Recommended standards in endocrinology and diabetes for undergraduate medical education and suggested strategy for implementation

Prepared by the Society for Endocrinology in partnership with

Diabetes UK and the Association of British Clinical Diabetologists

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Society for Endocrinology

Diabetes UK

ABCD Association of British Clinical Diabetologists

Background to the document

A task force for undergraduate medical education was established within the umbrella of the Society for Endocrinology's (SfE) Clinical Committee in order to promote and enhance teaching of clinical endocrinology and diabetes in UK medical schools. Diabetes UK and the Association of British Clinical Diabetologists (ABCD) joined the working group to provide expertise in diabetes. This proposal outlines in brief the remit of the group, together with suggested minimum standards for the curriculum – both content and learning outcomes. The document also outlines suggestions for a strategy for their dissemination and enhanced interface with undergraduate students. There are no proposals for the methods by which medical schools should teach or implement the curriculum as this is likely to be medical school-specific.

Remit of the SfE/Diabetes UK/ABCD Task Force for undergraduate medical school curriculum

- Development of minimum standards for the medical undergraduate curriculum content in endocrinology and diabetes
- Development of a suggested strategy for their dissemination
- Creation of an online information resource for undergraduate medical students to include:
  - Curriculum resource for endocrinology and diabetes to supplement / support provision in UK medical schools
  - Source of contact details for endocrine and diabetes 'leads' in UK medical schools
  - 'Advertising' of opportunities in endocrinology and diabetes such as research projects, special study modules, clinical placements, available awards and prizes
  - Signposting to careers advice via SfE/Diabetes UK/ABCD and 'NHS careers' websites
  - Point of contact for like-minded students / creation of an online community

Task Force composition

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Curriculum aims

1. Promote understanding of the organisation of the endocrine system
2. Outline the role of the endocrine system
3. Ensure that students understand the pathophysiology of endocrine disorders
4. Enable students to apply that understanding to the investigation and management of patients with diabetes and endocrine diseases
5. Highlight the perspective of diabetes / endocrine diseases from the patient and their family
6. Focus on the importance of working with multi-disciplinary teams
7. Developing the practical skills needed to manage patients with diabetes
8. Ensure that students understand the impact of diabetes on population health
9. Promote interest in and enthusiasm for diabetes and endocrinology as a specialty

Learning outcomes

On completion of the course, students should be able to:

1. Describe and understand the anatomy and histology of the endocrine system
2. Outline the regulation of hormone secretion and the mechanisms of hormone action
3. Explain the function of the hypothalamus, pituitary, adrenal, thyroid, parathyroid, endocrine pancreas, ovary, testis, and their hormones
4. Discuss some examples of disorders of the endocrine glands named above and their treatment
5. Demonstrate familiarity with all of the topics outlined in 'core knowledge' in the outline curriculum
6. Outline the main principles of laboratory tests and imaging in the diagnosis of endocrine disorders
7. Correctly demonstrate the skills / competencies / practical procedures listed in the outline curriculum
8. Discuss the hormonal control of carbohydrate metabolism and the causes, diagnosis and management options for all forms of diabetes (including Type 1 and Type 2 diabetes), also include the prevention and treatment of acute and chronic complications
9. Discuss the management of hyperlipidaemia in patients with diabetes
10. Discuss the impact of all forms of diabetes (including Type 1 and Type 2 diabetes) on the lives of individual patients and their families
11. Understand the importance of safe insulin prescribing and be familiar with recommended e-learning modules

Core knowledge

Areas to be incorporated into the curriculum should include all of the key topics listed in the next section.

Experiences

It is recognised that the availability of and access to particular types of clinical experience varies between medical schools and clinical placements. However as an aspiration, it might be desirable that the students are able to access some of the following experiences to enrich their learning:

- Opportunities to perform an excellent clinical history and physical examination in an endocrine-focused manner and in a way that reflects the impact of diabetes and endocrine disease on day-to-day lives and relationships
- Participation in diabetes and endocrine clinics
- Experience of diabetes management in the community setting
- Opportunities to follow complex endocrine patients through their treatment pathway and personally assess at least 2 patients with each of the following; thyroid disease, adrenal disease, pituitary disease and diabetes
- If possible, observation of the execution of dynamic endocrine testing in order to develop an understanding of and be able to interpret dynamic endocrine tests
- Opportunities in the inpatient and outpatient setting to learn about treatment options and prognoses for both common and rare endocrine conditions
- Opportunities to attend theatres to observe endocrine surgery and radiology / nuclear medicine departments to observe endocrine imaging

Key skills

Where feasible, students should be enabled to achieve the following core skills:

- Obtain a capillary blood glucose reading
- Dipstick a urine sample for glucose and ketones
- Calculate a body mass index (BMI) and measure a waist circumference
- Evaluate a patient's diet and construct an appropriate diet for diabetes
- Evaluate a patient's physical activity
- Examine feet and footwear
- Administer a subcutaneous injection of insulin
- Examine injection sites
- Take a blood pressure lying and standing and interpret the findings
- Explain the principles of management of an intravenous insulin sliding scale
- Perform visual acuity and visual field assessment and fundoscopy

Topics in diabetes and endocrinology

DIABETES

- Introduction to DM
  - Glucose homeostasis / metabolism
  - Insulin action
  - The pancreas
  - Other pancreatic hormones (glucagon) and incretins
  - Diagnosis of DM / impaired glucose tolerance / impaired fasting glucose
    - FPG, OGTT, HbA1c and the role of C-peptide
    - Dipstick urinalysis for ketones
  - Glycaemic control (HbA1c, BM monitoring)
  - Types of DM: 1 / 2 / other types of DM
  - Structured education in diabetes
- T2 DM
  - Insulin resistance / metabolic syndrome
  - Pathophysiology T2 DM
  - Genetics T2 DM
  - Epidemiology T2 DM
  - Natural history T2 DM
  - Treatment
    - Diet / OHAs (MTN, SUs, TZDs, incretins) / Insulin
- T1 DM
  - Pathophysiology T1 DM
  - Genetics T1 DM
  - Epidemiology T1 DM
  - Natural history T1 DM
  - Diagnosis of insulin dependence
  - Insulin treatment (types / regimens)
  - sc insulin injection
  - Future therapies for T1 DM

- **Long-term complications of diabetes**
  - ☐ Screening, prevention, treatment
  - ☐ Macrovascular and microvascular
  - ☐ Diabetic foot
  - ☐ Mental health issues and diabetes
  - ☐ DCCT / UKPDS evidence
- **Acute complications of diabetes**
  - ☐ Hypoglycaemia
  - ☐ Diabetic ketoacidosis / hyperosmolar hyperglycaemic state
  - ☐ Sick day rules
  - ☐ Management of acute illness in DM patients
  - ☐ Perioperative management of DM patients
  - ☐ IV insulin sliding scales
- **Lipids**
  - ☐ Lipid metabolism
  - ☐ Dyslipidaemia (primary / secondary)
  - ☐ Treatment of hyperlipidaemia
  - ☐ Assessing and reducing vascular disease risk in DM patients
- **Holistic team-based management of DM**
  - ☐ Chronic disease management / long-term conditions
    - Partnership between HCPs and patient, using databases and protocols
  - ☐ Roles of the multidisciplinary team, primary and secondary care
  - ☐ Patient self-management / monitoring
  - ☐ Structured education programmes (DAFNE / DESMOND / X-Pert)
  - ☐ Living with diabetes (effects on individual)
    - Psychosocial aspects of DM; employment/insurance/driving
    - Costs of good glycaemic control
    - Barriers to achieving good glycaemic control
  - ☐ Dietary evaluation

- **Pregnancy and DM**
  - Physiology of CHO metabolism in normal pregnancy
  - Obesity and pregnancy in women with T1 / T2 DM
  - Gestational DM and pregnancy in women with T1 / T2 DM

ENDOCRINOLOGY

- **Introduction to endocrinology**
  - Definitions of terms
    - Hormone, endocrinology, homeostasis
    - Endocrine, paracrine, autocrine
  - Overview of endocrine organs & their hormones
    - Anatomy and histology
    - Peptide and steroid hormones
  - Hormone synthesis & release
  - Regulation of hormone secretion
    - Feedback control, neuroendocrine interactions
    - Primary and secondary endocrine dysfunction
  - Hormone transport
  - Hormone receptors & second messengers
- **Thyroid hormones**
  - Physiology
  - Thyroid function tests
  - Structural and functional imaging of the thyroid
  - Hyperthyroidism (Graves and TAO, TMNG, thyroiditis)
    - Anti-thyroid drugs
    - Radioiodine therapy, thyroid surgery
  - Hypothyroidism
    - Thyroxine treatment
  - Other thyroid diseases (goitre, nodules, cancer)

- **Calcium homeostasis**
  - Physiology (PTH, vitamin D)
  - Interpreting the 'bone profile'
  - Diagnostic imaging
  - Hypercalcaemia (primary hyperPTH, other causes)
  - Hypocalcaemia (osteomalacia)
- **Adrenal cortex**
  - Hormones
    - GC, MC, adrenal androgens, steroid synthesis
  - Physiology
    - Diurnal variation, stress response
  - Assessing cortisol production
  - Adrenal imaging
  - Addison's disease
  - GC / MC treatment
  - Addisonian crisis (diagnosis, treatment, prevention)
  - Autoimmune polyendocrinopathies
  - Long term, high dose pharmacological steroid treatment
- **Endocrine hypertension**
  - Hormones and physiology (RAAS, adrenal medulla)
  - Secondary hypertension
    - Conn's syndrome, phaeochromocytoma

- **Hypothalamic-Pituitary Axis**
  - Hormones
  - Assessment
    - Biochemical, including basic dynamic function tests
    - Imaging (MRI)
    - Visual field assessment
  - Acromegaly, Cushing's, NFA, prolactinoma
  - Treatment
    - Medical, surgical, radiotherapy
  - Hypopituitarism
    - Hormone replacement therapy
- **Thirst / fluid balance**
  - Physiology (posterior pituitary)
  - DI / polyuria & polydipsia
  - SIADH / hyponatraemia
- **Appetite / weight**
  - Physiology
  - Nutritional assessment (including BMI)
  - Obesity
    - Epidemiology
    - Causes and consequences
    - Prevention and treatment options: medical, surgical, societal
  - Diet and endocrinology
    - Starvation and anorexia nervosa
- **Growth and puberty**
  - Physiology
  - Delayed / premature puberty
  - Turner syndrome

- **Gynae-endocrinology**
  - Physiology (menstrual cycle)
  - Menopause / HRT
  - Definitions of terms: primary and secondary amenorrhoea, oligomenorrhoea
  - Hypothalamic amenorrhoea, POF
  - Oligomenorrhoea, acne, hirsutism [PCOS, CAH]
- **Lactation**
  - Physiology
  - Galactorrhoea
  - Prolactinoma
- **Male reproductive system**
  - Physiology
  - ED
  - Male hypogonadism (primary and secondary) and testosterone treatment
  - Gynaecomastia
  - Psychological aspects of ED
- **Endocrine tumours**
  - Carcinoid
  - MEN syndromes
  - Spontaneous hypoglycaemia
  - Imaging endocrine tumours

Suggested strategy for dissemination and implementation

Database of endocrine education 'links' between the SfE and each of the UK medical schools

Enhanced student area within Society for Endocrinology website, incorporating

- Core curriculum outline (knowledge, experience, skills)
- Signposting to endocrine opportunities including undergraduate prizes, special study modules, studentships, grants and awards, relevant intercalated degrees
- Signposting to careers information and advice
- List of Society for Endocrinology Education 'Links' for each of the UK medical schools
- If relevant schools may nominate a distinct 'link' person for diabetes

Consideration for similar enhanced student area or specific named education 'links' via Diabetes UK also.

Education 'link' role / job description

- To provide a point of contact for medical students in own medical school with an interest in endocrinology and/or diabetes
- To promote and encourage the incorporation of the core standards for the undergraduate curriculum into the medical school teaching
- To promote and encourage the inclusion of assessment questions drawn from endocrinology and diabetes into the medical school programme of assessment
- To provide a point of contact for medical students from other institutions who may wish to participate in endocrine or diabetes programmes / opportunities at your institution
- To provide a list of any special opportunities specific to your department that could be advertised via the Society for Endocrinology, Diabetes UK and the ABCD such as intercalated degrees, studentships and research projects
- To provide a point of contact for the Society for Endocrinology, Diabetes UK and the ABCD to advertise opportunities that the organisations offer to medical students, such as essay prizes, free places at conferences, website information etc.
- To report back on the above issues to the organisations if requested.

Education 'link' person specification

ESSENTIAL

- Member of the relevant organisation (to be a link for the SfE the individual must be a member of the SfE)
- Interest in undergraduate education
- Knowledge / understanding of the curriculum in their own medical school
- Willingness to share contact details on the relevant organisation's website
- Willingness to be contacted by medical students and provide guidance and direction regarding endocrinology opportunities
- Willingness to liaise with the organisation and their own medical school colleagues as required to promote incorporation of the core curriculum and advertise the opportunities from the SfE, Diabetes UK and/or the ABCD to the medical student body
- If relevant, schools may wish to nominate an additional distinct 'link' person for diabetes

DESIRABLE

- Ability to influence the content and/or delivery of endocrinology education within their own medical school
- Influence in medical school assessment or examination
- Credible clinical role / good clinical role model

Contact Details

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The Society for Endocrinology is the major British society representing scientists, clinicians and nurses who work with hormones.

Diabetes UK

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Diabetes UK is the largest organisation in the UK working for people with diabetes, funding research, campaigning and helping people live with the condition.

Association of British Clinical Diabetologists

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The Association of British Clinical Diabetologists is the national organisation of consultant physicians in Britain who specialise in diabetes mellitus. Most are also acute general physicians, and many are also specialists in endocrinology and lipid metabolism.