Paediatrics at a Glance

Fourth Edition

Lawrence Miall
Mary Rudolf
Dominic Smith

with online self test

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Paediatrics at a Glance

Dedication

To our children: Charlie, Mollie and Rosie, Aaron and Becca, Edward and Daniel and our spouses: Domini, Michael and Kathy and all the patients who have taught us so much over the years.

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Paediatrics at a Glance

Fourth Edition

Lawrence Miall
MBBS, BSc, MMedSc, MRCP, FRCPCH
Consultant in Neonatal Medicine and
Honorary Senior Lecturer
Leeds Teaching Hospitals NHS Trust and
University of Leeds
Leeds

Mary Rudolf
MBBS, BSc, DCH, FRCPCH, FAAP
Professor of Population Health
Bar Ilan University Faculty of Medicine
in the Galilee, Israel
Visiting Professor of Child Health
University of Leeds, UK

Dominic Smith
MBBS, MMedSc, MRCP, MRCPCH
Consultant Paediatrician
Department of Child Health
York Teaching Hospital and Hull York Medical
School
York

WILEY Blackwell

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Preface

" 'What is the use of a book,' thought Alice, 'without pictures or conversations?' " Lewis Carroll, Alice in Wonderland.

Paediatric medicine requires an understanding of developing anatomy, physiology and psychology as well as a holistic family-orientated approach. There are a wide range of professional challenges: from the technical aspects of intensive care to the ethical and sociological questions relating to issues of autonomy, independence and children's rights. The paediatric environment is very different to the world of adult medicine. This can all be daunting to those who are new to the specialty, but developing the skills and confidence in successfully managing these challenges can enable professionals to make significant differences to the lives of children and families. This makes paediatric medicine amongst the most rewarding of all the medical specialties.

In preparing the fourth edition, we have updated the text to reflect changes in understanding of childhood illness over the last 5 years. The new edition includes advances in genetics, screening and therapy of childhood illness. Multiple choice questions to test and expand on knowledge from the text are included on the companion website. Video clips highlighting clinical signs and examination techniques are available on the companion website.

Children have complex needs that require medical staff to work together with other professionals in child health, psychology, education and social care. There is increasing recognition of the need for all health professionals to have a good understanding of their role in safeguarding vulnerable people. New chapters have been added to expand on psychological issues and ethics in child health. There is a new chapter on Palliative Care, which is an emerging area in the specialty.

We hope that this edition will continue to educate and inspire students and trainees in taking the first steps towards an understanding of children, their illnesses, their resilience in the face of adversity and amazing capacity for recovery. It is a book with many pictures to aid the introduction and revision of the key topics. We hope this will help as students begin their all-important conversations with young patients.

Lawrence Miall
Mary Rudolf
Dominic Smith
Leeds, United Kingdom
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Abbreviations

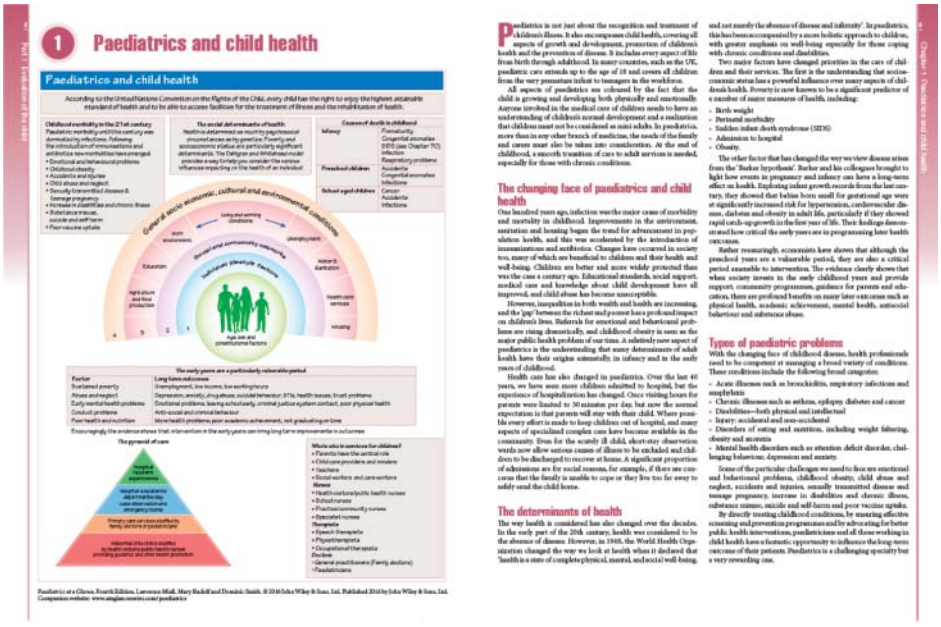
AABR	automated auditory brainstem response
ACTH	adrenocorticotropic hormone
ADD	attention deficit disorder
ADH	anti-diuretic hormone
ADPKD	autosomal dominant polycystic kidney disease
AFP	alpha-fetoprotein
AIDS	acquired immunodeficiency syndrome
ALL	acute lymphoblastic leukaemia
ALT	alanine transaminase
ALTE	acute life-threatening event
AML	acute myeloid leukaemia
ANA	antinuclear antibody
APTT	activated partial thromboplastin time
ARPKD	autosomal recessive polycystic kidney disease
ASD	atrial septal defect
ASOT	antistreptolysin O titre
AVPU	alert, voice, pain, unresponsive
AVSD	atrioventricular septal defect
AXR	abdominal radiograph
AZT	zidovudine (azidothymidine)
BCG	bacille Calmette–Guérin
BMI	body mass index
BP	blood pressure
BSER	brainstem evoked responses
CDH	congenital dislocation of the hip
CF	cystic fibrosis
CFTR	cystic fibrosis transmembrane regulator
CFU	colony-forming unit
CHARGE	coloboma, heart defects, choanal atresia, retarded growth and development, genital hypoplasia, ear anomalies
CHD	congenital heart disease
CMV	cytomegalovirus
CNS	central nervous system
CONI	care of the next infant
CPAP	continuous positive airway pressure
CPR	cardiopulmonary resuscitation
CRP	C-reactive protein
CRT	capillary refill time
CSF	cerebrospinal fluid
CSII	continuous subcutaneous insulin infusion
CT	computed tomography
CXR	chest radiograph
DDH	developmental dysplasia of the hip
DIC	disseminated intravascular coagulation
DIDMOAD	diabetes insipidus, diabetes mellitus, optic atrophy and deafness
DKA	diabetic ketoacidosis
DM	diabetes mellitus
DMD	Duchenne muscular dystrophy
DMSA	dimercaptosuccinic acid
DTPA	diethylenetriamine penta-acetate
EBV	Epstein–Barr virus
ECG	electrocardiogram
EDD	expected due date
EEG	electroencephalogram
ENT	ear, nose and throat
ESR	erythrocyte sedimentation rate
FBC	full blood count
FDP	fibrin degradation product
FSGS	focal segment glomerulosclerosis
FTT	failure to thrive
G6PD	glucose 6-phosphate dehydrogenase
GCS	Glasgow Coma Scale
GH	growth hormone
GI	gastrointestinal
GOR	gastro-oesophageal reflux
GP	general practitioner
GTT	glucose tolerance test
HAART	highly active antiretroviral therapy
Hb	haemoglobin
HbF	fetal haemoglobin
HbS	sickle-cell haemoglobin
HIE	hypoxic-ischaemic encephalopathy
HIV	human immunodeficiency virus
HPLC	high-performance liquid chromatography
HSP	Henoch–Schönlein purpura
HSV	herpes simplex virus
HUS	haemolytic uraemic syndrome
ICP	intracranial pressure
Ig	immunoglobulin
IM	intramuscular
INR	international normalized ratio
IO	intraosseous
IRT	immunoreactive trypsin
ITP	idiopathic thrombocytopenic purpura
IUGR	intrauterine growth retardation
IV	intravenous
IVC	inferior vena cava
IVF	in vitro fertilization
IVH	intraventricular haemorrhage
IVU	intravenous urogram
JCA	juvenile chronic arthritis
LFT	liver function test

LIP	lymphocytic interstitial pneumonitis
LMN	lower motor neuron
LP	lumbar puncture
Mag-3	radioisotope technetium ^{99m}Tc mertiatide
MCAD	medium-chain acyl-carnitine deficiency
MCGN	minimal change glomerulonephritis
MCH	mean cell haemoglobin
MCUG	micturating cystourethrogram
MCV	mean cell volume
MDI	metered dose inhaler
MLD	mild learning difficulty
MMR	measles, mumps, rubella
MRI	magnetic resonance imaging
MUAC	mid-upper arm circumference
NEC	necrotizing enterocolitis
NF	neurofibromatosis
NHL	non-Hodgkin's lymphoma
NICU	neonatal intensive care unit
NPA	nasopharyngeal aspirate
NSAID	non-steroidal anti-inflammatory drug
OAE	otoacoustic emissions
OFC	occipitofrontal circumference
ORS	oral rehydration solution
P_{CO_2}	partial pressure of carbon dioxide
PCP	pneumocystis pneumonia
PCR	polymerase chain reaction
PCV	packed cell volume
PDA	patent ductus arteriosus
PEFR	peak expiratory flow rate
PKU	phenylketonuria
PNET	primitive neuroectodermal tumour
PR	per rectum
PT	prothrombin time
PTT	partial thromboplastin time
PUJ	pelviureteric junction
PUO	pyrexia of unknown origin
PVL	periventricular leucomalacia
RAST	radio-allergosorbent test
RBC	red blood cell
RDS	respiratory distress syndrome
RNIB	Royal National Institute for the Blind
ROP	retinopathy of prematurity
RSV	respiratory syncytial virus
SCBU	special care baby unit
SCID	severe combined immunodeficiency
SGA	small for gestational age
SIADH	syndrome of inappropriate antidiuretic hormone secretion
SIDS	sudden infant death syndrome
SLD	severe learning difficulty
SSPE	subacute sclerosing encephalitis
STD	sexually transmitted disease
SUDI	sudden unexpected death in infancy
T4	thyroxine
TAPVD	total anomalous pulmonary venous drainage
TB	tuberculosis
TGA	transposition of the great arteries
TNF	tumour necrosis factor
TORCH	toxoplasmosis, other (syphilis), rubella, cytomegalovirus, hepatitis, HIV
TS	tuberous sclerosis
TSH	thyroid stimulating hormone
tTG	tissue transglutaminase
U&E	urea and electrolytes
UMN	upper motor neuron
URTI	upper respiratory tract infection
UTI	urinary tract infection
UV	ultraviolet
VACTERL	vertebral anomalies, anal atresia, cardiac anomalies, tracheo-oesophageal fistula, renal anomalies, limb defects
VER	visual evoked response
VKDB	vitamin K deficiency bleeding
VSD	ventricular septal defect
VUR	vesicoureteric reflux
WCC	white cell count

How to use your textbook

Features contained within your textbook

Each topic is presented in a double-page spread with clear, easy-to-follow diagrams supported by succinct explanatory text.



1 Paediatrics and child health

Paediatrics and child health

The changing face of paediatrics and child health

Types of paediatric problems

The determinants of health

Key point boxes give a summary of the topics covered in a topic.

KEY POINTS

Non-organic pain is characteristically:

- Periodic pain with intervening good health
- Periumbilical
- May be related to school hours.

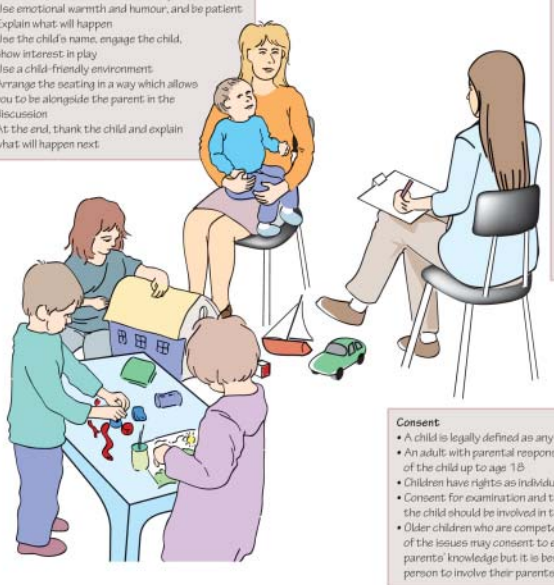
Consider organic pain if there is

- Pain occurring at night
- Weight loss, reduced appetite, lack of energy or recurrent fever
- Organ-specific symptoms, e.g. change in bowel habit, polyuria, menstrual problems, vomiting, occult or frank bleeding
- Ill appearance, growth failure or swollen joints.

Your textbook is full of photographs, illustrations and tables.

The doctor–patient relationship

The consultation
- Introduce yourself to the child and parent
- Use emotional warmth and humour, and be patient
- Explain what will happen
- Use the child's name, engage the child, show interest in play
- Use a child-friendly environment
- Arrange the seating in a way which allows you to be alongside the parent in the discussion
- At the end, thank the child and explain what will happen next



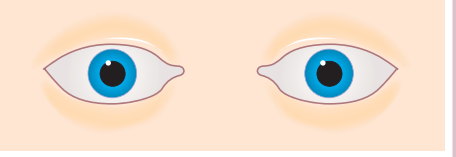
Observations
- While taking the history start to observe the child and parent
- What is the interaction like?
- Consider child's development of movement, play and communication
- Are there any immediate signs of illness?
- Move on to measure height, weight and head circumference. Plot these on centile charts
- Examine for signs of acute illness
  - pulse
  - temperature
  - capillary refill time
  - blood pressure
  - respiratory rate
  - conscious level
- Assess for signs of pain
- Examine each system

Consent
- A child is legally defined as any individual below age 18 years
- An adult with parental responsibility can make a decision on behalf of the child up to age 18
- Children have rights as individuals
- Consent for examination and treatment is agreed with parent but the child should be involved in the discussion
- Older children who are competent to understand the significance of the issues may consent to examination and treatment without parents' knowledge but it is best practice to encourage the young person to involve their parents for support if possible

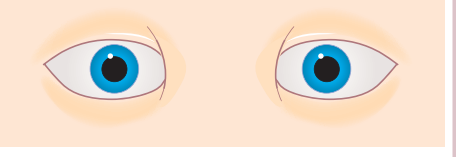
The 'play icon' indicates related videos which can be found on the companion website.

The visual system

Observation of eyes
- Look at the iris, sclera and pupil
- Check pupils are equal and react to light, both directly and indirectly
- Look for red reflex to exclude cataract, especially in the newborn
- Look at reflection of light on the cornea—is it symmetrical or is one eye squinting? (see box opposite)
- Look at the inner epicanthic folds—if very prominent they may cause a pseudosquint



Normal symmetrical light reflex



Pseudosquint due to prominent inner epicanthic folds

About the companion website

Don't forget to visit the companion website for this book:

www.ataglanceseries.com/paediatrics

There you will find valuable material designed to enhance your learning, including:

- Interactive self-assessment case studies
- Multiple-choice questions
- Videos on various procedures and concepts covered in the book
- Links to online resources

Scan this QR code to visit the companion website.

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Evaluation of the child

Part 1

Chapters

1 Paediatrics and child health

Paediatrics and child health

According to the United Nations Convention on the Rights of the Child, every child has the right to enjoy the highest attainable standard of health and to be able to access facilities for the treatment of illness and the rehabilitation of health.

Childhood morbidity in the 21st century

Paediatric morbidity until this century was dominated by infections. Following the introduction of immunisations and antibiotics new morbidities have emerged:

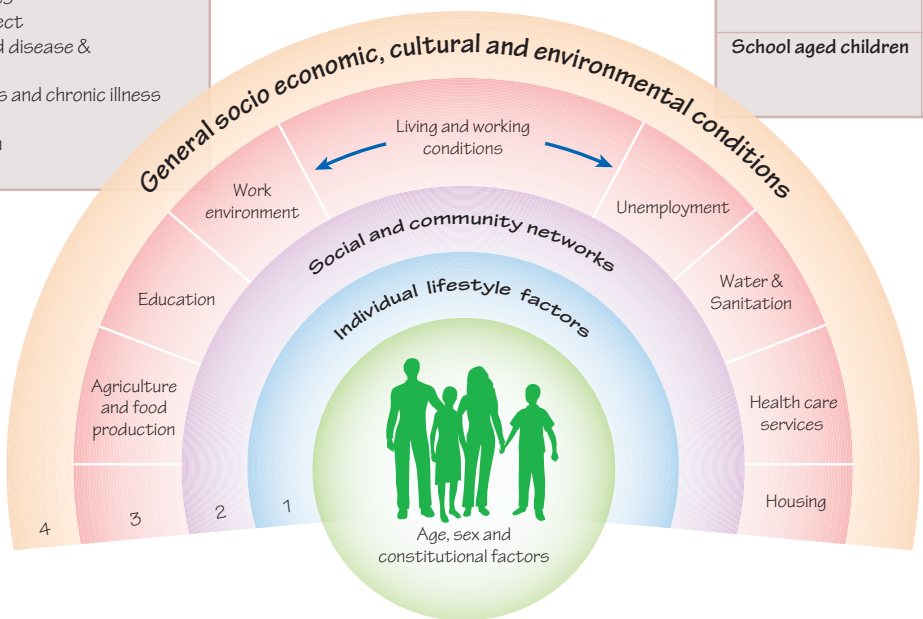
- Emotional and behavioural problems
- Childhood obesity
- Accidents and injuries
- Child abuse and neglect
- Sexually transmitted disease & teenage pregnancy
- Increase in disabilities and chronic illness
- Substance misuse, suicide and self harm
- Poor vaccine uptake

The social determinants of health

Health is determined as much by psychosocial circumstances as by genetics. Poverty and socioeconomic status are particularly significant determinants. The Dahlgren and Whitehead model provides a way to help you consider the various influences impacting on the health of an individual

Causes of death in childhood

Infancy	Prematurity Congenital anomalies SIDS (see Chapter 70) Infection Respiratory problems
Preschool children	Accidents Congenital anomalies Infections
School aged children	Cancer Accidents Infections

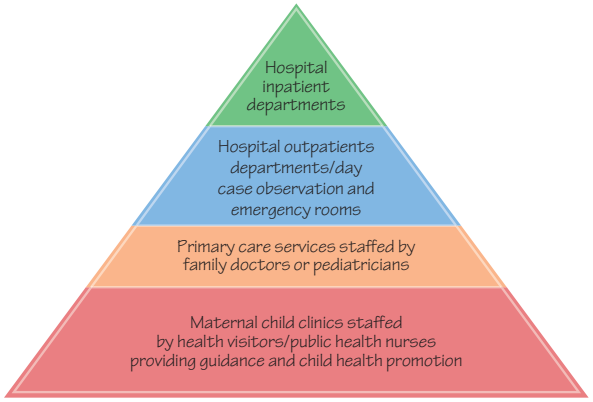


The early years are a particularly vulnerable period

Factor	Long term outcomes
Sustained poverty	Unemployment, low income, low working hours
Abuse and neglect	Depression, anxiety, drug abuse, suicidal behaviour, STIs, health issues, trust problems
Early mental health problems	Emotional problems, leaving school early, criminal justice system contact, poor physical health
Conduct problems	Anti-social and criminal behaviour
Poor health and nutrition	More health problems; poor academic achievement, not graduating on time

Encouragingly the evidence shows that intervention in the early years can bring long term improvements in outcomes

The pyramid of care



Who's who in services for children?

- Parents have the central role
- Child care providers and minders
- Teachers
- Social workers and care workers

Nurses

- Health visitors/public health nurses
- School nurses
- Practice/community nurses
- Specialist nurses

Therapists

- Speech therapists
- Physiotherapists
- Occupational therapists

Doctors

- General practitioners (Family doctors)
- Paediatricians

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Paediatrics is not just about the recognition and treatment of children's illness. It also encompasses child health, covering all aspects of growth and development, promotion of children's health and the prevention of disease. It includes every aspect of life from birth through adulthood. In many countries, such as the UK, paediatric care extends up to the age of 18 and covers all children from the very premature infant to teenagers in the workforce.

All aspects of paediatrics are coloured by the fact that the child is growing and developing both physically and emotionally. Anyone involved in the medical care of children needs to have an understanding of children's normal development and a realization that children must not be considered as mini adults. In paediatrics, more than in any other branch of medicine, the needs of the family and carers must also be taken into consideration. At the end of childhood, a smooth transition of care to adult services is needed, especially for those with chronic conditions.

The changing face of paediatrics and child health

One hundred years ago, infection was the major cause of morbidity and mortality in childhood. Improvements in the environment, sanitation and housing began the trend for advancement in population health, and this was accelerated by the introduction of immunizations and antibiotics. Changes have occurred in society too, many of which are beneficial to children and their health and well-being. Children are better and more widely protected than was the case a century ago. Educational standards, social support, medical care and knowledge about child development have all improved, and child abuse has become unacceptable.

However, inequalities in both wealth and health are increasing, and the 'gap' between the richest and poorest has a profound impact on children's lives. Referrals for emotional and behavioural problems are rising dramatically, and childhood obesity is seen as the major public health problem of our time. A relatively new aspect of paediatrics is the understanding that many determinants of adult health have their origins antenatally, in infancy and in the early years of childhood.

Health care has also changed in paediatrics. Over the last 40 years, we have seen more children admitted to hospital, but the experience of hospitalization has changed. Once visiting hours for parents were limited to 30 minutes per day, but now the normal expectation is that parents will stay with their child. Where possible every effort is made to keep children out of hospital, and many aspects of specialized complex care have become available in the community. Even for the acutely ill child, short-stay observation wards now allow serious causes of illness to be excluded and children to be discharged to recover at home. A significant proportion of admissions are for social reasons, for example, if there are concerns that the family is unable to cope or they live too far away to safely send the child home.

The determinants of health

The way health is considered has also changed over the decades. In the early part of the 20th century, health was considered to be the absence of disease. However, in 1948, the World Health Organization changed the way we look at health when it declared that 'health is a state of complete physical, mental, and social well-being, and not merely the absence of disease and infirmity'. In paediatrics, this has been accompanied by a more holistic approach to children, with greater emphasis on well-being especially for those coping with chronic conditions and disabilities.

Two major factors have changed priorities in the care of children and their services. The first is the understanding that socioeconomic status has a powerful influence over many aspects of children's health. Poverty is now known to be a significant predictor of a number of major measures of health, including:

- Birth weight
- Perinatal morbidity
- Sudden infant death syndrome (SIDS)
- Admission to hospital
- Obesity.

The other factor that has changed the way we view disease arises from the 'Barker hypothesis'. Barker and his colleagues brought to light how events in pregnancy and infancy can have a long-term effect on health. Exploring infant growth records from the last century, they showed that babies born small for gestational age were at significantly increased risk for hypertension, cardiovascular disease, diabetes and obesity in adult life, particularly if they showed rapid catch-up growth in the first year of life. Their findings demonstrated how critical the early years are in programming later health outcomes.

Rather reassuringly, economists have shown that although the preschool years are a vulnerable period, they are also a critical period amenable to intervention. The evidence clearly shows that when society invests in the early childhood years and provide support, community programmes, guidance for parents and education, there are profound benefits on many later outcomes such as physical health, academic achievement, mental health, antisocial behaviour and substance abuse.

Types of paediatric problems

With the changing face of childhood disease, health professionals need to be competent at managing a broad variety of conditions. These conditions include the following broad categories:

- Acute illnesses such as bronchiolitis, respiratory infections and anaphylaxis
- Chronic illnesses such as asthma, epilepsy, diabetes and cancer
- Disabilities—both physical and intellectual
- Injury: accidental and non-accidental
- Disorders of eating and nutrition, including weight faltering, obesity and anorexia
- Mental health disorders such as attention deficit disorder, challenging behaviour, depression and anxiety.

Some of the particular challenges we need to face are emotional and behavioural problems, childhood obesity, child abuse and neglect, accidents and injuries, sexually transmitted disease and teenage pregnancy, increase in disabilities and chronic illness, substance misuse, suicide and self-harm and poor vaccine uptake.

By directly treating childhood conditions, by ensuring effective screening and prevention programmes and by advocating for better public health interventions, paediatricians and all those working in child health have a fantastic opportunity to influence the long-term outcome of their patients. Paediatrics is a challenging specialty but a very rewarding one.