



## **Proceedings of the inaugural International Summit for Medical Nutrition Education and Research**

### **Author**

Laur, C, Ball, L, Ahankari, AS, Avdagovska, M, Crowley, J, Deen, D, Douglas, P, Hark, L, Kohlmeier, M, Luzi, L, McCotter, L, Martyn, K, Nowson, C, Wall, C, Ray, S

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## ABSTRACT

Medical nutrition education is well recognised as an area of medical training requiring additional attention, with potential for considerable public health impact across the lifespan. Despite countries having disparate education systems, many of the facilitators and barriers to medical nutrition education are consistent across borders. Therefore, a shared approach to supporting greater medical nutrition education is ideal to support countries to work together. In an effort to facilitate a shared approach, the ‘*Need for Nutrition Education/Innovation Programme*’ (NNEdPro) Group, in association with the American Society for Nutrition, hosted the inaugural International Summit on Medical Nutrition Education and Research on August 8, 2015 in Cambridge, United Kingdom. Speakers from the United Kingdom, the United States, Canada, Australia, New Zealand, Italy, and India provided insights into their country’s education system, challenges and potential solutions across two main themes. Theme 1, *Medical Nutrition Education*, focused on best practice examples in competencies and assessment. Theme 2, *Medical Nutrition Research*, discussed how to translate nutrition research into education opportunities for students. The Summit identified shared needs across regions; showcased examples of transferrable models of strategies across regions and identified opportunities for joint strategies in nutrition education for medical and healthcare professionals. These proceedings highlight the key messages presented as part of the Summit and showcases opportunities for working together towards a common goal of improvement in medical nutrition education.

## **Introduction**

On August 8, 2015 in Cambridge, United Kingdom, the ‘*Need for Nutrition Education/Innovation Programme*’ (NNEdPro) Group, in association with the American Society for Nutrition (ASN), hosted the inaugural International Summit on Medical Nutrition Education and Research. Speakers for the event were invited from the United Kingdom, the United States, Canada, Australia, New Zealand, Italy, and India. The presentations were divided into two main themes: Medical Nutrition Education, with a focus on best practice examples in competencies and assessment; and Medical Nutrition Research, with a focus on translating research into education opportunities. Attendees included representatives from the British Dietetic Association (BDA), British Medical Association (BMA), Cambridge University Health Partners, the Medical Research Council, and from over 15 universities around the world. Although the main presentations were held during one day, pre and post meetings provided opportunities for key attendees to discuss potential projects and collaborations to build upon the common facilitators and barriers highlighted during the Summit.

### *NNEdPro Background*

The NNEdPro Group is an independent knowledge generation, transfer/exchange and evaluation platform<sup>1</sup>. The group represents a strategic interdisciplinary partnership between doctors, dietitians, nutritionists, and other healthcare professionals. It is composed of several partner organisations including the BDA, Society for Nutrition Education and Behaviour, the Cambridge University Hospitals/School of Clinical Medicine, the University of Ulster and the UK Medical Research Council Human Nutrition Research unit in Cambridge. Details and recent publications are available at [www.nnedpro.org.uk](http://www.nnedpro.org.uk)<sup>1</sup>.

In 2014, the NNEdPro Director SR, launched the Global Innovation Panel, co-chaired by LB and CL, which aims to promote international initiatives and knowledge exchange on nutrition education innovations relevant to clinical and public health practice for medical and health professionals. One of the key projects of the Global Innovation Panel has been to arrange the inaugural International Summit on Medical Nutrition Education and Research<sup>2</sup>.

### *ASN Background*

The NNEdPro Group works closely with the American Society for Nutrition (ASN), and the Medical Nutrition Council (MNC) sub-committee. The ASN is dedicated to bringing together the

world's top researchers, clinical nutritionists and industry to advance knowledge and application of nutrition for the sake of humans and animals.<sup>3</sup> The MNC focuses on meeting the needs of those ASN members interested in clinical, research, educational, and/or training aspects of nutrition and metabolism as it relates to optimal health and the prevention and treatment of human disease. The aims of ASN and MNC align well with the NNEdPro themes and the organizations collaborated closely to organize the Summit.

### **Aim of the Summit**

The aim of the inaugural International Summit on Medical Nutrition Education and Research was to identify shared needs across regions and showcase examples of transferrable strategies on the topic of medical nutrition education. The Summit was facilitated by the co-Chairs of the NNEdPro Global Innovation Panel, Dr Lauren Ball and Ms Celia Laur. Opportunities for joint strategies in nutrition education for medical and healthcare professionals were identified and plans were discussed for moving forward. These proceedings highlight the key messages presented as part of the Summit and showcase opportunities for future work on a common goal of improvement of medical nutrition education.

The main goals of the Summit were to:

1. Share information on the current state of medical nutrition education and associated research in each region
2. Share examples of learning from each region, including successful and unsuccessful initiatives and actions
3. Identify common or shared needs across regions
4. Showcase examples of transferable models of strategies across regions
5. Identify opportunities for joint strategies in medical nutrition education

### **Medical Nutrition Education**

The importance of nutrition to medical and healthcare has traditionally been undervalued, and is widely neglected within undergraduate medical education. Despite evidence of continuing nutritional neglect in health care<sup>4-6</sup>, the development of nutrition care guidelines<sup>7</sup> and a medical undergraduate nutritional curriculum framework<sup>8</sup>, medical schools rarely demonstrate sufficient nutrition-related educational outcomes for their students. This situation poses a pedagogical challenge to ensure that nutrition, whilst only a small element of the medical curriculum, is

demonstrated as important and central to the health of the population, and that doctors play a crucial role in ensuring nutrition is also central in the medical care and management of their patients. Sharing resources and collaborating with others allows the development of best practice strategies that promote the importance of nutrition and ensure that doctors are equipped to provide effective nutrition care to patients in their daily practice.

In this session, presenters were asked to focus on best practice examples in nutrition-related competencies and assessment. Topics included guidelines for each region, gaps between current practice and the guidelines, as well as recommendations for future work. Facilitators, barriers and country-specific considerations were also discussed, as were examples of strategies that have been implemented to attempt to address the barriers.

### *Medical Nutrition in the UK*

Following the introduction from the NNEdPro group, Dr Kathy Martyn, from the University of Brighton's Medical School presented on medical nutrition education in the UK. The aim of her presentation was to explore some of the pedagogical challenges that emerged when introducing the Undergraduate Medical Nutrition Curriculum<sup>8</sup> into a programme that is already 'jam packed' with important subject matter. Dr Martyn emphasised that nutrition must be clearly threaded and signposted throughout the curriculum. Dr Martyn also highlighted that undergraduate medical students have many disparate areas to study, so having clear nutritional outcomes that are assessed will support learning and develop students' confidence in addressing nutritional issues as qualified practitioners. Using multiple pedagogical practices, including problem based learning (PBL), case studies from clinical practice, lectures, symposia and student-selected components will ensure nutritional content is accessible and feels 'real' to the students. The role of local 'nutrition champions' was also emphasised as it can be an asset to raise and then maintain the profile of nutrition and its relevance to medical practice and patient care. Champions should reflect the multi-professional team and include doctors, dietitians and nurses. However, excessive reliance on champions can create problems because the absence of a champion can reduce interest and enthusiasm can wane.

At the University of Brighton, investing in a research and education dietitian, as a joint appointment between the local teaching hospital and medical school, aims to provide opportunities for embedding nutrition in the medical curriculum and identifying 'local' research

opportunities including 4<sup>th</sup> year Medical students Independent Research Projects. This position also signals a commitment between education and practice that recognises the role of nutrition in the medical care and management of patients.

### *The US Perspective*

Dr Lisk Hark from the Sidney Kimmel Medical College, Philadelphia, emphasised that deficiencies in nutrition education in US medical schools and residency programs have been noted for over 30 years<sup>9-12</sup>. While curriculum hours and teaching methods vary widely, nutrition educators suggest that a total of 25 hours are needed to properly train medical students in nutrition<sup>12-15</sup>. In order to successfully implement nutrition content in medical schools and graduate programs, it is important to consider new trends in medical education. These include earlier teaching of interviewing and physical exam skills, longitudinal experiences that span several years, and self-learning assignments to prepare for life-long learning. Case-based curriculum is favored by medical students and inter-professional education to reinforce team-base care is growing<sup>16-18</sup>. Students from medical, nursing, physician assistant, occupational therapy, and pharmacy schools are learning clinical content together and many visit patients in their home over several years<sup>18</sup>.

Medical education programs leading to the MD degree in the US and Canada are accredited by the Liaison Committee on Medical Education (LCME)<sup>19</sup>. The updated 2015 LCME curriculum standards described in *Functions and Structure of a Medical School*, include objectives where nutrition can be incorporated<sup>19,20</sup>. For example, Standard 7.2 requires covering content related to organ systems, life cycle, primary care, prevention, wellness, symptoms, signs, differential diagnosis, treatment planning, and impact of behavioral/social factors<sup>19,20</sup>. Standard 7.5 focuses on societal problems which could incorporate obesity education. In addition, US medical schools are required by LCME to have competency-based learning objectives at all levels of training.

As early as 1995, the National Heart, Lung, and Blood Institute and the National Institute of Diabetes, Digestive, and Kidney Diseases established the Nutrition Academic Award (NAA) Program (<http://www.nhlbi.nih.gov/research/training/naa/>)<sup>21, 22</sup>. The NAA Curriculum Committee developed the *Nutrition Curriculum Guide to Training Physicians*, which contains over 200 educational learning objectives across 12 topic areas that medical students, residents, and practicing physicians should acquire to achieve competency<sup>23</sup>. This document can be used as

a template when designing and implementing nutrition curriculum into lectures, small group sessions, problem-based assignments, and self-learning modules<sup>24, 25</sup>. With advances in technology, electronic textbooks, online learning modules, and (e)-learning platforms, medical and nutrition educators have many resources to implement these nutrition competencies and learning objectives<sup>25-27</sup>.

Current trends in medical education for team-based learning, interprofessional education, and longitudinal learning environments make it an ideal time to ensure that all medical students and residents graduate with positive attitudes towards nutrition, along with nutrition-related knowledge and skills. These attributes are needed to help their patients improve their dietary behaviours to reduce, prevent, treat, and manage acute and chronic diseases<sup>20, 28-32</sup>. Building on previous research, the relevance of the course material to medical practice is critical in order to implement a successful nutrition education program for medical students and residents<sup>13</sup>. It is imperative to take advantage of this highly relevant time in society when nutrition content can be successfully incorporated into all medical school curriculum to meet 2015 LCME standards and graduate medical education competencies<sup>19, 20, 29-34</sup>. The health of the nation depends upon this important training at both the medical school and residency level<sup>20</sup>.

### *A Canadian Example*

Melita Avdagovska presented on behalf of her team at the University of Alberta, Edmonton, and provided an example of a Canadian medical education program, with a presentation entitled *The Evolution of WellnessRx: Initiating a Paradigm Shift from “Illness-Care” to “Health-Care” Through Nutrition and Physical Activity Education*. WellnessRx is an interdisciplinary health initiative designed to address gaps in knowledge, skills and attitudes regarding nutrition and physical activity<sup>35</sup>. The presentation focused on the establishment of the WellnessRx initiative, the education program development and the findings from the curriculum pilots.

The Wellness Rx initiative aims to assess the current level of knowledge, skills and attitudes of health professional students and practitioners regarding nutrition and physical activity; assess changes in these attributes after completing the nutrition and physical activity curriculum; and evaluate the effectiveness of an online delivery approach used for the learning modules and their content, activities, resources and other aspects focusing on nutrition and physical activity<sup>35</sup>. The curriculum evaluation is designed as a ‘developmental evaluation’ intended to capture two

measures: the change in students' knowledge with the completion of the learning modules, as determined through the pre-post knowledge assessments; and the students' and instructors' perceptions, experiences and recommendations regarding the learning module content, clarity, activities, resources and value or learnings, as well as the online delivery approach. Revision of curriculum modules is ongoing and based on participant evaluations.

The Wellness Rx initiative fills a documented curricular gap in the domains of nutrition and physical activity across preclinical health professional education programs at the University of Alberta. Improvements in knowledge end points were documented in the pilot assessments and this information along with the interviews/focus groups with students indicate that students enhanced their knowledge, skills and attitudes about nutrition and physical activity. By empowering our current and future healthcare professionals and giving them the tools they need to council on health and wellness through nutrition and exercise/physical activity, we will be positioned to facilitate a shift from a system which is focused on disease treatment through medications and medical interventions to a one which incorporates strategies to promote health and prevent disease.

#### *Ongoing work in Australia*

Professor Caryl Nowson from the School of Exercise and Nutrition Sciences, Deakin University, provided an overview of nutrition in medical curricula in Australia. The presentation included a summary of the current gaps and barriers to adequate medical nutrition education, information on the new Nutrition Competency Framework (NCF), consisting of 4 knowledge and 5 skill-based nutrition competencies for medical graduates, and the development of the Web-based Nutrition Competency Implementation Toolkit (WNCIT)<sup>36</sup> to support medical programs to meet the competencies outlined in the NCF.

The content of nutrition within entry-level medical courses within Australia is highly variable. A 2009 survey of Australian medical schools found that there was no clear integration of learning opportunities for nutrition knowledge or skills across medical courses and that assessment of nutrition knowledge and skills varied widely<sup>37</sup>. A 2013 survey indicated that the barriers to the introduction of nutrition competencies were an overcrowded curriculum, inability to train educators, lack of prioritisation, cost and inability to capitalise on technology<sup>36</sup>.



The WNCIT includes an instruction manual, the NCF (with Student Learning Outcomes), a nutrition curriculum mapping tool, nutrition competency assessment tools and a set of nutrition teaching exemplars. The NCF has been well-received by medical educators and WNCIT has provided opportunities for further networking and development of nutrition education in medical, nursing and allied health curricula.

### *The New Zealand Perspective*

Dr Clare Wall and Jennifer Crowley from the University of Auckland presented findings on nutrition education in the context of undergraduate medical education and general practitioner training in New Zealand (NZ). Currently, approximately 580 medical students graduate each year from NZ's two, entry-level medical courses, configured as a 6- year undergraduate course. Approximately thirty percent of graduates express interest in becoming General Practitioners (GP)<sup>38</sup>, highlighting an important area of focus for this country. For GP training, the Royal New Zealand College of General Practitioners introduced a nutrition syllabus into the training programme in 2012, with competencies that GP registrars are expected to develop throughout three years of training<sup>40</sup>. The Australian Medical Council accredits NZ medical schools and guidelines for accreditation standards specify that medical graduates must have the ability to apply nutrition knowledge in practice<sup>39</sup>. However, no nutrition competencies are formally integrated or mandated into either medical course.

Nutrition has been included in the medical curriculum at the University of Auckland's Medical School, NZ's largest medical school, since 2008. However, as there is no consensus in international literature on the level of practical skill levels appropriate for medical graduates, the team in Auckland have undertaken their own evaluation of this nutrition education. The insights gained from this evaluation have been that: (a) while medical students gain nutrition knowledge and improve their nutrition behaviours when nutrition is included in the early stages of undergraduate education, they lack confidence to provide nutrition care; (b) medical students at the completion of their training, GP registrars and GPs all have positive attitudes towards nutrition care, yet low confidence in their effectiveness to help people improve their dietary behaviours; (c) GPs perceived a lack of time as a barrier to provide nutrition care in consultations with patients. Lack of confidence to provide nutrition care suggests that it nutrition education may not be provided as appropriately as would be ideal and that GP registrars and GPs need to be supported to provide nutrition care at all clinically appropriate opportunities.

### *Changes and Challenges in Italy*

For an Italian perspective, Dr Livio Luzi, Professor of Endocrinology, Università degli Studi di Milano Director, Endocrinology and Metabolism San Donato Hospital and Scientific Institute provided a clear breakdown of higher education on human nutrition in Italy. Dr Luzi outlined the Italian University system for 3 year technical degrees, including Bachelor, Master and PhD as well as the 5-6 year medical degrees which can include a specialization in clinical nutrition after completion of a medical degree (see Figure 1 for details). The breakdown of courses included in nutrition education was also provided, including the combination of nutrition and sport.

Dr Luzi explained how the *Human Nutrition Research: International Center for Assessment of Nutritional Status (ICANS)* at the University of Milan is responsible for training of dietitians, medical doctors, PhD students and students of Scuola di Specializzazione in Scienza della Alimentazione. As of 2014, this centre had recruited 1570 new patients, and conducted 5337 outpatient clinic visits, and 1330 nutritional procedures. Treatments available in human nutrition provided through this centre included dietary counselling, psychological counselling, medications, medical devices, and bariatric surgery.

INSERT FIGURE ONE ABOUT HERE

### *Medical Education, Nutrition Training and India*

Dr Anand Ahankari of University of Nottingham and Halo Medical Foundation, India, presented a unique perspective regarding the current state of play in medical education in India. The main goal in his presentation was to present the views and attitudes of clinical and healthcare professionals towards the integration of nutrition education in the current medical/paramedical education systems. Based on the results of a study connected with medical doctors, a dentist, and a medical social activist, Dr Ahankari presented the views of clinicians and healthcare professionals about nutrition education. He also identified opportunities to include nutrition training and referrals within the existing government healthcare system.

Dr Ahankari proposed that the current medical/paramedical education system in India does not have sufficient focus on nutrition and doctors are not adequately trained in providing nutrition care. In the current curriculum, Indian students are not being equipped with the nutrition

knowledge and training to adequately care for patients' nutritional needs. Dr Ahankair highlighted that the practical application of nutrition training in the doctor's practice is of paramount importance in India which has a widely diverse population. He also discussed how different medical and paramedical education systems (such as ayurveda, homeopathy, dentistry) should be monitored so that a consistent approach to nutrition education is available throughout all aspects of the Indian education system. The diversity between culture, language and thus differences between food preparation must be carefully addressed in student learning in order for doctors to be supported to provide nutrition care to patients.

### **Medical Nutrition Research**

Translating medical nutrition research into practice through education is an important consideration in medical education. With increasing focus on evidence based medicine<sup>41</sup>, mechanisms to provide the right evidence to the right professionals is crucial to support effective and safe medical practice. The presenters in this section discussed how evidence is translated into practice in their region, as well as some of the barriers and facilitators to this translation.

#### *NNEdPro and Medical Nutrition Research*

Dr Sumantra Ray, NNEdPro Chair, Senior Clinician Scientist, Unit Senior Medical Advisor and UK National Diet and Nutrition Survey (NDNS) Lead Clinician at the UK Medical Research Council (MRC) presented an introduction to Medical Nutrition Research. Dr Ray discussed how the NNEdPro Group focuses on developing, synthesising and translating nutrition evidence into practice. One framework for this translation is the Knowledge to Action process<sup>42</sup> which includes development of knowledge, synthesis of information and implementation into practice by understanding context, barriers and facilitators. The research regarding the complex relationships between diet and cardiovascular disease/metabolic risk was discussed to highlight new evidence and the importance of translating this into evidence-based practice. The mechanism for this area of NNEdPro work is through the Nutrition and Vascular Studies (NVS) Platform/Team. The NVS team has a particular interest in understanding how diets rich in (or supplemented with) fruit, vegetables and/or phytonutrients can modulate cardio-metabolic pathways in at-risk populations, such as the overweight and obese. Based on NVS work, the NNEdPro group aims to translate key findings and other supporting evidence from the wider literature, particularly into educational innovations for healthcare professionals. This work is explained through three strands including: *Experiment: Individual Diets, Nutrition and Vascular/Endothelial Function;*

*Epidemiological:* Population Diets, Nutrition and Cardiovascular/ Metabolic Risk; and  
*Translational:* Evidence Synthesis and Knowledge Exchange for Researchers and/or Practitioners.

Dr Ray focused on the translation aspect of this work, including the importance of knowledge synthesis and how this can lead to evidence based practice in medicine. Through the Knowledge-to-Action framework, the NNEdPro group aims to synthesize knowledge, and understand the context, barriers and potential solutions to incorporating research into evidence-based care.

### *Integrating Nutritional Genomics in the Medical School Curriculum*

Dr Martin Kohlmeier from the University of North Carolina, Chapel Hill, presented another aspect of integrating evidence based practice into the medical curriculum, with a particular focus on nutritional genomics. In outlining nutritional genomics, Dr Kohlmeier explained that everyone has numerous genetic variants and that some are associated with health consequences. Dr Kohlmeier provided a variety of examples and teaching opportunities to explain how nutrition education in medical curricula could be enhanced by exploring interactions of nutrient metabolism and genetics. An example from the preventative approach focused on the common genetic variants of how some people metabolize caffeine less efficiently than others. People with this particular genetic variant are exposed to the stimulant, caffeine, for longer after ingestion than those without the variant and there are potential consequences. If used in medical teaching, discussion on this topic could relate to caffeine targets and adenosine receptors, blood pressure control, removal of bioactives with decaffeination and induction of hepatic oxidases by plant compounds. Other teaching examples were discussed and a few examples of key learning points are included in Figure 2.

INSERT FIGURE 2 ABOUT HERE

Dr Kohlmeier concluded that he did not believe it was possible to provide good nutrition education without frequently addressing genetic variation. He also highlighted that most medical school curricula in the US already include nutrigenomic issues, but usually without referencing the actual term or concept. Nutrigenomic concepts can be included in many diverse settings, such

as basic science courses, case-based instruction, and clinical rounds, and most medical nutrition educators would like to see a significant expansion of nutrigenomic presentations.

### *Translation of Hydration Research into Education*

Pauline Douglas and Dr Lynn McGuffin from the NNEdPro Group presented an important example of how to translate research into education. The NNEdPro Group has been working on a hydration education project for GPs which has included the development of a blended learning package. The evidence regarding importance of adequate hydration is transitioning from a complete focus on hydration in sports, to its impact on overall health and specific medical conditions. For this project, incorporation of evidence included four key stages: 1. needs assessment; 2. delivery of the education package; 3. evaluation and 4. dissemination.

During the needs assessment stage, a review of scientific literature and clinical guidelines was considered essential to ensure a robust collation of the most up-to-date evidence. This evidence was then tailored to the target audience by reviewing the target group's curricula and building on existing learning. A survey of the target group's knowledge, attitudes and self-reported practices in relation to hydration practice identified key gaps which were used to inform the intervention to meet the identified needs. Scientific experts were consulted throughout this process to ensure the translation into education did not affect the scientific interpretation. Consultation with GP trainers also occurred to ensure the materials were appropriate for the audience. Once the material was brought together, a pilot of the education package with the target group was conducted and evaluated for changes in knowledge, attitudes and practices, as well as qualitative feedback on the usefulness of the training. Suggestions from the evaluation were incorporated into the material and adapted for the next group.

Delivery of the hydration package for GPs involved both face-to-face teaching and provision of materials online. The evaluation of both aspects included feedback on the quality of the materials, quality of tutors and key learning points. A more objective evaluation was also conducted by measuring hydration knowledge, attitudes and practices immediately before and after the face-to-face session as well as completion of online activities. The next step in this program of work will be to disseminate the findings, not only through traditional peer-reviewed avenues, but also by continuing to offer this teaching to GPs and apply the learning to other areas of nutrition.

## **Conclusion**

All speakers presented unique perspectives on medical nutrition education and research based on their region and their experiences. However, a consistent message throughout all presentations was that collaboration is essential to ensure nutrition is prioritised in the medical curriculum. Following the Summit, the group continues to collaborate and plans are already underway for the next Summit in June 2016.

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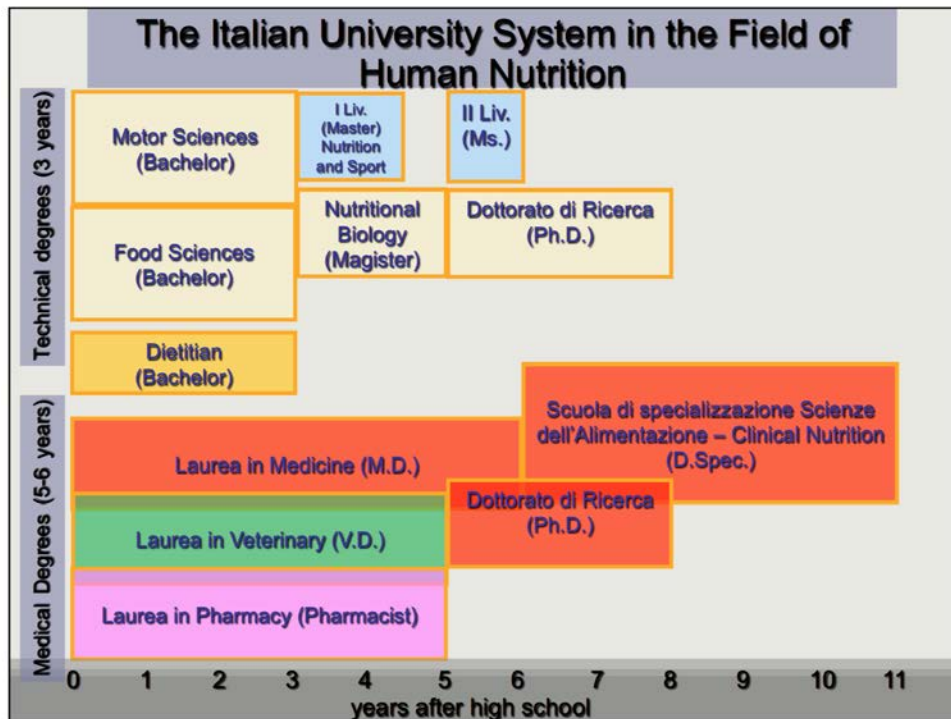


Figure 1: Overview of the Italian university system for human nutrition.

- Mechanisms of gene-nutrient interactions and inherited nutritional individuality
- Evolutionary and short-term genomic adaptations to nutrition exposure
- Research methods and study types for the investigation of gene-nutrient interactions
- Principles and practice of assessing evidence for nutritional genomics
- Inherited food and nutrient intolerances
- Genetic variability of appetite control, metabolic rates and body composition
- Mechanisms and relevance of nutrition-related epigenetic modifications before and after birth
- Practice and public health implications of genetically diverse responsiveness to nutrition

Figure 2: Key learning points for medical student regarding nutritional genomics