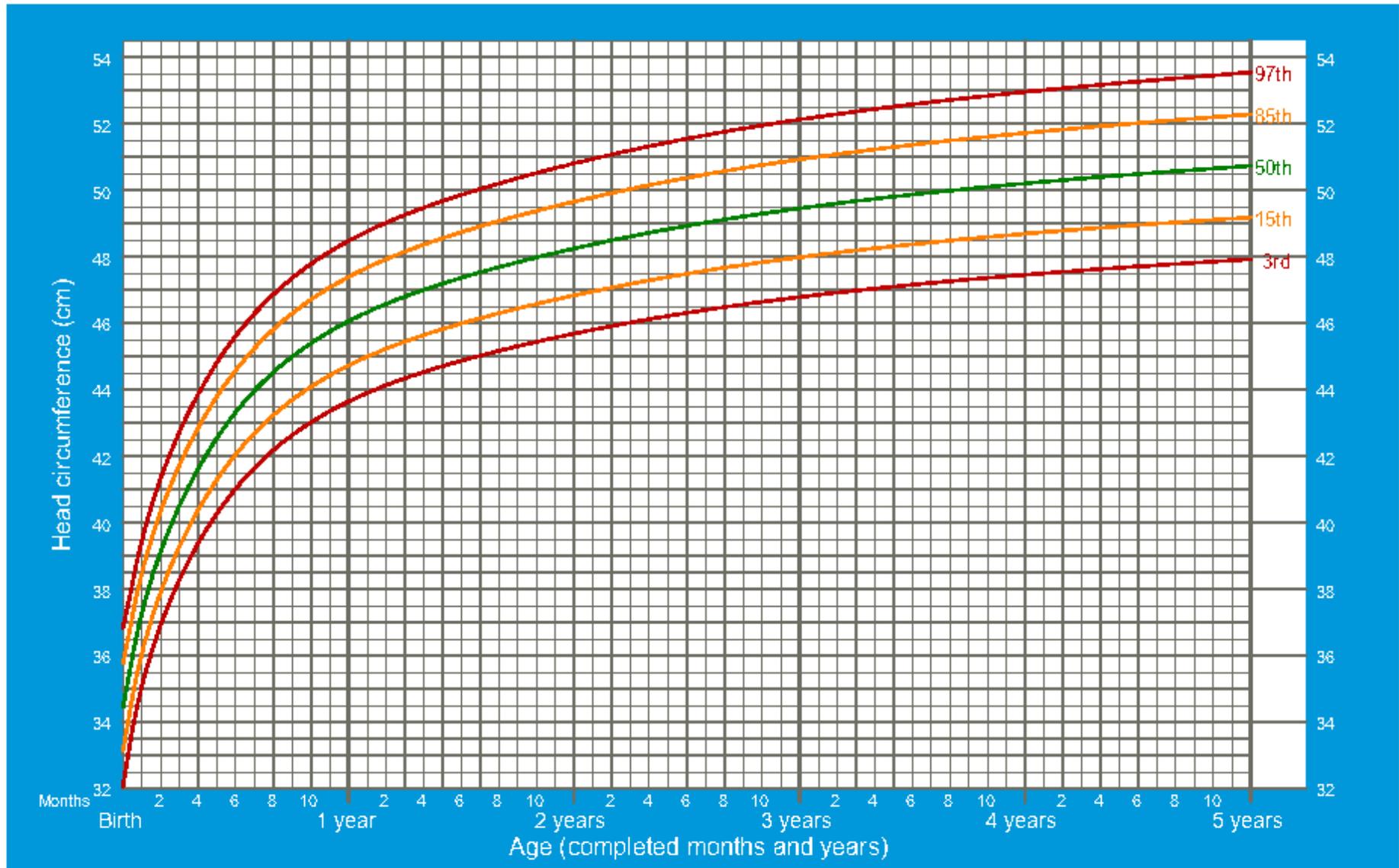
A tape measure is used to measure from the supraorbital ridge to the occiput circumferentially

Normal at birth- 35cm (33-37cm)

Normal growth – 12cm in 1st year (2cm/month in 0-3months; 1cm/month from 3-6month; 0.5cm/month 6-12months)

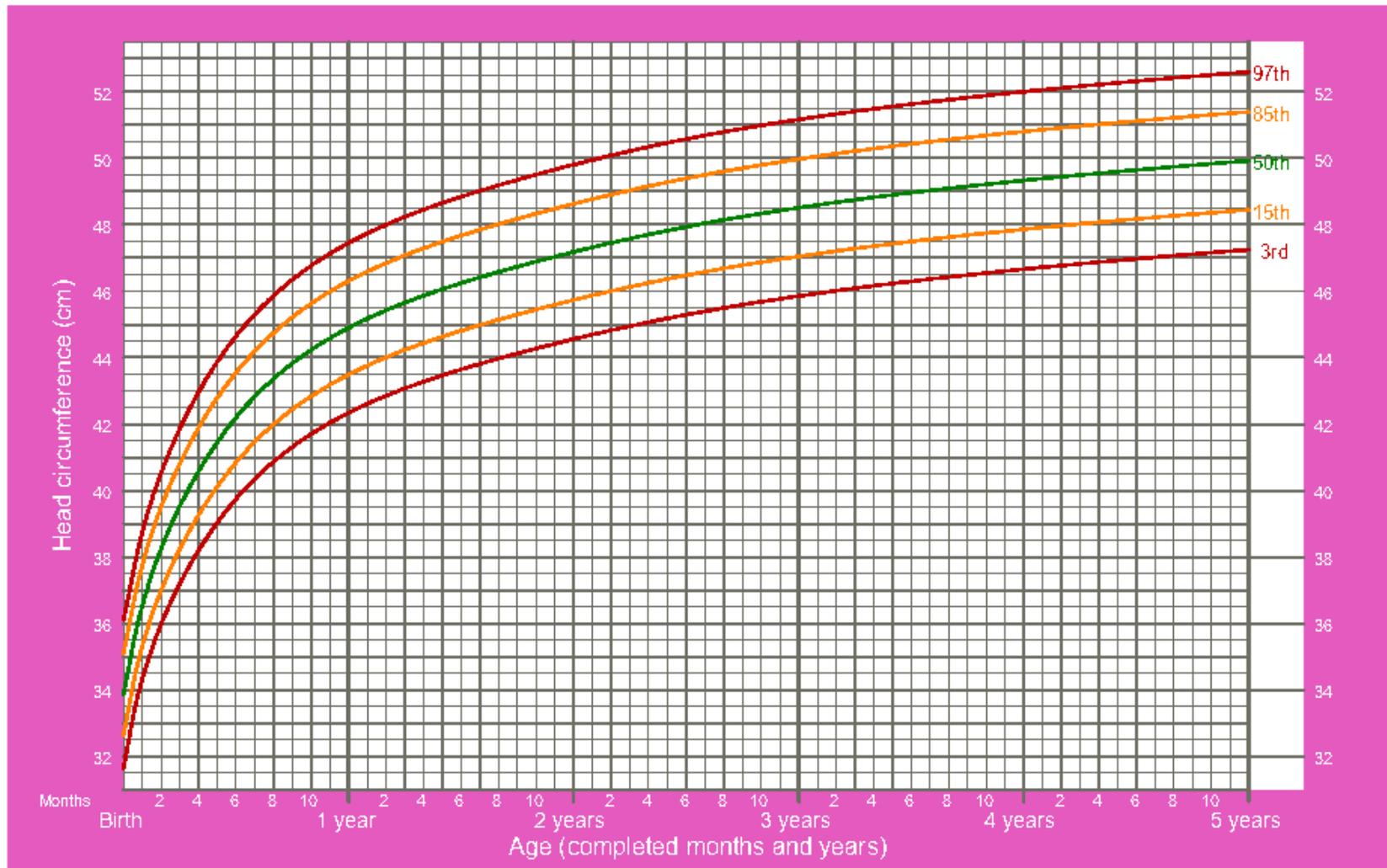
Head circumference-for-age **BOYS**

Birth to 5 years (percentiles)



Head circumference-for-age GIRLS

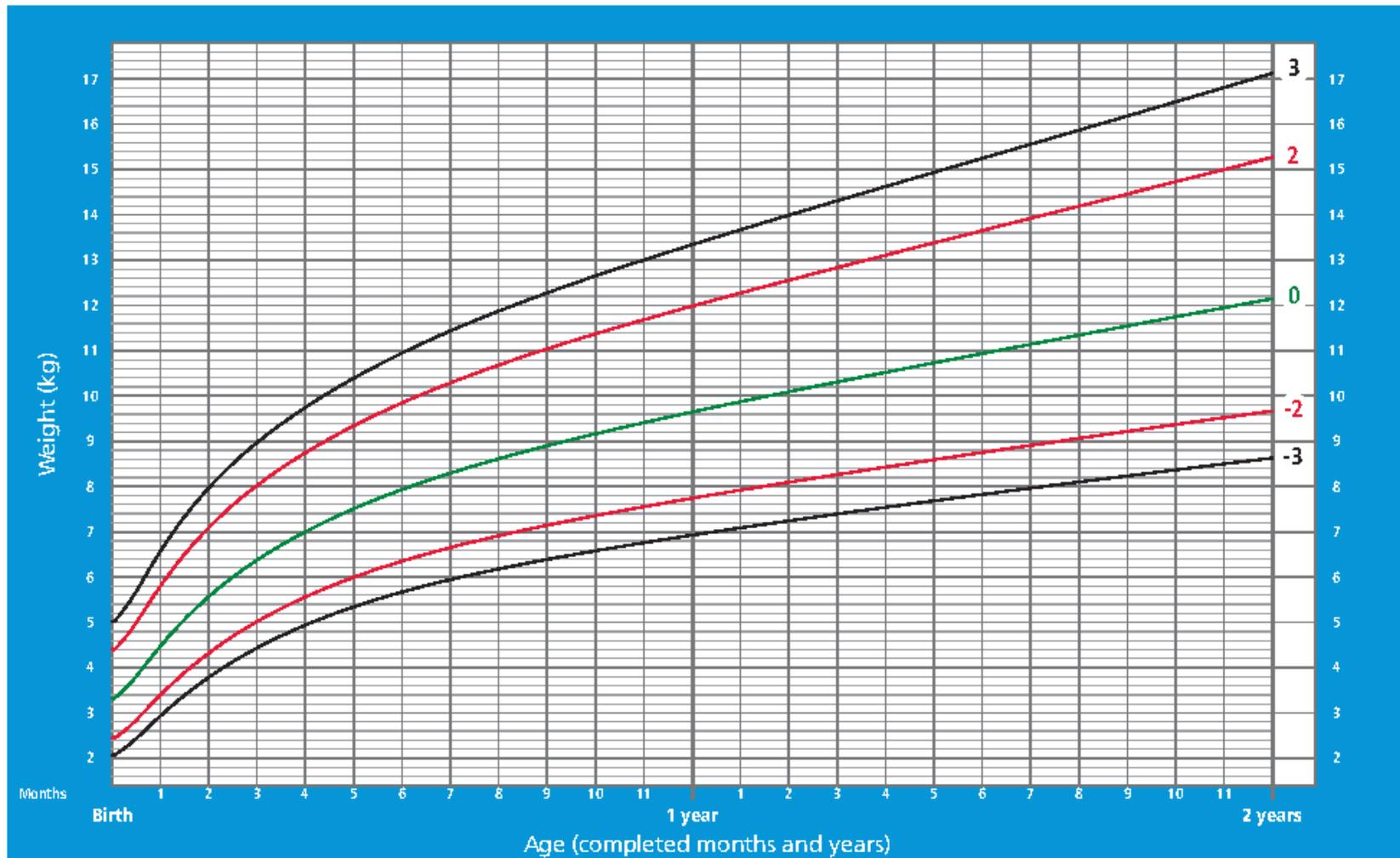
Birth to 5 years (percentiles)



WHO Child Growth Standards

Weight-for-age BOYS

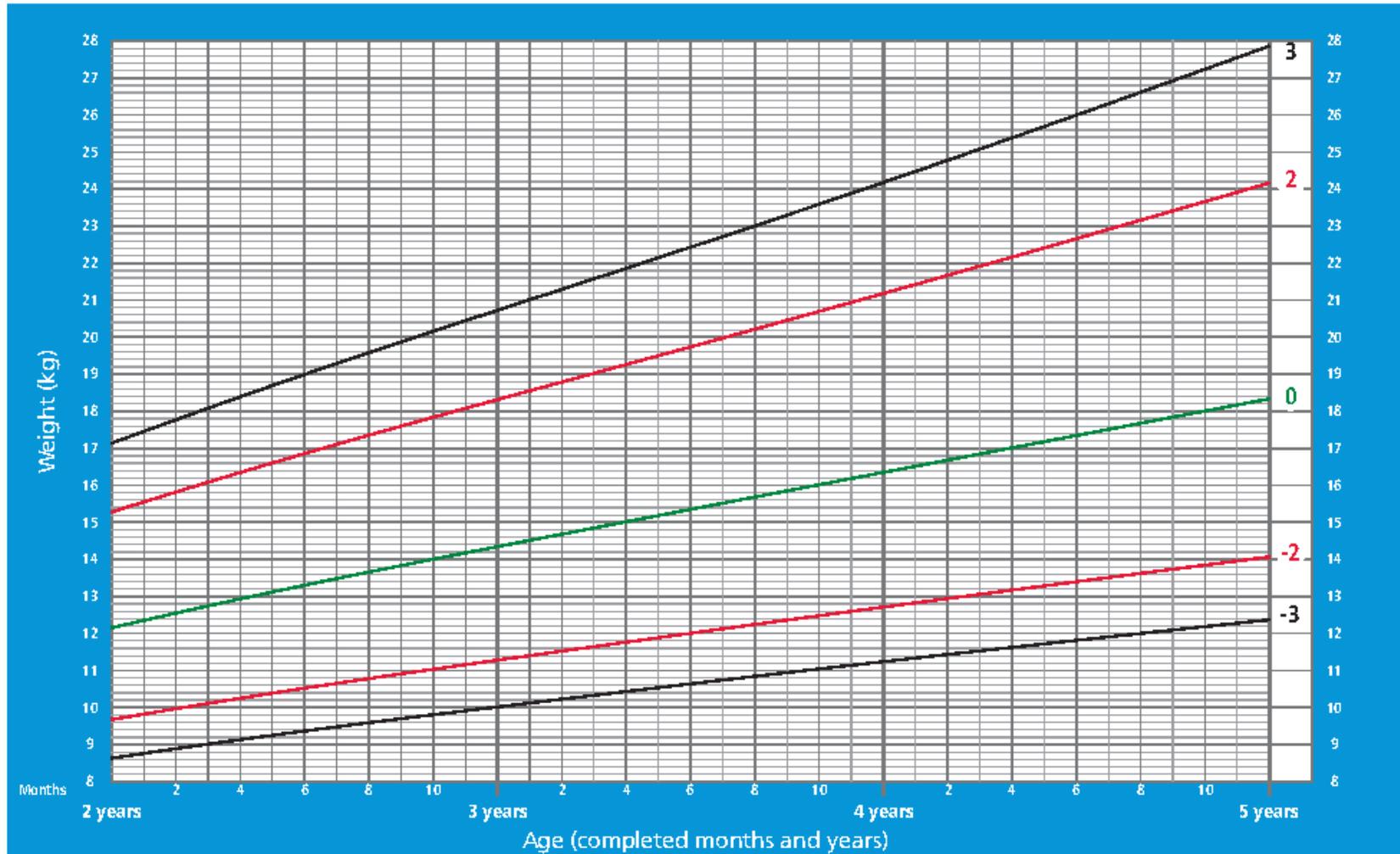
Birth to 2 years (z-scores)



WHO Child Growth Standards

Weight-for-age BOYS

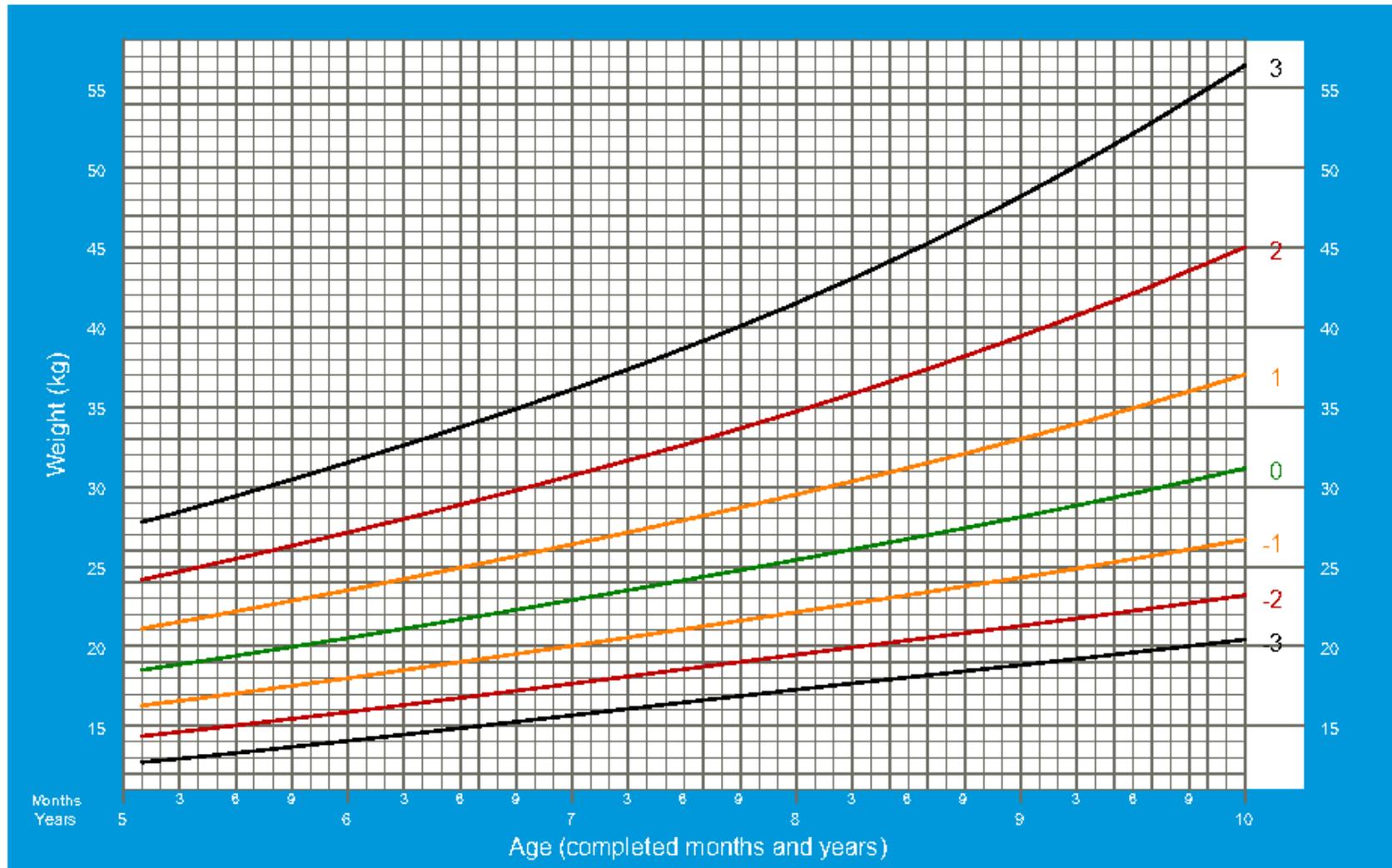
2 to 5 years (z-scores)



WHO Child Growth Standards

Weight-for-age BOYS

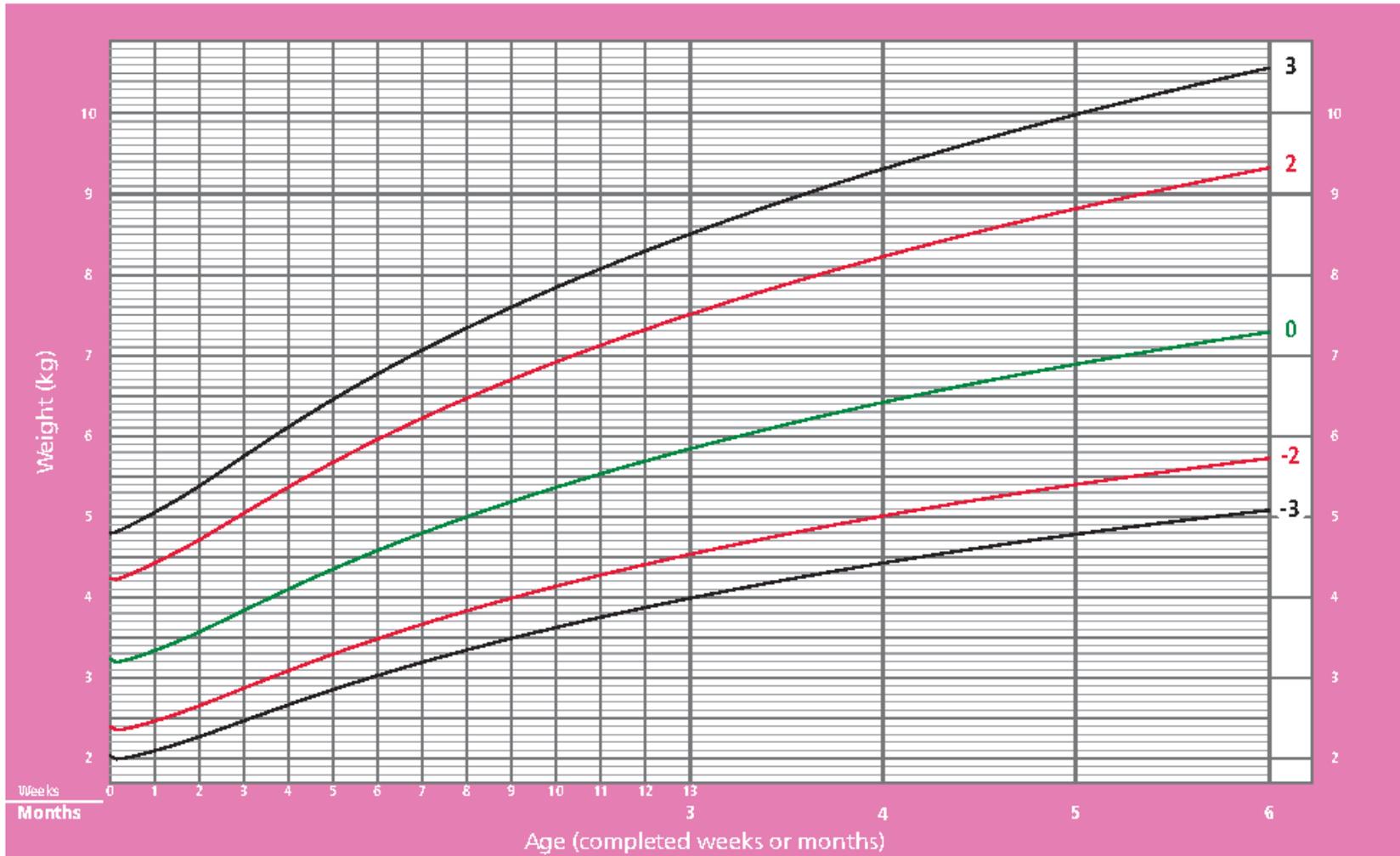
5 to 10 years (z-scores)



2007 WHO Reference

Weight-for-age GIRLS

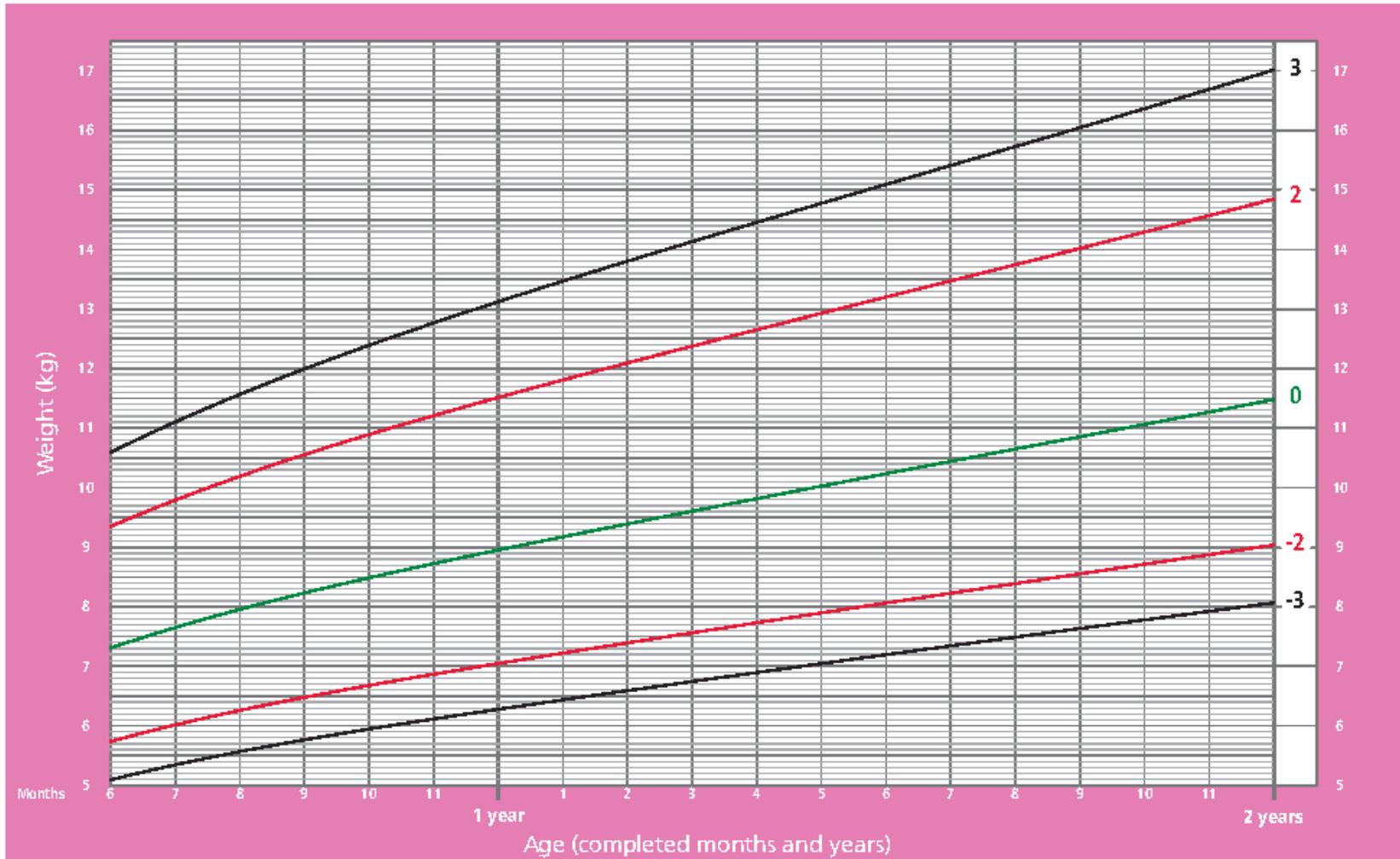
Birth to 6 months (z-scores)



WHO Child Growth Standards

Weight-for-age GIRLS

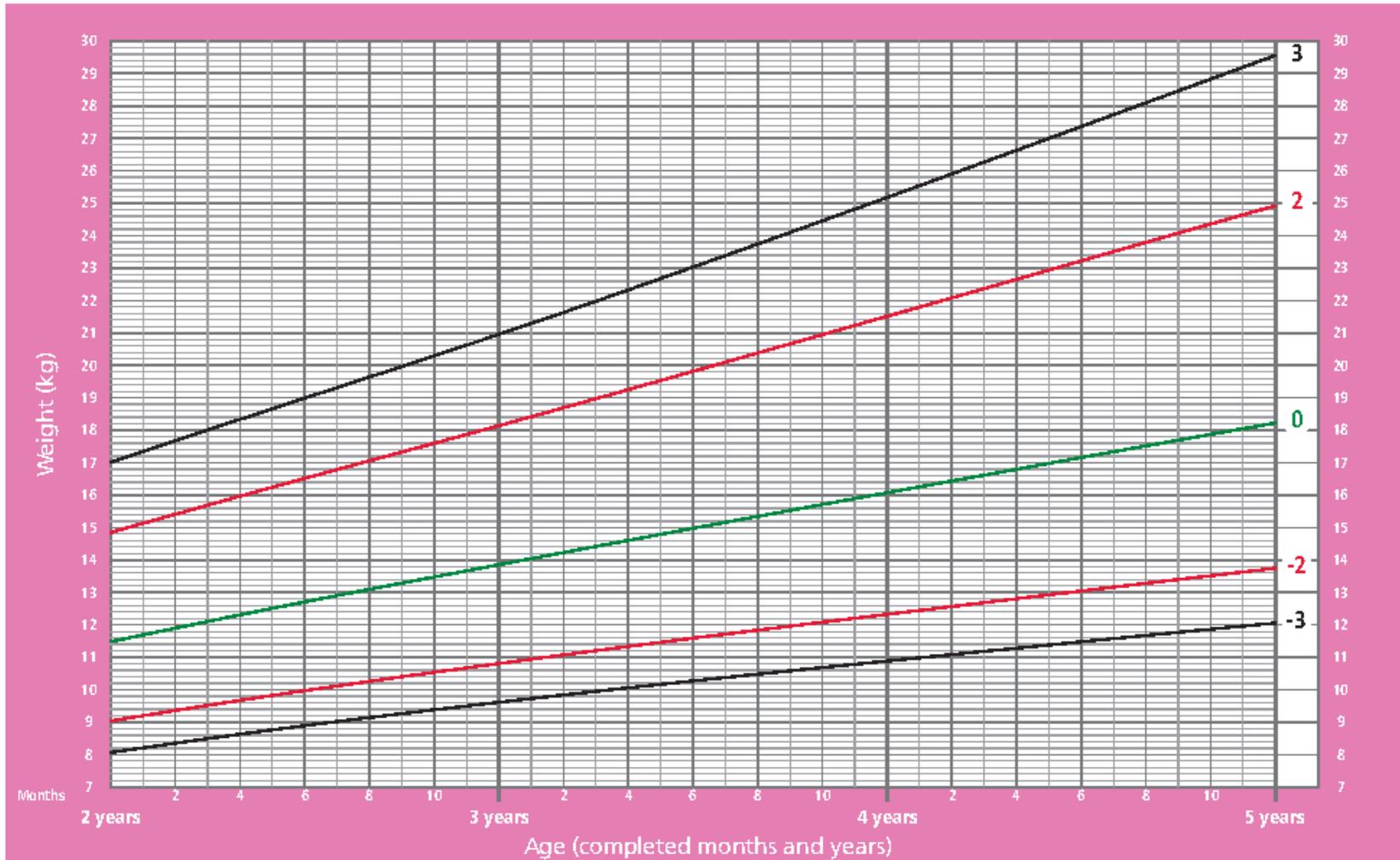
6 months to 2 years (z-scores)



WHO Child Growth Standards

Weight-for-age GIRLS

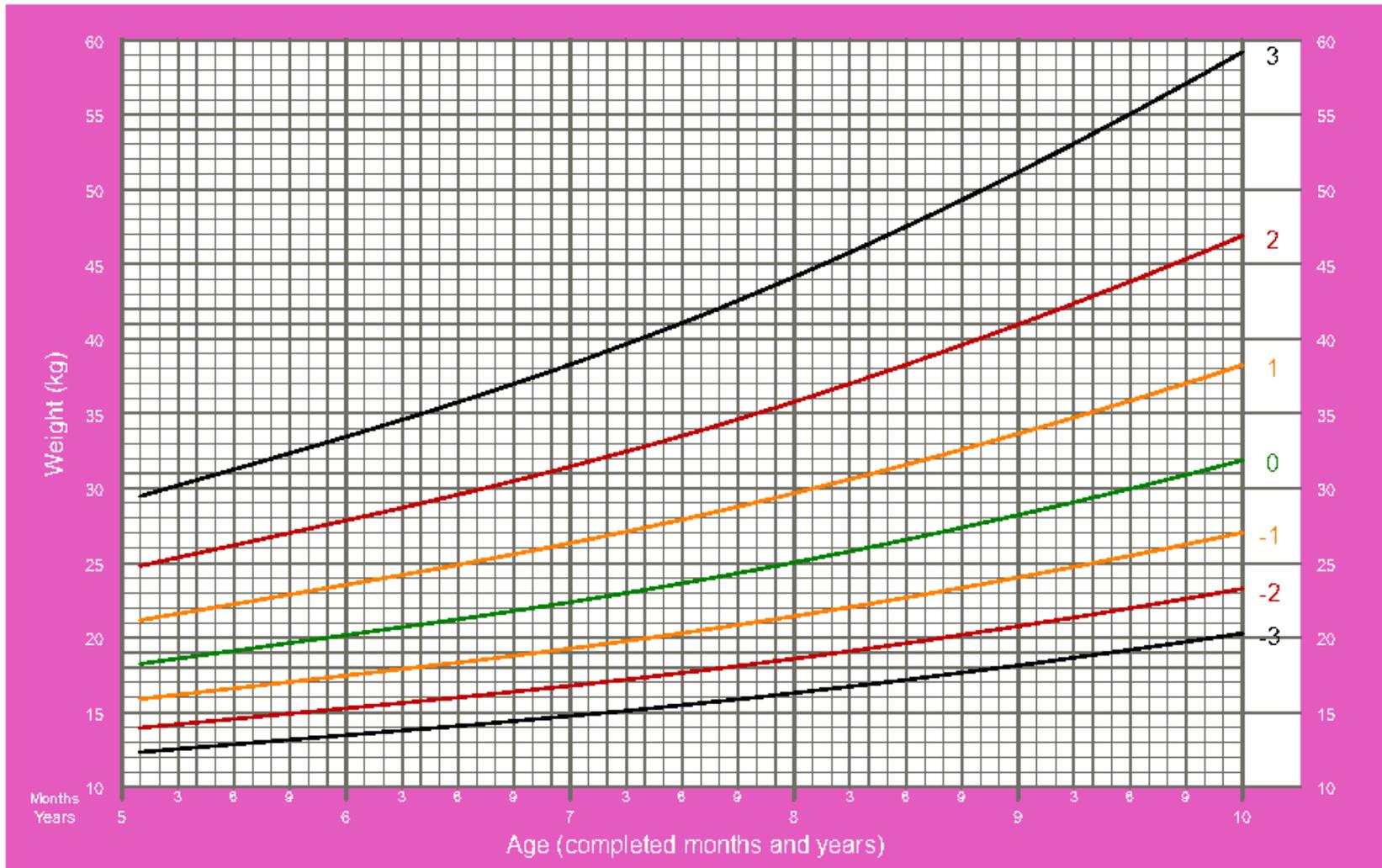
2 to 5 years (z-scores)



WHO Child Growth Standards

Weight-for-age GIRLS

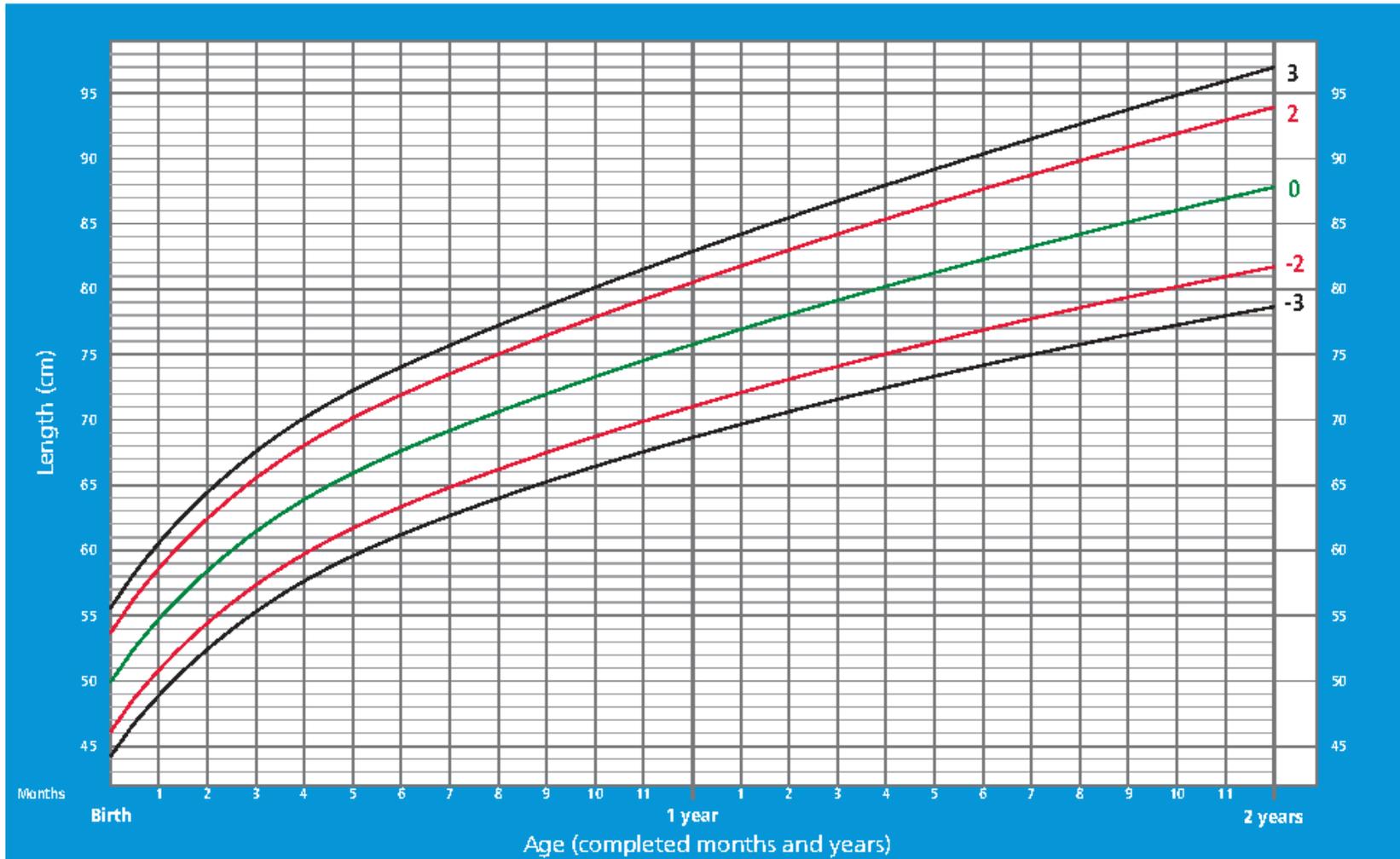
5 to 10 years (z-scores)



2007 WHO Reference

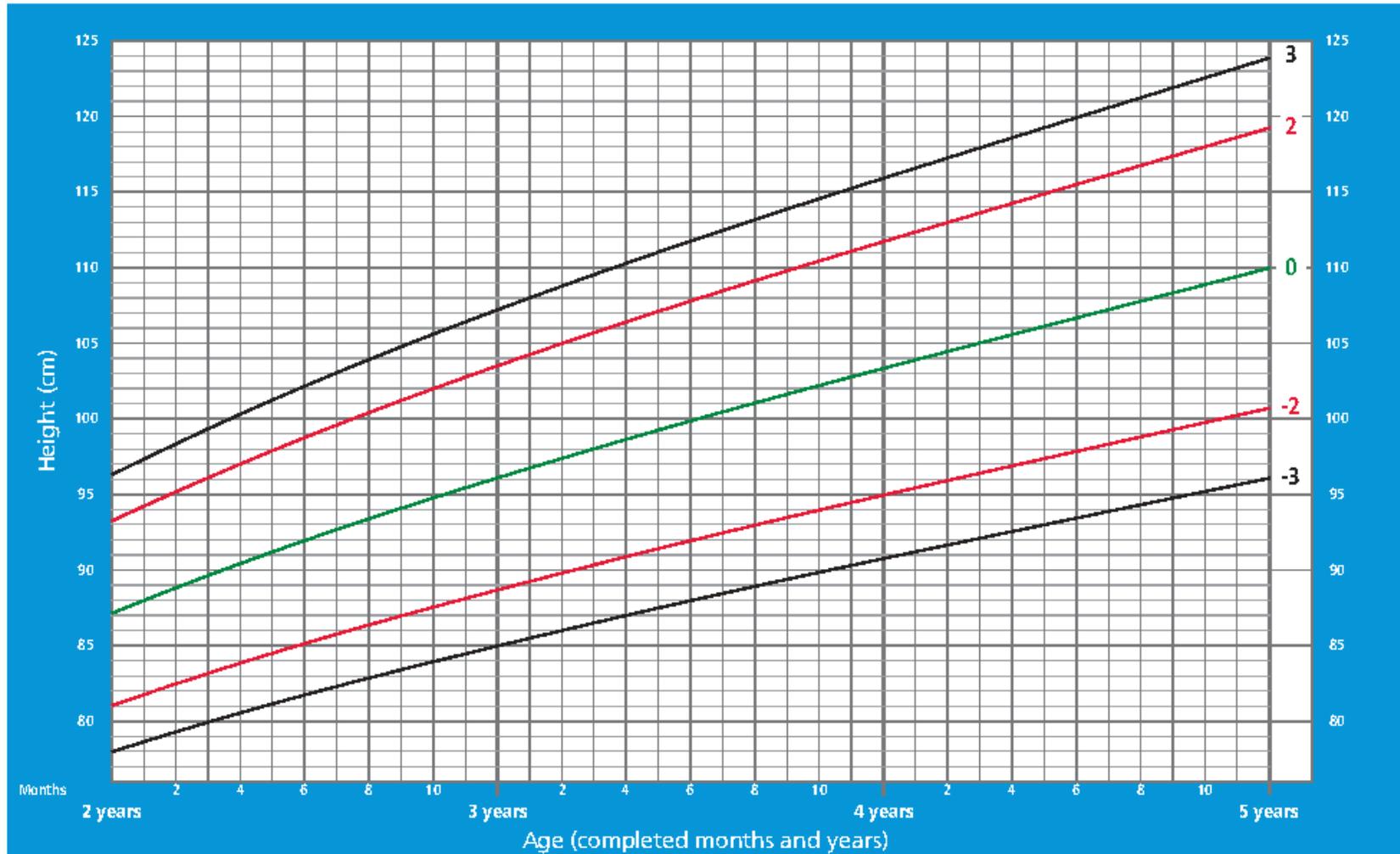
Length-for-age BOYS

Birth to 2 years (z-scores)



Height-for-age BOYS

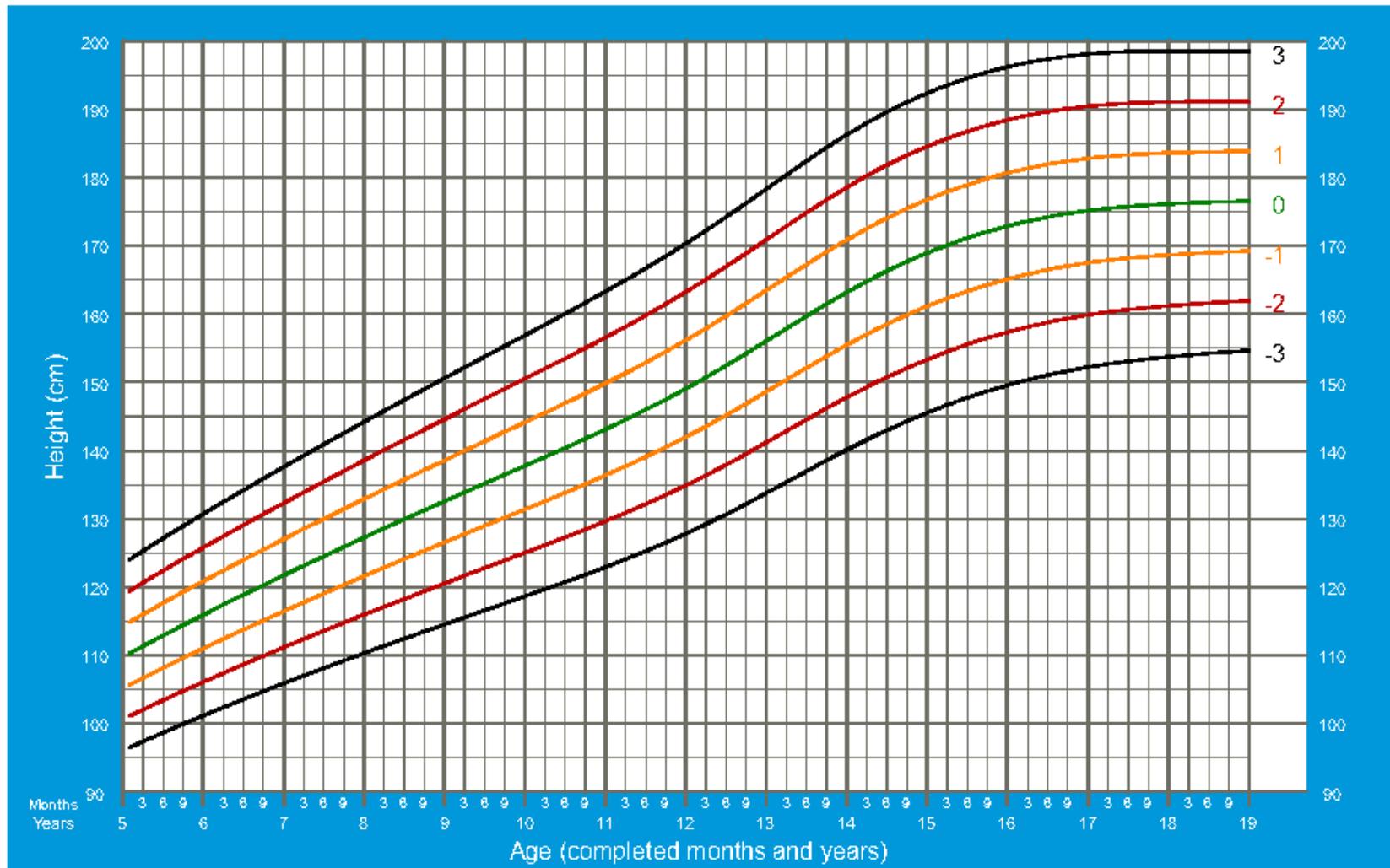
2 to 5 years (z-scores)



WHO Child Growth Standards

Height-for-age BOYS

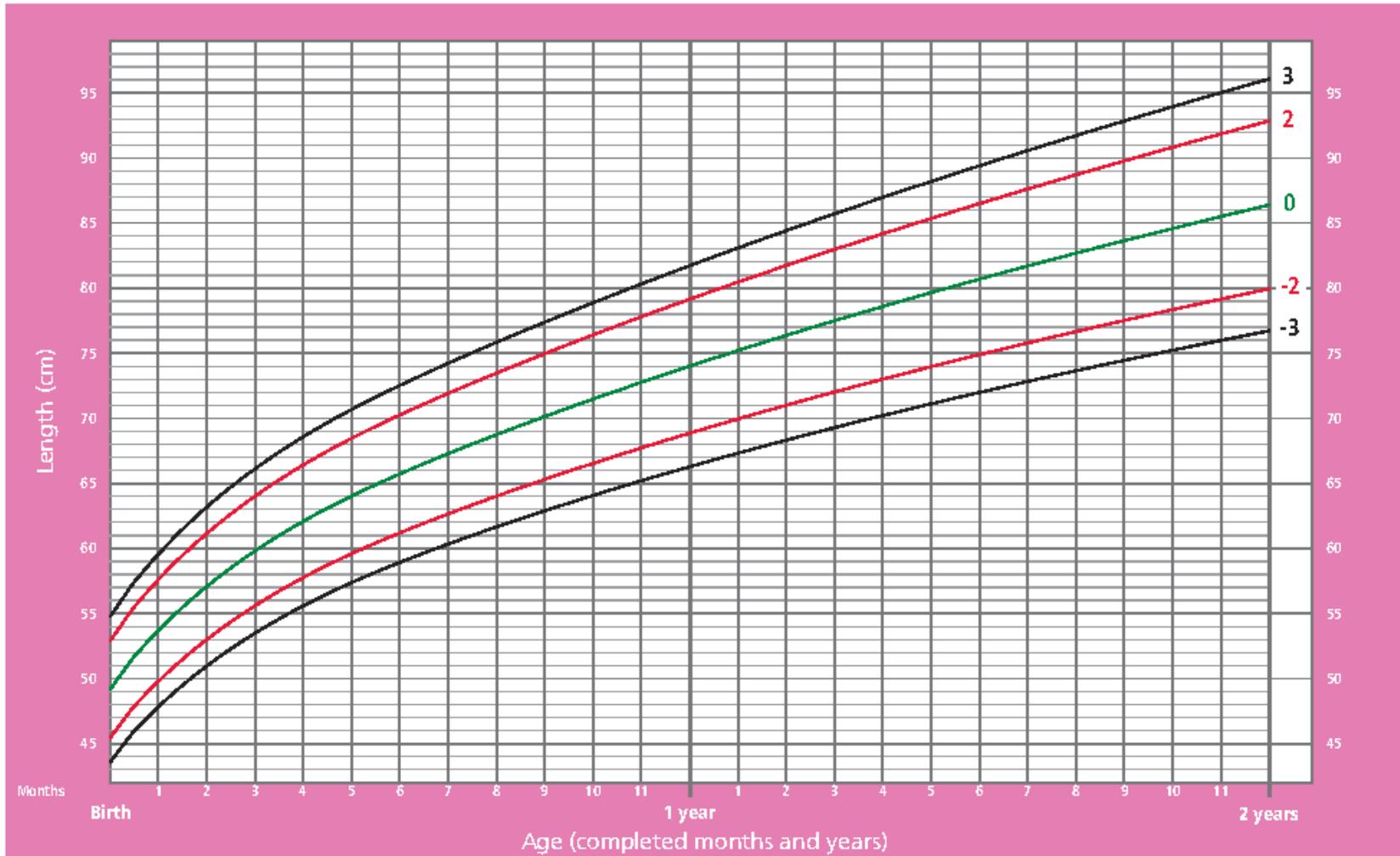
5 to 19 years (z-scores)



2007 WHO Reference

Length-for-age GIRLS

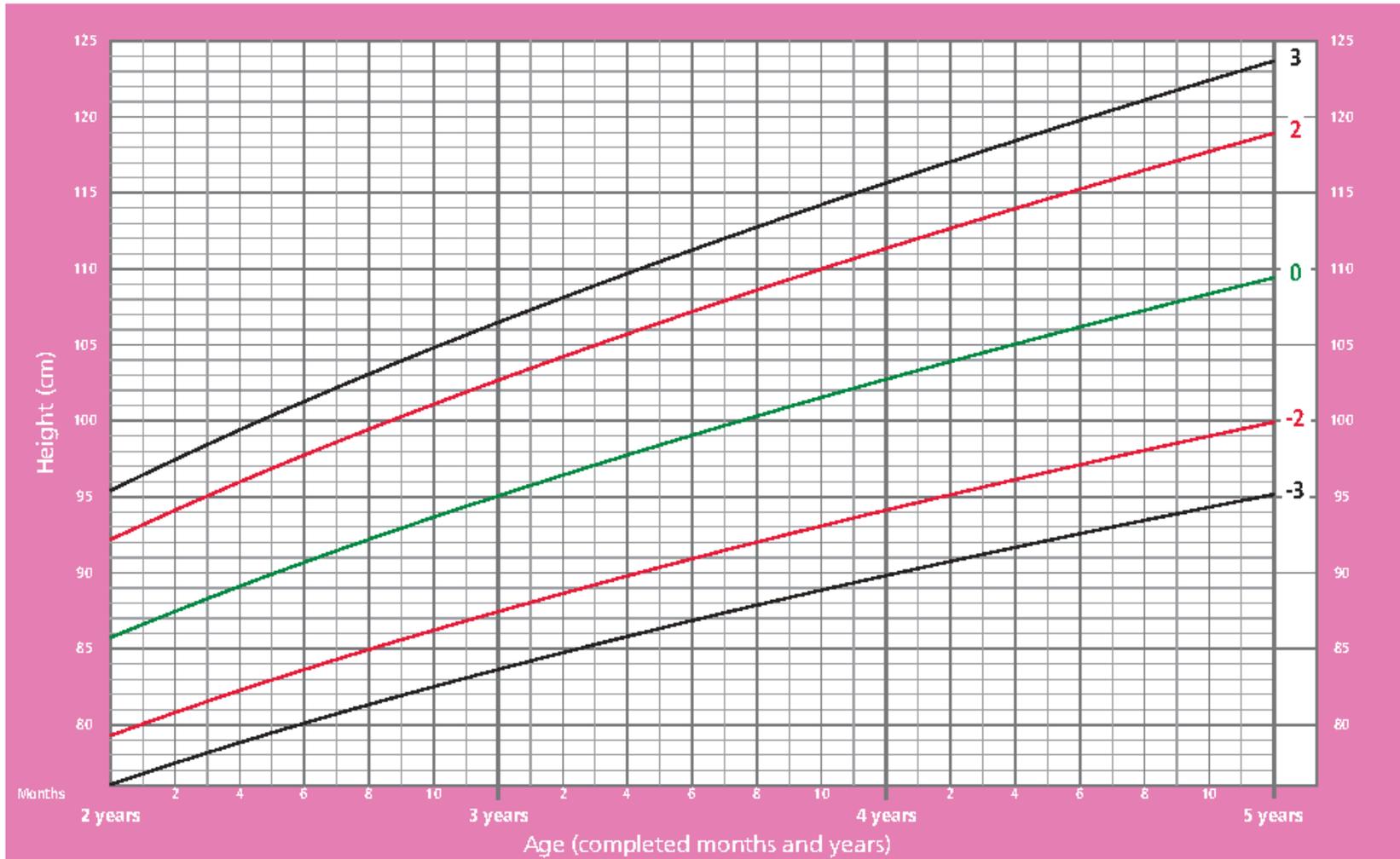
Birth to 2 years (z-scores)



WHO Child Growth Standards

Height-for-age GIRLS

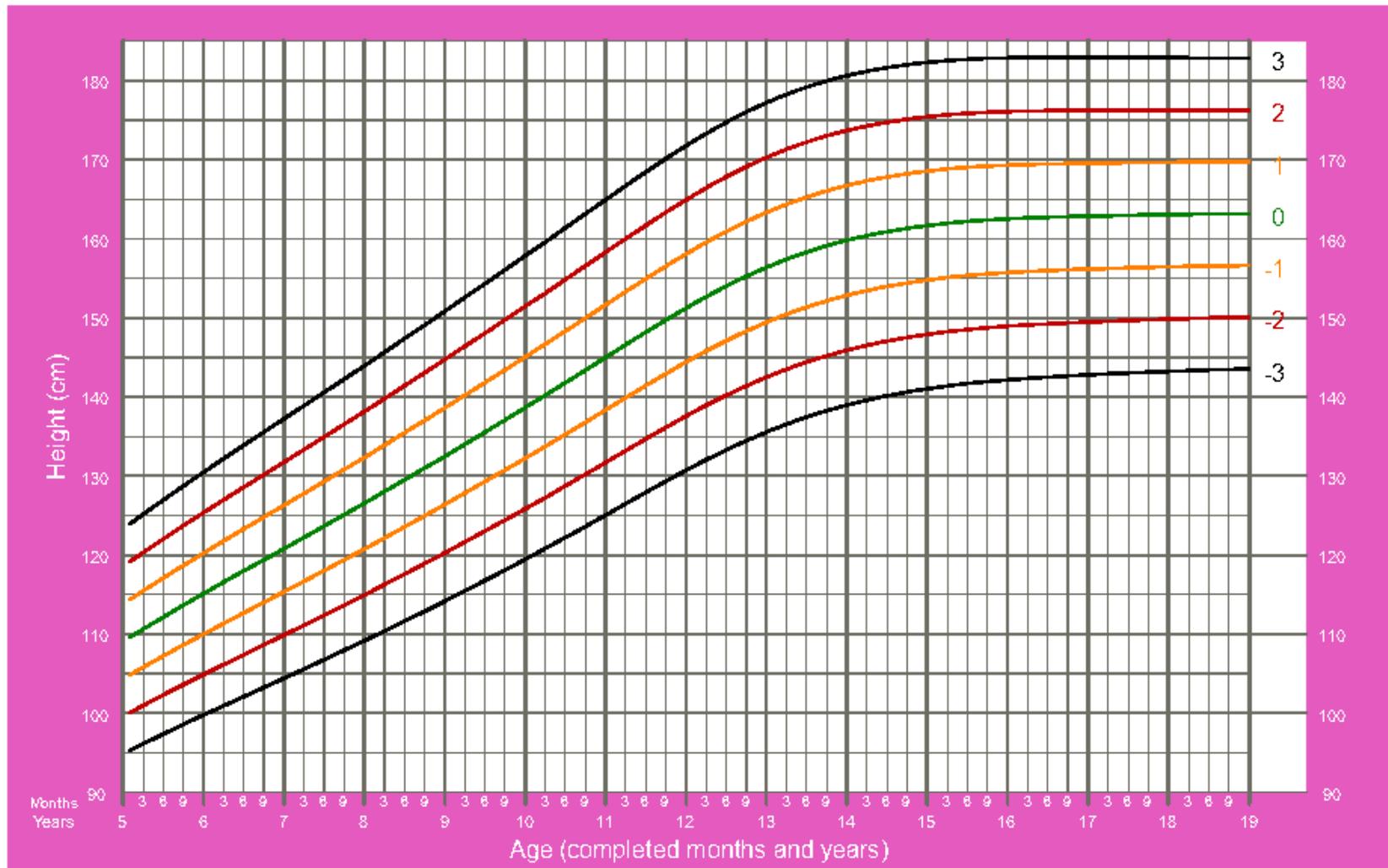
2 to 5 years (z-scores)



WHO Child Growth Standards

Height-for-age GIRLS

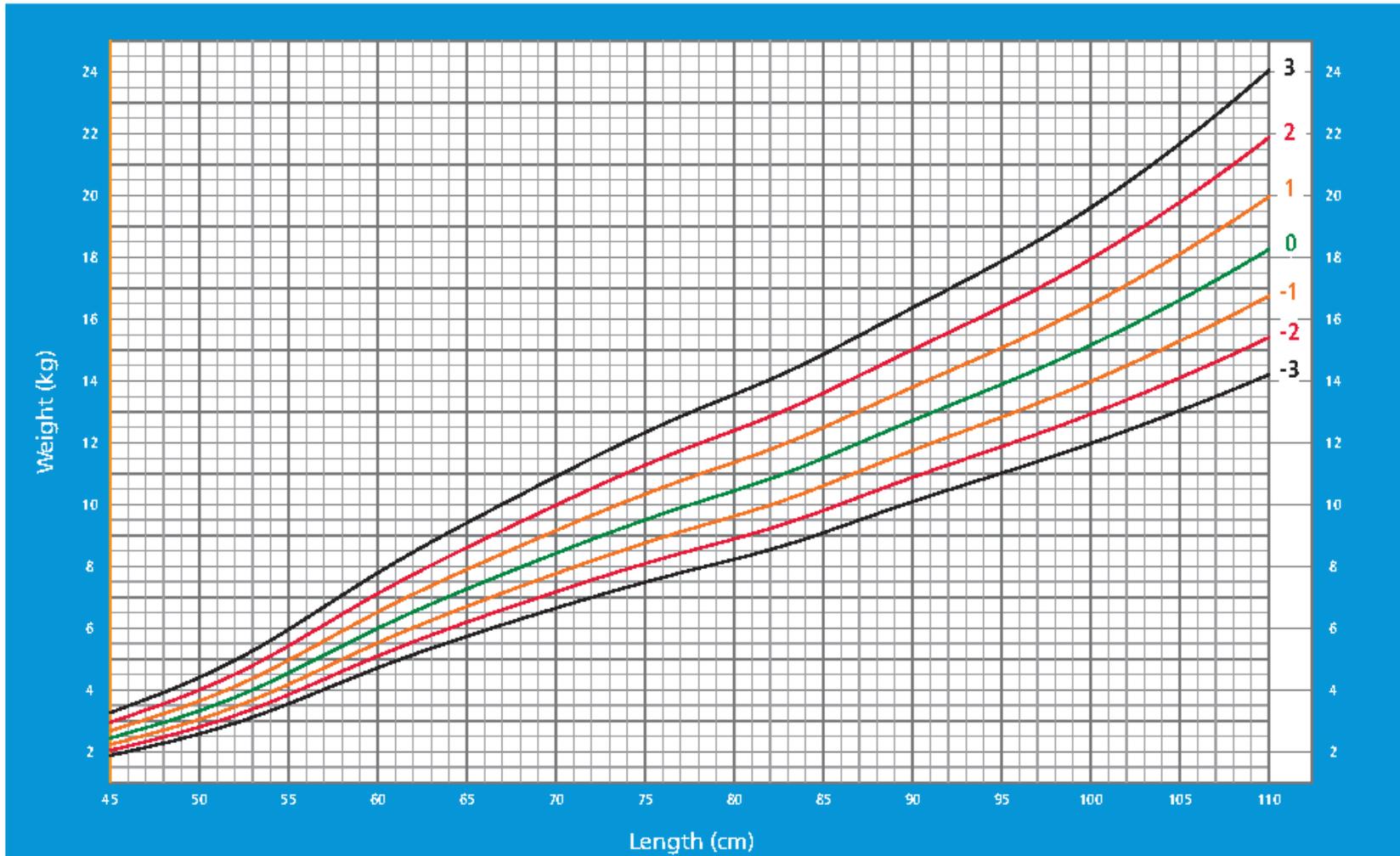
5 to 19 years (z-scores)



2007 WHO Reference

Weight-for-length BOYS

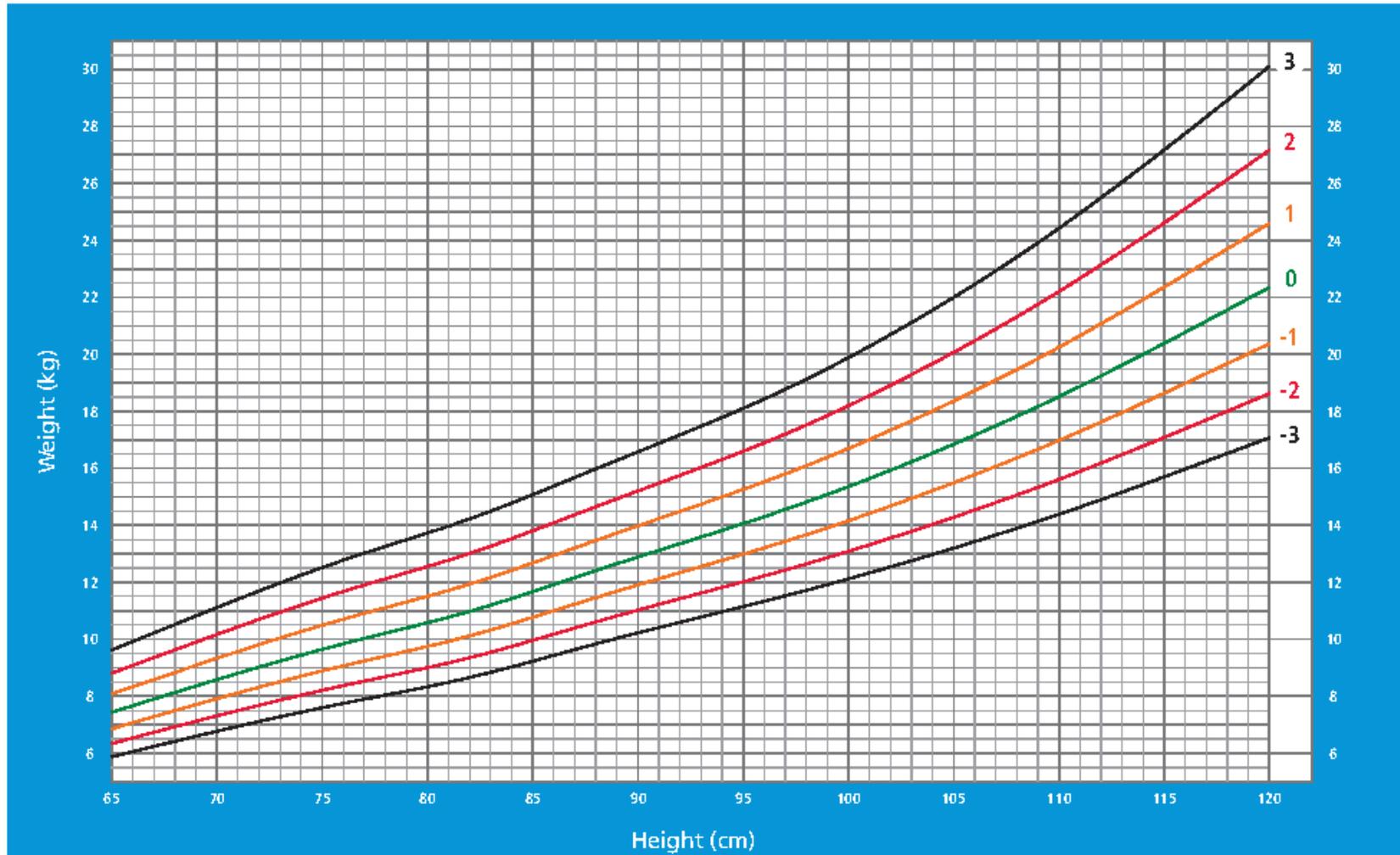
Birth to 2 years (z-scores)



WHO Child Growth Standards

Weight-for-height BOYS

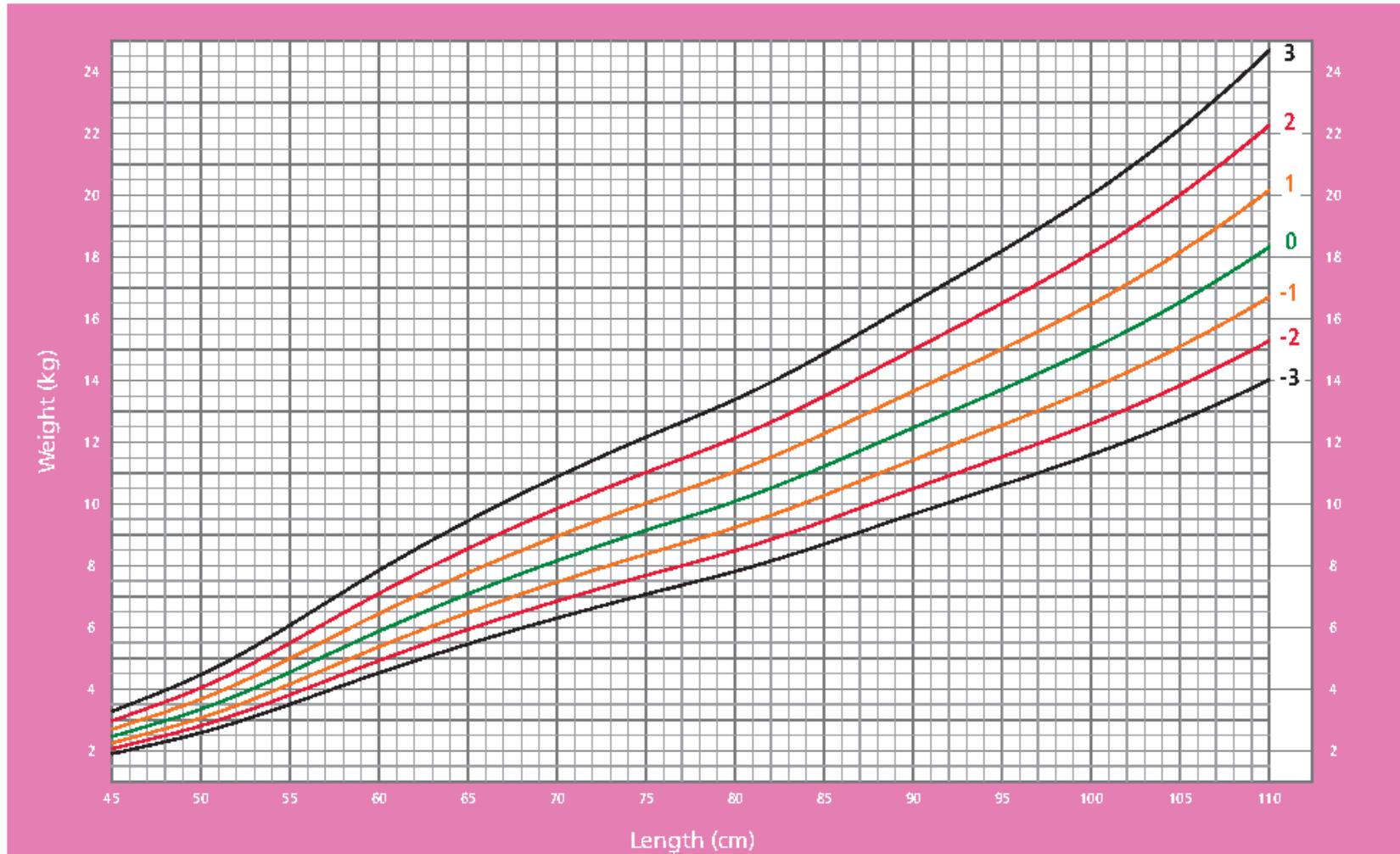
2 to 5 years (z-scores)



WHO Child Growth Standards

Weight-for-length GIRLS

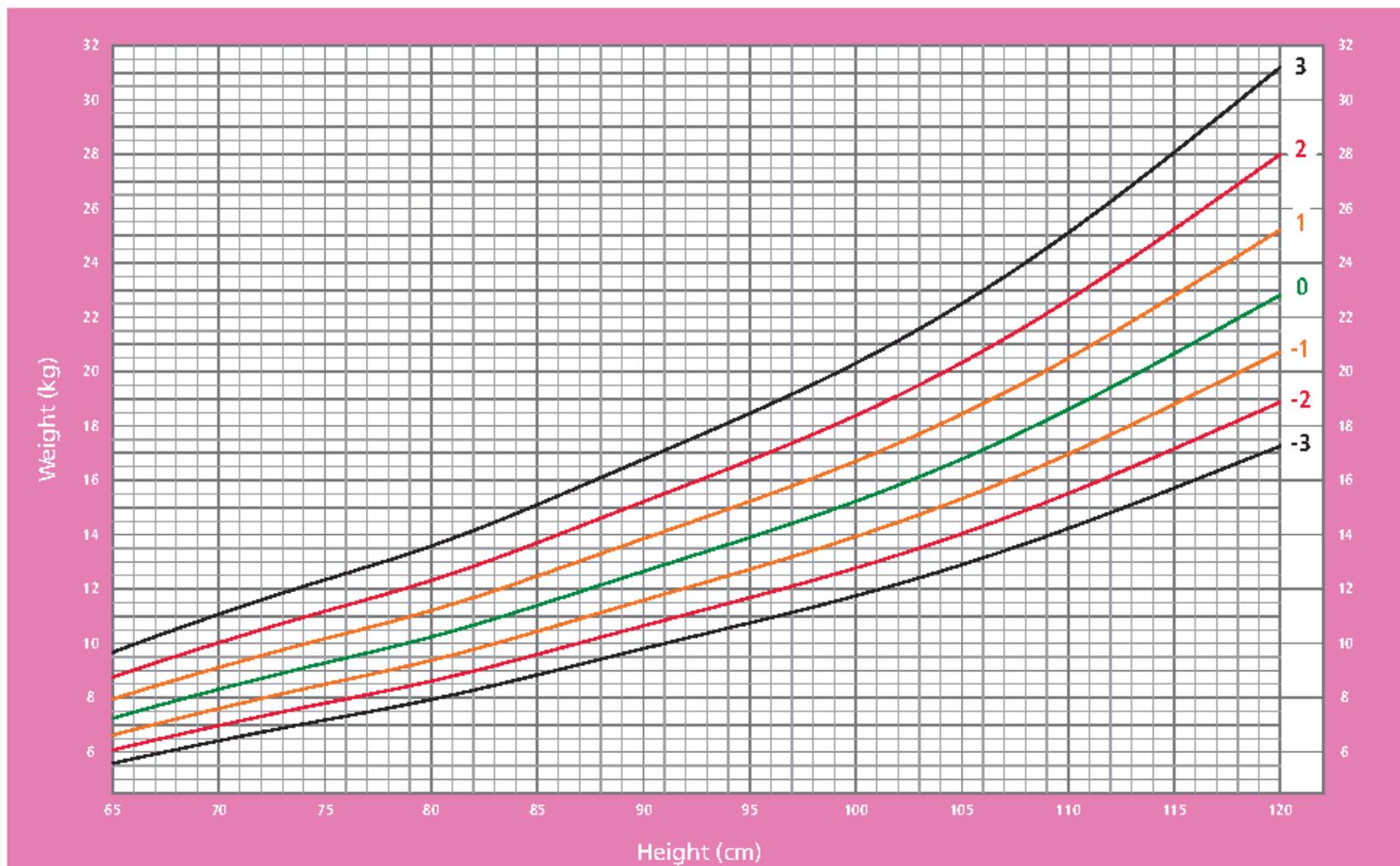
Birth to 2 years (z-scores)



WHO Child Growth Standards

Weight-for-Height GIRLS

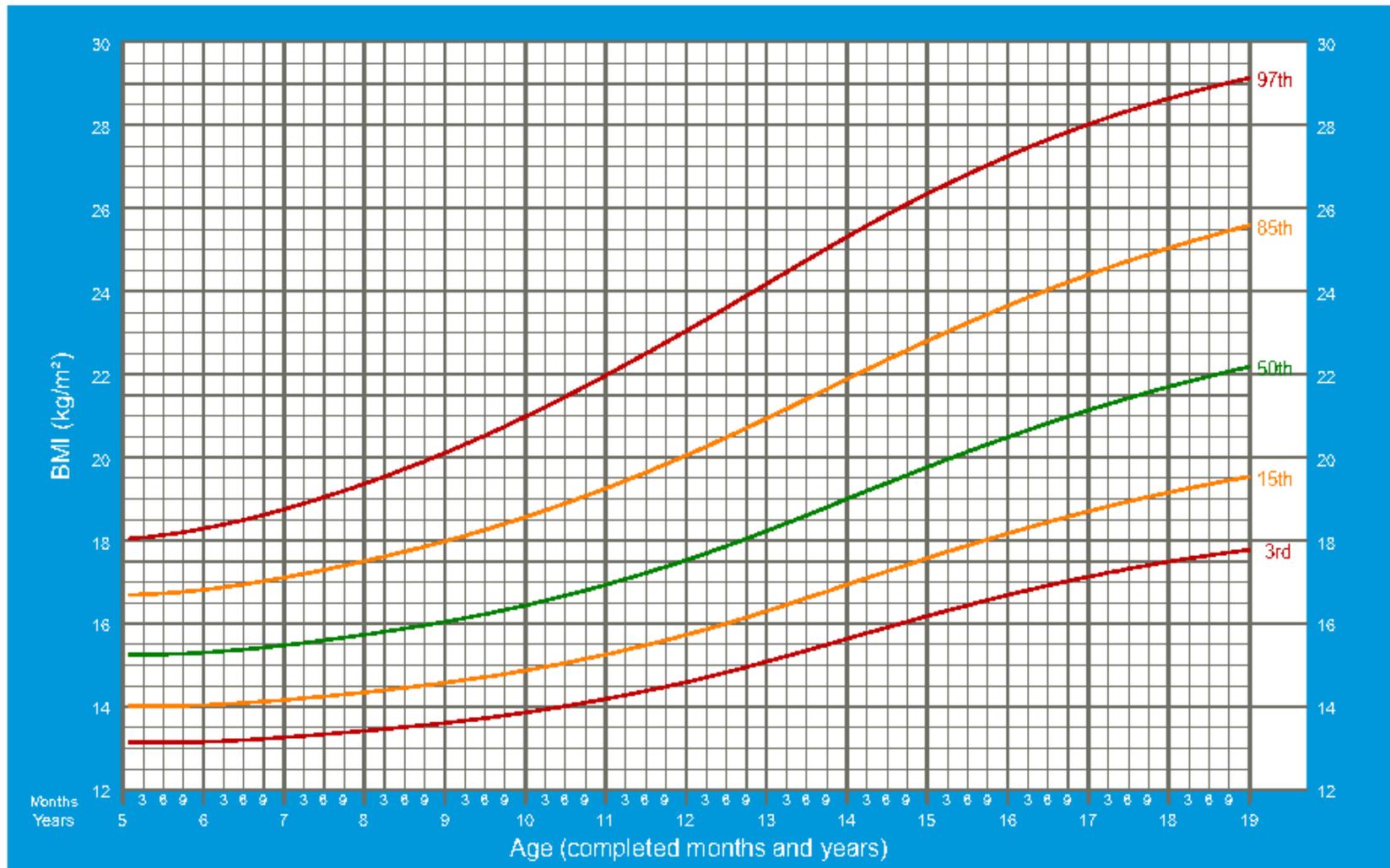
2 to 5 years (z-scores)



WHO Child Growth Standards

BMI-for-age BOYS

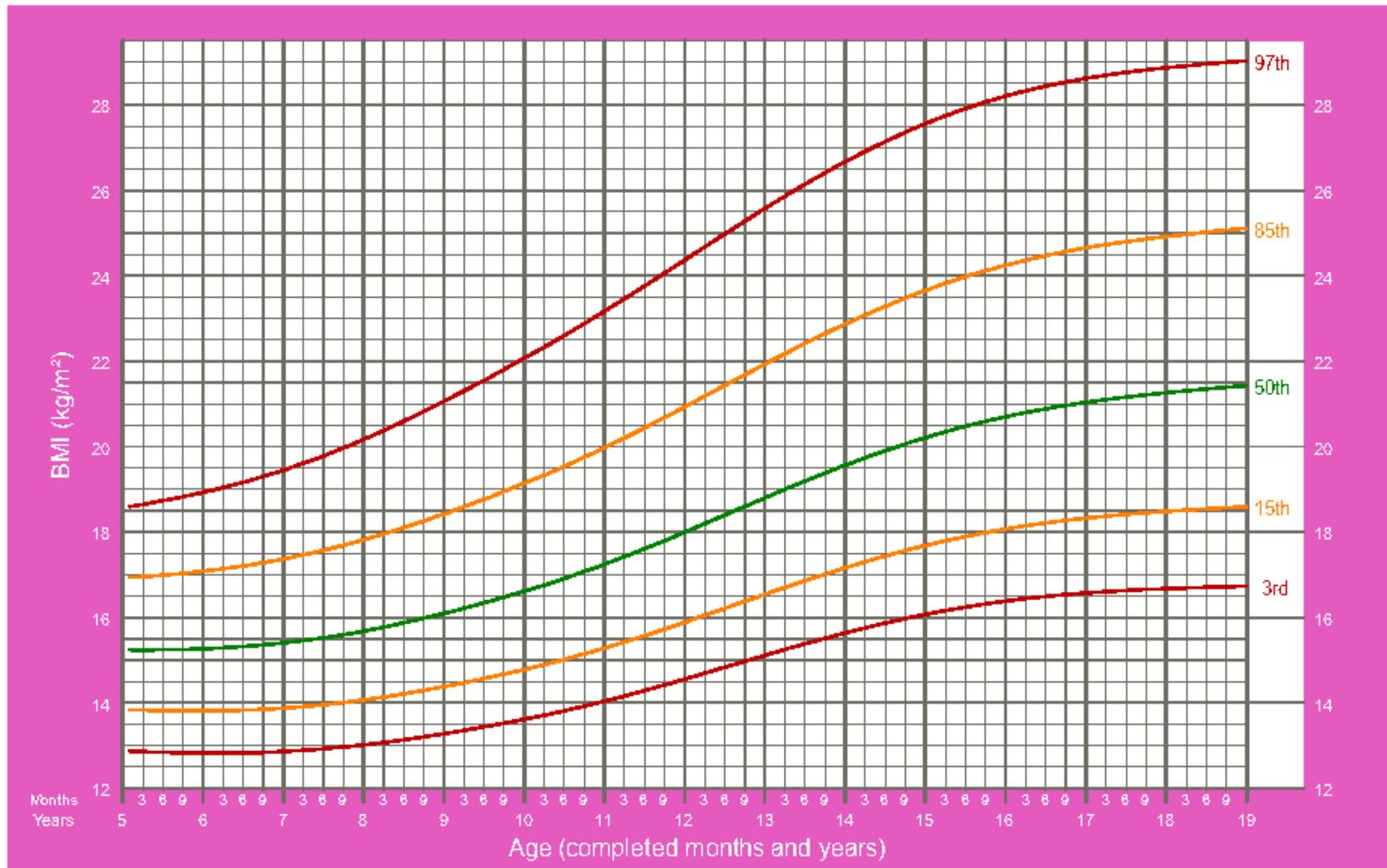
5 to 19 years (percentiles)



2007 WHO Reference

BMI-for-age GIRLS

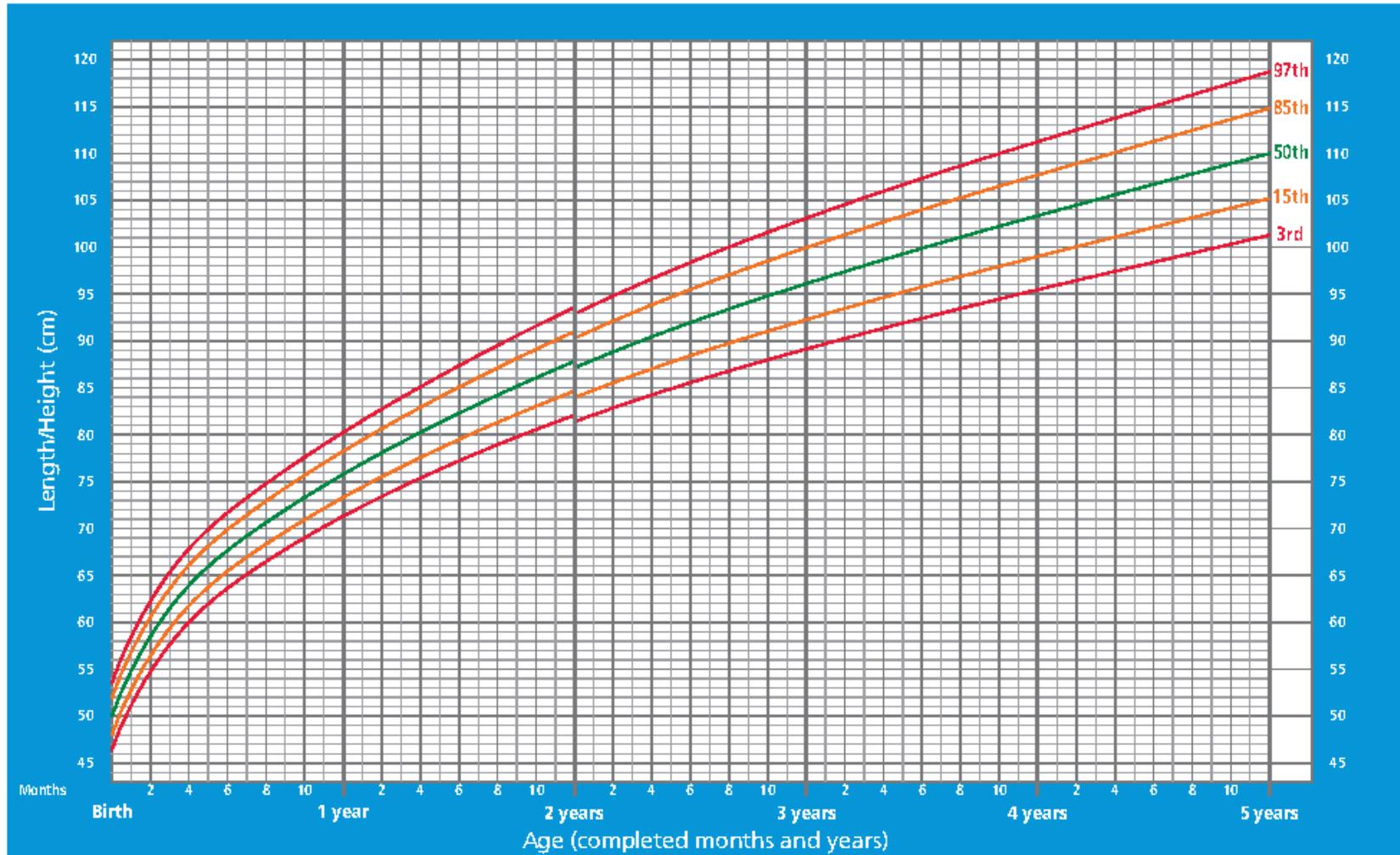
5 to 19 years (percentiles)



2007 WHO Reference

Length/height-for-age BOYS

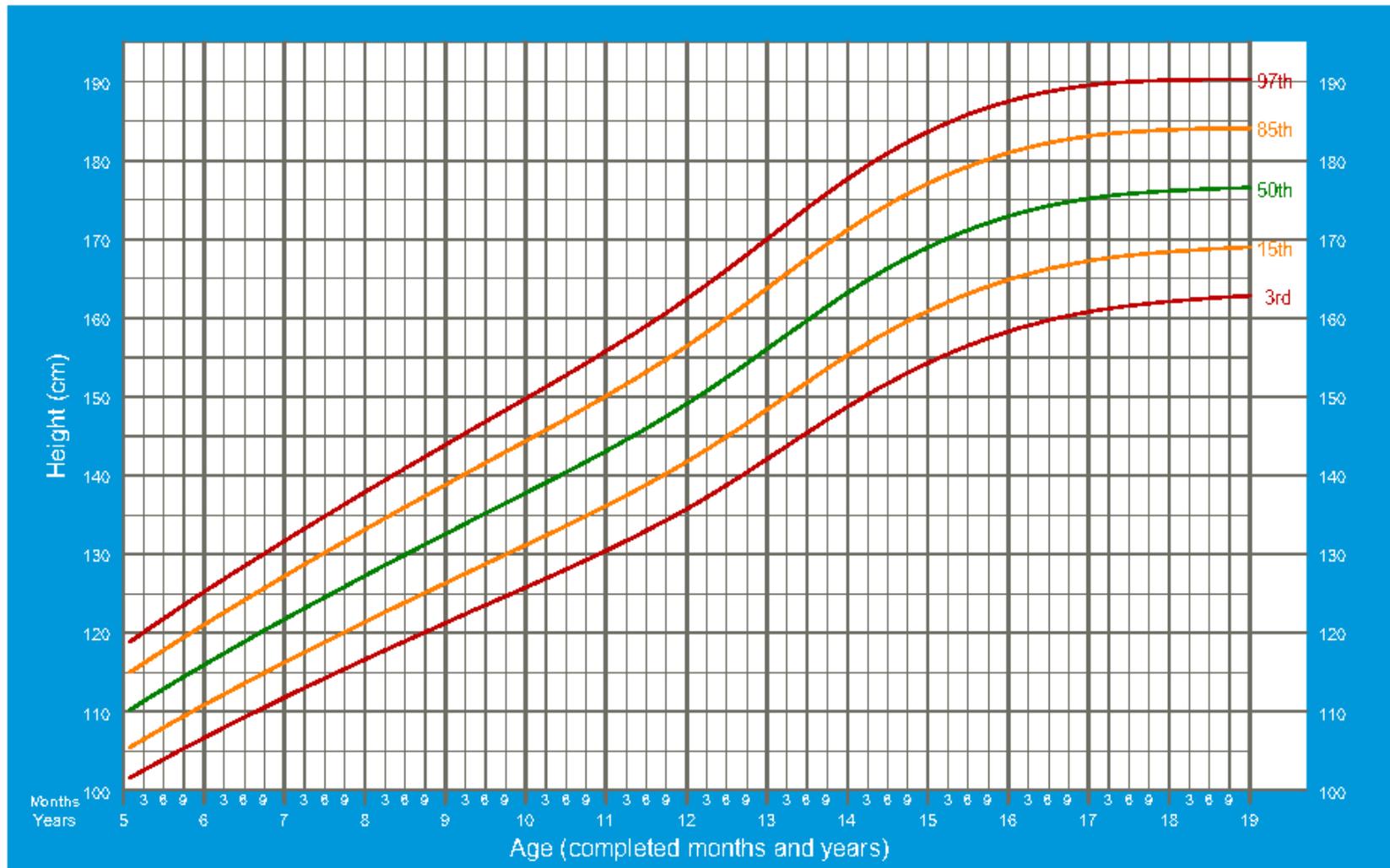
Birth to 5 years (percentiles)



WHO Child Growth Standards

Height-for-age BOYS

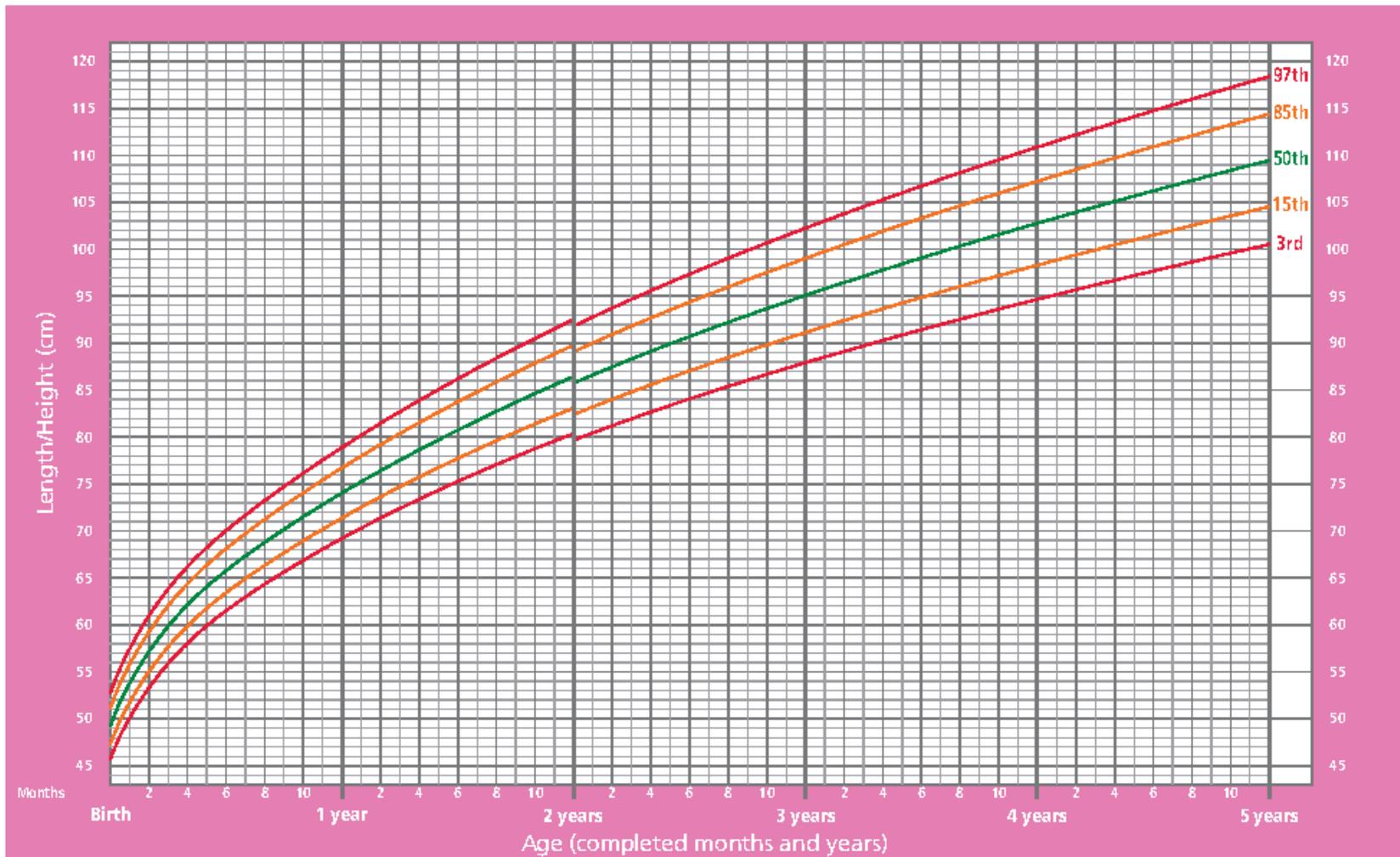
5 to 19 years (percentiles)



2007 WHO Reference

Length/height-for-age GIRLS

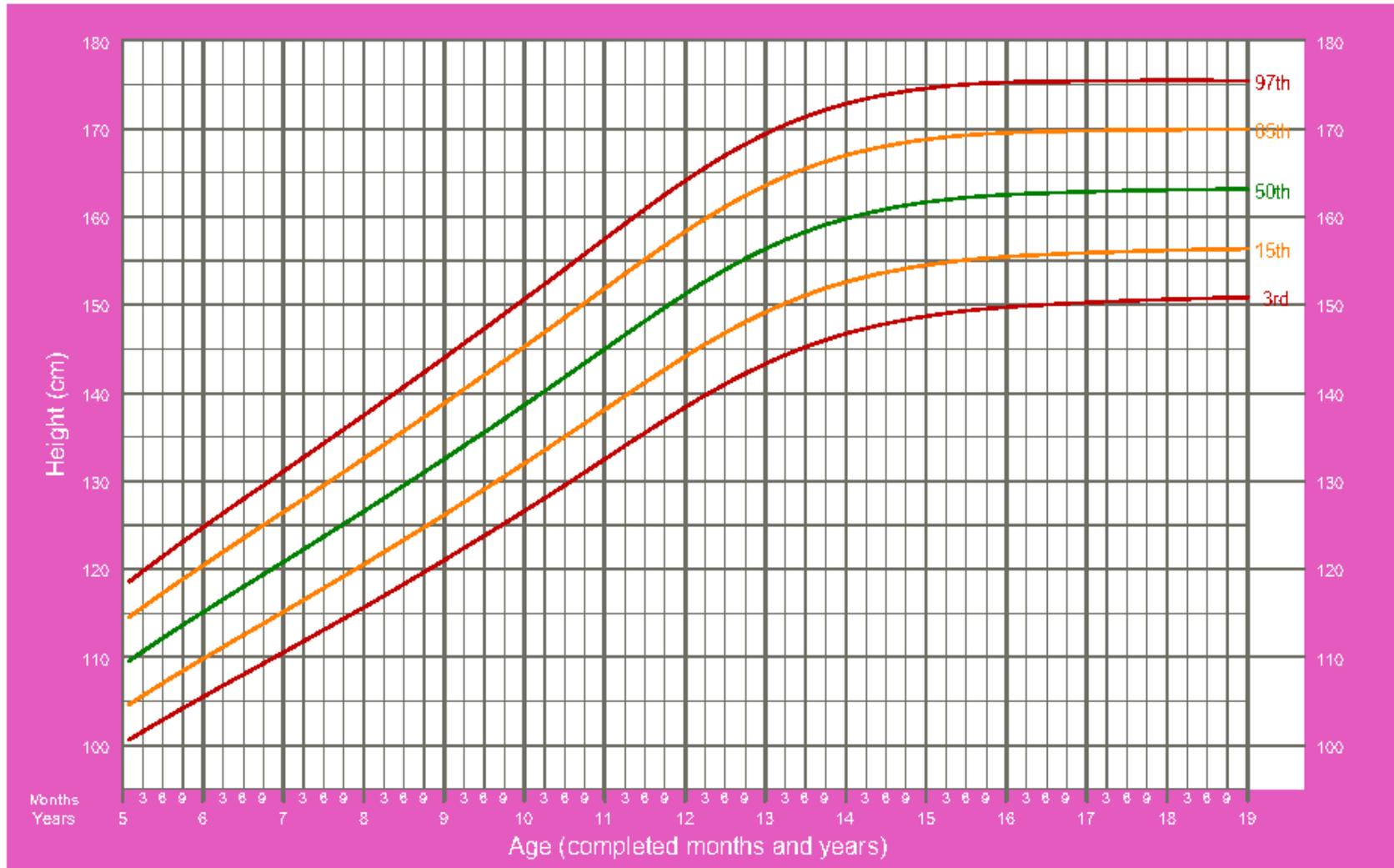
Birth to 5 years (percentiles)



WHO Child Growth Standards

Height-for-age GIRLS

5 to 19 years (percentiles)



2007 WHO Reference

Blood Pressure Levels for Boys by Age and Height Percentile

Age (Year)	BP Percentile ↓	Systolic BP (mmHg)							Diastolic BP (mmHg)						
		← Percentile of Height →							← Percentile of Height →						
		5th	10th	25th	50th	75th	90th	95th	5th	10th	25th	50th	75th	90th	95th
1	50th	80	81	83	85	87	88	89	34	35	36	37	38	39	39
	90th	94	95	97	99	100	102	103	49	50	51	52	53	53	54
	95th	98	99	101	103	104	106	106	54	54	55	56	57	58	58
	99th	105	106	108	110	112	113	114	61	62	63	64	65	66	66
2	50th	84	85	87	88	90	92	92	39	40	41	42	43	44	44
	90th	97	99	100	102	104	105	106	54	55	56	57	58	58	59
	95th	101	102	104	106	108	109	110	59	59	60	61	62	63	63
	99th	109	110	111	113	115	117	117	66	67	68	69	70	71	71
3	50th	86	87	89	91	93	94	95	44	44	45	46	47	48	48
	90th	100	101	103	105	107	108	109	59	59	60	61	62	63	63
	95th	104	105	107	109	110	112	113	63	63	64	65	66	67	67
	99th	111	112	114	116	118	119	120	71	71	72	73	74	75	75
4	50th	88	89	91	93	95	96	97	47	48	49	50	51	51	52
	90th	102	103	105	107	109	110	111	62	63	64	65	66	66	67
	95th	106	107	109	111	112	114	115	66	67	68	69	70	71	71
	99th	113	114	116	118	120	121	122	74	75	76	77	78	78	79
5	50th	90	91	93	95	96	98	98	50	51	52	53	54	55	55
	90th	104	105	106	108	110	111	112	65	66	67	68	69	69	70
	95th	108	109	110	112	114	115	116	69	70	71	72	73	74	74
	99th	115	116	118	120	121	123	123	77	78	79	80	81	81	82
6	50th	91	92	94	96	98	99	100	53	53	54	55	56	57	57
	90th	105	106	108	110	111	113	113	68	68	69	70	71	72	72
	95th	109	110	112	114	115	117	117	72	72	73	74	75	76	76
	99th	116	117	119	121	123	124	125	80	80	81	82	83	84	84
7	50th	92	94	95	97	99	100	101	55	55	56	57	58	59	59
	90th	106	107	109	111	113	114	115	70	70	71	72	73	74	74
	95th	110	111	113	115	117	118	119	74	74	75	76	77	78	78
	99th	117	118	120	122	124	125	126	82	82	83	84	85	86	86
8	50th	94	95	97	99	100	102	102	56	57	58	59	60	60	61
	90th	107	109	110	112	114	115	116	71	72	72	73	74	75	76
	95th	111	112	114	116	118	119	120	75	76	77	78	79	79	80
	99th	119	120	122	123	125	127	127	83	84	85	86	87	87	88
9	50th	95	96	98	100	102	103	104	57	58	59	60	61	61	62
	90th	109	110	112	114	115	117	118	72	73	74	75	76	76	77
	95th	113	114	116	118	119	121	121	76	77	78	79	80	81	81
	99th	120	121	123	125	127	128	129	84	85	86	87	88	88	89
10	50th	97	98	100	102	103	105	106	58	59	60	61	61	62	63
	90th	111	112	114	115	117	119	119	73	73	74	75	76	77	78
	95th	115	116	117	119	121	122	123	77	78	79	80	81	81	82
	99th	122	123	125	127	128	130	130	85	86	86	88	88	89	90

Blood Pressure Levels for Boys by Age and Height Percentile (Continued)

Age (Year)	BP Percentile ↓	Systolic BP (mmHg)							Diastolic BP (mmHg)						
		← Percentile of Height →							← Percentile of Height →						
		5th	10th	25th	50th	75th	90th	95th	5th	10th	25th	50th	75th	90th	95th
11	50th	99	100	102	104	105	107	107	59	59	60	61	62	63	63
	90th	113	114	115	117	119	120	121	74	74	75	76	77	78	78
	95th	117	118	119	121	123	124	125	78	78	79	80	81	82	82
	99th	124	125	127	129	130	132	132	86	86	87	88	89	90	90
12	50th	101	102	104	106	108	109	110	59	60	61	62	63	63	64
	90th	115	116	118	120	121	123	123	74	75	75	76	77	78	79
	95th	119	120	122	123	125	127	127	78	79	80	81	82	82	83
	99th	126	127	129	131	133	134	135	86	87	88	89	90	90	91
13	50th	104	105	106	108	110	111	112	60	60	61	62	63	64	64
	90th	117	118	120	122	124	125	126	75	75	76	77	78	79	79
	95th	121	122	124	126	128	129	130	79	79	80	81	82	83	83
	99th	128	130	131	133	135	136	137	87	87	88	89	90	91	91
14	50th	106	107	109	111	113	114	115	60	61	62	63	64	65	65
	90th	120	121	123	125	126	128	128	75	76	77	78	79	79	80
	95th	124	125	127	128	130	132	132	80	80	81	82	83	84	84
	99th	131	132	134	136	138	139	140	87	88	89	90	91	92	92
15	50th	109	110	112	113	115	117	117	61	62	63	64	65	66	66
	90th	122	124	125	127	129	130	131	76	77	78	79	80	80	81
	95th	126	127	129	131	133	134	135	81	81	82	83	84	85	85
	99th	134	135	136	138	140	142	142	88	89	90	91	92	93	93
16	50th	111	112	114	116	118	119	120	63	63	64	65	66	67	67
	90th	125	126	128	130	131	133	134	78	78	79	80	81	82	82
	95th	129	130	132	134	135	137	137	82	83	83	84	85	86	87
	99th	136	137	139	141	143	144	145	90	90	91	92	93	94	94
17	50th	114	115	116	118	120	121	122	65	66	66	67	68	69	70
	90th	127	128	130	132	134	135	136	80	80	81	82	83	84	84
	95th	131	132	134	136	138	139	140	84	85	86	87	87	88	89
	99th	139	140	141	143	145	146	147	92	93	93	94	95	96	97

BP, blood pressure

*The 90th percentile is 1.28 SD, 95th percentile is 1.645 SD, and the 99th percentile is 2.326 SD over the mean.

For research purposes, the standard deviations in Appendix Table B-1 allow one to compute BP Z-scores and percentiles for boys with height percentiles given in Table 3 (i.e., the 5th, 10th, 25th, 50th, 75th, 90th, and 95th percentiles). These height percentiles must be converted to height Z-scores given by (5% = -1.645; 10% = -1.28; 25% = -0.68; 50% = 0; 75% = 0.68; 90% = 1.28%; 95% = 1.645) and then computed according to the methodology in steps 2-4 described in Appendix B. For children with height percentiles other than these, follow steps 1-4 as described in Appendix B.

Blood Pressure Levels for Girls by Age and Height Percentile

Age (Year)	BP Percentile ↓	Systolic BP (mmHg)							Diastolic BP (mmHg)						
		← Percentile of Height →							← Percentile of Height →						
		5th	10th	25th	50th	75th	90th	95th	5th	10th	25th	50th	75th	90th	95th
1	50th	83	84	85	86	88	89	90	38	39	39	40	41	41	42
	90th	97	97	98	100	101	102	103	52	53	53	54	55	55	56
	95th	100	101	102	104	105	106	107	56	57	57	58	59	59	60
	99th	108	108	109	111	112	113	114	64	64	65	65	66	67	67
2	50th	85	85	87	88	89	91	91	43	44	44	45	46	46	47
	90th	98	99	100	101	103	104	105	57	58	58	59	60	61	61
	95th	102	103	104	105	107	108	109	61	62	62	63	64	65	65
	99th	109	110	111	112	114	115	116	69	69	70	70	71	72	72
3	50th	86	87	88	89	91	92	93	47	48	48	49	50	50	51
	90th	100	100	102	103	104	106	106	61	62	62	63	64	64	65
	95th	104	104	105	107	108	109	110	65	66	66	67	68	68	69
	99th	111	111	113	114	115	116	117	73	73	74	74	75	76	76
4	50th	88	88	90	91	92	94	94	50	50	51	52	52	53	54
	90th	101	102	103	104	106	107	108	64	64	65	66	67	67	68
	95th	105	106	107	108	110	111	112	68	68	69	70	71	71	72
	99th	112	113	114	115	117	118	119	76	76	76	77	78	79	79
5	50th	89	90	91	93	94	95	96	52	53	53	54	55	55	56
	90th	103	103	105	106	107	109	109	66	67	67	68	69	69	70
	95th	107	107	108	110	111	112	113	70	71	71	72	73	73	74
	99th	114	114	116	117	118	120	120	78	78	79	79	80	81	81
6	50th	91	92	93	94	96	97	98	54	54	55	56	56	57	58
	90th	104	105	106	108	109	110	111	68	68	69	70	70	71	72
	95th	108	109	110	111	113	114	115	72	72	73	74	74	75	76
	99th	115	116	117	119	120	121	122	80	80	80	81	82	83	83
7	50th	93	93	95	96	97	99	99	55	56	56	57	58	58	59
	90th	106	107	108	109	111	112	113	69	70	70	71	72	72	73
	95th	110	111	112	113	115	116	116	73	74	74	75	76	76	77
	99th	117	118	119	120	122	123	124	81	81	82	82	83	84	84
8	50th	95	95	96	98	99	100	101	57	57	57	58	59	60	60
	90th	108	109	110	111	113	114	114	71	71	71	72	73	74	74
	95th	112	112	114	115	116	118	118	75	75	75	76	77	78	78
	99th	119	120	121	122	123	125	125	82	82	83	83	84	85	86
9	50th	96	97	98	100	101	102	103	58	58	58	59	60	61	61
	90th	110	110	112	113	114	116	116	72	72	72	73	74	75	75
	95th	114	114	115	117	118	119	120	76	76	76	77	78	79	79
	99th	121	121	123	124	125	127	127	83	83	84	84	85	86	87
10	50th	98	99	100	102	103	104	105	59	59	59	60	61	62	62
	90th	112	112	114	115	116	118	118	73	73	73	74	75	76	76
	95th	116	116	117	119	120	121	122	77	77	77	78	79	80	80
	99th	123	123	125	126	127	129	129	84	84	85	86	86	87	88

Blood Pressure Levels for Girls by Age and Height Percentile (Continued)

Age (Year)	BP Percentile ↓	Systolic BP (mmHg)							Diastolic BP (mmHg)						
		← Percentile of Height →							← Percentile of Height →						
		5th	10th	25th	50th	75th	90th	95th	5th	10th	25th	50th	75th	90th	95th
11	50th	100	101	102	103	105	106	107	60	60	60	61	62	63	63
	90th	114	114	116	117	118	119	120	74	74	74	75	76	77	77
	95th	118	118	119	121	122	123	124	78	78	78	79	80	81	81
	99th	125	125	126	128	129	130	131	85	85	86	87	87	88	89
12	50th	102	103	104	105	107	108	109	61	61	61	62	63	64	64
	90th	116	116	117	119	120	121	122	75	75	75	76	77	78	78
	95th	119	120	121	123	124	125	126	79	79	79	80	81	82	82
	99th	127	127	128	130	131	132	133	86	86	87	88	88	89	90
13	50th	104	105	106	107	109	110	110	62	62	62	63	64	65	65
	90th	117	118	119	121	122	123	124	76	76	76	77	78	79	79
	95th	121	122	123	124	126	127	128	80	80	80	81	82	83	83
	99th	128	129	130	132	133	134	135	87	87	88	89	89	90	91
14	50th	106	106	107	109	110	111	112	63	63	63	64	65	66	66
	90th	119	120	121	122	124	125	125	77	77	77	78	79	80	80
	95th	123	123	125	126	127	129	129	81	81	81	82	83	84	84
	99th	130	131	132	133	135	136	136	88	88	89	90	90	91	92
15	50th	107	108	109	110	111	113	113	64	64	64	65	66	67	67
	90th	120	121	122	123	125	126	127	78	78	78	79	80	81	81
	95th	124	125	126	127	129	130	131	82	82	82	83	84	85	85
	99th	131	132	133	134	136	137	138	89	89	90	91	91	92	93
16	50th	108	108	110	111	112	114	114	64	64	65	66	66	67	68
	90th	121	122	123	124	126	127	128	78	78	79	80	81	81	82
	95th	125	126	127	128	130	131	132	82	82	83	84	85	85	86
	99th	132	133	134	135	137	138	139	90	90	90	91	92	93	93
17	50th	108	109	110	111	113	114	115	64	65	65	66	67	67	68
	90th	122	122	123	125	126	127	128	78	79	79	80	81	81	82
	95th	125	126	127	129	130	131	132	82	83	83	84	85	85	86
	99th	133	133	134	136	137	138	139	90	90	91	91	92	93	93

BP, blood pressure

* The 90th percentile is 1.28 SD, 95th percentile is 1.645 SD, and the 99th percentile is 2.326 SD over the mean.

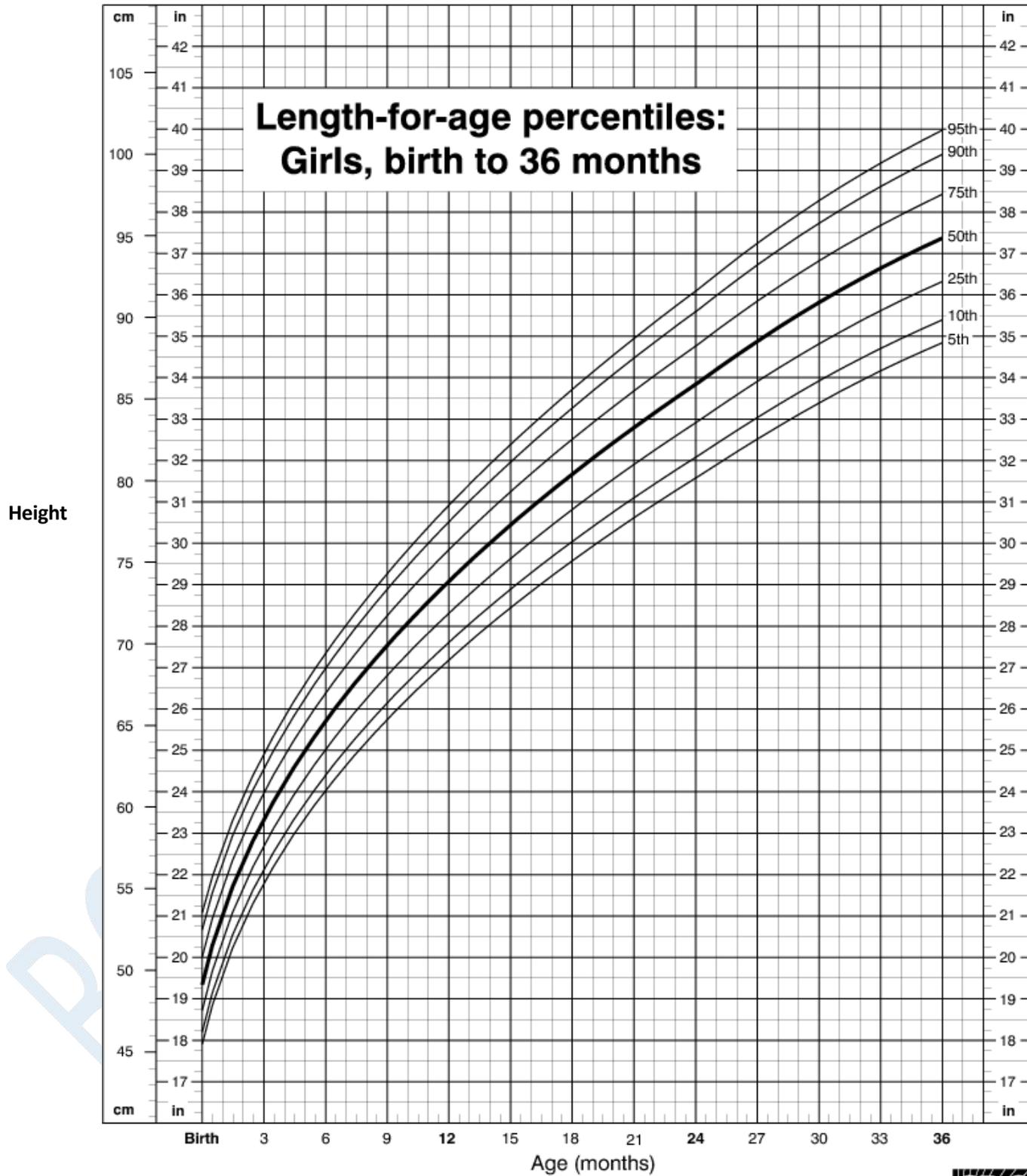
For research purposes, the standard deviations in Appendix Table B-1 allow one to compute BP Z-scores and percentiles for girls with height percentiles given in Table 4 (i.e., the 5th, 10th, 25th, 50th, 75th, 90th, and 95th percentiles). These height percentiles must be converted to height Z-scores given by (5% = -1.645; 10% = -1.28; 25% = -0.68; 50% = 0; 75% = 0.68; 90% = 1.28%; 95% = 1.645) and then computed according to the methodology in steps 2-4 described in Appendix B. For children with height percentiles other than these, follow steps 1-4 as described in Appendix B.

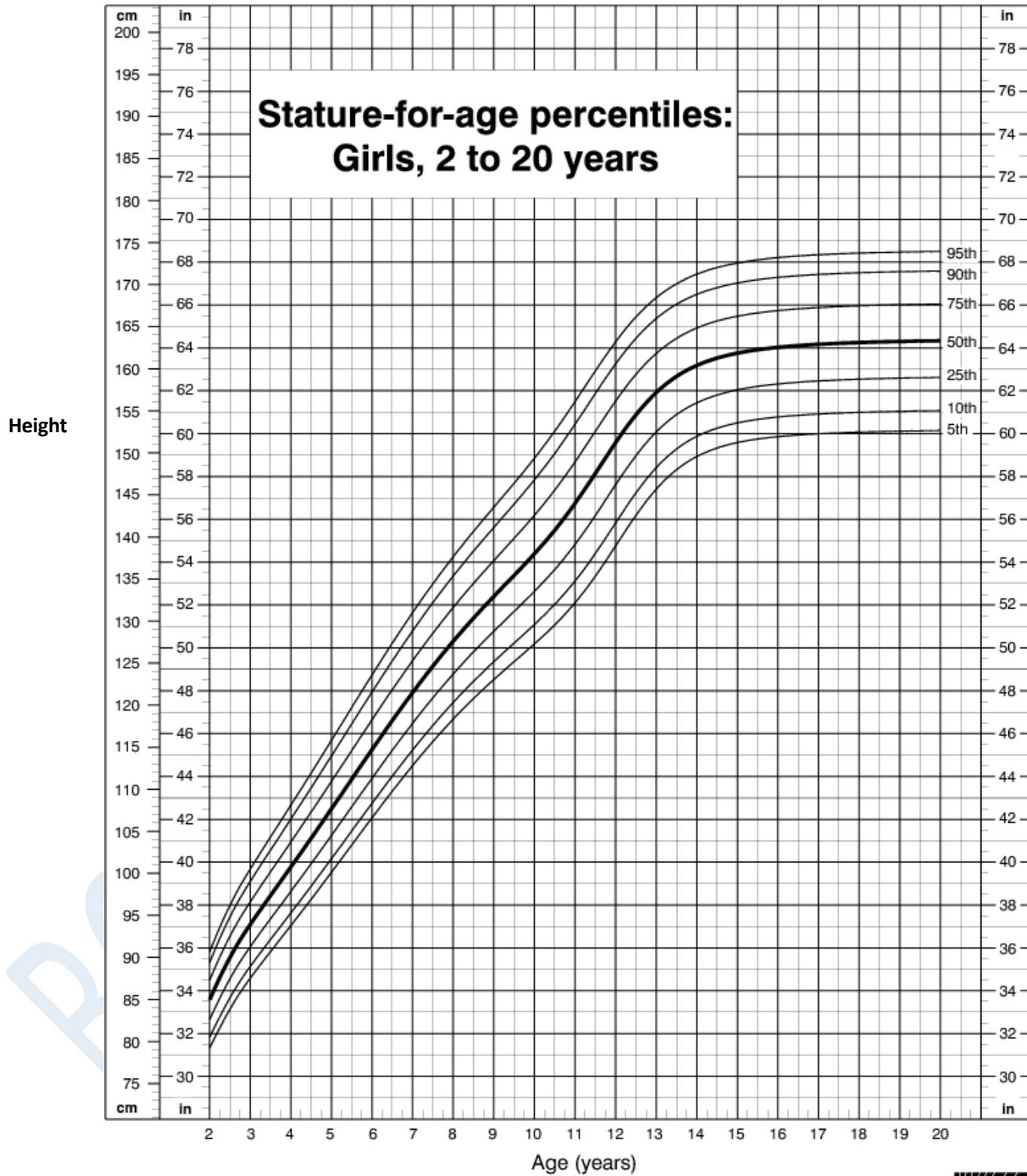
SYMPTOMS OF ORGANPHOSPHATE/CARBAMATE POISONING:**MILD SYMPTOMS**

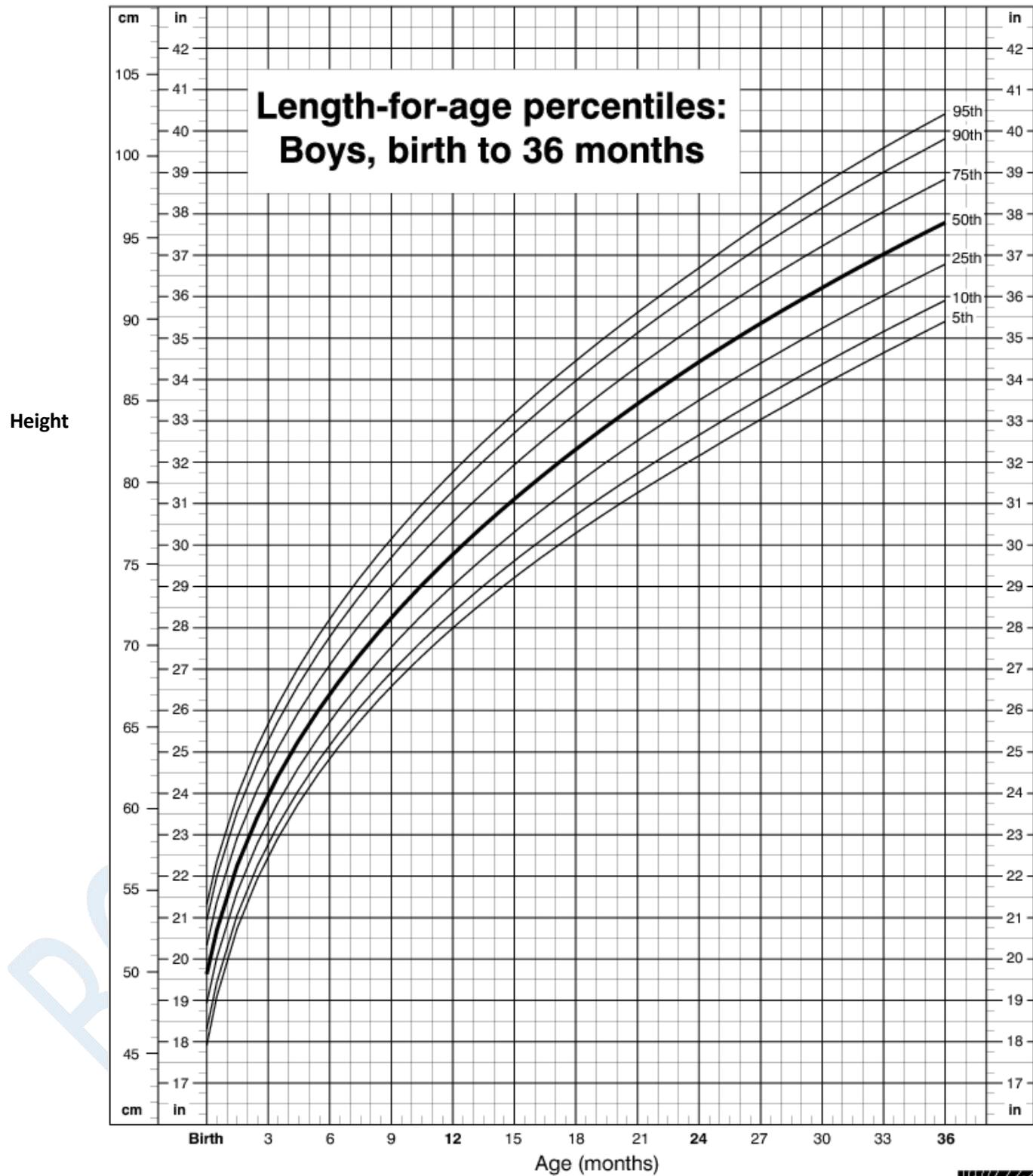
1. Blurred vision or miosis (pupil constriction)
2. Unexplained excessive lacrimation
3. Unexplained excessive Naso-pharyngeal secretions
4. Increased salivation
5. Chest tightness, difficulty breathing wheezes or cough
6. Tremors throughout the body or muscular twitching
7. Nausea, vomiting, abdominal cramping, diarrhea
8. Tachycardia/bradycardia

SEVERE SYMPTOMS

1. Altered mental status
2. Loss of consciousness
3. Respiratory distress
4. Excessive secretions from the lungs/airways
5. Severe muscular twitching, generalized weakness or paralysis
6. Involuntary urination and/or defecation
7. Convulsion or seizures







Height

