

Metabolic Problems

One in a series of curriculum statements produced by
the Royal College of General Practitioners:

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- 2 The General Practice Consultation
- 3 Personal and Professional Responsibilities
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Key messages

- The prevalence of obesity and diabetes mellitus is increasing to alarming proportions.
- The management of diabetes, hyperthyroidism and hypothyroidism in primary care are key competences for general practice.
- All general practitioners should be competent in the management of diabetic, thyroid and adrenal emergencies.
- Hyperuricaemia is a common cause of morbidity that is usually diagnosed and managed in primary care.

INTRODUCTION

For the purpose of this RCGP curriculum statement, metabolic problems include obesity, diabetes mellitus, thyroid disorders, hyperlipidaemia, hyperuricaemia and endocrine problems.

Rationale for this curriculum statement

Obesity is a risk factor for a variety of medical problems, including Type 2 diabetes, hypertension, hyperlipidaemia, coronary heart disease, stroke, osteoarthritis, gout, sleep apnoea, gallstones, and cancer of the breast, prostate and colon.^{1,2} People who are overweight have a higher all-cause mortality than average, which increases with greater obesity.² The prevalence of obesity in children and adults is increasing in the UK and elsewhere across all gender, age, race and ethnicity groups.³

The following UK statistics have been compiled by the National Audit Office:⁴

- One in five adults are obese
- The prevalence of obesity has trebled over the last 20 years
- Nearly two-thirds of men and over half of women are overweight or obese
- The estimated human cost:
 - 18 million sick days a year
 - 30,000 deaths a year, resulting in
 - 40,000 lost years of working life
 - deaths linked to obesity shorten life by nine years on average
- The estimated financial cost:
 - £½ billion a year in treatment costs to the NHS
 - possibly £2 billion a year impact on the economy.

Diabetes Mellitus is a disorder of glucose metabolism with associated disorders of lipid metabolism and hypertension. Each type of diabetes (Type 1 and Type 2) has profound daily and lifelong effects on the wellbeing of individuals. 2010, around 2.2 million people were diagnosed as having diabetes in England alone. In 1998, around 1.8 million people in the UK were diagnosed as having diabetes.⁵ At least a million more – ‘the missing million’ – are thought to have diabetes but do not know it yet.^{6,7,8} The prevalence of Type 2 diabetes is increasing in the UK^{9,10,11,12} and, as a result, there will be increasing demand on the resources of the nation. Some research suggests that as much as 9% of the total NHS budget is spent managing diabetes.¹³ Studies have demonstrated that the management of the modifiable risk factors associated with diabetes reduces both morbidity and mortality from the common chronic complications of diabetes.^{14,15,16}

Thyroid disorders are also very common and have an enormous impact on quality of life, but the diagnosis is often missed. In general practice an average general practitioner’s (GP’s) list of 2000 patients would contain 20–30 women and two men with hyperthyroidism and 20–25 women and one man with hypothyroidism.¹⁷

Hyperuricaemia, which usually presents as gout or urolithiasis, is a very common condition with nearly 1% of the English population diagnosed as having gout (85% being male). Five per cent of men and 1% of women over 65 have been affected.¹⁸ It is a cause of preventable morbidity that is usually diagnosed and managed in primary care

The other metabolic and endocrine problems encountered in general practice are uncommon, but once a diagnosis has been made then the GP’s management of the problem is lifelong, often in partnership with specialist colleagues.

UK health priorities

The *National Service Framework for Diabetes* sets out 12 standards covering the identification of people with diabetes, clinical management, emergency and secondary care, pregnancy and the

detection and management of long-term complications.¹⁹ It was later adapted for use in Wales; the *Diabetes NSF Standards (Wales)* were published on 29 April 2002. The Delivery Strategy was launched in Wales in spring 2003. The *Scottish Diabetes Framework* was published in April 2002.

General Medical Services 2 Contract:

The ~~new~~ GMS contract for 2011/12 includes 10-20 clinical domains indicators in the Quality and Outcomes Framework. Of these, one covers the management of diabetes, ~~and~~ another relates to the management of hypothyroidism and a third relates to the management of obesity.²⁰

LEARNING OUTCOMES

The following learning objectives describe the knowledge, skills and attitudes that a GP requires when managing patients with metabolic problems. This curriculum statement should be read in conjunction with the other RCGP curriculum statements in the series. The full range of generic competences is described in the *core* RCGP curriculum statement 1, *Being a General Practitioner*.

Primary care management

- Manage primary contact with patients who have a metabolic problem.
- Coordinate care with other primary care health professionals, such as diabetes nurse specialists, dieticians, district nurses, community matrons, chiropodists and opticians to enable chronic disease management.
- Explain the indications for referral to an endocrinologist for management of complex metabolic problems or investigation of endocrine disorders.

The knowledge base

Symptoms:

Patients with metabolic problems are frequently asymptomatic or have non-specific symptoms, such as tiredness, malaise, weight loss or gain, etc.

Certain symptoms raise clinical suspicion of metabolic problems:

- Diabetes mellitus – tiredness, polydipsia, polyuria, weight loss, infections
- Hypothyroidism – tiredness, weight gain, constipation, hoarse voice, dry skin and hair, menorrhagia
- Hyperthyroidism – weight loss, tremor, palpitations, hyperactivity, exophthalmos, double vision
- Hyperlipidaemia – xanthelasma
- Hyperuricaemia – gout
- Individual endocrine disorders have typical symptom complexes.

Common and/or important conditions:

- Obesity
- Diabetes mellitus – Type 1 and 2
- Impaired glucose tolerance
- Thyroid disorders – hypothyroidism, hyperthyroidism, goitre, nodules
- Hyperlipidaemia
- Hyperuricaemia
- Endocrine problems – pituitary disease (e.g. prolactinoma, acromegaly, diabetes insipidus), adrenal disease (e.g. Cushing's syndrome, hyperaldosteronism, Addison's disease, pheochromocytoma) and parathyroid disease.

Investigations:

- Body mass index calculation
- WHO diagnostic criteria for diabetes mellitus
- Near patient capillary glucose measurement (including patient self-monitoring)
- HbA1c and fructosamine to assess glycaemic control
- Albumin: creatinine ratio or dipstick for microalbuminuria

- Interpret serum electrolyte and urate results
- Interpret thyroid function tests and understand their limitations – TSH, T4, free T4, T3, auto-antibodies
- Interpret lipid profile tests – total cholesterol, HDL, LDL, triglycerides
- Visual acuity and retinal photography
- Knowledge of secondary care investigations including the glucose tolerance test, thyroid ultrasound and fine needle aspiration, specialised endocrine tests.

Treatment:

- Understand principles of treatment for common conditions managed largely in primary care – obesity, diabetes mellitus, hypothyroidism, hyperlipidaemia, hyperuricaemia
- Chronic disease management including specific disease management, systems of care and multidisciplinary teamwork for people with established metabolic problems
- Communication with patients and their families, and interprofessional communication both within the primary healthcare team and between primary and secondary care.

Emergency care:

- Acute management of diabetic emergencies – hypoglycaemia, hyperglycaemic ketoacidosis and hyperglycaemic hyperosmolar non-ketotic coma
- Acute management of thyroid emergencies – myxoedema coma and hyperthyroid crisis
- Recognition and primary care management of Addisonian crisis.

Prevention:

- Health promotion activities include dietary modification and exercise advice
- Understand when prevention of hyperuricaemia is appropriate, e.g. patients treated for myelo/proliferative disorders
- Obesity and diabetes mellitus are risk factors for other conditions, so optimal management is preventative.

Person-centred care

- Recognise that non-concordance is common for chronic metabolic conditions (e.g. diabetes) and respect the patient’s autonomy when negotiating management.
- Communicate the patient’s risk of complications from obesity and diabetes mellitus clearly and effectively in a non-biased manner.
- Develop a flexible approach to health promotion which reflects that certain groups with obesity or diabetes mellitus require different approaches, e.g. children, adolescents and young adults, pregnant women, ethnic minorities, elderly and housebound patients.
- Negotiate a programme of weight reduction sensitively with patients, giving appropriate health promotion advice regarding diet, exercise and pharmacological therapies.
- Utilise disease registers and data-recording templates effectively for opportunistic and planned monitoring of metabolic problems to ensure continuity of care between different healthcare providers.
- Recognise the potential for abuse of thyroxine and propose strategies to reduce dosage.

Specific problem-solving skills

- Intervene urgently when patients present with a metabolic emergency, e.g. hypoglycaemia and hyperglycaemic conditions.
- Recognise that patients with metabolic problems are frequently asymptomatic or have non-specific symptoms, and that diagnosis is often made by screening or recognising symptom complexes and arranging appropriate investigations.
- Demonstrate a logical, incremental approach to investigation and diagnosis of metabolic problems.

A comprehensive approach

- Recognise that patients with diabetes often have multiple co-morbidities and consequently polypharmacy is common.
- Develop strategies to simplify medication regimes and encourage concordance with treatment.
- Advise patients appropriately regarding lifestyle interventions for obesity, diabetes mellitus, hyperlipidaemia and hyperuricaemia.

Community orientation

- Recognise that environmental and genetic factors affect the prevalence of metabolic problems, e.g. diabetes is more prevalent in the UK in patients of Asian and Afro-Caribbean origin,²¹ hyperuricaemia is more common in prosperous areas and is associated with obesity, diabetes, hypertension and dyslipidaemia.²²
- Recognise that public health interventions are likely to have the largest impact on obesity and diabetes mellitus, and support such programmes where possible, e.g. exercise on prescription.
- Describe the exemptions from prescription charges for patients with metabolic conditions.

A holistic approach

- Recognise the psychosocial impact of diabetes and other long-term metabolic problems, e.g. risk of depression, restrictions on employment and driving for diabetes, sexual dysfunction.
- Recognise that stigma is associated with obesity.
- Empower patients to self-manage their conditions as far as practicable.

Contextual aspects

- Recognise the central role of primary care in managing diabetes and hypothyroidism.
- Understand the key government policy documents that influence healthcare provision for metabolic problems.
- Understand the systems of care for metabolic conditions, including the roles of primary and secondary care, shared-care arrangements, multidisciplinary teams and patient involvement.

Attitudinal aspects

- Ensure that a patient's weight does not prejudice the information communicated or the doctor's attitude towards the patient.
- Ensure that the risks of diabetic complications are not overstated in order to coerce a patient into complying with treatment.

Scientific aspects

- Describe and implement the key national guidelines that influence healthcare provision for cardiovascular problems (e.g. NICE guidelines, British Hypertension Society Joint Committee recommendations, national frameworks and quality markers).
- Describe the key research findings that influence management of metabolic problems (e.g. UK Prospective Diabetes Study [UKPDS], Diabetes Control and Complications Trial [DCCT], [Action to control cardiovascular risk in Diabetes \[ACCORD\]](#) and [Action in Diabetes and vascular disease: preterax and diamicron modified release controlled evaluation \[ADVANCE\]](#)).
- Describe the role of particular groups of medication in the management of diabetes (e.g. antiplatelet drugs, angiotensin-converting enzyme inhibitors, angiotensin-II receptor antagonists, and lipid-lowering therapies).

Psychomotor skills

- Calculate body mass index.
- Demonstrate lower-leg examination for complications of diabetes mellitus.
- Demonstrate capillary glucose measurement using a near-patient test.
- Demonstrate clinical examination of the neck.

FURTHER READING

Examples of relevant texts and resources

- British Medical Association and Royal Pharmaceutical Society of Great Britain *The British National Formulary* London: BMJ Books, updated annually
- British Medical Association, Royal Pharmaceutical Society of Great Britain, Royal College of Paediatrics and Child Health. *The Neonatal and Paediatric Pharmacists Group BNF for Children* London: BMA, 2005
- Chambers R, Stead J, Wakley G. *Diabetes Matters in Primary Care* Oxford: Radcliffe Medical Press, 2001.
- Jones R, Britten N, Culpepper L, et al. (eds). *Oxford Textbook of Primary Medical Care* Oxford: Oxford University Press, 2004
- MacKinnon M. *Providing Diabetes Care in General Practice (4th edn)* London: Class Publishing, 2001
- Warrell D, Cox TM, Firth JD, Benz EJ (eds). *Oxford Textbook of Medicine (4th edn)* Oxford: Oxford University Press, 2004
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- Webber J. Changing epidemiology of obesity – implications for diabetes. In: Barnett AH and Kumar S (eds). *Obesity and Diabetes* Chichester: John Wiley & Sons, 2004 , pp. 1-11
- Zimmet P, Cameron A, Shaw J. The diabetes epidemic: genes and environment clashing. In: Ganz M (ed.). *Prevention of Type 2 Diabetes* Chichester: John Wiley & Sons, 2005, pp. 3-13

Web resources

Association of British Clinical Diabetologists

The national organisation of consultant physicians in Britain who specialise in diabetes mellitus.
www.diabetologists-abcd.org.uk/

Association for the Study of Obesity (ASO)

The UK's foremost charitable organisation dedicated to the understanding and treatment of obesity.
www.aso.org.uk

Better testing

Home of the best practice in primary care pathology project. The site provides information in a question and answer style to around 120 clinical scenarios which are frequently seen in general practice and reviews national and international best practice guidance for testing in these scenarios.
www.bettertesting.org.uk

British Dietetic Association

Established in 1936, the British Dietetic Association was formed to provide training and facilities for state-registered dietitians.
www.bda.uk.com/

Diabetes in Scotland

The Scottish Diabetes Framework published in April 2002 set out the first steps of a 10-year programme to address the problem of diabetes. This website provides a record of what has been

achieved as well as a means of sharing information and ideas about the challenges and opportunities ahead.

www.diabetesinscotland.org.uk/Publications.aspx

Diabetes National Service Framework (Wales)

www.wales.nhs.uk/sites3/home.cfm?orgid=440

Diabetes Research and Wellness Foundation

www.drwf.org.uk/

Diabetes UK

The leading charity working for people with diabetes, funding research, campaigning and helping people live with the condition.

www.diabetes.org.uk/

European Association for the Study of Diabetes

www.easd.org/#welcome.html

Federation of European Nurses in Diabetes

A unique voice for nurses working in the field of diabetes care, research and education in Europe.

www.fend.org/

International Diabetes Federation

A non-governmental organisation in official relations with the World Health Organization (WHO) and the Pan American Health Organization (PAHO).

www.idf.org/home/

Institute of Chiropodists and Podiatrists

A professional body whose aim is to further the awareness of foot health issues by the general public.

www.inst-chiropodist.org.uk/

National Library for Health and Public Health Specialist Library

The aim of the National Library for Health (NLH) is to provide clinicians with access to the best current know-how and knowledge to support health care related decisions. Patients, carers and the public are also welcome to use the site, because the NLH is open to all. The ultimate aim is for the Library to be a resource for the widest range of people both directly and indirectly.

The main priority for the NLH is to help the NHS achieve its objectives. However, it is also aimed at those healthcare professionals who are working in the private sector where common standards should apply. For example, the National Screening Committee is not only an NHS advisory committee, but its mission is also to promote the health of the whole population and its recommendations are relevant to the private sector. Part of the content of the NLH such as Clinical Evidence and Cochrane Library is licensed from commercial providers. There are two other groups of health and care professionals whose needs will also be met by the NLH – those working in public health and in social care. The Public Health Specialist Library is intended for all public health professionals, many of whom work in local government. It has been developed by the Health Development Agency.

<http://www.library.nhs.uk>

National Service Framework for Diabetes: Standards (Department of Health, England) 2001

www.dh.gov.uk/PolicyAndGuidance/HealthAndSocialCareTopics/Diabetes/fs/en

Obesity Learning Centre

A website developed by the National Heart Forum with the support of the Department of health and Department of education to support people who work either directly or indirectly on promoting a healthy weight and tackling obesity

www.obesitylearningcentre-nhf.org.uk

NICE Guidelines:

- Management of Type 2 Diabetes—managing blood glucose levels (Guideline G), 2002
- Management of Type 2 Diabetes—management of blood pressure and blood lip(Guideline H), 2002
- Management of Type 2 Diabetes—renal disease, prevention and early management (Guideline F), 2002
- Management of Type 2 Diabetes - retinopathy (Guideline E), 2002
- Type 2 diabetes: prevention and management of foot problems, 2004.
- Type 2 diabetes : the management of type 2 diabetes (CG66) 2008
- Type 2 diabetes : newer agents (CG87) 2009
- Preventing type 2 diabetes - population and community interventions in high risk groups and the general population (PHJ 35) 2011
- Obesity: the prevention, identification, assessment and management of overweight and obesity in adults and children (CG43) 2006

www.nice.org.uk

Interesting papers

- Diabetes Control and Complications Trial Research Group. The effect of intensive diabetes treatment on the development and progression of long-term complications in insulin-dependent diabetes mellitus. The Diabetes Control and Complications Trial *N Engl J Med* 1993; 329: 977-86
- Eriksson, KF and Lindgarde F. Prevention of type 2 (non-insulin-dependent) diabetes mellitus by diet and physical exercise. The 6-year Malmo feasibility study *Diabetologia* 1991; 34: 891-8
- Haffner SJ and Cassells H. Hyperglycemia as a cardiovascular risk factor *Am J Med* 2003; 115 (Suppl 8A): 6-11S
- Lindstrom J, Louheranta A, Mannelin M, Rastas M, *et al.* The Finnish Diabetes Prevention Study (DPS): lifestyle intervention and 3-year results on diet and physical activity *Diabetes Care* 2003; 26: 3230-6
- Norris SL, Engelgau MM, Venkat Narayan KM. Effectiveness of self-management training in type 2 diabetes. A systematic review of randomised controlled trials *Diabetes Care* 2001; 24: 561-87
- UKPDS 33. Intensive blood glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes *Lancet* 1998; 352: 837-53
- UKPDS 34. Effect of intensive blood-glucose control with metformin on complications in overweight patients with type 2 diabetes *Lancet* 1998; 352: 854-65
- UKPDS 38. Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes *BMJ* 1998; 317: 703-13
- Effect of intensive glucose lowering in type 2 diabetes. The ACCORD study group. *NEJM* 2008; 358:2545-2559

- [Intensive blood glucose control and vascular outcomes in patients with type 2 diabetes. The ADVANCE collaborative group. NEJM 2008; 358:2560-2572](#)
- [Effect of intensive blood pressure control in Type 2 diabetes. The ACCORD study group. NEJM 2010; 362:1563-1574](#)

PROMOTING LEARNING ABOUT METABOLIC PROBLEMS

Work-based learning – in primary care

This is probably the best place for a GP to learn how to manage metabolic problems, especially the management of diabetic patients. There is no substitute for clinical experience supported by a GP trainer and experienced members of the primary healthcare team. Particular areas of learning include risk factor management, management of metabolic problems as they present (acute and chronic) to include emergencies and chronic disease management.

Work-based learning – in secondary care

Some GP training programmes will contain placements of varying length with physicians who may be diabetes or endocrinology specialists that give exposure to patients with serious metabolic problems in the acute setting. Most specialist care is, however, provided in outpatient or clinic settings. These are ideal places for seeing concentrated groups of patients with metabolic problems. They provide opportunities to observe many rare metabolic conditions and specialist treatments.

Specialty registrars (GP) should also take the opportunity to attend specialist diabetes, endocrine and metabolic clinics when working in other hospital posts and should also consider attending specialist clinics during their general practice placements.

Non-work-based learning

Many postgraduate deaneries provide courses on skin problems. Some medical schools also provide postgraduate certificate courses in diabetes and metabolic problems; notable examples include the University of Birmingham and the University of Warwick medical schools.

Learning with other healthcare professionals

The RCGP is keen to encourage the provision of multiprofessional training opportunities in primary care. A multiprofessional approach, combining the training of pharmacists, nurses and GPs, would greatly benefit patients and help to promote greater integration in local services. Team training programmes should draw on the experience of consultant diabetes and endocrinology specialists and their specialist nursing colleagues to enable knowledge to be shared with nurses, pharmacists and GPs in primary care.

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