Association for Nutrition

Regulating Professionals – Raising Standards – Improving Health

AfN UK Undergraduate Curriculum in Nutrition for Medical Doctors

October 2021

AfN Inter-Professional Working Group
On Medical Nutrition Education

Association for Nutrition

Regulating Professionals, Raising Standards, Improving Health

Association for Nutrition

UK Undergraduate Curriculum In Nutrition for Medical Doctors

Published: October 2021

Contents

Executive Summary

Scope and Purpose

Nutrition is fundamental to good health and plays an integral role in disease prevention, development and progression. Poor nutrition is also a core factor within increased hospital stays, increased complications and co-morbidities, with health and social care costs associated with an undernourished patient increasing three fold. The key role of nutrition in health has been highlighted by the NHS Long Term Plan stating "we will ensure nutrition has a greater place in professional education training." This curriculum is designed to provide undergraduate medical students with basic knowledge and understanding of nutrition, that can be developed further within foundation and speciality training.

Stakeholder Involvement

This curriculum has been developed through the involvement and engagement of medical schools, Royal Colleges, medical and nutrition organisations, training providers, policy professionals, students, medical professionals, nutrition professionals and in consultation with additional representatives of these stakeholders, plus patients and the general public.

Development

Following the transfer of the UK Undergraduate Curriculum in Nutrition for newly qualified doctors from the Academy of Medical Royal Colleges (AoMRC) to the Association for Nutrition (AfN) in May 2018, the AfN has led the review and development of a nutrition curriculum.

An AfN-Interprofessional Working Group for Medical Education was formed and has reviewed and revised the previous AoMRC-ICGN curriculum to ensure it is deliverable and provides undergraduate medical students with the knowledge and understanding of nutrition required to support their achievement of the GMC Outcomes for Graduates and progress to post-graduate training. A stakeholder consultation was also held, inviting feedback on the revised curriculum and medical schools were surveyed to identify implementation needs. This has enabled this final version of the undergraduate curriculum to be produced, alongside implementation support activities.

Applicability

Nutrition and/or diet is explicitly mentioned within 5 of the GMC Outcomes for Graduates. However nutrition and its role in health and disease can also be a applicable to many more outcomes and applies across multiple clinical areas. Embedding nutrition in a multidisciplinary manner enables this curriculum to be incorporated within the wider medical curriculum and reiterates the central role of nutrition across all areas, for example from gastroenterology, cardiopulmonary and surgery to medicolegal, primary care, community and public health.

Editorial Independence

This curriculum has been produced without external funding, with all parties giving their time and expertise freely to this work.
All working group members were required to report any declarations of interest at each meeting.

Introduction

Nutrition science is the study of where and how energy and nutrients are derived from the diet, the components of food, influences on dietary intakes and patterns, and the actions, interactions and balance of these in relation to health and disease. As an integrative science, it draws upon knowledge and understanding across disciplines such as biochemistry, physiology, biology, psychology, sociology, health sciences, food science, environmental science, agricultural and veterinary sciences. The importance of nutrition for health has received increased interest, with Public Health England noting the need to develop training in diet and health for non-nutritionists [1] and the NHS Long Term Plan stating "we will ensure nutrition has a greater place in professional education training" [2]. There is widespread appreciation that nutrition is fundamental for good health, and poor nutrition is directly associated with an increased risk of disease, morbidity and mortality [3, 4]. In the hospital setting, poor nutrition is associated with increased complications and longer in-patient stays, and hence increased costs to the individual and the NHS [1, 2, 3]. An understanding and appreciation of nutrition is also fundamental in underpinning a graduate's achievement of the GMC Outcomes for graduates.

As the rate of smoking has decreased in developed countries, the food and drink that we consume together with decreased levels of physical activity have become the main modifiable/behavioural determinants of life expectancy. The 2020 Global Nutrition Report states that 'collectively, malnutrition is responsible for more ill health than any other cause – good health is not possible without good nutrition' [4]. The World Health Organization (WHO) have also stated that consuming a healthy diet throughout life helps to prevent malnutrition in all its forms (both under- and over-nutrition), and associated non-communicable diseases (NCDs) [5]. The increased availability of energy dense foods that are high in fats, salt and sugars (HFSS), together with larger portion sizes, rapid urbanisation and changing lifestyles have led to a shift in dietary patterns (nutrition transition). The WHO and UK government have both highlighted that as individuals are consuming more energy dense and HFSS foods, they eat less fruit, vegetables and dietary fibre. On average, the UK population consumes too much salt, saturated fat and free sugars, whilst eating too little fibre, oily fish, fruit and vegetables compared to official recommendations. Alcohol consumption and reduced physical activity can also be contributing factors to excess energy intake, with both impacting on body weight and also on physical and mental health and wellbeing [3, 5, 6]

Issues relating to nutrition (including dietary patterns associated with prevention, management and potential remission of chronic disease and under/over-nutrition) are extremely common in medical practice. They feature as a consideration in all medical and surgical specialities, at all stages of life (pregnancy, neonates, children, adults and the older adults) and across public health, community and hospital settings. Nutrition integrates many aspects of basic sciences (anatomy, physiology, biochemistry and pharmacology) together with aspects of applied science in public health, community care and clinical practice. Specific interventions for diet and physical activity form part of the guidelines for the prevention and treatment of medical conditions such as diabetes, bowel disorders and renal disease etc. It is important for doctors to recognise these risks and to ensure advice provided to patients is appropriate to medical, cultural and individual requirements, as well as to know when to refer a patient on to a UK Voluntary Register of Nutritionists (UKVRN) Registered (Associate) Nutritionist (ANutr/RNutr) or a Health and Care Professions Council (HCPC) Registered Dietitian (RD) for specialist support or care.

In 2019, 60% of women and 68% of men in England were reported as being overweight (31% and 41% respectively) or obese (29% and 27% respectively) [7]. Additionally in 2018-19, approximately 1/3 of children were living with overweight or obesity when they left primary school (aged 10 - 11) [8]. These figures represent a significant increased risk of developing chronic disease with the potential to impact on a high number of individuals with additional costs and challenges placed on communities and healthcare systems. For example, people living with obesity have an increased risk of serious health conditions, such as cancer, type 2 diabetes mellitus, cardiovascular disease, non-alcoholic fatty liver disease, stroke etc., and within a clinical setting there can be higher risks associated with surgical and anaesthetic complications [3, 9].

Whilst life expectancy has increased due to medical advances, public health initiatives and improvements in living standards ([10], [11]), this has not been matched with increases in healthy life expectancy. This is significantly impacted by social deprivation, with a 20 year difference in years lived in good health between the most and least deprived areas [12]. Social determinants of health and health inequalities influence the ageing process and the healthy ageing of an individual [13]. Lifestyle factors (incl. diet, physical activity, alcohol, smoking and body weight) are key modifiable factors in healthy ageing, but are ones that are impacted by the social determinants of health and health inequalities. Therefore nutrition, age-related physiological changes and health are interconnected, with interdependence in some incidences [14]. Health is also closely linked to an individual's social environment (location, housing conditions etc.) and to inequalities (food poverty, resources etc.) that exist across the breadth of society and in all regions (the social determinants of health). Therefore an awareness and understanding of the social determinants of health, and activities to reduce health inequalities is fundamental to achieving a healthier society [15].

The British Association for Parenteral and Enteral Nutrition (BAPEN) report that in the UK, 33% of older adults aged over 65 years admitted to hospital are, or are at risk of being, undernourished. With levels in nursing homes rising to 41%. Being undernourished can increase the length of hospital stay, readmission rates, susceptibility to infection and mortality. It was estimated in 2018 that the health and social care costs are three times greater for an undernourished patient (£7,408) than for a non-undernourished patient (£2,155) [16].

The 2020 Global Nutrition Report highlights that there is a major problem with multiple forms of malnutrition occurring within populations and it is increasingly recognised these can co-exist within the same individual – this is referred to as the double burden of disease [4, 17]. For example, the combination of sarcopenia and obesity (sarcopenic obesity) and the combination of wasting and micronutrient toxicity present complicated interactions of relevant factors. The 2020 Global Nutrition Report notes that 88% of countries face the serious burden of more than one form of malnutrition, with 29% having high levels of all three forms: acute and/or chronic undernutrition, micronutrient deficiencies, obesity and diet-related diseases (including type II diabetes, cardiovascular diseases, poor oral health and certain types of cancer). 15.95 million children are both stunted and wasted and 8.23 million experience stunting and overweight [4].

Although great emphasis has been placed on problems identified as energy imbalance, all over the world and in the UK there are also problems of specific nutrient imbalances which may be relatively common (e.g. vitamin A, D, folate, iron, iodine and B12) and have substantial clinical and public health implications. Micronutrient deficiencies may often be an under-

recognised concomitant of obesity in adults and throughout childhood, attributable to low dietary diversity and high intakes of HFSS foods and drinks. These complex nutritional problems carry adverse implications for the physical, immunological and cognitive development of the child [17]. The deficiencies that are more likely to occur and their impact on health changes throughout the life-course and within different population groups.

Research into COVID-19 suggests that in those who contract the virus, excess weight is associated with an increased risk of hospitalisation, advanced levels of treatment and mortality, with a progressive increase in these risks as BMI rises above the healthy weight range. [18]. Physical distancing measures and periods of lockdown that were undertaken to reduce the spread of COVID-19 also resulted in many individuals spending extended periods indoors during the spring and summer, when the majority of vitamin D is obtained from sunlight exposure. Therefore resulting in an increased risk of an insufficient vitamin D status across all population groups and a stronger emphasis on the recommendation in the UK for all individuals to consider supplementation with vitamin D during the autumn and winter months, and year round for those who spend little time outdoors, cover most of the skin when outdoors and/or with dark skin tones [19].

It is important to remember that achieving good nutritional status also includes achieving adequate water balance or hydration. Dehydration is most evident in the sick, older adults or in patients with small bowel stomas/fistulas. Whereas over-hydration may be found frequently in patients receiving large amounts of intravenous saline. Dehydration has been recognised as a cause for concern within the UK, with approximately a third of emergency hospital admissions of older adults dehydrated and around 45% of patients found to be dehydrated within 48 hours of admission [20]. Inadequate fluid intake is a significant contributor to preventable dehydration, along with medication and incontinence. Dehydration has been associated with increased hospitalisation, mortality, lethargy, falls, pressure sores, constipation, urinary tract infections and decreased mental performance [21]

Food is not just a source of nutrients and energy. It can bring both enjoyment and anxiety, and is a key aspect of many social interactions. People do not choose to eat or not eat something based purely on its nutritional content. It is important to appreciate the wider factors that influence what people do and do not consume, such as taste, cost, appetite, time, availability, culture, familiarity etc. and that these factors have implications for both what advice is provided and how [22].

References

[1] Public Health England, “Sugar Reduction: The evidence for action,” October 2015. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/470179/Sugar_reduction_The_evidence_for_action.pdf.

[2] NHS Digital, “The NHS Long Term Plan,” 7 January 2019. [Online]. Available: https://www.longtermplan.nhs.uk/publication/nhs-long-term-plan/. [Accessed September 2020].

[3] Public Health England, “Calorie reduction: The scope and ambition for action,” March 2018. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/800675/Calories_Evidence_Document.pdf.

[4] Development Initiatives, “2020 Global Nutrition Report: Action on equity to end malnutrition,” July 2020. [Online]. Available: https://globalnutritionreport.org/documents/566/2020_Global_Nutrition_Report_2hrssKo.pdf.

[5] World Health Organisation, “Healthy Diet: Factsheet No. 394,” August 2018. [Online]. Available: https://www.who.int/publications/m/item/healthy-diet-factsheet394.

[6] Public Health England and Food Standards Agency, “National Diet and Nutrition Survey: Results from Years 9 and 10 (combined) of the Rolling Programme (2016/17 to 2018/19),” December 2020. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/943114/NDNS_UK_Y9-11_report.pdf.

[7] National Statistics, “Health Survey for England 2019,” December 2020. [Online]. Available: https://digital.nhs.uk/data-and-information/publications/statistical/health-survey-for-england/2019.

[8] National Statistics, “National Child Measurement Programme, England 2018/19 School Year,” October 2019. [Online]. Available: https://digital.nhs.uk/data-and-information/publications/statistical/national-child-measurement-programme/2018-19-school-year/age.

[9] Bazurro, Ball and Pelosi, “Perioperative management of obese patient. Current Opinion in Critical Care 24(6):560-567,” December 2018. [Online]. Available: https://journals.lww.com/co-criticalcare/Abstract/2018/12000/Perioperative_management_of_obese_patient.21.aspx.

[10] Office for National Statistics, “Living longer: how our population is,” 2018. [Online]. Available: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/ageing/articles/livinglongerhowourpopulationischangingandwhyitmatters/2018-08-13.

[11] Public Health England, “Health Profile for England,” 2018. [Online]. Available: https://www.gov.uk/government/publications/health-profile-for-england-2018.

[12] Public Health England & Centre for Ageing Better, “A consensus on healthy ageing,” 2019. [Online]. Available: https://www.gov.uk/government/publications/healthy-ageing-consensus-statement.

[13] World Health Organisation, “World Report on Ageing and Health: WHO,” 2015. [Online]. Available: https://www.who.int/ageing/events/world-report-2015-launch/en/.

[14] Scientific Advisory Committee on Nutrition, “SACN statement on nutrition and older adults living in the community,” January 2021. [Online]. Available: https://www.gov.uk/government/publications/sacn-statement-on-nutrition-and-older-adults-living-in-the-community.

[15] Institute of Health Equity, “Build Back Fairer: The COVID-19 Marmot Review,” December 2020. [Online]. Available: https://www.health.org.uk/publications/build-back-fairer-the-covid-19-marmot-review.

[16] British Association of Parenteral and Enteral Nutrition, “Managing malnutritionto improve lives and save money,” October 2018. [Online]. Available: https://www.bapen.org.uk/pdfs/reports/mag/managing-malnutrition.pdf.

[17] World Health Organisation, “Double Burden of Malnutrition,” 2017. [Online]. Available: https://www.who.int/nutrition/double-burden-malnutrition/en/.

[18] Public Health England, “Excess Weight and COVID-19: Insights from new evidence,” July 2020. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/907966/PHE_insight_Excess_weight_and_COVID-19__FINAL.pdf.

[19] Public Health England, “Statement from PHE and NICE on vitamin D supplementation during winter,” 2020 November 28. [Online]. Available: https://www.gov.uk/government/publications/vitamin-d-supplementation-during-winter-phe-and-nice-statement/statement-from-phe-and-nice-on-vitamin-d-supplementation-during-winter.

[20] El-Sharkawy et al., “Hydration in the Older Hospital Patient - Is it a Problem?,” *Age Ageing,* vol. 43, no. (Sup 1), p. i33, 2014.

[21] Sheils, R and Morrell-Scott, NE, “Prevention of Dehydration in Hospital,” 2018. [Online]. Available: http://researchonline.ljmu.ac.uk/id/eprint/8869/3/Prevention%20of%20Dehydration%20in%20Hospital%20Patients.pdf.

[22] European Food Information Council, “The factors that influence our food choices,” June 2006. [Online]. Available: https://www.eufic.org/en/healthy-living/article/the-determinants-of-food-choice.

Curriculum Development

The Academy of Medical Royal Colleges (AoMRC) transferred responsibility for the UK Undergraduate Curriculum in Nutrition for newly qualified doctors to the Association for Nutrition (AfN). The original UK Undergraduate Curriculum in nutrition for medical students was developed by the AoMRC's Inter-Collegiate Group on Nutrition (ICGN) and an implementation group representing UK medical schools. It described expected nutrition content of undergraduate medical training to meet 'Outcomes for Graduates (Tomorrow's doctors)' published by the General Medical Council (GMC).

With the support of both the AoMRC and GMC, the Association for Nutrition (AfN) has led work on the review and implementation of nutrition into the undergraduate curriculum of medical students to develop nutrition capacity to meet the needs of newly qualified doctors and the achievement of the GMC Outcomes for Graduates.

> *'The Academy of Medical Royal Colleges is delighted the Association for Nutrition will lead on the review and implementation of the undergraduate curriculum, to ensure all newly qualified doctors are appropriately trained and skilled in nutrition to support clinical practice.'*
>
> **Alastair Henderson, Chief Executive of Academy of Medical Royal Colleges**

> *'We welcome the transfer of responsibility for the UK Undergraduate Curriculum in Nutrition from Academy of Medical Royal Colleges to Association for Nutrition. The Association for Nutrition will continue the excellent work of the Academy of Medical Royal Colleges in developing capacity in nutrition in undergraduate medical education to meet GMC Outcomes for Graduates."*
>
> **Mark Dexter, Head of Policy (Education), General Medical Council**

The AfN thank all those who have contributed to the AfN-Interprofessional Working Group for Medical Education. The working group have reviewed the previous AoMRC-ICGN curriculum to ensure it is deliverable and provides undergraduate medical students the ability to develop their knowledge and understanding of nutrition to support their achievement of the GMC Outcomes for graduates and progress to post-graduate training. A stakeholder consultation was held, where all Medical Schools, Royal Colleges, Medical and Nutrition Organisations, Training Providers, Students, Medical Professionals and Nutrition Professionals were invited to provide feedback on the revised curriculum. This has enabled this final version of the undergraduate curriculum to be produced, alongside implementation support activities.

Working Group Members

Organisation	Representative
Association for Nutrition	Ms Helen Clark Dr Alan Jackson RNutr Dr Glenys Jones RNutr
Aston Medical School	Dr Duane Mellor RD RNutr
Barts Medical School	Dr Timothy Eden RD
Bournemouth University	Dr Swarjit Sarkar RNutr
Brighton Medical School	Dr Kathy Martyn RNutr
Brighton & Sussex University Hospital	Ms Elaine MacAnich RD
British Association for Parenteral and Eternal Nutrition	Dr Trevor Smith
British Dietetic Association	Dr Judy Lawrence RD RNutr Ms Chloe Adams RD Ms Elaine MacAnich RD Ms Pauline Douglas RD
British Nutrition Foundation	Ms Ayela Spiro
British Society of Lifestyle Medicine	Dr Sue Kenneally ANutr
Culinary Medicine*	Dr Rupy Aujla
Edge Hill University	Dr Thomas Butler RD RNutr
Education and Research in Medical Nutrition Network*	Ms Elaine MacAnich RD Ms Kathy Martyn RNutr
General Medical Council	Dr Mark Dexter
Hull York Medical School	Dr Martyn Veysey
Junior Doctors	Dr Timothy Eden RD
London School of Hygiene & Tropical Medicine	Dr Marko Kerac RNutr
Medical Schools Council	Dr Alexandra Johnstone RNutr Dr Martyn Veysey
NHS England & NHS Improvement	Dr John Barber
NNEdPro Global Centre for Nutrition and Health*	Ms Pauline Douglas RD Prof Sumantra Ray RNutr
Nutritank* (representing Medical Students)	Dr Iain Broadley Ms Ally Jaffee Dr Jessicarr Moorhouse
Nutrition Society	Dr Bernard Corfe Dr Bernadette Moore Dr Dean Sewell RNutr
Public Health England	Ms Margie Van Dijk RNutr Dr Jennifer Garry RNutr Ms Rachel White RD
Queen Mary University London	Dr Jenny Blythe
Rowett Institute of Nutrition & Health, University of Aberdeen	Dr Alexandra Johnstone RNutr
Royal College of Physicians	Dr Peter Aggett Dr Jeremy Nightingale
Royal College of General Practitioners	Dr Sue Kenneally ANutr
Royal College of Paediatrics and Child Health	Dr Jonathan Hind
Southampton Medical School	Dr Steve Wootton
University of Chester	Dr Thomas Butler RD RNutr
University of Dundee	Dr Angela Craigie RNutr Dr Suzanne Zaremba RNutr
University of Nottingham & Queen's Medical Centre	Prof Dileep Lobo
University of Ulster	Ms Pauline Douglas RD

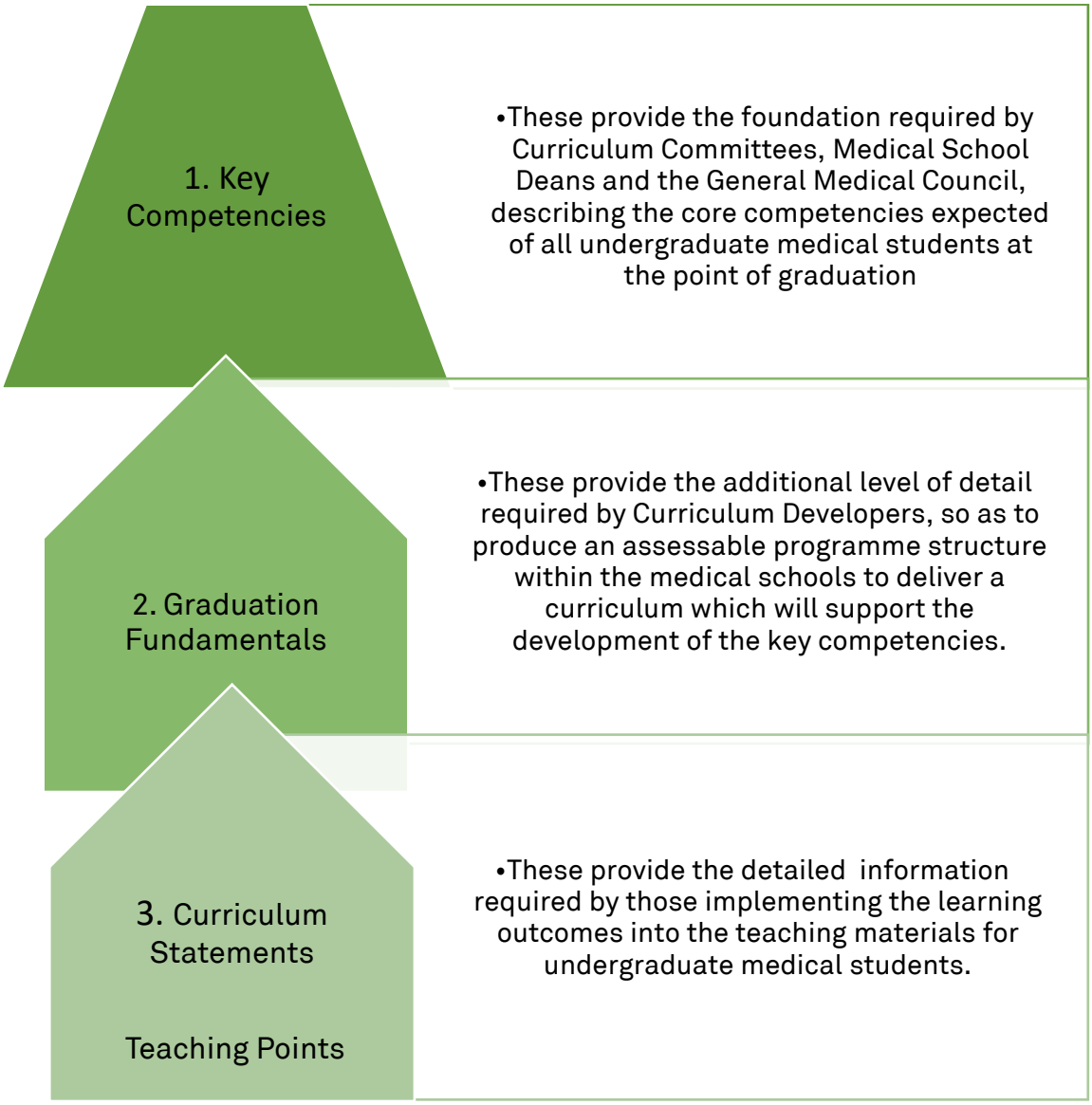
* Since the creation of this working group, these 4 organisations have formed The Nutrition Implementation Coalition

Document Format and Use

Nutrition is relevant to all physiological systems and clinical specialties, but within medical training it is not considered a clinical specialty in its own right. Furthermore, nutrition learning opportunities should be embedded by Medical Schools within the general medical undergraduate curriculum, without the need to add in a large number of new components to an already crowded programme or with an additional burden on teaching staff.

This document enables the clear identification of the learning outcomes (key competencies & graduation fundamentals) for students and suggests appropriate teaching points to achieve these. These are benchmarked against the GMC Outcomes for graduates.

This document is divided into 3 main levels:



Integration within the general medical undergraduate curriculum

This nutrition curriculum provides undergraduate students to gain the knowledge, understanding and skills required to support them in being safe practitioners before they move onto the next stage of their medical training.

The Undergraduate Curriculum in Nutrition for Medical Doctors supports the development of 13 core nutritional competencies for all undergraduate medical students at the point of graduation, assessed through the achievement of 11 graduation fundamentals.

The curriculum supports the understanding and skill development of the core competencies, and has 8 key curriculum statements. The curriculum statements are supported by teaching points which can be integrated across foundation courses (or introductory learning) where the principles of basic nutrition underpinning good health across the life course can be incorporated alongside basic biochemical and physiological principles, within public health teaching, and within clinical teaching by specialty. Thus ensuring students understand the importance of nutrition in the prevention and both the progression and management of disease, and conversely how disease can exert an effect on nutritional state.

The curriculum statements cover the primary knowledge base, the essential skills all doctors should have and places nutrition within the context of public health and modern professional practice. Throughout the curriculum, benchmarks to the GMC Outcomes for graduates are provided.

Alongside formative lectures, learning with the use of case- or problem-based approaches provide a very good opportunity for the role of nutrition within medicine to be illustrated, with each case presenting an opportunity to address one or more learning outcome. Combining supporting resources and activities, with lectures and a portfolio of case-studies, alongside the acquisition of practical skills through clinical training or at the bedside, undergraduate medical students should be provided with sufficient opportunity to meet all the learning outcomes in this curriculum and achieve the key competencies for graduates.

The nutrition curriculum is designed to be presented as an integral part of the general undergraduate medical curriculum, thereby making it clear to students how nutrition inter-relates with the study of other systems and contributes to an inclusive understanding of health and disease.

Key Competencies For Undergraduate Medical Curriculum In Clinical Nutrition

The 13 core nutritional competencies expected of undergraduate medical students at the point of graduation are divided into three categories. Newly qualified doctors should be able to demonstrate the knowledge base, ability to assess and skills in intervention to facilitate safe, effective nutritional care.

The curriculum will act to support the development of the competencies, and is intended to be embedded in to existing medical school programmes. Nutritional considerations underpin health and disease, and improving nutritional status enhances the effectiveness of other aspects of care and therapeutic interventions.

Knowledge

- K.1 Understand the principles of a healthy balanced diet and where to access national guidelines on nutritional messages.
- K.2 Understand the challenges and barriers to achieving a balanced diet and dietary recommendations i.e. socio-economic, physical, beliefs, values and perceptions.
- K.3 Understand that nutrition has a direct/indirect impact on health and disease.
- K.4 Understand ethical and medicolegal considerations relating to nutrition and hydration.
- K.5 Understand the roles and responsibilities of colleagues from multiple departments involved in the provision of nutrition care and the referral pathways to nutrition specialists/specialist services.
- K.6 Know the requirements for water, electrolytes (incl. sodium), both orally and intravenously.

Assessment

- A.1 Be able to weigh and measure the height of a patient accurately.
- A.2 Be able to accurately calculate a patient's body mass index (BMI), percentage weight loss and be able to plot measures on a growth chart for children and accurately measure a child's weight category.
- A.3 Be able to interpret BMI (understanding its limitations), physical examination and biomarkers against reference ranges to identify patients at risk of malnutrition (underweight, excess weight and micronutrient deficiency).
- A.4 Be able to identify high nutritional risk of common and relevant disease/disorders.

Skills in Intervention

- S.1 Be able to acknowledge appropriate scope of practice, limitations and when and how to refer on for specialist nutrition/dietetic care.
- S.2 Be able to start a sensitive, non-judgmental conversation about weight, food and lifestyle in a brief consultation within a primary/secondary care setting.
- S.3 Be able to include appropriate data to provide a comprehensive referral for specialist nutrition/dietetic care.

Graduation Fundamentals

All medical students at the point of completing undergraduate training should be able to:

1. Detect patients who are underweight or at risk of undernutrition and patients who are living with excess weight.

2. Include a basic assessment of nutritional status into every patient's clerking and state, where appropriate, a nutritional care plan/referral.

3. Know the importance of fluid and electrolyte requirements in health and during illness (including post-operatively).

4. Describe how giving nutritional support to undernourished patients and achieving movement towards a healthy weight in individuals who are underweight/overweight or with obesity can improve quality of life, morbidity and/or mortality.

5. Describe the importance of diet in maintaining health in all ages, life-stages, sex and ethnic groups.

6. Undertake a basic assessment of nutritional and hydration status to identify undernutrition, its consequences and treatment/ management.

7. Identify individuals who are living with excess weight at all ages and the related health risk consequences and be aware of the treatment/management options, appreciating micronutrient deficiency may also be a factor to consider.

8. Have an understanding of, and know where to reference, the approximate average energy, macronutrient, water, micronutrient requirements and the more common deficiencies in the UK population.

9. Describe the official UK population dietary recommendations and be able to promote a "healthy balanced diet".

10. Describe the indications for patients needing clinically assisted nutrition and hydration support (oral, enteral and parenteral); know the principles of administration and the potential complications.

11. Understand when it is appropriate to refer for specialist nutrition/dietetic support and/or to specialist nutrition/weight management services.

These graduation fundamentals should then be further developed in both breadth and depth during post-graduate and specialist training.

The UK Undergraduate Curriculum in Clinical Nutrition

Curriculum Statements and Teaching Points

A. Nutrition / Hydration In Health And Disease

Curriculum Statement A:

Be safe and competent to advise on nutrition and hydration in healthy and ill people.

Teaching Points for Curriculum Statement A

1. Understand how appetite/food intake is regulated (including neurological, hormonal and psychological mechanisms).

2. Understand the processes of digestion, absorption and metabolism (for macronutrients, water, micronutrients) and the importance of dietary intake in maintaining and managing gastrointestinal function (including constipation).

3. Know how to assess hydration status and understand daily requirements for fluids in health and disease states.

4. Be able to discuss the social, economic, cultural, environmental (including regulatory) and psychological drivers of people's eating, drinking and activity behaviours throughout their life course, including an understanding of the social determinants of health/health inequalities and the impact of socioeconomic deprivation and food poverty.

5. Have an understanding of the dietary reference values for energy, macronutrients and micronutrients. Be aware that these requirement can vary, for example with energy intake, physical activity, clinical condition and during the life course (including pregnancy).

6. Be able to describe a "healthy balanced diet" in terms of the major food groups using knowledge of UK dietary recommendations/advice (including specific supplement recommendations) for the population.

7. Be aware of the interactions of nutrients with:
    i. common medications (e.g. anticoagulants, anticonvulsants and chemotherapy)
    ii. fluids (including clinically assisted nutrition and hydration support)
    ii. drugs of abuse (including alcohol, opiates), other nutrients and other food components

8. Be aware of the common use of supplements including high dose vitamins, herbs, phytonutrients and other supplements and their potential adverse effects.

9. Be aware of the implications that suboptimal nutrition, nutritional management or long-term conditions can have on pregnancy outcomes, maternal and infant health.

10. Know the current official advice regarding breast feeding, including its initiation and duration. Be aware of the benefits breastfeeding provides to both the mother and infant.

11. Know the current official advice regarding the initiation of complementary feeding (commonly referred to as weaning) and have awareness of suitable sources of support and information. Be aware and sensitive to the difficulties that can be experienced in respect to both breast and bottle feeding.

B. Nutrition Screening & Assessment

Curriculum Statement B:

Be able to make an assessment of the patient's general nutritional status. This includes an evaluation of their general physical condition, a basic review of dietary intake and the undertaking of simple anthropometric measurements.

Teaching Points for Curriculum Statement B

1. Be able to interpret measurements using child growth charts and detect abnormal patterns, including wasting, stunting, growth faltering and excess weight. Know the importance of growth in early life and its association with health and disease in later life, and when to refer on abnormal growth patterns for further investigation.

2. Be aware of potential difficulties in oral intakes including problems patients may have in getting food into their mouth, being able to chew (including denture problems) and failing swallowing mechanisms; and recognising the benefit of a bedside swallow assessment by trained staff and how & who to refer to for a formal swallowing assessment.

3. Be able to assess fluid status from the oral or recorded history (e.g. reported thirst, urine colour, low intake level, sudden weight changes) and from examination (e.g. oedema, dry skin, postural hypotension/tachycardia).

4. Be able to use a dietary screening tool to assess basic dietary, fluid, alcohol and physical activity history, including information on patterns of consumption, activity, appetite, weight change, including unintentional weight changes (loss or gain). Be able to clearly document the discussions and know when to refer to a nutrition professional for a formal nutritional assessment.

5. Be aware of common anthropometric measures (e.g BMI, BMI Z scores, mid-upper arm circumference, waist circumference, skinfolds), and their advantages, disadvantages and variations in different populations (e.g. age, ethnicity, medical conditions). Be able to sensitively and accurately weigh and measure a patient's height to calculate their BMI, know the standard ranges defined for underweight, healthy weight, overweight and with obesity. Have awareness of potential differences in cut-off points for population sub-groups and the sub-groups in which BMI has limitations of use (e.g. athletes, sarcopenic, limb deformity). Be aware that anthropometry is a proxy measure of malnutrition and should not be used alone to determine clinical status.

6. Have a knowledge of the biochemical changes that occur in undernutrition (e.g. Na, K, Mg, Phosphate), the molecular mechanisms by which micronutrient deficiencies can alter metabolism or result in physiological consequences, and their implications for refeeding. Additionally, know when biochemical markers are not valid measures of nutritional status e.g. low serum albumin.

7. Have knowledge of common micronutrient deficiencies and be aware of the impact of both subclinical (i.e. only detectable on biochemical tests) and clinical (i.e. those with specific symptoms and signs) deficiencies across body weight spectrum and impact of dietary variety on this. To include vitamins A, C, D, E, K, B_{12}, folate, thiamine, iron, selenium, zinc, magnesium, calcium, and essential fatty acids.

C. Effect Of Nutrition Status On Illness

Curriculum Statement C:

Know that being underweight, overweight/with obesity, and/or nutrient deficient may adversely affect the prognosis of many diseases (including during their treatment).

Teaching Points for Curriculum Statement C

1. Know that some diseases (e.g. COPD, CCF, IBD and cancer) and surgical procedures may have a better outcome if nutritional status is improved/normalised.
2. Be aware of the effect of being underweight, undernourished and/or cachectic on clinical outcomes (including complications, quality of life, length of stay and readmission rate) via mechanisms including:
    - muscle strength (thus mobility and respiratory reserve),
    - wound healing and the risk of pressure ulcers
    - resistance to infection
3. Be aware that patients living with excess weight are more prone to disease masking, increased co-morbidity risk, fertility and pregnancy challenges and/or complications of their illness and in particular surgical-associated risks (e.g. anaesthetic risks, DVT, hyperglycaemia and unrecognised sarcopenia).
4. Understand how inflammation and specific diseases (including sepsis, cachexia, malabsorption, trauma, burns, cancer) and their treatments influence nutritional status and needs (and vice versa) by affecting:
    i. intake, digestion and absorption
    ii. requirements
    iii. losses (e.g. gut or urine water and electrolytes)

D. Malnutrition: Underweight / Undernourished

Curriculum Statement D:

Be able to work with a multidisciplinary nutrition support team to give nutritional support to patients who are already underweight, undernourished or at risk of becoming so.

Teaching Points for Curriculum Statement D

1. Know the effects and manifestations of acute and chronic undernutrition on key processes (including physiological, biochemical, immunological and psychological).

2. Know the importance of formally assessing nutritional status and the limitations of solely relying on the initial clinical impression alone. Understand the difference between screening and assessment tools, plus their roles in:
   i. Detecting those currently underweight from the calculation of BMI and percentage weight loss.
   ii. Detecting those at risk of becoming undernourished from the current nutrient intake and the illnesses' predicted course.

3. Be able to identify intake (oral) failure (inability to get food into the gut) and the factors that may influence poor intake including poor dentition, poor appetite, head/neck, oesophageal cancer, trauma, neurological disease (e.g. stroke, cerebral palsy, motor neurone disease, multiple sclerosis), psychological disorders (e.g. dementia, depression and eating disorders) and social circumstances (e.g. isolation, poverty and limited knowledge and understanding of nutrition). Know when and how to refer on for specialist nutrition/dietetic support.

4. Be aware of the potential signs and symptoms of typical and atypical eating disorders (and other psychological problems) and know how to obtain help from eating disorder specialists.

5. Identify digestive and absorptive (intestinal) failures. Digestive failure could include (but is not limited to) gastric or pancreatic disease and absorptive (intestinal) failure due to short gut, intestinal fistula, obstruction, dysfunction or mucosal disease. Be aware of the role of the wider MDT and colleagues in supporting the management of such conditions.

6. Identify patients at risk of developing refeeding problems when food (especially carbohydrate) is introduced to an underweight/undernourished patient. Know the principles to prevent/treat this and understand when it is appropriate to refer on to a dietitian.

7. Understand the role of the multidisciplinary nutrition support team (NST) and/or specialist nutrition colleagues (e.g. nutrition nurse specialist, dietitian) in providing good quality, safe nutritional care and support to the patient throughout the risk reduction, treatment and management stages, and know when to refer a patient to them.

8. Know the indications for referral to specialist nutrition/dietetic support (Nutrition Support Team/specialist nutrition colleagues). Have knowledge of the routes (oral, enteral and parenteral) of giving nutritional support, the advantages and disadvantages, and contraindications of the different forms of nutrition support.

9. Have knowledge of the problems that can occur with enteral nutrition (e.g. mal-positioned enteral tube) and with parenteral nutrition (e.g. catheter-related blood stream infection and central vein thrombosis/stenosis) and understand when to obtain specialist nutrition/dietetic support.

10. Know and understand how to apply the principles of the ethical / legal aspects of providing, withholding and/or withdrawing nutrition/ hydration treatment (with reference to latest GMC guidelines). This includes autonomy, beneficence, non-maleficence, justice and mental capacity.

E. Malnutrition: Overweight, Obesity & Metabolic Syndrome

Curriculum Statement E:

Be able to advise on the appropriate management of individuals who are living with excess weight (overweight or obesity).

Teaching Points for Curriculum Statement E

1. Be aware that obesity is a complex problem for adults and children, however at its simplest level is the result of an energy imbalance (intake exceeds expenditure) and micronutrient deficiencies can be prevalent alongside positive energy balance.

2. Understand that reduced energy intake is required for weight loss, but both reduced energy intake and increased physical activity support the maintenance of a healthier weight. Be aware that physical activity has other health benefits beyond weight control and that weight regain is common, so as to aid healthy discussion.

3. Know that the drivers for obesity and metabolic syndrome (dietary intake) are often beyond individual control alone and are influenced by a large variety of factors including:

    - Individual biology (e.g. genetics, physiological state)
    - Social / cultural / behavioural factors and inequalities
    - Advertising and promotion of food & drink
    - Mental health and wellbeing (e.g. depression/anxiety - comfort eating etc.)
    - Built environment (e.g. access to shops and cycle/footpaths etc.)
    - Availability and cost of less healthy food, drinks & alcohol
    - Socio-economic factors affecting knowledge, finances and capacity/time

    Most importantly, know and understand that obesity is determined by the interaction of these factors and not one in isolation.

    Be aware that there may also be some other potential factors where the evidence base is still developing (e.g. gut microbiome, chronobiology)

4. Be able to give realistic basic advice to a patient about a diet that promotes a healthier weight in line with current evidence-based Government recommendations and know when (& how) to refer on to a UKVRN Registered Nutritionist, Dietitian and/or weight management/bariatric services for more complex interventions/advice reinforcement. Be able to accurately document advice given/referrals, identifying outcomes and responsibility for follow-up.

5. Be aware of the stigma of living with excess weight (overweight/obesity) and thus the need to support individuals with empathy and use of non-stigmatising or discriminatory language. Be aware of the potential impact of this stigma on healthcare provision and perception, with weight stigma, weight bias and weight discrimination having potentially adverse physical and psychological effects.

6. Have knowledge of the current graded obesity care pathway and be able to refer patients to appropriate services/resources.

7. Be aware of pharmaceutical approaches to weight management, their strengths, limitations and indications.

8. Have knowledge of the current and developing evidence-based diets recommended for weight management recognised by official health organisations. Be aware of highly restrictive and common popular diets with limited/weak evidence bases and their risks/potential unintended consequences and long term acceptability for individuals.

9. Have knowledge of the indications for bariatric surgery (weight loss and metabolic disorders), understand its benefits and complications (nutritional, psychological) plus the prolonged nutritional follow up and support needed after surgery.

F. Specific Dietary Requirements

Curriculum Statement F:

Be aware of dietary approaches in specific situations and when to refer to a UKVRN Registered Nutritionist or Dietitian.

Teaching Points for Curriculum Statement F

1. Be able to provide basic advice on the following diets, how to obtain help with providing them and when to refer on for specialist nutrition/dietetic support:
    - Weight reducing diets
    - Weight increasing, energy/protein dense diets (including for growth and management of undernutrition)
    - Other diets to support health and reduce disease risk

2. Be aware of the impact of disease, frailty, age and dementia on eating and obtain help with providing weight increasing and/or varied diets.

3. Be aware of dietary restrictions for medical purposes, cultural/religious or ethical reasons and the potential nutritional risks.

    These include:
    - Gluten free (for coeliac disease)
    - Lactose free
    - Low fibre
    - Low fat
    - Low FODMAP (IBS)
    - Ketogenic diets (childhood epilepsy)
    - Low phenylalanine/protein diets (for phenylketonuria)
    - Vegetarian diets (including vegan diet in which it is important to know medicines/feeds that are free of animal products)
    - Religious/cultural diets (kosher, halal, jainism etc)
    - Food allergies & common diagnosed intolerances (nuts, milk, soya etc)
    - Foods to be avoided or restricted during pregnancy

4. Know evidence-based dietary strategies used to help treat /manage illnesses, understand that the evidence for these is often evolving (e.g. FODMAPS, probiotics) and the need for specialist nutrition support. For example, those used for:

    - IBS and IBD
    - Perioperative (Pre and post-surgical) care (incl. bariatric intervention)
    - Metabolic disorders

G. Hydration

Curriculum Statement G:

Be able to maintain fluid and electrolyte balance in health and disease.

Teaching Points for Curriculum Statement G

1. Understand the importance of hydration for both physical and mental wellbeing in health and disease/injury prevention, along with official population level recommendations and how these might be affected by working environment, temperature, activities, medications (e.g. diuretics) etc.

2. Be able to identify the clinical symptoms, signs, observations (weight / fluid balance) and implications of over- and underhydration, and when to refer on for support.

3. Be aware of the current clinical guidelines on the fluid needs of patients of different ages (e.g. frail elderly patients) and in different situations (e.g. septic, post-operative, dysphagia, constipation).

4. Be able to identify overhydration (especially saline excess in surgical patients) and impact on recovery, mortality, complications and the duration of hospital admission.

5. Know how to calculate fluid requirements according to patient weight/condition and the importance of, and how to monitor fluid and electrolyte balance with daily weight and fluid balance charts.

6. Be able to advise on strategies to prevent dehydration and be aware that it can cause acute and chronic kidney injury and other adverse outcomes.

H. Nutrition In Health Promotion And Illness Prevention (Public Health)

Curriculum Statement H:

Be safe and competent to provide basic nutrition and hydration advice for the maintenance of health / prevention of disease and when to refer on to a UKVRN Registered Nutritionist or HCPC Dietitian.

Teaching Points for Curriculum Statement H

1. Understand the relationship between public health/population level guidance and the role of all health professionals in providing individual nutrition and healthcare advice and support.

2. Be aware of the epidemiological evidence and metabolic mechanisms linking dietary, nutritional and activity related risk factors (including sedentary behaviour) with health conditions such as cardiovascular disease (BP and lipids), cancers, osteoporosis and diabetes, as well as understanding the role of diet and activity in their risk, management and treatment. Understand that the evidence-base is evolving and be able to identify credible sources for obtaining up to date information on research and developing evidence.

3. Be able to identify the risk of macronutrient/micronutrient excess or inadequacy in individuals and populations, and identify relevant interventions.

4. Understand major evidence-based national government recommendations for a healthy balanced diet for health promotion and disease prevention (e.g. increased fibre, fruit and vegetables, unsaturated fats and oily fish and reduction of salt, saturated fats and free sugars).

5. Be aware of current advice on nutrition and on food/drinks (e.g. alcohol and caffeine) and know how it will be affected by cultural/religious beliefs and different life stages. Be able to provide cultural and language appropriate advice about these issues with an awareness of low levels of health literacy in the population.

6. Be aware that doctors have a responsibility in nutritional care and management, and how the role of doctor in nutrition advice may differ in primary, secondary and tertiary care settings, but are important in all three.

7. Be aware that a doctor's advice on diet and nutrition is often highly regarded by a patient and thus may be very influential and effective in diet-related health conditions.

8. Be aware of own limitations and know when and how to refer the patient to a UKVRN Registered Nutritionist or HCPC registered Dietitian for additional advice or support, in in-patient, outpatient and community settings.

9. Know and understand the role of other health professionals in managing nutrition, including (but not limited to) an appreciation of the role of:
    - Midwives and health visitors in managing nutrition in pregnancy and in infancy, and their importance in encouraging breastfeeding;
    - Nurses and Healthcare assistants in screening measurements and feeding;
    - Nutrition Nurse Specialists in on-ward nutrition and hydration management and feeding tube/IV feed line care;
    - Speech & Language Therapists (SLT) in swallowing disorders;

- Biomedical scientists and haematologists in assessment of clinical and biochemical markers,
- Pharmacists in the use and supply of medication and medical appliances, contraindications and preparation formats;
- Dietitians for their unique knowledge in clinical nutrition management and treatment, with specialties including diabetes, cancer, burns, ICU and renal disease
- UKVRN Registered Nutritionists for their expertise in public health nutrition, weight management, disease risk reduction, education and food science.

Along with appreciation of support roles that influence food intake such as chefs, family and feeding volunteers.

Curriculum Mapping

Nutrition is a fundamental component of good health and is interrelated with medical presentation and conditions across almost all areas of clinical practice. Consideration of nutritional factors is therefore a core skill in the assessment of patients, their diagnosis and treatment.

Nutrition within the Outcomes for Graduates

Tables 1-4 identify where this curriculum maps to the GMC Outcomes for Graduates. The curriculum has been mapped at the level of Key Competencies, Graduate Fundamentals and Curriculum Statements. This showcases where this curriculum fits into the training needs of medical students and can be incorporated and delivered across disciplines/clinical areas.

Table 1: Outcomes for Graduates that contain nutritional considerations

	Outcome Point		Sub-Points within Outcome																			
			a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u
Outcome 1 -Professional values and behaviours	2	✓	✓	✓						✓		✓	✓	✓							✓		
	3																						
	4	✓																					
	5																						
	6	✓	✓	✓	✓	✓		✓															
	7	✓		✓						✓													
	8																						
	9	✓	✓	✓	✓																		
Outcome 2 - Professional Skills	10	✓	✓	✓																			
	11	✓	✓		✓																		
	12	✓																					
	13	✓																					
	14	✓	✓	✓				✓	✓			✓		✓	✓								
	15																						
	16																						
	17																						
	18	✓	✓																				
	19																						
Outcome 3 - Professional knowledge	20																						
	21																						
	22	✓	✓			✓	✓																
	23	✓	✓			✓																	
	24	✓	✓	✓		✓	✓																
	25	✓	✓		✓	✓	✓		✓			✓	✓										
	26	✓	✓	✓			✓				✓												

✓ = Explicit mention of nutrition within outcome

Table 2:
Mapping of Key Competencies to Outcomes for Graduates

Key Competency	Supports Achievement of Graduate Outcome(s)
K1. Understand the principles of a healthy balanced diet and where to access national guidelines on nutritional messages.	2, 7, 11, 14, 25, 26
K2. Understand the challenges and barriers to achieving a balanced diet and dietary recommendations i.e. socio-economic, physical, beliefs, values and perceptions.	2, 6, 7, 14, 23, 24, 25
K3. Understand that nutrition has a direct/indirect impact on health and disease.	6, 7, 14, 22, 25
K4. Understand ethical and medicolegal considerations relating to nutrition and hydration.	2, 4
K5. Understand the roles and responsibilities of colleagues from multiple departments involved in the provision of nutrition care and the referral pathways to nutrition specialists/specialist services.	2, 6, 9, 12, 14
K6. Know the requirements for water, electrolytes (incl. sodium), both orally and intravenously.	14, 22
A1. Be able to weigh and measure the height of a patient accurately.	7, 11, 13, 14, 25
A2. Be able to accurately calculate a patient's body mass index (BMI), percentage weight loss and be able to plot measures on a growth chart for children and accurately measure a child's weight category.	7, 11, 13, 14
A3. Be able to interpret BMI (understanding its limitations), physical examination and biomarkers against reference ranges to identify patients at risk of malnutrition (underweight, excess weight and micronutrient deficiency).	7, 11, 13, 14, 25
A4. Be able to identify high nutritional risk of common and relevant disease/disorders.	6, 7, 11, 13, 14, 22, 25
S1. Be able to acknowledge appropriate scope of practice, limitations and when and how to refer on for specialist nutrition/dietetic care.	2, 6, 9, 10, 11, 12, 14
S2. Be able to start a sensitive, non-judgmental conversation about weight, food and lifestyle in a brief consultation within a primary/secondary care setting.	2, 6, 7, 10, 11, 13, 14, 23, 24, 25
S3. Be able to include appropriate data to provide a comprehensive referral for specialist nutrition/dietetic care.	6, 9, 10, 12, 14, 23, 26

Table 3:
Mapping of Graduate Fundamentals to Outcomes for Graduates

Graduate Fundamental	**Supports Achievement of Graduate Outcome(s)**
1. Detect patients who are underweight or at risk of undernutrition and patients who are living with excess weight.	6, 7, 14, 22, 23, 24, 25
2. Include a basic assessment of nutritional status into every patient's clerking and state, where appropriate, a nutritional care plan/referral.	7, 9, 10, 11, 12, 13, 14, 23, 25
3. Know the importance of fluid and electrolyte requirements in health and during illness (including post-operatively).	6, 14, 22
4. Describe how giving nutritional support to undernourished patients and achieving movement towards a healthy weight in individuals who are underweight/overweight or with obesity can improve quality of life, morbidity and/or mortality.	2, 7, 14, 22, 23
5. Describe the importance of diet in maintaining health in all ages, life-stages, sex and ethnic groups.	6, 22, 23, 24, 25, 26
6. Undertake a basic assessment of nutritional and hydration status to identify undernutrition, its consequences and treatment/ management.	6, 7, 11, 12, 13, 14, 25
7. Identify individuals who are living with excess weight at all ages and the related health risk consequences and be aware of the treatment/management options, appreciating micronutrient deficiency may also be a factor to consider.	2, 7, 12, 22, 25
8. Have an understanding of, and know where to reference, the approximate average energy, macronutrient, water, micronutrient requirements and the more common deficiencies in the UK population.	2, 14, 22
9. Describe the official UK population dietary recommendations and be able to promote a "healthy balanced diet".	2, 6, 12, 14, 22, 24, 25, 26
10. Describe the indications for patients needing clinically assisted nutrition and hydration support (oral, enteral and parenteral); know the principles of administration and the potential complications.	2, 4, 6, 7, 12, 14, 18, 22
11. Understand when it is appropriate to refer for specialist nutrition/dietetic support and/or to specialist nutrition/weight management services.	2, 6, 9, 10, 12, 14, 22

Table 4:
Mapping of Curriculum Statements to Outcomes for Graduates

Curriculum Statement	**Supports Achievement of Graduate Outcome(s)**
A. Nutrition/Hydration in Health and Disease	2, 6, 7, 10, 12, 13, 14, 18, 22, 23, 24, 25
B. Nutrition Screening & Assessment	2, 6, 7, 11, 13, 14, 22, 25
C. Effect Of Nutrition Status On Illness	6, 22, 25
D. Malnutrition: Underweight / Undernourished	2, 4, 6, 7, 9, 10, 11, 12, 13, 14, 18, 23, 24, 25
E. Malnutrition: Overweight, Obesity & Metabolic Syndrome	2, 7, 9, 10, 11, 12, 13, 14, 18, 22, 23, 24, 25, 26
F. Specific Dietary Requirements	2, 6, 9, 10, 11, 12, 13, 14, 22, 23, 25
G. Hydration	2, 7, 9, 12, 13, 14, 22, 24, 25
H. Nutrition In Health Promotion And Illness Prevention (Public Health)	2, 6, 7, 9, 12, 13, 22, 24, 25, 26

Nutrition within the Medical Licence Assessment (MLA)

Tables 5-7 highlight areas within the six MLA domains that can either be caused/influenced by nutritional factors or that can in turn impact on a patient's nutritional status. In addition to underpinning achievement of the Outcomes for Graduates, this curriculum helps to prepare medical students to successfully meet the knowledge, skills and behaviours expected of doctors entering the UK Foundation Programme and assessed via the MLA.

Whilst nutrition underpins and influences health and disease across clinical practice areas, patient presentations and conditions, the tables below highlight those specifically stated within the 2021 MLA content map for inclusion within an applied knowledge test (AKT) and clinical and professional skills assessment (CPSA).

Table 5:
Areas of the MLA content map where nutrition may be a key or influencing factor

Areas of clinical practice	
Acute and emergency	Cancer
Cardiovascular	Child health
Clinical haematology	Dermatology
Endocrine and metabolic	Gastrointestinal including liver
General practice and primary healthcare	Medicine of older adult
Mental health	Musculoskeletal
Obstetrics and gynaecology	Perioperative medicine and anaesthesia
Areas of professional knowledge	
Allergy and immunology	Biomedical sciences
Clinical biochemistry	Clinical pharmacology and therapeutics
Laboratory haematology	Medical ethics and law
Psychological principles	Social and population health
Clinical and professional capabilities	
Obtains relevant information about the patient through appropriate history and physical/mental health examination, formulating a prioritised list of problems and differential diagnoses	Identifies and requests relevant investigations, interprets results and ensures they are acted on appropriately in the context of the clinical situation, avoiding over-investigation
Assesses and generates management plans for chronic conditions	Deals appropriately with complexity and uncertainty including managing multimorbidity and prioritising tasks
Assesses and generates management plans to promote health and prevent disease	Utilises evidence-based guidelines appropriately
Communicates effectively with health care professionals, patients, relatives, carers and other advocates	Works effectively, respectfully and supportively as a member of the team

Table 6:
MLA mapped patient presentations where nutrition may be a key or influencing causal factor, potential adversely impacted or a management/treatment option

Patient Presentation / Area of Clinical Practice	Acute & Emergency	Cancer	Cardiovascular	Child Health	Clinical haematology	Dermatology	Ear, Nose & Throat	Endocrine & Metabolic	Gastrointestinal	General Practice & Primary Healthcare	Infection	Medicine of Older adult	Mental Health	Musculoskeletal	Neurosciences	Obstetrics & Gynaecology	Perioperative medicine and anaesthesia	Renal & urology
Abnormal development/ developmental delay				x											x			
Abnormal eating or exercising behaviour										x			x					
Allergies				x			x			x								
Anaphylaxis	x																	
Blackouts and faints			x									x			x			
Chronic rash						x				x								
Constipation									x	x		x						
Decreased appetite		x							x				x					
Dehydration	x			x													x	x
Diarrhoea				x					x	x	x							
Difficulty with breast feeding				x												x		
Electrolyte abnormalities		x						x				X					x	x
Falls										x		X						
Fatigue								x		x			x					
Food intolerance				x					x									
Hypertension			x							x		X				x		x
Infant feeding problems				x						x								
Normal pregnancy and antenatal care																x		
Pregnancy risk assessment																x		
Small for gestational age/ large for gestational age																x		
Subfertility																x		
Weight gain								x	x	x			x					
Weight loss		x						x			x		x					
Wellbeing checks										x								

Table 7:
MLA mapped conditions where nutrition may be a key or influencing causal factor, potential adversely impacted or a management/treatment option

Conditions / Area of Clinical Practice	Acute & Emergency	Cancer	Cardiovascular	Child Health	Clinical haematology	Dermatology	Ear, Nose & Throat	Endocrine & Metabolic	Gastrointestinal	General Practice & Primary Healthcare	Infection	Medicine of Older adult	Mental Health	Musculoskeletal	Neurosciences	Obstetrics & Gynaecology	Perioperative medicine and anaesthesia	Renal & urology
Anaemia				x	x				x	x						x	x	
Anaphylaxis	x			x													x	
Atopic dermatitis and eczema				x		x				x								
Autism spectrum disorder				x									x					
Chronic obstructive pulmonary disease	x									x								x
Coeliac disease				x														
Constipation				x					x	x								
Covid-19											x							
Dehydration	x			x													x	x
Depression										x			x					
Diabetes in pregnancy (gestational and pre-existing)								x								x		
Diabetes mellitus type 1 and 2				x				x		x							x	
Disease prevention/screening										x								
Eating disorders				x					x				x					
Epilepsy															x	x		
Hyperlipidemia								x										
Hypoglycaemia								x										
Inflammatory bowel disease				x					x									
Irritable bowel syndrome									x	x								
Malabsorption									x									
Malnutrition				x					x	x		x						
Meniere's disease							x								x			
Migraine				x						x					x			
Obesity				x				x		x			x				x	
Obesity and pregnancy																x		
Obstructive sleep apnoea				x														x
Osteomalacia								x						x				
Osteoporosis								x		x		x		x				
Stroke	x		x									x			x			
Vitamin B12 and/or folate deficiency									x									

Implementation Support

To aid medical schools in embedding the teaching points within their core curriculum, a resource support section is available on the AfN website. This includes:

- **Case Studies**

  Included on the AfN website are a number of case studies from medical schools that have successfully incorporated nutrition training into their core teaching. These examples demonstrate how programmes have approached embedding nutrition within their curriculum, and provide examples that other programmes can use to aid them in their curriculum review.

- **Quality Assured Resources**

  There is a plethora of resources available that could potentially be used by medical schools to support the inclusion of nutrition within their core curriculum, however identifying suitable resources that are evidence-based and addressing the teaching points needed is not always easy. The AfN have therefore introduced a quality assurance scheme that will review submitted resources to determine whether the content has been developed or reviewed by qualified nutrition professionals, is evidence-based and achieves the delivery of specified teaching points. Resources that are successful in their review, will be awarded AfN Content Assured status, and will be listed on the AfN website along with details of the teaching points the resource covers. This quality assurance scheme will cover face-to-face, online and written resources, helping medical schools to identify suitable resources that meet their teaching/student needs.

In addition, the AfN Inter-Professional Working Group on Medical Nutrition Education will develop a set of nutrition questions to submit to the GMC for inclusion in the MLA. These will be regularly reviewed and amendments/new questions submitted as appropriate.

Glossary

Adequate nutrition provision describes the provision of sufficient foods and fluids to provide an individual with the required intake of nutrients to promote overall health and prevent chronic diseases; lifestyle, preferences and sustainability aspects should also be considered for a more holistic perspective.

Artificial hydration is the provision of water or electrolyte solutions by any other route than the mouth. This can be achieved by tubes, intravenous and subcutaneous (¼ dermoclysis) administration

Clinically Assisted Nutrition & Hydration (CANH) refers to the giving of nutrition either into the gut via a tube (enteral nutrition) or by an intravenous catheter (parenteral nutrition). Clinically Assisted Nutrition & Hydration is defined by ESPEN as including oral nutritional supplements (ONS), enteral nutrition (EN) or parenteral nutrition (PN). Enteral delivery of nutrients includes nasogastric and nasogastrojejunal tubes or percutaneous endoscopic gastrostomy (PEG) or jejunostomy (PEG-J) or surgically induced feeding tubes. Parenteral delivery includes can involve peripheral intravenous access or central venous access.

Dehydration is defined by NHS England as: “a state in which a relative deficiency of fluid causes adverse effects on function and clinical outcome”.

Essential components of a diet are macronutrients (carbohydrates, fats and proteins), water, minerals (includes those often referred to as electrolytes (Na, K, Cl, Mg, Ca, P) and as trace elements (e.g. Se and Zn)) and vitamins

Healthy balanced diet is used to indicate a diet that follows evidence-based, healthy eating guidelines/dietary patterns from officially recognised UK sources (the government, charities such as British Heart Foundation, World Cancer Research Fund and Coeliac UK). Advice on a healthy balanced diet incorporates types of foods/food groups and the proportions in which these should be consumed to meet dietary recommendations and promote long term health at a population level.

Malnutrition refers to a state in which a deficiency or excess of nutrients such as energy, protein, vitamins and minerals causes measurable adverse effects on body composition, function (including social and psychological) and clinical outcome. The term malnutrition covers 2 broad groups of conditions. Energy balance and net weight is one factor of malnutrition. The 2nd factor is macro and micronutrient intake. Deficiencies, insufficiencies or excesses can occur in both over- and underweight individuals. Malnutrition therefore includes on one hand stunting, wasting, underweight and micronutrient deficiencies or insufficiencies, and on the other overweight, obesity, nutrient excess and diet-related non-communicable diseases.

Macronutrients (fats, proteins and carbohydrates) are the nutrients the body needs in relatively large quantities (g/d) for normal growth and development and for providing us with energy.

Micronutrients are nutrients (vitamins and minerals) the body requires from the diet in very small quantities for normal growth and development. Micronutrients can be classified as water-soluble vitamins, fat-soluble vitamins, minerals and trace minerals.

Nutrition Nurse Specialist are clinically trained nurse specialists with knowledge and experience in nutrition support. Nutrition nurses are most frequently involved in the patient care of individuals who require naso-gastric feeding, percutaneous endoscopic gastronomy, radiologically inserted gastronomy or peripherally inserted central catheters.

Nutrition Support Team/Specialist Nutrition Colleagues are multi-discipline professionals involved in nutritional care and support. Within an in-patient setting this includes (but is not limited to) doctors, nutrition nurse specialists, dietitians, pharmacists and allied health professionals. It brings together clinical experts on nutrition from across medicine/surgery, nursing, occupational health, dietetics and pharmacy who can co-ordinate the contributions of each of these specialties into coherent nutritional support. The focus within a hospital in-patient setting is on the safe provision of Clinically Assisted Nutrition & Hydration (CAHN). Within outpatient settings and the wider community, education and public health settings, nutrition support should also bring in the expertise of UKVRN Registered Nutritionists, chefs, dietetic assistants, midwives and community support workers.

Overweight and obesity are terms used to describe the presence of excess body fat accumulation, that may adversely impact on health, and can be assessed (in-part) via BMI, waist circumference and/or waist-to-hip ratio measurements. Excess body fat is linked to an increased risk for a number of non-communicable diseases, can be associated with poor psychological and emotional health, poor sleep and increased susceptibility to suffer from stigma, which may negatively impact on self-esteem. Overweight and obesity are a chronic conditions and can be interdependent with other medical conditions.

Public Health is about helping people to stay healthy and protecting them from threats to their health. Activities can be at the individual level or at a wider level that has an impact on the health of many (for example an age-group, an ethnic group, a locality, or a country). Public health contributes to reducing the causes and risk factors of ill-health and improving people's health and wellbeing

Registered Dietitian (RD) are nutrition experts who have graduated with a degree in dietetics recognised by the Health Care Professions Council. RDs are statutorily regulated professionals and must hold active registration with the Health and Care Professions Council (HCPC) to use the professional title of dietitian. RDs predominately work clinically with patients, leading on the dietetic support required for the assessment, diagnosis, management and treatment of dietary and nutritional ill health. RDs abide by an ethical code laid out by the HCPC.

UKVRN Registered Associate Nutritionist (ANutr) are nutrition experts who have typically graduated from a BSc (Hons) or MSc in a nutritional science within the last 3 years. Registered with the Association for Nutrition, an ANutr can prove underpinning scientific knowledge in evidence-based nutrition and abide by standards of ethics, conduct and performance. Predominately working in non-clinical settings to aid/promote public health and disease risk reduction, ANutrs can also work in clinical settings to support dietetic colleagues with the assessment, diagnosis, management and treatment of dietary and nutritional ill health.

UKVRN Registered Nutritionist (RNutr) are nutrition experts who have nutrition science knowledge and understanding at a minimum of honours-degree level, plus at least 3-years' experience of evidence-based application in their professional practice, within a specialist area of competence (e.g. Public Health). Registered with the Association for Nutrition, RNutrs abide by standards of ethics, conduct and performance. They predominately work non-

clinically to aid and promote public health and disease risk reduction, but can also work in a clinical environment supporting dietetic colleagues with the management and treatment of ill health. A medical doctor who also has at least degree-level nutrition training plus >3years-experience applying this in their medical practice, can apply to become a RNutr (Healthcare-Medical).

Undernutrition/Undernourished refers to a deficiency in energy and/or of one or more essential nutrient. When energy intakes are insufficient, vitamins and minerals intakes are likely to be also be low. Undernutrition can occur due to inadequate intakes or problems with nutrient absorption. The terms undernutrition and undernourished are often used interchangeably with malnutrition and underweight, but are actually a type of malnutrition and an individual may be undernourished without being underweight.

Underweight is a term used to describe a low body weight that may adversely contribute to fatigue, nutritional deficiencies, reduced bone health, fertility challenges and weakened immune function. It is usually assessed via a combination of BMI measurement and assessment.

www.associationfornutrition.org

3rd Floor Alliance House
29-30 High Holborn
London
UK
WC1V 6AZ