Extended Nutrition Competency Framework (NCF)
March 2016

Introduction

The Nutrition Competency Framework (NCF) for medical graduates describes four knowledge and five skill based competencies that demonstrate:

- Understanding of the basic sciences in relation to nutrition (K1)
- Knowledge of the interactive role of nutrition in health and the prevention of disease (K2)
- Knowledge of evidence-based dietary strategies for prevention and treatment of disease (K3)
- Awareness of food sources of nutrients, food habits and the cultural and social importance of food (K4)
- Skills in the identification of nutritional risk, nutritional deficits and excesses (S1)
- Ability to interpret nutrition evidence in a critical and scientific manner and apply it appropriately in clinical practice (S2)
- Ability to apply basic dietary strategies for prevention and treatment of medical conditions and disease and trauma, with recognition that many nutritional issues require specialist management by a dietitian (S3)
- Ability to apply principles of ethics related to nutritional management (S4)
- Ability to work effectively in a team with other health professionals to deliver optimal nutrition care (S5).

This NCF has been developed over three years by a team of medical and nutrition professionals. The nutrition competencies have been mapped to the current Australian Medical Council (AMC) Graduate Outcome Statements (www.amc.org.au). We have undertaken extensive consultation with key bodies and refined our NCF as a result of this feedback. Recently we have extended the NCF to provide examples of the range of relevant topics, with learning outcomes that could be included, together with examples of assessment strategies as part of the Web-based Nutrition Competency Implementation Toolkit (WNCIT) project which has been funded through the Federal Government's Office for Learning and Teaching. It is hoped that the NCF will provide a useful reference point for entry-level medical courses throughout Australia.

We are interested in any feedback you may wish to provide on this framework.
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Explanatory Notes

The NCF describes the learning outcomes for each of the knowledge- and skill-based competencies for medical graduates. A relevant range of variables provide contexts and environments in which competency could be demonstrated. Important explanatory notes to the NCF include:

- Owing to the breadth of contextual variables, some learning outcomes may be repeated as applicable across many contexts and/or environments to demonstrate competency.
- Assessment strategies have been included in this 'extended' version of the NCF.
- A medical graduate should demonstrate all competencies by the end of medical training. Due to various medical training models, time periods (e.g. end of year 1) have not been specified.
- The terms 'Student Learning Outcome', 'Graduate Competencies' and/or 'Graduate Attributes' may be used across various institutions to describe the skills and knowledge students will achieve.
- K = knowledge, S = skill

	AMC GOS	Nutrition Competency (knowledge- or skill-based)	Student Learning Outcomes / Objectives (SLOs)	Examples of subject matter to address SLOs	Examples of SLOs that could be incorporated into existing topics in medical courses	Examples of assessment strategies
K1	1.1	Demonstrate understanding of the basic sciences in relation to nutrition	1. Describe the functions of essential nutrients, and the basis for the biochemical demand for energy and nutrients 2. Describe the integrative normal processes of appetite, eating, intestinal function, digestion, absorption and nutrient utilisation and common disorders that affect them 3. Differentiate the energy and nutrient requirements across the lifespan for normal growth, structure and function	• Anthropometric standards and reference ranges for individuals/groups • Clinical/biochemical standards and reference ranges for individuals/groups • Macronutrient and micronutrient requirements (e.g. energy, protein, CHO, fat, iron, calcium, vitamin D, zinc) and biochemical functions in individuals and/or population groups and disorders which may affect digestion, absorption and requirements for these • Gastrointestinal tract structure function; digestive and absorptive processes • Fuel metabolism and homeostasis of carbohydrates, fats and protein • Hormonal control of hunger and satiety • Biochemical demand and contributors to energy intake and energy expenditure in the body across the life course • Nutritional requirements across the lifespan including infancy, childhood, adolescence, adulthood, pregnancy, lactation and later life • Strategies to address nutrition requirements of clients in a range of settings, e.g. acute care, rehabilitation, nursing home, community, primary care settings	• Identify key macronutrients and micronutrients, understand their biochemical functions and describe individual requirements for different population groups • Describe fuel metabolism and homeostasis of carbohydrates, fats and protein; explain the impacts on biochemical demand and contributors to energy intake and energy expenditure in the body across the life course • Describe gastrointestinal tract structure and function; describe the process of digestion and identify major sites where absorption of nutrients occurs • Describe the mechanisms of hunger and satiety control • Describe how different disease processes impact nutritional status • Differentiate the nutritional requirements across the lifespan including infancy through to end of life and pregnancy and lactation • Identify appropriate strategies to address nutrition requirements of clients at different life stages and in different settings (e.g. acute care, rehabilitation, nursing home, community) • Source and identify the most appropriate anthropometric standards and reference ranges for individuals/groups • Recognise and identify clinical/biochemical standards and reference ranges	Written exam/MCQ OSCE Case report/studies Individual or community-based assessment
K2	1.3 2.1, 3.3, 3.5	Demonstrate knowledge of the interactive role of nutrition in health and	1. Describe the common nutrition-related causes of mortality and	• Dietary links with non-communicable diseases, e.g. diabetes, obesity, CVD (including hypertension), cancer, osteoporosis, nutrient deficiencies (e.g. vitamin D, iron, folate) • Nutrition-related risk factors across the lifecourse for various disease and predictors of mortality including:	• Identify the most common causes of morbidity and mortality that have dietary links e.g. diabetes, obesity, CVD (including hypertension), cancer, osteoporosis, nutrient deficiencies (e.g. Vitamin D, iron, folate)	Written exam/MCQs OSCEs Case report/studies

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	3.2
	
	1.1,
	1.2,
	1.4,
	1.5
	3.2
		the prevention of disease	morbidity in the population
			2. Explain the biochemical basis of how nutrition affects health and risk factors for disease
			3. Translate how disease can affect nutritional status
				a) Dyslipidaemia (high trans and saturated fat)
				b) Hypertension (high sodium)
				c) Overweight/obesity (excess energy intake/low energy expenditure)
				d) Osteoporosis (low calcium intake)
				e) NTDs (low folate intake)
				f) Malnutrition/failure to thrive (insufficient macro and/or micronutrients)
				g) Micronutrient deficiency (e.g.: iron deficiency anaemia and vegetarianism)
				h) Surgical/trauma/infection (macro and micronutrient deficiency)
				• Diseases/disease processes and their impact on nutritional status including:
				  a) Malnutrition associated with increased requirements and/or decreased intake in common conditions including respiratory disease, CCF, gastrointestinal disorders including those related to surgery, #NOF, cancer and associated treatments, neurological impairment including dementia
				  b) Gastrointestinal disease and micronutrient deficiencies e.g. coeliac disease, Crohn's Disease, short gut
				  c) Eating disorders and weight loss/malnutrition/deficiencies
				  d) Increased macro/micronutrient requirements for healing of pressure areas (e.g. long-term institutionalised)
				  e) Chronic renal and end-stage renal failure and energy, protein, fluid, Na^+, K^+, PO_4 requirements
				  f) Starvation and refeeding syndrome
				  g) Cystic fibrosis/inborn errors of metabolism and child growth/development
				  h) Food allergy/intolerance and other practices requiring dietary restriction
				• Complex cases which require outside referral; therefor
				  a) Identify relevant dietetic services, provide referral and appropriate documentation (e.g. biochemistry, medications, history)
				  b) Effectively communicate to patients regarding disease process and plans for referral to nutrition and dietetics professional
					• Describe the nutrition-related risk factors for various diseases and predictors of mortality
					• Describe which dietary factors may impact on cardiovascular disease, including those that affect lipids, hypertension and weight
					• Describe the impact of a low-calcium intake on osteoporosis
					• Describe the dietary patterns that may impact on cancer development
					• Describe the impact of malnutrition and failure to thrive on health
					• Identify the impact of obesity on those at risk of type 2 diabetes
					• Describe the reasons for altered nutrient requirements in inflammatory bowel disease and coeliac disease
					• Describe the possible reasons for increases in the risk of malnutrition in respiratory disease
					• Identify what body composition changes can occur in long-term eating disorder patients
					• Describe the nutritional effects that dementia may have on patients in aged care
						Individual or community-based assessment Referral letter

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	AMC GOS	Nutrition Competency (knowledge- or skill-based)	Student Learning Outcomes / Objectives (SLOs)	Examples of subject matter to address SLOs	Examples of SLOs that could be incorporated into existing topics in medical courses	Examples of assessment strategies

K3	1.3 2.7, 2.12	Demonstrate knowledge of evidence-based dietary strategies for prevention and treatment of disease	1. Describe the role of nutrition in treatment of disease
			2. Describe the dietary management strategies for relevant medical conditions and disease
			3. Demonstrate an appreciation of nutrient/drug interactions
				• Evidence-based dietary management of nutritional and medical conditions:
				  a) Cardiovascular risk factors:
				    o Hypercholesterolemia (trans and saturated fats, fibre, plant sterols, omega 3 PUFAs, MUFAs)
				    o Hypertension (sodium, alcohol, obesity)
				    o Overweight/obesity (energy)
				    o Diabetes (energy, protein, CHO intake, physical inactivity, GI)
				  b) Metabolic/endocrine disorders:
				    o Diabetes (energy, protein, CHO intake, physical inactivity, GI)
				    o PCOS (obesity, physical inactivity, GI)
				  c) Gastrointestinal disorders:
				    o Gall bladder disease (obesity, saturated fat)
				    o Coeliac disease (gluten)
				    o Constipation/diarrhoea/diverticular disease (soluble and insoluble fibre, fluids, microbiome)
				    o Inflammatory Bowel Disease (energy, protein, fluid, electrolytes)
				    o Dietary intolerance (fructose, lactose, fructans, oligosaccharides)
				  d) Renal disease
				    o ARF (electrolytes, fluid, energy, protein)
				    o CRF (protein, fluid, electrolytes)
				    o ESRF (energy, protein, fluids)
				    o Electrolytes (phosphate, potassium, sodium)
				  e) Oncology
				    o Malnutrition/weight loss (protein/ energy)
				  f) Burns
				    o Wound healing (protein, energy, fluid, micronutrients e.g. zinc
				  g) Pulmonary disorders
				    o Malnutrition/weight loss (protein/energy)
				    o Fluid overload (fluid and sodium)
				• Drugs/treatments that may affect nutritional status and dietary requirements, such as:
				  a) Cardiovascular (e.g. warfarin and Vitamin K)
					• Outline the major medical conditions where dietary management is of particular importance
					• Describe the dietary management strategies in treating food allergy
					• Describe the dietary management strategies in treating cardiovascular disease
					• Describe the dietary management strategies in treating polycystic ovarian syndrome
					• Describe the dietary management strategies in treating type 2 diabetes
					• Describe the dietary management strategies in treating coeliac disease
					• Describe the dietary management strategies in treating inflammatory bowel disease
					• Describe the dietary management strategies in treating malnutrition
					• Describe the dietary management strategies in treating burns
					• Describe the dietary management strategies in treating pulmonary disorders
					• Describe drugs/treatments used that may affect nutritional status and dietary requirements
						MCQs Short answer questions Case report/studies OSCEs

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				b) Endocrinology (e.g. thyroid radiation and iodine; metformin and vitamin B12) c) Renal (e.g. dialysis and electrolytes, protein) d) Psychiatric (e.g. MAO inhibiters and tyramine; medications associated with weight gain)		
K4	3.2 3.4, 3.8, 3.9 1.1, 1.2, 1.4, 1.5	Demonstrate awareness of food sources of nutrients, food habits and the cultural and social importance of food	1. List the food sources of major nutrients 2. Describe how the social determinants of health influence food consumption patterns and the consequences of this 3. Appreciate the social and cultural importance of food	• Macro and micronutrients provided by each food group in the Australian Guide to Healthy Eating (http://www.eatforhealth.gov.au/) • The Australian Dietary Guidelines (http://www.eatforhealth.gov.au/) as promoted by the Department of Health and Ageing • The food groups as outlined by the Australian Guide to Healthy Eating as promoted by the Commonwealth Department of Health and Ageing (http://www.eatforhealth.gov.au/) • Foods providing high amounts of carbohydrate, protein, fats (including high poly- and monounsaturated fats) and dietary fibre that are protective against disease e.g. CVD, overweight, some cancers, diabetes, hypertension • Foods that contain high amounts of micronutrients, especially iron, zinc, B group vitamins, calcium • Processed, takeaways and other discretionary foods that contain high saturated and trans fats, sodium and sugar that are linked to disease (as noted in K2) • Food labels - to determine the major macro and micronutrient profiles of foods • Community groups vulnerable to food insecurity, and factors contributing to food insecurity (individual, household, community and state/federal levels) • Social and cultural interactions impacting food availability, dietary intakes of individuals and populations e.g. cultural cuisine, impact of occupational environment	• Identify food sources of the major macro and micronutrients • Identify community groups vulnerable to food insecurity • Identify factors contributing to food insecurity at an individual, household, government level • Describe how social and cultural interactions impact the dietary intakes of individuals and populations	MCQs Short answer questions Case report/studies Referrals OSCEs
S1	2.2 2.4	Demonstrate skills in the identification of nutritional risk, nutritional deficits and excesses	1. Assess nutrition risk factors pertaining to over- and undernutrition 2. Integrate nutrition in the	• Nutrition assessment* as part of the overall medical assessment in all patients including: a) Food/nutrition-related history (e.g. food intake, medication, complementary/alternative medicine use, food knowledge/beliefs and availability, physical activity, mental health status)	• Demonstrate skills in identification of clients who may need further assistance in managing their diet • Demonstrate the use of anthropometric measures such as BMI, waist circumference and use of growth charts	MCQs Short answer questions Case report/studies OSCEs

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DAA Dietitians Association of Australia

THE UNIVERSITY OF QUEENSLAND AUSTRALIA

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			medical history and physical examination 3. Interpret and integrate findings from the assessment to define nutritional problems	b) Anthropometry – assess and utilise anthropometric data using recognised methods (height, weight, weight history, BMI, waist circumference, growth charts) c) Biochemical data, tests, procedures – identify, request and interpret results of relevant tests that are clinically applicable to assess nutritional status (e.g. UEC, CMP, FBC, iron studies, hormones, micronutrients) d) Nutrition-focused physical findings – physical appearance, muscle and fat wasting, swallow function, appetite and affect e) Client history – medical/health/family history, treatments, therapy, occupational and social history • Validated nutrition screening and assessment tools (e.g. MST, MUST, NRS, MNA-SF, MNA, SGA,PG-SGA); evaluating data for relevance/significance and validating information collected where possible • Referring to dietetics professional (APD) a) dietetic services, providing referrals and appropriate case documentation including history, results of investigations and previous management plans b) Formulating strategies to access expertise in a range of settings including rural, city and remote locations *Adapted from Academy of Nutrition and Dietetics, IDNT Manual, 4th Edition 2013.*	• Demonstrate awareness of the importance of nutrition-related factors in the medical and physical assessment • Display incorporation of nutrition-related findings into assessment and management plan where appropriate; develop plans for clients and appropriate referrals to other agencies/services	
S2	1.1, 1.2, 1.4, 1.5 2.15, 3.5, 4.2	Demonstrate ability to interpret nutrition evidence in a critical and scientific manner and apply appropriately in clinical practice	1. Locate and critically appraise literature on nutrition related to prevention and treatment of disease 2. Apply an evidence-based approach in the delivery of appropriate nutrition	• Resources related to nutrition management of patients: research databases, professional associations (e.g. Dietitians Association of Australia, Diabetes Australia, Baker IDI, National Heart Foundation, Cancer Council) and dietetic professionals with APD credentials • Research analysis: a) Differences between clinical versus statistical significance in nutrition management of patients b) Confounding variables that can impact nutrition-related research c) Non-evidence-based materials including some complementary and alternative therapies (CAM) and practitioners • Scientific evidence and nutrition management of patients; practices relevant to current evidence	• Displays the use of current evidence based information in the management of clients with nutrition related issues • Demonstrate use of relevant evidence-based nutrition resources and apply them in patient management	MCQs Short answer questions Case report/studies Referrals OSCEs

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			management in clinical practice			
S3	2.7, 2.12 2.7, 2.9, 3.2 2.7, 2.8, 2.9	Demonstrate ability to apply basic dietary strategies for prevention and treatment of medical conditions, disease and trauma, with recognition that many nutritional issues require specialist management by a dietitian	1. Apply clinical reasoning to prioritise nutritional management strategies 2. Explain nutritional risk factors for common diseases to patients and their families 3. Provide basic evidence-based advice on nutrition to patients 4. Where appropriate integrate nutrition goals into patients' care plans, including referral to other professionals as required, (particularly dietitians) 5. Recognise that dietary strategies may include those for non-communicable diseases	• Risk factors including: a) Low fibre and wholegrain cereals related to constipation, diverticular disease b) Fruit and vegetable intake and cancer c) Low calcium intake and osteoporosis d) Weight gain and inactivity and type 2 diabetes e) High saturated fat intake, sodium and CVD f) Sweetened drinks and weight gain • ADGs that relate to the individual client • Appropriate nutrition management strategies such as: a) To improve type 2 diabetes control, suggest weight loss/maintenance b) To treat CVD, reduce saturated fat/increase MUFA AND PUFA to improve lipid profile c) To assist failure to thrive children, suggest increased energy using supplements with specialist input form a dietitian d) For coeliac disease, suggest strict gluten avoidance with specialist input form a dietitian e) For malnourished nursing home patients, suggest increased eating frequency, energy dense foods and specialist dietitian input d) Provide referrals to dietetic-trained professionals; work as a team to ensure all aspects of patients' care plans are regularly addressed; keep in close touch with the allied health staff and ask for details of treatment as a self-learning vehicle	• Demonstrate skills in the identification of nutritional risk, nutritional deficits and excesses • Demonstrate prioritisation of nutritional issues, depending on the broader profile/life circumstances of the patient • Demonstrate the ability to communicate common risk factors that could be modified to prevent/treat disease • Demonstrate the ability to apply different management strategies for clients in a range of settings • Demonstrate the ability to provide basic evidence-based nutrition advice to patients with common diseases such as type 2 diabetes, CVD, malnutrition • Demonstrate the ability to recognise in what situations referral to a dietitian is appropriate	Literature review Case report/studies

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S4	2.13 4.4 4.4	Demonstrate the ability to apply principles of ethics related to nutritional management	1. Apply ethical and legal requirements to the decision-making process concerning nutrition	• Decisions regarding:
				   a) withholding or withdrawing of nutrition or hydration support
				   b) deciding when enteral or parenteral nutrition is required and seek specialised nutritional advice
				   c) seek medicolegal advice when indicated, for example in chronic eating disorders, child malnourishment, meal provision in aged care services
				 • Respecting patients' choices in decisions related to provision of nutrition via oral, enteral or parenteral routes
					• Demonstrate the ability to recognise the nutrition-related ethical issues that may be involved in end of life situations	OSCEs Case reports/studies Referrals

S5	3.6, 3.7 4.8	Demonstrate ability to work effectively in a team with other health professionals to deliver optimal nutrition care	1. Recognise the limitations of own knowledge and skill and refer or consult with another health practitioner appropriately 2. Understand, respect, incorporate and support the roles of other health professionals in nutritional management of patients	• Multidisciplinary team approaches to nutritional assessment and management of individuals and groups • Engaging respectfully and effectively with multidisciplinary team members • Utilising services of community-based organisations and NGOs that promote health and nutrition (e.g. the Red Cross, Meals on Wheels, community health centres) • Providing written referrals (including relevant assessment and diagnostic information) or newer technologies to communicate with other allied health professionals • Counselling individuals and groups regarding non-evidence-based practices that may be harmful to health, nutrition or financial status for an individual	• Demonstrate ability to engage respectfully and effectively with multidisciplinary team members • Demonstrate skills in locating and utilising services of community-based organisations and NGOs that promote health and nutrition (e.g. the Red Cross, Meals on Wheels, community health centres) • Demonstrate the importance of using a multidisciplinary team approach to nutritional assessment and management of individuals and groups • Demonstrate the importance of communication via referral including relevant assessment and diagnostic information	OSCEs Case reports/studies Referrals

Abbreviations

ADGs	Australian Dietary Guidelines
AMC	Australian Medical Council
APD	Accredited Practising Dietitian
ARF	Acute Renal Failure
CAM	Complementary and Alternative Therapies
CCF	Congestive Cardiac Failure
CHO	Carbohydrate
CMP	Calcium/Magnesium/Phosphate (blood test)
CRF	Chronic Renal Failure
CVD	Cardiovascular Disease
ESRF	End Stage Renal Failure
FBC	Full Blood Count
Fe^{2+}	Iron
GI	Glycaemic Index
GOS	Galacto-oligosaccharides
K^+	Potassium
MAO	Monoamine Oxidase
MCQ	Multiple Choice Questionnaire
MNA	Mini Nutrition Assessment
MNA-SF	Mini Nutrition Assessment Short Form
MST	Malnutrition Screening Tool
MUFAs	Monounsaturated Fatty Acids
MUST	Malnutrition Universal Screening Tool
Na^+	Sodium
NCDs	Non Communicable Diseases
NGOs	Non-Government Organisations
#NOF	Fracture Neck of Femur
NRS	Nutrition Risk Screening Tool
NTDs	Neural Tube Defects
OSCE	Objective Structured Clinical Examinations
PCOS	Polycystic Ovary Syndrome
PG-SGA	Patient Generated Subjective Global Assessment
PO_4	Phosphate
PUFAs	Polyunsaturated Fatty Acids
SGA	Subjective Global Assessment
UEC	Urea/Electrolyte/Creatinine (blood test)