The Royal Australasian College of Physicians

Endocrinology

Advanced Training Curriculum

Paediatrics & Child Health Division

Australasian Paediatric Endocrine Group

The Royal Australasian College of Physicians

Physician Readiness for Expert Practice (PREP) Training Program

Paediatric Endocrinology Advanced Training Curriculum

TO BE USED IN CONJUNCTION WITH:

Basic Training Curriculum – Paediatrics & Child Health

Professional Qualities Curriculum

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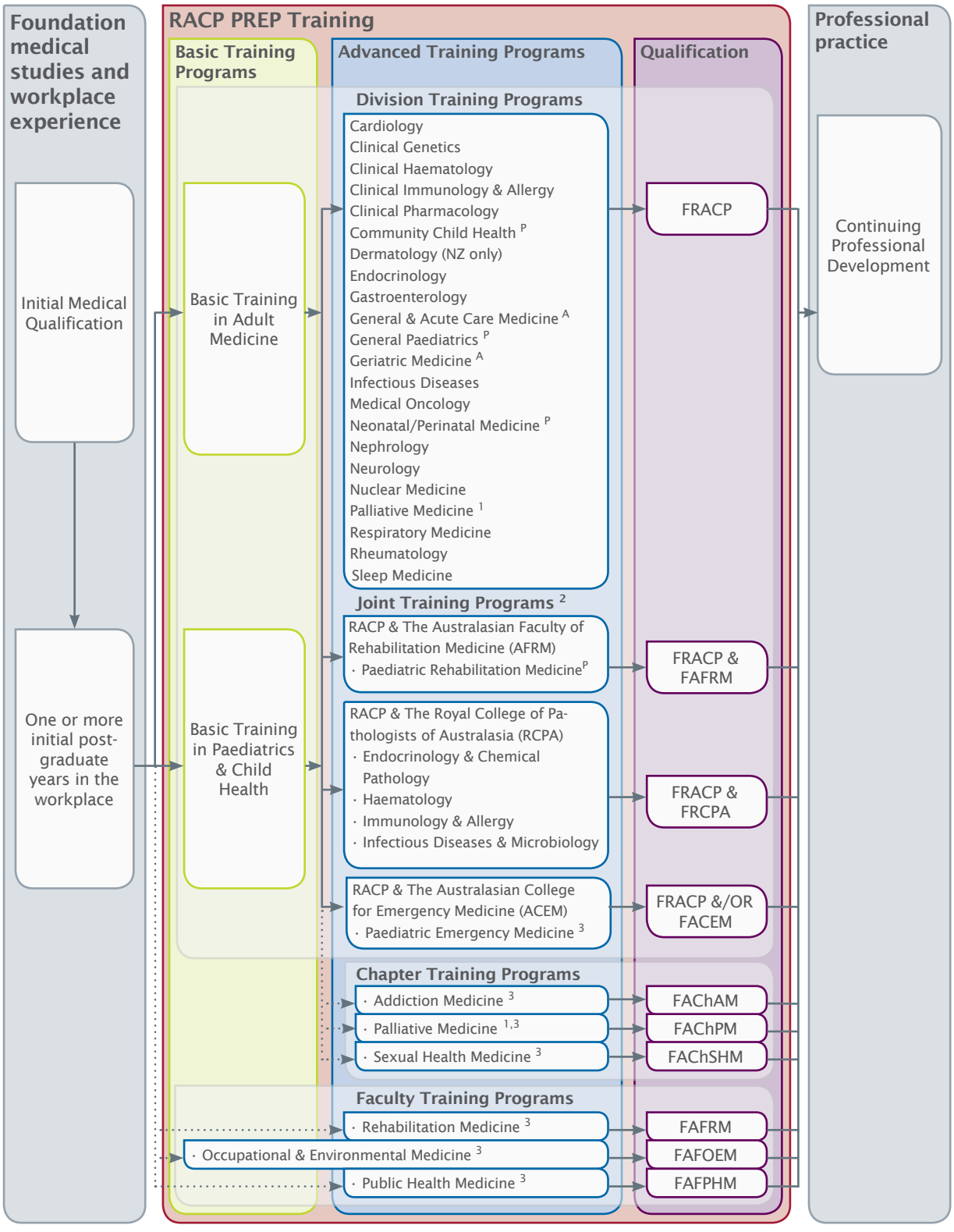
Please note: No Domains, Themes or Learning Objectives have been updated for this edition; design changes ONLY.

RACP FELLOWSHIP TRAINING PATHWAYS AND THE CONTINUUM OF LEARNING



P Trainees must complete Basic Training in Paediatrics & Child Health to enter this program.
A Trainees must complete Basic Training in Adult Medicine to enter this program.
1 Trainees who have entered Advanced Training in Palliative Medicine via a RACP Basic Training Program will be awarded FRACP upon completion and may subsequently be awarded FAChPM. Trainees who have NOT entered Advanced Training in Palliative Medicine via a RACP Basic Training Program will only be awarded FAChPM upon completion.
2 The Child & Adolescent Psychiatry Joint Training Program with the Royal Australian and New Zealand College of Psychiatrists (RANZCP) is currently under review by the RACP and RANZCP and closed to new entrants at present.
3 Alternative entry requirements exist for these training programs; please see the corresponding PREP Program Requirements Handbook for further information.

NB1: This diagram only depicts training programs that lead to Fellowship. Please see the RACP website for additional RACP training programs.
NB2: For further information on any of the above listed training programs, please see the corresponding PREP Program Requirements Handbook.

OVERVIEW OF THE SPECIALTY

Paediatric endocrinology is the study of hormones and the treatment of hormone based diseases. The specialty of clinical endocrinology encompasses the diagnosis and management of disorders of the endocrine system. Hormones from the body's major gland systems - thyroid, pancreas, adrenal and pituitary - regulate growth, metabolism, blood pressure, reproduction as well as many other necessary functions.

Paediatric endocrinologists provide treatment, diagnostic and laboratory analysis, and conduct basic and applied research in a wide range of humoral and metabolic conditions. These include: diabetes and its complications; thyroid, pituitary and adrenal disease; gonadal disorders and disorders of sexual differentiation; neuroendocrine conditions; endocrine tumours; disorders of growth and puberty; congenital and acquired endocrine dysfunction; lipid and nutritional abnormalities; and metabolic bone disease.

Endocrine conditions are diverse in their requirement for specialist medical advice and their impact is lifelong. Many pose a diagnostic challenge, and in some the application of new but only partially effective treatments requires fine judgement. Endocrine disorders affect many body systems and call for expertise in metabolic disease, clinical biochemistry and genetic counselling.

Paediatric endocrinologists need to be able to interpret biochemical tests relating to endocrine diagnosis and have a good understanding of the laboratory methods underlying these analyses and their limitations. Consequently, experience in clinical or laboratory research and in diagnostic endocrine laboratory medicine is an essential component of training. They are familiar with organ imaging investigations, bone age assessment and fine needle aspiration as they relate to endocrine diagnosis.

During their training, paediatric endocrinologists will have acquired a depth and breadth of knowledge in clinical endocrinology and metabolism, including diabetes. In addition they will have developed a detailed understanding of the principles of endocrine physiology, biochemistry and cellular and hormonal metabolism that underlie clinical and diagnostic specialist practice. They will also develop expertise in diagnostic laboratory endocrinology, with the current literature in both basic and applied endocrinology, and become conversant with research activities in the endocrine field.

CURRICULUM OVERVIEW

Paediatric Endocrinology – Advanced Training Curriculum

This curriculum outlines the broad concepts, related learning objectives and the associated theoretical knowledge, clinical skills, attitudes and behaviours required and commonly utilised by paediatric endocrinologists within Australia and New Zealand.

The purpose of Advanced Training is for trainees to build on the cognitive and practical skills acquired during Basic Training. At the completion of the Paediatric Endocrinology Advanced Training Program, trainees should be competent to provide at consultant level, unsupervised comprehensive medical care in paediatric endocrinology.

Attaining competency in all aspects of this curriculum is expected to take three years of training. It is expected that all teaching, learning and assessment associated with the Paediatric Advanced Training Endocrinology Curriculum will be undertaken within the context of the paediatrician's everyday clinical practice and will accommodate discipline-specific contexts and practices as required. As such it will need to be implemented within the reality of current workplace and workforce issues and the needs of health service provision.

There may be learning objectives that overlap with or could easily relate to other domains; however, to avoid repetition, these have been assigned to only one area. In practice it is anticipated that within the teaching/learning environment, the progression of each objective would be explored.

Note: The curricula should always be read in conjunction with the relevant College Training Handbook available on the College website.

Professional Qualities Curriculum

The Professional Qualities Curriculum (PQC) outlines the range of concepts and specific learning objectives required by, and utilised by, all physicians or paediatricians, regardless of their specialty or area of expertise. It spans both the Basic and Advanced Training Programs and is also utilised as a key component of the Continuing Professional Development (CPD) Program.

Together with the various Basic and Advanced Training curricula, the PQC integrates and fully encompasses the diagnostic, clinical, and educative-based aspects of the physician's/paediatrician's daily practice.

Each of the concepts and objectives within the PQC will be taught, learnt and assessed within the context of everyday clinical practice. It is important, therefore, that they be aligned with, and fully integrated into, the learning objectives within this curriculum.

EXPECTED OUTCOMES AT THE COMPLETION OF TRAINING

Graduates from this training program will be equipped to function effectively within the current and emerging professional, medical and societal contexts. At the completion of the Advanced Training Program in paediatric endocrinology, as defined by this curriculum, it is expected that a new Fellow will have developed the clinical skills and have acquired the theoretical knowledge for competent endocrinology practice. It is expected that a new Fellow will:

- be able to contribute to the education of colleagues, students, junior medical officers and other health care workers
- have the skills required to acquire and process new knowledge
- have the desire to promote and maintain excellence through actively supporting or participating in research or quality assurance activities.

CURRICULUM THEMES AND LEARNING OBJECTIVES

Each of the curriculum documents has been developed using a common format, thereby ensuring a degree of consistency and approach across the spectrum of training.

Domains

The domains are the broad fields which group common or related areas of learning.

Themes

The themes identify and link more specific aspects of learning into logical or related groups.

Learning Objectives

The learning objectives outline the specific requirements of learning. They provide a focus for identifying and detailing the required knowledge, skills and attitudes. They also provide a context for specifying assessment standards and criteria as well as providing a context for identifying a range of teaching and learning strategies.

LEARNING OBJECTIVES TABLES

DOMAIN 1	LIFE STAGES
Theme 1.1	Fetal Endocrinology
Learning Objectives	
1.1.1	Outline principles of fetal endocrinology
Theme 1.2	Neonatology
Learning Objectives	
1.2.1	Outline principles of endocrinology in neonates
Theme 1.3	Childhood
Learning Objectives	
1.3.1	Outline principles of endocrinology in infancy and childhood
Theme 1.4	Adolescence
Learning Objectives	
1.4.1	Outline principles of endocrinology in adolescence
Theme 1.5	Transition to Adult Life
Learning Objectives	
1.5.1	Outline principles of female gonadal maturation
1.5.2	Outline principles of male gonadal maturation
1.5.3	Assess and manage chronic endocrine disease
DOMAIN 2	**DISEASES AND DISORDERS**
Theme 2.1	Growth and Development
Learning Objectives	
2.1.1	Outline principles of disorders of growth
2.1.2	Assess and manage disorders of intrauterine growth
2.1.3	Assess and manage short stature
2.1.4	Assess and manage tall stature
2.1.5	Assess and manage constitutional growth delay
2.1.6	Assess and manage growth hormone disorders

Theme 2.2	Disorders of the Pituitary Gland
Learning Objectives	
2.2.1	Assess and manage disorders of the pituitary gland
Theme 2.3	Disorders of the Adrenal Gland
Learning Objectives	
2.3.1	Assess and manage adrenal excess
2.3.2	Assess and manage adrenal insufficiency
2.3.3	Assess and manage congenital adrenal hyperplasia
Theme 2.4	Puberty and Disorders of Pubertal Development
Learning Objectives	
2.4.1	Assess and manage disorders of pubertal development
Theme 2.5	Disorders of Sex Development
Learning Objectives	
2.5.1	Assess and manage sex chromosome disorders of sex development
Theme 2.6	Disorders of the Thyroid
Learning Objectives	
2.6.1	Assess and manage thyroid disorders in infancy
2.6.2	Assess and manage hyperthyroidism
2.6.3	Assess and manage hypothyroidism
2.6.4	Assess and manage autoimmune thyroid disease
2.6.5	Assess and manage nodular thyroid disease
2.6.6	Assess and manage carcinoma of the thyroid
2.6.7	Assess and manage thyroid function and non-thyroidal illness
Theme 2.7	Calcium, Phosphorous and Bone
Learning Objectives	
2.7.1	Assess and manage hypocalcaemia
2.7.2	Assess and manage hypercalcaemia
2.7.3	Assess and manage pseudohypoparathyroidism

2.7.4	Assess skeletal dysplasias
2.7.5	Assess and manage congenital and acquired osteoperosis
2.7.6	Assess and manage rickets
2.7.7	Assess and manage vitamin D deficiency
2.7.8	Assess and manage bone health of children with a chronic disability
Theme 2.8	Diabetes
Learning Objectives	
2.8.1	Assess and manage diabetes mellitus
2.8.2	Assess and manage type 1 diabetes mellitus
2.8.3	Assess and manage type 2 diabetes mellitus
2.8.4	Assess and manage monogenic diabetes
2.8.5	Assess and manage cystic fibrosis related diabetes
2.8.6	Assess and manage secondary and rare forms of diabetes
Theme 2.9	Hypoglycaemia
Learning Objectives	
2.9.1	Assess and manage neonatal hypoglycaemia
2.9.2	Assess and manage childhood hypoglycaemia
Theme 2.10	Secondary Endocrine Disorders
Learning Objectives	
2.10.1	Assess and manage endocrine abnormalities of anorexia
2.10.2	Assess and manage endocrine abnormalities of thalassaemia
2.10.3	Assess and manage endocrine abnormalities of cystic fibrosis
2.10.4	Assess and manage endocrine abnormalities of Prader-Willi syndrome
2.10.5	Assess and manage endocrine aspects of obesity
2.10.6	Assess and manage drug-induced endocrine disorders
Theme 2.11	Disorders of Water Balance
Learning Objectives	
2.11.1	Assess and manage cerebral salt wasting
2.11.2	Assess and manage syndrome of inappropriate antidiuretic hormone secretion

2.11.3	Assess and manage endocrine aspects of nephrogenic diabetes insipidus
Theme 2.12	Other Endocrine Disorders
Learning Objectives	
2.12.1	Assess and manage autoimmune endocrinopathies
2.12.2	Assess and manage endocrine disorders related to cancer
2.12.3	Assess and manage endocrine aspects of pheochromocytoma and multiple endocrine neoplasia syndromes
2.12.4	Assess and manage endocrine aspects of Turner syndrome
DOMAIN 3	**INVESTIGATIONS**
Theme 3.1	Investigations in Endocrinology
Learning Objectives	
3.1.1	Order and interpret laboratory investigations and screening
3.1.2	Order and interpret dynamic endocrine testing
3.1.3	Order and interpret radiological investigations, including MRI, CT scan and ultrasonography
3.1.4	Outline the role of nuclear medical imaging
3.1.5	Order and interpret bone densitometry investigations
Theme 3.2	Molecular Endocrinology and Diagnostics
Learning Objectives	
3.2.1	Order and interpret genetic testing
DOMAIN 4	**PROFESSIONAL QUALITIES SPECIFIC TO ENDOCRINOLOGY**
Theme 4.1	Professional Qualities of the Endocrinologist
Learning Objectives	
4.1.1	Access and apply guidelines and consensus statements around clinical practice and endocrine disorders
4.1.2	Counsel and educate endocrine patients and their carers/families
4.1.3	Advocate for endocrine patients and their carers/families

DOMAIN 1	LIFE STAGES
Theme 1.1	Fetal Endocrinology
Learning Objective 1.1.1	Outline principles of fetal endocrinology
Knowledge	
• describe the role of placental and maternal hormones in fetal life • describe the development of the fetal endocrine organs • outline the principles of fetal growth and nutrition.	

DOMAIN 1	LIFE STAGES
Theme 1.2	Neonatology
Learning Objective 1.2.1	Outline principles of endocrinology in neonates
Knowledge	**Skills**
• describe the postnatal physiology of endocrine organs, especially thyroid/hypothalamic-pituitary-adrenal/gonadal axis, including the minipuberty of infancy • outline the principles of endocrine physiology in full term and premature neonates • describe the effects of birth size (either small or large for gestational age) on endocrine function.	• diagnose and manage endocrine disorders in the neonatal period.

DOMAIN 1	LIFE STAGES
Theme 1.3	Childhood
Learning Objective 1.3.1	Outline principles of endocrinology in infancy and childhood
Knowledge	**Skills**
• outline the principles of growth and development during childhood, including normal variation.	• diagnose and manage endocrine disorders in infancy and childhood.

DOMAIN 1	LIFE STAGES
Theme 1.4	Adolescence
Learning Objective 1.4.1	Outline principles of endocrinology in adolescence

Knowledge	Skills
• describe hormonal maturation and development during adolescence.	• perform a clinical assessment of growth and maturation during adolescence • respond to physiological, psychological and social problems associated with endocrine disease in adolescence, including the concerns and anxieties of parents/carers • recognise common risk taking behaviour in young people and its effects on endocrine disease.

DOMAIN 1	LIFE STAGES
Theme 1.5	Transition to Adult Life
Learning Objective 1.5.1	Outline principles of female gonadal maturation

Knowledge	Skills
• describe establishment of normal menstrual cycles and ovulation • describe the normal menstrual cycle • describe the interaction of endocrine and gynaecological disorders • explain appropriate referral for ovarian harvest and storage.	• investigate and manage disorders, including amenorrhoea, dysmenorrhoia and menorrhagia • recognise when to refer to gynaecologist • diagnose and manage hypogonadism, including pubertal induction and ongoing gonadal replacement.

DOMAIN 1	LIFE STAGES
Theme 1.5	Transition to Adult Life
Learning Objective 1.5.2	Outline principles of male gonadal maturation

Knowledge	Skills
• describe normal development of male fertility.	• recognise potential male infertility disorders and appropriate referral • diagnose and manage hypogonadism, including pubertal induction and ongoing gonadal replacement.

DOMAIN 1	LIFE STAGES
Theme 1.5	Transition to Adult Life
Learning Objective 1.5.3	Assess and manage chronic endocrine disease

Knowledge	Skills
• describe the burden of chronic endocrine disease • describe the role of psychosocial support and ongoing education of endocrine emergencies.	• assess and manage chronic endocrine disease • enlist appropriate support and counselling.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.1	Growth and Development
Learning Objective 2.1.1	Outline principles of disorders of growth

Knowledge	Skills
• describe different phases of human growth, i.e. fetal, childhood and adolescence • outline factors that contribute to normal growth during these three phases • describe normal variations in growth patterns, including constitutional delay in growth and puberty • describe effect of parental height in determining genetic height potential • describe assessment of patients with growth disorders, including history, physical examination and appropriate investigations.	• use and interpret growth and growth velocity charts • use disease specific growth charts, e.g. Turner specific growth charts • perform clinical examination for assessment of growth and pubertal status • calculate midparental height • interpret bone age x-rays and use the height prediction tables to predict final height.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.1	Growth and Development
Learning Objective 2.1.2	Assess and manage disorders of intrauterine growth

Knowledge	Skills
• describe causes and consequences of intrauterine growth retardation (IUGR) • describe natural history of IUGR • describe role of and effects of growth promoting treatment such as growth hormone (GH) in IUGR • outline definition of small for gestational age (SGA) • describe causes and consequences of fetal macrosomia.	• use growth charts to identify and monitor individuals with IUGR and macrosomia.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.1	Growth and Development
Learning Objective 2.1.3	Assess and manage short stature

Knowledge	Skills
• describe causes of short stature • discuss genetic and acquired causes of short stature • describe effect of parental height in determining genetic height potential • outline history, physical examination and investigations which may be required in assessment of short stature • describe appropriate follow-up of individuals with short stature • describe effect of parental height in determining genetic height potential for short stature • describe treatments available for management of short stature, including indications for growth hormone therapy and its potential risks and expected outcomes • describe psychological effects of short stature.	• perform clinical examination to assess causes of short stature.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.1	Growth and Development
Learning Objective 2.1.4	Assess and manage tall stature

Knowledge	Skills
• describe causes of tall stature • discuss genetic and acquired causes of tall stature, including identification of pathological causes of tall stature • outline history, physical examination and investigations which may be required in the assessment of tall stature • describe follow-up of individuals with tall stature • describe treatments available for management of tall stature, including indications for use of high dose oestrogen or testosterone therapy and their potential risks and expected outcomes • describe effect of parental height in determining genetic height potential for tall stature • describe use of non-conventional therapies (e.g. ephysiodesis) in management of tall stature • describe psychological effects of tall stature.	• perform clinical examination to assess causes of tall stature • identify pathological clinical findings, e.g. arachnodactyly, lens dislocation in individuals with tall stature.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.1	Growth and Development
Learning Objective 2.1.5	Assess and manage constitutional growth delay

Knowledge	Skills
• describe cause of constitutional delay • describe growth and maturational pattern of constitutional delay • outline history, physical examination and investigations which may be required in the assessment of constitutional delay • describe follow-up of individuals with constitutional delay • describe treatments available for management of constitutional delay of growth and puberty, including indications for use of oestrogen or testosterone therapy, including potential risks and expected outcomes	• use and interpret growth and growth velocity charts to identify constitutional delay of growth and puberty • perform clinical examination for assessment of growth and pubertal status in constitutional delay of growth and puberty.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.1	Growth and Development
Learning Objective 2.1.5	Assess and manage constitutional growth delay

• describe psychological effects of constitutional delay of growth and puberty.	

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.1	Growth and Development
Learning Objective 2.1.6	Assess and manage growth hormone disorders

Knowledge	Skills
• describe causes of GH disorders • describe growth and maturational pattern of individuals with GH disorders • outline history, physical examination and investigations which may be required in assessment of GH disorders • describe follow-up of individuals with GH disorders • describe the use of GH for GH disorders, including the indications, use, risks, monitoring and expected outcomes • describe psychological effects of GH disorders and treatment with GH.	• use and interpret growth and growth velocity charts to identify individuals with GH disorders • perform clinical examination for assessment of growth and pubertal status in individuals with GH disorders • interpret GH investigations • use, implement and adhere to government guidelines for the availability of GH • monitor efficacy and outcomes of treatment in individuals with GH disorders.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.2	Disorders of the Pituitary Gland
Learning Objective 2.2.1	Assess and manage disorders of the pituitary gland

Knowledge	Skills

Panhypopituitarism
• describe hypothalamic, pituitary and end-organ physiology and feedback systems for thyroid, adrenal, gonads, and growth hormone
• recognise different presentations of clinical hypopituitarism, including congenital (e.g. septo-optic dysplasia) and acquired (e.g. post-surgery) hypopituitarism and pituitary apoplexy, from abnormal pituitary imaging and basal endocrine tests
• describe anatomy of hypothalamic-pituitary connections
	• target history for clinical symptoms of hormonal deficiencies
	• use and interpret basal and dynamic testing of pituitary function, using:
	  • thyrotropin-releasing hormone (TRH)
	  • glucagon/arginine
	  • gonadotropin-releasing hormone (GnRH)
	  • corticotropin releasing factor (CRF)
	• use appropriate medical imaging of the hypothalamic-pituitary axis

Diabetes insipidus • describe regulation of salt and water balance, including regulation of free water clearance by cortisol and thyroid hormone • describe primary causes of diabetes insipidus, including genetics • describe secondary causes and natural history of diabetes insipidus, including infiltrative disorders, metabolic causes, tumours, trauma and surgery • describe salt and water balance, understanding the limitations of measuring electrolytes, osmolality and urinary specific gravity, and measurement of strict fluid balance • describe differential diagnoses including nephrogenic diabetes insipidus and chronic water excess (primary polydipsia) • describe pharmacology of desmopressin (DDAVP) • describe diabetes insipidus and loss of thirst regulation secondary to pituitary/hypothalamic disease and/or surgery	• investigate diabetes insipidus, both elective and in post-neurosurgical setting • diagnose and manage in acute and sub-acute hospital setting, including calculation of fluid balance and replacement of ongoing and previous urine output • manage diabetes insipidus unmasked by cortisol and/or thyroid hormone replacement • interpret water deprivation testing • manage combined diabetes insipidus and loss of thirst regulation • perform clinical assessment of thyroid adequacy and over-replacement
Central hypothyroidism • outline pharmacology of thyroid hormone replacement, signs of over-replacement and difficulty in monitoring	• perform clinical assessment of thyroid adequacy and over-replacement

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.2	Disorders of the Pituitary Gland
Learning Objective 2.2.1	Assess and manage disorders of the pituitary gland

Central hypoadrenalism • outline pharmacology of adrenal hormone replacement, signs of over-replacement and difficulty monitoring without feedback hormones • describe requirements for physical stress and illness	• perform clinical assessment of adrenal adequacy and over-replacement • educate patients about stress replacement and precautions
GH deficiency • define role of GH in childhood and adult life • define role of insulin-like growth factors (IGFs) and their binding proteins in growth and differentiation	• prescribe GH appropriately in childhood and in adulthood
Functioning pituitary tumours • describe anatomy and physiology of hormonal excess tumours, overgrowth, secondary hypogonadism and galactorrhoea • outline pharmacology of cabergoline, bromocriptine, somatostatin analogues, octreotide, lanreotide etc.	• perform visual field testing and interpret more complex field testing • perform ophthalmoscopy of optic nerve and refer appropriately where required • appropriately use dopamine agonists.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.3	Disorders of the Adrenal Gland
Learning Objective 2.3.1	Assess and manage adrenal excess

Knowledge	Skills
• describe causes and presentation of Cushing's syndrome at different ages • describe adverse effects of steroid therapy in children on long-term maintenance or therapeutic glucocorticoid treatment, e.g. chronic inflammatory diseases or malignancies • describe presentation and diagnosis of tumours of the adrenal cortex, including virilising tumours, feminising tumours and aldosterone secreting tumours.	• order and interpret diagnostic biochemical tests of adrenal excess (glucocorticoid excess and mineralocorticoid excess) • provide acute and chronic management of patients with adrenal excess after pituitary or adrenal surgery • recognise adverse effects of exogenous steroids and their investigation • order and interpret other appropriate investigations of adrenal excess.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.3	Disorders of the Adrenal Gland
Learning Objective 2.3.2	Assess and manage adrenal insufficiency

Knowledge	Skills
• describe development of the fetal adrenal cortex and neonatal adrenal complications • recognise causes and presentations of adrenal insufficiency in childhood and adolescence, including new infectious agents and the use of exogenous steroids in paediatric practice • recognise presentations and biochemical features of mineralocorticoid deficiency and glucocorticoid deficiency and their possible separation in time • outline the basal and stress requirements of glucocorticoids and mineralocorticoids • describe associated disorders, such as other autoimmune disease and multiple endocrine neoplasia (MEN) • describe the pharmacological actions of glucocorticoids and mineralocortiocids.	• diagnose and manage an adrenal crisis • interpret and use Synacthen test (low and standard dose) to diagnose adrenal insufficiency • investigate the cause of the adrenal insufficiency, including very-long-chain fatty acids (VLCFAs) and adrenal antibodies • provide long-term management of children with adrenal insufficiency, including appropriate prescribing of glucocorticoids and mineralocorticoids and follow-up screening for associated disorders • manage glucocorticoid replacement during surgery • educate families about stress replacement of glucocorticoids and associated precautions.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.3	Disorders of the Adrenal Gland
Learning Objective 2.3.3	Assess and manage congenital adrenal hyperplasia

Knowledge	Skills
• describe pathways of steroid biosynthesis • describe enzyme deficiencies and genetics of congenital adrenal hyperplasia and their relative frequency in the population • describe presentations of congenital adrenal hyperplasia at different ages, including non classic forms • describe the differential diagnosis of salt losing crises in infancy and in a female presenting with ambiguous genitalia • describe roles of the multidisciplinary team in managing congenital adrenal hyperplasia • outline principles and timing of reconstruction surgery • describe effects of inadequate or excessive suppression of the adrenal glands in congenital adrenal hyperplasia, including short stature and adrenal rests • recognise pharmacology of hydrocortisone, dexamethasone and fludrocortisone and their requirements at different ages • outline principles and outcomes of prenatal treatment of CYP21 deficiency.	• prescribe oral and parenteral hydrocortisone and oral fludrocortisone under basal and stress conditions • provide fluid management of salt losing crises • educate families about stress replacement of glucocorticoids and precautions • interpret Synacthen tests for the diagnosis of congenital adrenal hyperplasia • interpret growth and development in the follow-up of congenial adrenal hyperplasia • interpret biochemistry to guide long-term management using androgen and renin levels, including capillary profiles over 24 hours of 17-hydroxy progesterone • use other measures to guide management or treatment of congenital adrenal hyperplasia, e.g. bone age, ambulatory blood pressure monitoring, GnRH analogue therapy • counsel families at diagnosis and during childhood and adolescence, including genetics and availability of prenatal diagnosis with recurrence risk in siblings.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.4	Puberty and Disorders of Pubertal Development
Learning Objective 2.4.1	Assess and manage disorders of pubertal development

Knowledge	Skills
• describe the normal regulation of the hypothalamic-pituitary-gonadal axis • describe the normal development of the female and male reproductive systems • describe factors that regulate the onset of puberty and understand the normal stages of sexual maturation in neonatal infants, children and adolescents • describe the actions of the main sex steroids: ovarian, testicular and adrenal • describe the definitions of early normal variant puberty, precocious puberty and premature adrenarche/thelarche • describe treatments for precocious puberty, including long acting GnRH agonists and the ongoing management of these agents • describe the outcome variables of precocious puberty • describe the potential role of other agents used to slow epiphyseal maturation such as anti-estrogens and insulin sensitisers • describe the developmental and psychosocial effects of precocious puberty • describe presentations of hypogonadism in childhood, adolescence and adulthood • outline the principles of pubertal induction and ongoing gonadal replacement in males and females • describe investigations and management of hyperandrogenism.	• elicit appropriate history and undertake specific investigations to assess precocious puberty • perform accurate Tanner staging of puberty and accurate testicular volume estimation • interpret gonadotropin, oestrogen, testosterone and adrenal androgen levels • evaluate dynamic testing of the hypothalamic-pituitary-gonadal axis, including GnRH stimulation and Buserelin stimulation tests • manage pubertal suppression • manage pubertal delay, including pubertal induction and ongoing gonadal replacement therapy • diagnose and manage hyperandrogenism in adolescence.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.5	Disorders of Sex Development
Learning Objective 2.5.1	Assess and manage sex chromosome disorders of sex development

Knowledge	Skills
• describe the process of human sexual differentiation • define the role of human sex chromosomes in sexual differentiation and disorders of sex development (DSDs) • explain causes of sex chromosome 46 XY and 46 XX DSDs • describe clinical, chromosomal (fluorescence in-situ hybridization (FISH) for Y material), biochemical, radiological and anatomical features of DSDs • describe the roles within the multidisciplinary team managing an infant with a DSD and their family, including paediatrician/neonatologist, paediatric endocrinologist, paediatric surgeon, psychologist and general practitioner • describe basis of gender assignment in DSDs • describe cultural and social factors that may impact on gender assignment • describe psychosocial impact on parents with an infant with a DSD • describe the psychosocial impact on an individual with a DSD • describe natural history of DSDs • explain need for full parental disclosure and full disclosure to the individual at a developmentally appropriate time • describe the need and timing of appropriate pubertal induction • outline risks of gonadal malignancy in individuals with Y-containing chromosomes, and appropriate timing of gonadal biopsy and/or gonadectomy • describe likelihood of fertility in individuals with DSDs, including appropriate counselling regarding assisted fertility options	• assess infant with a sex chromosome DSD • counsel the parents/family of a child with a DSD • use investigations, including chromosomal, biochemical, radiological and laparoscopic diagnostic modalities • interpret clinical assessment and investigations, together with cultural and social factors so that an appropriate and timely recommendation for gender assignment can be made • work with other members of the multidisciplinary team • use sex steroids for pubertal induction where needed • counsel regarding risk of gonadal malignancy, need for gonadectomy and fertility • counsel a young person with a DSD.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.5	Disorders of Sex Development
Learning Objective 2.5.1	Assess and manage sex chromosome disorders of sex development

• counsel family regarding genetic basis of the DSD, including availability of prenatal diagnosis and/or treatment and recurrence risk in siblings • define role of support groups for families and individuals with DSDs, and advise families accordingly.	

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.6	Disorders of the Thyroid
Learning Objective 2.6.1	Assess and manage thyroid disorders in infancy

Knowledge	Skills
• describe the process of newborn screening for hypothyroidism • describe differences in thyroid function between premature and term infants • describe causes of permanent thyroid dysfunction in term and pre-term infants • describe causes of transient hyper- and hypo-thyroidism in term and pre-term infants.	• interpret thyroid function tests in term and pre-term infants • interpret thyroid and bone age imaging in term and pre-term infants • prescribe thyroid replacement therapy and clinical follow-up in infants with congenital hypothyroidism • appropriately refer patients for hearing screening • manage an infant with neonatal hyperthyroidism.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.6	Disorders of the Thyroid
Learning Objective 2.6.2	Assess and manage hyperthyroidism

Knowledge	Skills
• describe causes of hyperthyroidism • describe follow-up of individuals with hyperthyroidism • describe long-term therapy of hyperthyroidism, including the indications, use, risks, monitoring and expected outcomes for different therapeutic alternatives, including anti-thyroid drugs (carbimazole and propylthiouracil), radio-iodine therapy and surgery.	• take a clinical history and perform examination to assess hyperthyroidism in patients with goitre or other signs of Graves' disease • interpret abnormal thyroid function tests • interpret thyroid nuclear imaging and ultrasound in patients with hyperthyroidism • monitor efficacy and outcomes of treatment, including cognitive outcomes, in individuals with hyperthyroidism • diagnose and treat thyroid crisis.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.6	Disorders of the Thyroid
Learning Objective 2.6.3	Assess and manage hypothyroidism

Knowledge	Skills
• describe causes of hypothyroidism beyond the newborn period • describe regulation of iodine homeostasis and iodine deficiency • describe thyroid hormone resistance and its clinical consequences.	• take a clinical history and perform examination to assess hypothyroidism in patients with goitre, symptoms of hypothyroidism or abnormal thyroid function tests • interpret abnormal thyroid function tests • interpret thyroid nuclear imaging and ultrasound in patients with hypothyroidism • monitor efficacy and outcomes of treatment, including cognitive outcomes, in individuals with hypothyroidism • interpret laboratory investigation of iodine deficiency.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.6	Disorders of the Thyroid
Learning Objective 2.6.4	Assess and manage autoimmune thyroid disease

Knowledge	Skills
• describe the process of thyroid autoimmunity • describe the associations of thyroid autoimmunity with other forms of autoimmune disease • describe the process of thyroid autoimmunity in the development of Graves' disease and Hashimoto's thyroiditis.	• perform clinical history and examination for assessment of suspected autoimmune thyroid disease • interpret laboratory investigation of thyroid autoimmunity.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.6	Disorders of the Thyroid
Learning Objective 2.6.5	Assess and manage nodular thyroid disease

Knowledge	Skills
• describe development of thyroid nodules • describe predisposing factors to nodular thyroid disease • describe investigation of thyroid nodular disease, especially differentiation of functioning vs. non-functioning nodules and benign vs. malignant nodules • explain the role of fine needle aspiration and its interpretation in nodular thyroid disease • describe therapeutic options for thyroid nodular disease.	• elicit a clinical history and perform examination to assess nodular thyroid disease • interpret abnormal thyroid function tests in nodular thyroid disease • interpret thyroid nuclear imaging and ultrasound in patients with nodular thyroid disease.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.6	Disorders of the Thyroid
Learning Objective 2.6.6	Assess and manage carcinoma of the thyroid

Knowledge	Skills
• describe different types of thyroid carcinoma and their clinical presentation • outline risk factors for malignant thyroid disease, particularly radiation exposure • describe the investigation of possible thyroid cancer, including imaging, fine needle aspiration, biopsy and when to use these • describe the role of radio-iodine therapy in malignant thyroid disease • describe the long-term follow-up of children with thyroid carcinoma, including risk of recurrence, monitoring and risk of second malignancies.	• elicit a clinical history and perform examination to assess malignant thyroid disease • interpret abnormal thyroid function tests and thyroglobulin in malignant thyroid disease • interpret thyroid nuclear imaging, ultrasound and staging imaging (CT/MRI) in patients with malignant thyroid disease • use and interpret fine needle aspiration in malignant thyroid disease • provide long-term management of children following treatment for malignant thyroid disease, including thyroid-stimulating hormone (TSH) suppression, use of thyroglobulin and monitoring for recurrence • refer appropriately to endocrine surgeons and nuclear medicine specialists.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.6	Disorders of the Thyroid
Learning Objective 2.6.7	Assess and manage thyroid function and non-thyroidal illness

Knowledge	Skills
• describe the effects of non-thyroidal illness, particularly severe illness, on thyroid function and thyroid function tests.	• take a clinical history and perform examination to assess patients with abnormal thyroid function associated with non-thyroidal illness • interpret abnormal thyroid function tests in patients with non-thyroidal illness • manage children with abnormal thyroid function associated with non-thyroidal illness.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.7	Calcium, Phosphorous and Bone
Learning Objective 2.7.1	Assess and manage hypocalcaemia

Knowledge	Skills
• describe the physiological actions of parathyroid hormone (PTH) • describe the potential limitations of PTH assays • explain acute and long-term medical management of hypocalcaemia • describe causes of hypoparathyroidism, and related clinical features of the different syndromes • describe differential diagnosis of neonatal hypocalcaemia, and the more likely causes of hypocalcaemia according to age of onset • describe the treatment of neonatal hypocalcaemia.	• interpret the results of PTH levels in the diagnosis of hypoparathyroidism • monitor patients on long-term calcitriol and calcium treatment with clinical assessment, blood and urine tests, and renal ultrasound, adjusting the medication doses to avoid hypocalcaemia and nephrocalcinosis • recognise transient hypoparathyroidism • interpret results of investigations in neonatal and childhood hypocalcaemia • formulate a management plan and review in the light of clinical progress.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.7	Calcium, Phosphorous and Bone
Learning Objective 2.7.2	Assess and manage hypercalcaemia

Knowledge	Skills
• explain the physiology of calcium homeostasis during fetal and neonatal life • describe causes of hypercalcaemia • identify causes of hyperparathyroidism, apart from MEN • describe the surgical management of hyperparathyroidism • describe differential diagnosis of neonatal hypercalcaemia and the approach to its investigation.	• interpret the biochemistry of causes of hypercalcaemia • manage hypercalcaemia • assess the severity of hypercalcaemia and formulate an appropriate plan for medical management • work in a multidisciplinary team including geneticists and endocrine surgeons • formulate a management plan for neonatal hypercalcaemia, depending on the cause and severity.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.7	Calcium, Phosphorous and Bone
Learning Objective 2.7.3	Assess and manage pseudohypoparathyroidism

Knowledge	Skills
• describe mechanisms causing the different forms of pseudohypoparathyroidism.	• individualise management of patients with pseudohypoparathyroidism, including therapy for hypocalcaemia, associated endocrine abnormalities (if present) and obesity

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.7	Calcium, Phosphorous and Bone
Learning Objective 2.7.4	Assess skeletal dysplasias

Knowledge	Skills
• describe features and the approach to diagnosis of the main types of skeletal dysplasia.	• contribute to multidisciplinary team management of skeletal dysplasias • appropriately refer patients with skeletal dysplasias.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.7	Calcium, Phosphorous and Bone
Learning Objective 2.7.5	Assess and manage congenital and acquired osteoporosis

Knowledge	Skills
• describe normal bone physiology and bone mass accrual • describe causes of acquired low bone mass • describe different forms of osteogenesis imperfecta and their management • describe the mechanism of action and potential toxicity of the bisphosphonates.	• interpret results of bone density measurements, allowing for the patient's age, size and pubertal stage • manage patients with osteoperosis, including appropriate use of pharmaceutical agents.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.7	Calcium, Phosphorous and Bone
Learning Objective 2.7.6	Assess and manage rickets

Knowledge	Skills
• describe causes of rickets • distinguish between calciopenic and phosphopenic rickets • describe the mechanisms for inherited forms of rickets • describe the treatment of hypophosphataemic rickets.	• interpret biochemistry and appropriate radiology of rickets • manage patients with rickets • manage patients with hypophosphataemic rickets.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.7	Calcium, Phosphorous and Bone
Learning Objective 2.7.7	Assess and manage vitamin D deficiency

Knowledge	Skills
• describe the physiology of vitamin D metabolism and action • describe the relative contributions of sunlight and dietary sources of vitamin D in Australia and New Zealand • describe risk factors for vitamin D deficiency • describe the vitamin D preparations available for replacement therapy.	• recognise when to screen for vitamin D deficiency • individualise vitamin D replacement regimens and follow-up according to patient circumstances.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.7	Calcium, Phosphorous and Bone
Learning Objective 2.7.8	Assess and manage bone health of children with a chronic disability

Knowledge	Skills
• describe the specific factors causing low bone mass in children with disability • describe investigations for bone health in children with disabilities.	• identify correctible factors contributing to low bone mass • liaise with other teams involved in the care of these children to formulate an individualised treatment plan.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.8	Diabetes
Learning Objective 2.8.1	Assess and manage diabetes mellitus

Knowledge	Skills
• describe hormonal and physiological regulation of normal glucose homeostasis • describe actions of the main hormones involved in glucose regulation • describe the incretin effect and role of gut-related peptides in glucose homeostasis • explain current concepts of the pathogenesis of the different forms of diabetes: type 1, type 2 and other forms • recognise implications of different types of diabetes for management and treatment • explain risk factors for the different types of diabetes • describe the role of transitional care in diabetes.	• use appropriate tests to diagnose and classify diabetes.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.8	Diabetes
Learning Objective 2.8.2	Assess and manage type 1 diabetes mellitus

Knowledge	Skills
• describe the epidemiology of type 1 diabetes mellitus (T1DM) • differentiate T1DM from other forms of diabetes • describe biosynthesis, secretion, action and pathophysiology of insulin • describe the initiation of insulin in T1DM- non acidotic • describe the initiation of insulin in T1DM- in diabetic ketoacidosis • describe the pathophysiology underlying diabetic ketoacidosis • describe the pathophysiology underlying cerebral oedema • describe the pathophysiology underlying the honeymoon phase of T1DM	• assess and treat diabetic ketoacidosis • initiate appropriate insulin therapy • establish an insulin regimen • screen for complications of T1DM over time • manage the long-term care of children with T1DM • set and adjust insulin infusion and bolus rates • interpret insulin pump download information • interpret glucose sensor output.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.8	Diabetes
Learning Objective 2.8.2	Assess and manage type 1 diabetes mellitus

- outline the general principles of living with T1DM: diet, exercise, activity, glucose monitoring, insulin therapy, ketone evaluation and follow-up
- describe the role and options of the different insulins and insulin regimens
- describe benefits and limitations of insulin pump therapy
- describe benefits and limitations of continuous glucose monitoring
- describe treatment of hypoglycaemia
- describe the pathophysiology of sick days and ketone avoidance in T1DM
- explain the association between T1DM and autoimmune disease
- describe risks for other family members for associated diseases, the inherent risk of T1DM in close relatives, and the role of screening family members for T1DM risk
- describe the psychosocial concerns associated with T1DM
- describe the management of T1DM during special situations, including surgery, flying, travel
- describe the role of screening for complications in the management of T1DM
- describe the role of transition of care in T1DM.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.8	Diabetes
Learning Objective 2.8.3	Assess and manage type 2 diabetes mellitus

Knowledge	Skills
• describe the unique epidemiology of type 2 diabetes mellitus (T2DM) in adolescents • describe insulin resistance and insulin deficiency in the context of T2DM: biosynthesis, secretion, action and pathophysiology, and the role of obesity and muscle insulin resistance • describe the pharmacology and role of insulin sensitisers, e.g. net form and thiazolidinedione (TZD) • outline concepts of the metabolic syndrome (with its various definitions) and prediabetes, including impaired glucose tolerance and impaired fasting glucose, their comorbidities, and the use in predicting the role in helping prevent T2DM • describe other comorbidities of T2DM • outline the psychosocial and cultural aspects of T2DM and the role of the whole family in management • describe the role of screening for complications of T2DM early in diagnosis • describe the precipitance of nonketotic hyperosmolar coma.	• initiate therapy for T2DM (oral therapy and insulin) • use a histrionic exam and blood tests to establish T2DM • institute and provide support in sick day management in T2DM • monitor the efficacy and outcome of treatment of T2DM and its complications • manage comorbidities in T2DM, including lipid disorders, hypertension and microalbuminuria.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.8	Diabetes
Learning Objective 2.8.4	Assess and manage monogenic diabetes

Knowledge	Skills
• describe different forms of monogenic diabetes • characterise the range of maturity onset diabetes of the young (MODY) syndromes • describe the action and pharmacology of oral sulphonylureas • outline long-term care and management of MODY.	• recognise when to investigate for monogenic diabetes • prescribe appropriate oral therapy (sulphonylureas) in monogenic diabetes • anticipate comorbidity in certain monogenic diabetes conditions • transition patients from treatment with insulin to oral sulphonylureas.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.8	Diabetes
Learning Objective 2.8.5	Assess and manage cystic fibrosis related diabetes

Knowledge	Skills
• describe the pathophysiology and diagnosis of cystic fibrosis (CF) related diabetes (CFRD) and pre-diabetes • describe the unique role of insulin therapy in CFRD • describe the glycaemic outcome in CF and the role of fructosamine, HbA1c, glucose estimation and continuous glucose monitoring system (CGMS) • describe nutritional, metabolic and infectious complications of CF.	• utilise screening for CFRD • initiate insulin treatment and monitor for glycaemia in CFRD • set appropriate goals and nutritional outcomes • use insulin with overnight or supplemental feeds.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.8	Diabetes
Learning Objective 2.8.6	Assess and manage secondary and rare forms of diabetes

Knowledge	Skills
• describe the rare forms of diabetes, including: neonatal diabetes, genetic syndromes of severe insulin resistance and/or insulin deficiency • describe the manifestation of steroid and chemotherapy induced diabetes.	• use appropriate tests to diagnose and classify secondary and rare forms of diabetes • liaise with national/international experts for these conditions • prescribe appropriate treatments for secondary and rare forms of diabetes and follow-up required.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.9	Hypoglycaemia
Learning Objective 2.9.1	Assess and manage neonatal hypoglycaemia

Knowledge	Skills
• describe biochemical pathways in beta cell relevant to glucose metabolism • describe neonatal causes of and risk factors for neonatal hypoglycaemia • describe maternal causes of and risk factors for neonatal hypoglycaemia	• order investigations for a neonate with hypoglycaemia • interpret investigation results for a neonate with hypoglycaemia • counsel parents on monitoring for signs of neonatal hypoglycaemia, and issues related to potential long-term complications of neonatal hypoglycaemia

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.9	Hypoglycaemia
Learning Objective 2.9.1	Assess and manage neonatal hypoglycaemia

• outline clinical and biochemical features which help differentiate hyperinsulinism from other causes of neonatal hypoglycaemia • describe more common causes of neonatal hypoglycaemia from hyperinsulinism • describe genetic studies for neonatal hypoglycaemia • describe mechanisms of action and major side effects of medical treatments for hyperinsulinism.	• provide emergency treatment options for neonatal hypoglycaemia – medical and surgical • provide therapeutic treatment options for neonatal hypoglycaemia – medical and surgical • recognise possible long-term complications from neonatal hypoglycaemia and appropriate monitoring • manage intercurrent illness.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.9	Hypoglycaemia
Learning Objective 2.9.2	Assess and manage childhood hypoglycaemia

Knowledge	Skills
• describe causes of hypoglycaemia in childhood • describe clinical features which should be examined for and may be relevant to children with childhood hypoglycaemia.	• order investigations in a child with childhood hypoglycaemia • interpret results of investigations in a child with childhood hypoglycaemia • initiate management of acute and chronic hypoglycaemia • arrange and supervise fasting studies.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.10	Secondary Endocrine Disorders
Learning Objective 2.10.1	Assess and manage endocrine abnormalities of anorexia

Knowledge	Skills

• describe endocrine abnormalities associated with anorexia, including:
  • effect on growth and puberty
  • bone health
  • effect on hypothalamus and anterior pituitary function
  • effect on posterior pituitary and fluid balance
  • thyroid abnormalities
  • effect on fertility and gonadal function.
	• assess patient with anorexia and screen for endocrine abnormalities
	• provide strategies to improve bone health
	• assess and manage ovarian dysfunction and predict ovarian recovery
	• assess fluid and electrolyte balance.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.10	Secondary Endocrine Disorders
Learning Objective 2.10.2	Assess and manage endocrine abnormalities of thalassaemia

Knowledge	Skills

• describe effect of thalassaemia and its treatment on:
  • glucose metabolism
  • growth
  • thyroid physiology
  • gonadal function
  • parathyroids.
	• assess and manage disturbances in glucose metabolism, puberty and short stature, thyroid physiology, and calcium metabolism.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.10	Secondary Endocrine Disorders
Learning Objective 2.10.3	Assess and manage endocrine abnormalities of cystic fibrosis

Knowledge	Skills
• describe abnormalities in glucose metabolism in CF and natural history of CFRD • describe effect of CF on growth and pubertal development • describe effect of CF on bone metabolism.	• assess and manage disturbances of glucose metabolism • interpret bone densitometry in CF and manage bone health • assess and manage growth and pubertal status.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.10	Secondary Endocrine Disorders
Learning Objective 2.10.4	Assess and manage endocrine abnormalities of Prader-Willi syndrome

Knowledge	Skills
• describe genetic basis for Prader-Willi syndrome • describe natural history of Prader-Willi syndrome, including neonatal hypotonia, feeding difficulties and later behaviour and hyperphagia • describe effect on body composition, gonadal function and stature • describe change effects and contraindications on respiratory function • describe effects of GH therapy.	• recognise clinical feature of Prader-Willi syndrome and order appropriate investigations • implement strategies for management of appetite and weight • explain indications and exclusion criteria for GH application • recognise importance of multidisciplinary approach to management.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.10	Secondary Endocrine Disorders
Learning Objective 2.10.5	Assess and manage endocrine aspects of obesity

Knowledge	Skills
• describe natural history of obesity • describe neuroendocrine control of appetite and satiety • outline indications and evidence for pharmacotherapy or bariatric surgery.	• investigate for syndromic or endocrine causes of obesity • recognise and monitor for endocrine complications of obesity • recognise importance of multidisciplinary team in obesity management • counsel families with regard to treatment of obesity • discuss lifestyle modifications with the patient and family.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.10	Secondary Endocrine Disorders
Learning Objective 2.10.6	Assess and manage drug-induced endocrine disorders

Knowledge	Skills
• identify medications that can cause alterations in glucose metabolism • describe pathophysiology • outline natural history of glucose disturbance medication exposure • describe medication exposure that places patients at risk of adrenal suppression • describe medications that can cause alterations in bone, thyroid and gonadal function.	• investigate disturbances in glucose metabolism and instigate appropriate treatment • recognise complications of glucocorticoid therapy • counsel patients families as to risks with these medications and when to seek treatment • interpret investigations into adrenal function and advise patients about emergency management • counsel families with regard to treatment of gonadal dysfunction and fertility • identify medications placing patients at risk of osteoporosis and provide strategies to optimise bone health • recognise long-term effects of transient and steroid-induced hypoglycaemia.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.11	Disorders of Water Balance
Learning Objective 2.11.1	Assess and manage cerebral salt wasting

Knowledge	Skills
• describe the clinical and biochemical scenario of cerebral salt wasting (CSW) • describe current knowledge on causes and mechanisms of CSW • describe investigation of CSW • describe clinical and investigative differentiation of CSW from syndrome of inappropriate antidiuretic hormone hypersecretion (SIADH) and fluid overload • describe adverse effects of hyponatraemia • explain risks of rapid correction of chronic hyponatraemia (pontine myelinosis).	• differentiate diagnosis from SIADH • provide appropriate acute management of CSW • provide appropriate monitoring during correctional therapy.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.11	Disorders of Water Balance
Learning Objective 2.11.2	Assess and manage syndrome of inappropriate antidiuretic hormone secretion

Knowledge	Skills
• describe the clinical and biochemical scenario of SIADH • describe the common central nervous system (CNS) and other causes of SIADH • describe investigation of SIADH and its differentiation from CSW and fluid overload • describe acute and sub-acute management of SIADH.	• differentiate diagnosis from CSW • manage SIADH in the acute and sub-acute setting • monitor patient during correctional therapy • investigate underlying causes of SIADH where appropriate.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.11	Disorders of Water Balance
Learning Objective 2.11.3	Assess and manage endocrine aspects of nephrogenic diabetes insipidus

Knowledge	Skills
• diagnose nephrogenic diabetes insipidus and its familial associations.	• manage nephrogenic diabetes insipidus at times of acute and chronic presentation.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.12	Other Endocrine Disorders
Learning Objective 2.12.1	Assess and manage autoimmune endocrinopathies

Knowledge	Skills
• describe mechanisms of autoimmune endocrine failure • describe the time course of polyglandular autoimmune disorders.	• use appropriate antibody and endocrine tests for surveillance and screening • counsel and educate families regarding the time-course of polyglandular autoimmune disorders, including risk of Addisonian crisis.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.12	Other Endocrine Disorders
Learning Objective 2.12.2	Assess and manage endocrine disorders related to cancer

Knowledge	Skills
• describe the long-term endocrine sequelae of cancer treatments • describe the time-course of organ failure following radiotherapy and chemotherapy, including gonadal failure • describe endocrine manifestations of cancer diagnosis, including bone and mineral disorders.	• use appropriate surveillance strategies and monitoring • diagnose, counsel and treat endocrine disorders related to malignancy and its treatment • use appropriate treatments for hypercalcaemia of malignancy.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.12	Other Endocrine Disorders
Learning Objective 2.12.3	Assess and manage endocrine aspects of pheochromocytoma and multiple endocrine neoplasia syndromes

Knowledge	Skills
• describe the metabolism of chromaffin tumours • describe appropriate surveillance and screening for other MEN systems (MEN1 and MEN2) • describe the physiology and genetics of transmission of MEN • describe hyperparathyroidism and its association with MEN1 and MEN2 and the management of families with MEN2 • describe medullary thyroid carcinoma, its association with MEN1 and management of families with MEN1.	• diagnose and manage excess catecholamine production • make appropriate referral for imaging and surgical treatment • use appropriate pharmacological treatment before, during and after surgery • monitor for other manifestations of MEN1 and MEN2.

DOMAIN 2	DISEASES AND DISORDERS
Theme 2.12	Other Endocrine Disorders
Learning Objective 2.12.4	Assess and manage endocrine aspects of Turner syndrome

Knowledge	Skills
• describe endocrine manifestations of Turner syndrome • outline the principles of growth hormone use • describe nonendocrine manifestations of Turner syndrome • describe natural history of pubertal development and ovarian failure of girls with Turner syndrome • describe advantages and disadvantages of various delivery systems for gonadal replacement.	• diagnose and treat endocrine manifestations, in particular growth failure, gonadal failure, insulin resistance and hypertension • coordinate care of patients with Turner syndrome • counsel and advise families about endocrine and non-endocrine manifestations and long-term sequelae.

DOMAIN 3	INVESTIGATIONS
Theme 3.1	Investigations in Endocrinology
Learning Objective 3.1.1	Order and interpret laboratory investigations and screening

Knowledge	Skills
• describe the range of baseline biochemical tests used to investigate endocrine disorders • describe laboratory processes and limitations involved in sample collection, storage, preparation and hormone measurement.	• order and interpret appropriate tests in a suspected endocrine condition.

DOMAIN 3	INVESTIGATIONS
Theme 3.1	Investigations in Endocrinology
Learning Objective 3.1.2	Order and interpret dynamic endocrine testing

Knowledge	Skills
• outline the principles and indications for dynamic endocrine testing, including age appropriate reference ranges and responses.	• order and interpret dynamic endocrine testing, including growth hormone, cortisol and pituitary stimulation tests.

DOMAIN 3	INVESTIGATIONS
Theme 3.1	Investigations in Endocrinology
Learning Objective 3.1.3	Order and interpret radiological investigations, including MRI, CT scan and ultrasonography

Knowledge	Skills
• describe the basis of estimation of bone age • explain the use of skeletal x-rays in suspected bone and mineral disorders • explain the use of MRI investigation for pituitary and hypothalamic disorders • explain the use of CT scanning in endocrine disease • describe the role of diagnostic ultrasound in paediatric endocrine disease, including thyroid uterus and ovaries, kidneys, testes and adrenal gland.	• interpret bone age using validated methodology, e.g. Greulich and Pyle or Tanner Whitehouse • interpret skeletal x-rays and recognise abnormalities • integrate results of ultrasound investigations into the diagnostic formulation for endocrine disease.

DOMAIN 3	INVESTIGATIONS
Theme 3.1	Investigations in Endocrinology
Learning Objective 3.1.4	Outline the role of nuclear medical imaging

Knowledge	Skills
• describe the role of nuclear medicine imaging in diagnosis of thyroid function abnormalities, including structural and malignant disorders • describe applications of nuclear medical imaging, including diseases of the thyroid, pancreas (F-DOPA) and adrenal (MIBG) • describe the application of bone scans • describe the application of positron emission tomography (PET).	• order and interpret thyroid scans, including labelled technetium uptake and radioactive iodine total body scans • integrate results of nuclear medicine investigations into the diagnostic formulation for endocrine disease.

DOMAIN 3	INVESTIGATIONS
Theme 3.1	Investigations in Endocrinology
Learning Objective 3.1.5	Order and interpret bone densitometry investigations

Knowledge	Skills
• describe the indications for measurement of bone densitometry using dual energy x-ray absorptiometry (DXA) and explain the need for specific paediatric software and age and sex matched reference ranges • describe the indications for measurement of bone densitometry using peripheral quantitative computed tomography (pQCT).	• order and interpret bone densitometry investigations • integrate results of bone densitometry investigations into the diagnostic and management formulation for endocrine disease.

DOMAIN 3	INVESTIGATIONS
Theme 3.2	Molecular Endocrinology and Diagnostics
Learning Objective 3.2.1	Order and interpret genetic testing

Knowledge	Skills
• describe the role of genetic testing in familial disease • describe the role of genetic testing in sporadic endocrine disease.	• integrate results of genetic testing into the diagnostic and management formulation for endocrine disease.

DOMAIN 4	PROFESSIONAL QUALITIES SPECIFIC TO ENDOCRINOLOGY
Theme 4.1	Professional Qualities of the Endocrinologist
Learning Objective 4.1.1	Access and apply guidelines and consensus statements around clinical practice and endocrine disorders

Skills
• access and apply guidelines and consensus statements around clinical practice and endocrine disorders.

DOMAIN 4	PROFESSIONAL QUALITIES SPECIFIC TO ENDOCRINOLOGY
Theme 4.1	Professional Qualities of the Endocrinologist
Learning Objective 4.1.2	Counsel and educate endocrine patients and their carers/families
Skills	
• counsel patients with chronic endocrine or metabolic disease, and their families • educate patients, their families and other health professionals regarding endocrine disorders and the impact of disease on the endocrine system • educate patients on prevention of endocrine disorders • provide lifestyle education to prevent and minimise endocrine disorders, including diabetes, obesity and calcium and vitamin D deficiencies.	

DOMAIN 4	PROFESSIONAL QUALITIES SPECIFIC TO ENDOCRINOLOGY
Theme 4.1	Professional Qualities of the Endocrinologist
Learning Objective 4.1.3	Advocate for endocrine patients and their carers/families
Skills	
• advocate for services, resources and rights of patients with diabetes and their carers/families • advocate for services, resources and rights of patients with chronic endocrine disorders and their carers/families • advocate for services and resources for patients in schools or sitting driver's licence exams.	

ACRONYMS AND INITIALISMS

CF	cystic fibrosis
CFRD	cystic fibrosis related diabetes
CGMS	continuous glucose monitoring system
CNS	central nervous system
CRF	corticotropin releasing factor
CSW	cerebral salt wasting
DDAVP	desmopressin
DXA	dual energy x-ray absorptiometry
DSD	disorder of sex development
FISH	fluorescence in-situ hybridisation
GH	growth hormone
IGF	insulin-like growth factor
IUGR	intrauterine growth retardation
MEN	multiple endocrine neoplasia
MODY	maturity onset diabetes of the young
PET	positron emission tomography
pQCT	peripheral quantitative computed tomography
PTH	parathyroid hormone
SGA	small for gestational age
SIADH	syndrome of inappropriate antidiuretic hormone hypersecretion
T1DM	type 1 diabetes mellitus
T2DM	type 2 diabetes mellitus
TRH	thyrotropin-releasing hormone
TSH	thyroid-stimulating hormone
TZD	thiazolidinedione
VLCFA	very-long-chain fatty acid