Transforming Personalised Nutrition Practice

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Aims & Contents

- CNELM, Vision & Research Aims
- DProf Research - Transforming Personalised Nutrition Practice. Aims, methods & outcomes.
- Personalised Nutrition – meaning, research and evidence.
- Current Nutrition Practice – approaches, strengths and weaknesses
- Evidence Based Personalised Nutrition Practice

CNELM Educational Courses

- BSc Hons Nutritional Science
- MSc in Personalised Nutrition
- PG Diploma in Personalised Nutrition
- PG Certificate in Personalised Nutrition
- Nutritional Therapy Practice Diploma (for graduates of the BSc Hons Nutritional Science and MSc/PG Dip in Personalised Nutrition)
- Neuro Linguistic Practitioner Certificate - attendance
- Dietary Educator Certificate
- Nutrition Coach Diploma
- Why Weight Practitioner coaching course
- Bioscience Entry courses
- Food for Health Certificate

CNELM Vision

- *‘*To be a Centre of Excellence for education and research into evidence based personalised nutrition that steers the integration of personalised approaches to nutrition into mainstream healthcare enabling them to be accessible population deliverable healthcare options*’.*

CNELM Research Aims:

- to build a research centre, with active postdoctoral, PhD and MSc researchers focusing on an integrated approach to evidence based personalised nutrition.
- to build bridges between academic communities: bringing together researchers in statistical machine learning and systems biology with nutritional scientists and practitioners of clinical nutrition.

Overall aims of DProf Research Project:

Title – Leading transformation in personalised nutrition practice

- Evaluate the ethics, limitations and opportunities of standardising data-collection methods in personalised nutrition practice;
- Construct new clinical tools for health data collection, clinical decision making and clinical outcome analysis that standardise case data-collection methods and enable assessment of the efficacy of interventions;
- Enable the development of a new, case-by-case, evidence base for personalised nutrition practice in obesity management.

5 Stage Research Design

1. Literature reviews
    1. Evidence based and personalised nutrition practice approaches
    2. The implications and ethical considerations of standardising a personalised approach
    3. Measures of obesity, signs & symptoms, biomarkers, mechanisms.
    4. Requirements and methods for developing reliable and validated tools
2. Data Gathering & Existing tool analysis
    1. Online systematic search for existing tools used with obesity
    2. Request practitioners to provide tools and participate in research
    3. Survey practitioners to assess which tools they use in practice.
    4. Interview practitioners to evaluate their experiences of using existing tools & views on ethics of standardising a personalised approach
    5. Interview academics & statisticians to evaluate their experience of tool development.

5 Stage Research Design

3. New tool development
   - Collaborative Delphi method - Review Categorised data, rank questions & tool Approaches
4. Pilot Trail
   1. Analyse reliability and validity of data provided by tools
   2. Survey practitioners & clients to assess their experience of using new tools
5. Evaluation
   1. Survey of practitioners to identify opportunities to enhance engagement with obese population
   2. Interviews with practitioners to identify barriers to pilot trial engagement and barrier for embedding standardised tools in clinical practice.
   3. Evaluate ways in which standardised tools can be imbedded into practice
   4. Evaluate ways which may enable the development of a new evidence base for personalised nutrition practice

Outcomes

- 4 new clinical tools that support pathophysiological reasoning.
- Defined and developed and evidence based personalised nutrition practice approach.
- Knowledge to develop tools that can measure the efficacy of personalised nutrition practice and highlighted the strengths and weaknesses of creating and implementing those tools.
- Attainable vision for making an evidence based personalised approach a reality.
- Identified unique opportunities to develop a new evidence base for nutritional practitioners which can make probabilistic predictions on empirical data.
- Opportunities for further research and practitioner researcher roles within the profession

Personalised Nutrition
Meaning, Research & Evidence

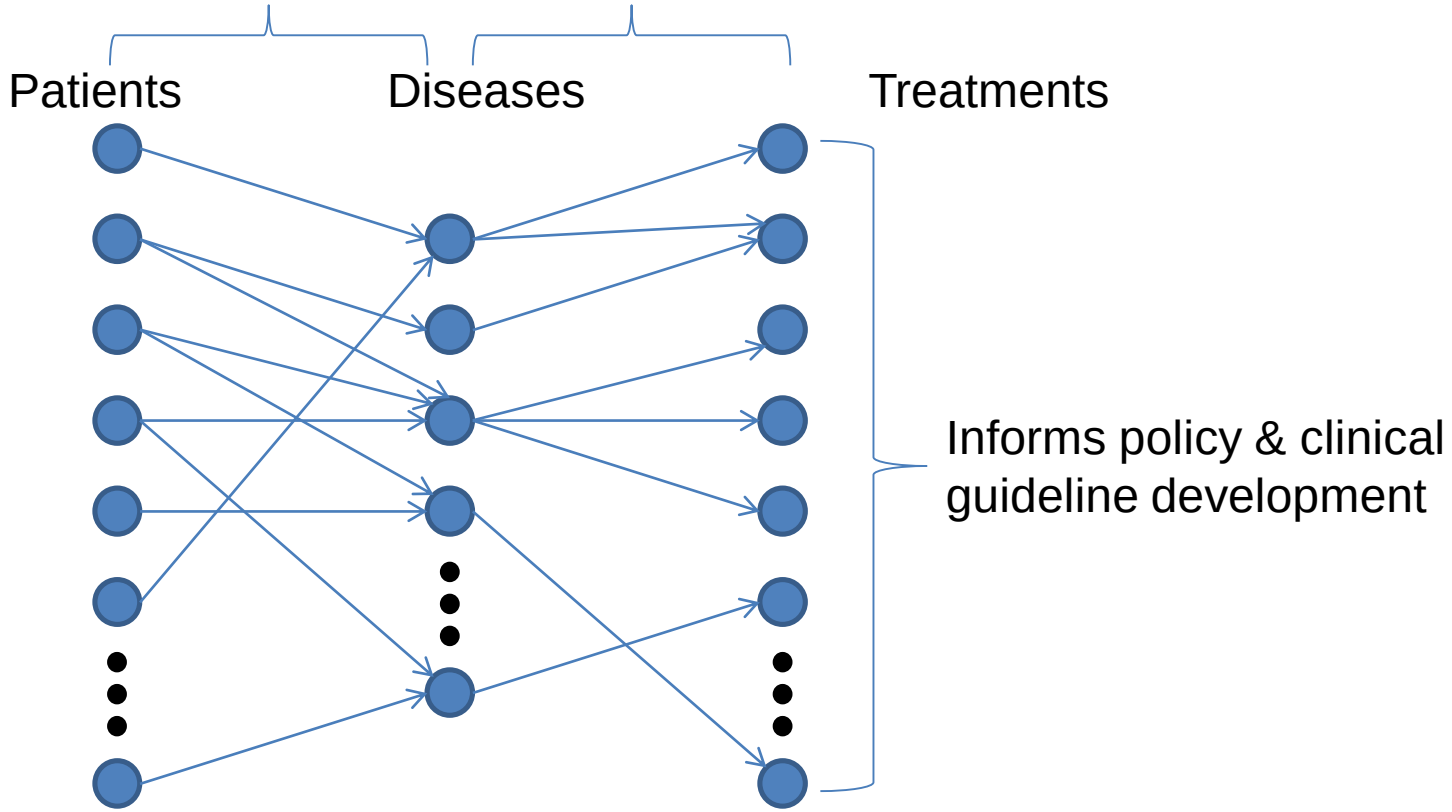
Personalised Nutrition Meanings

- Nardini et al., (2012) recognise the various meanings of ‘personalised medicine’ with one being personalised to the individual’s needs and another which refers to interventions based on genetic profile of the individual.
- Personalised: when interventions are stratified to target particular groups of patients (Day *et al.*,2017; Nardini *et al.*, 2012; Ordovas *et al.*, 2018; Patel *et al.*, 2015).
- Nutrition, as well as other economic business sectors are moving away from a “one size fits all” to a personalised model” (Ronteltap, van Trijp, Berezowska, & Goossens, 2013)

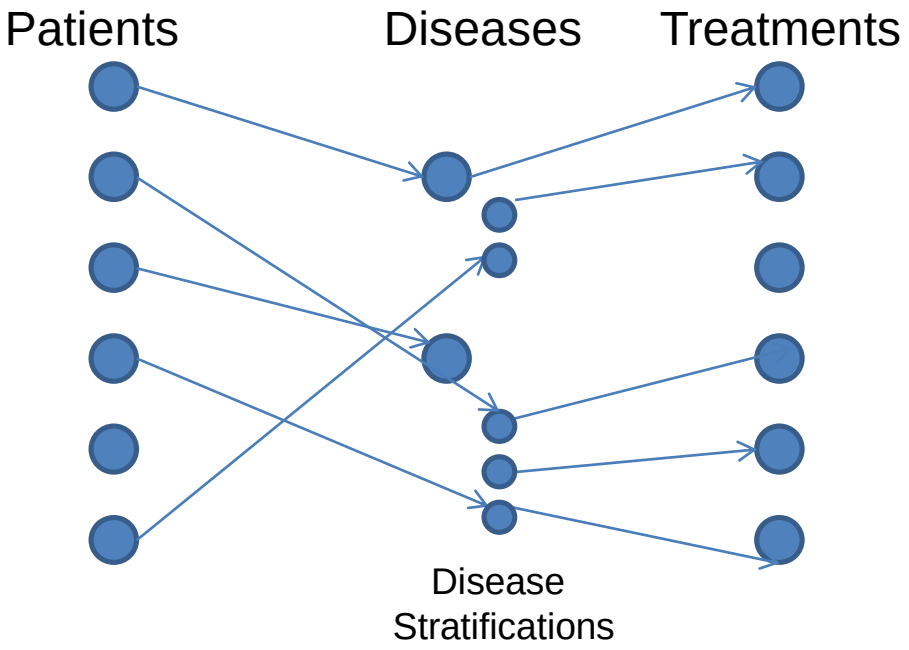
The Current EBM Research Paradigm

Pathology
Research Produces
Diagnostic Guidelines

Epidemiological RCTs & systematic reviews
on interventions demonstrate safety
and efficacy.



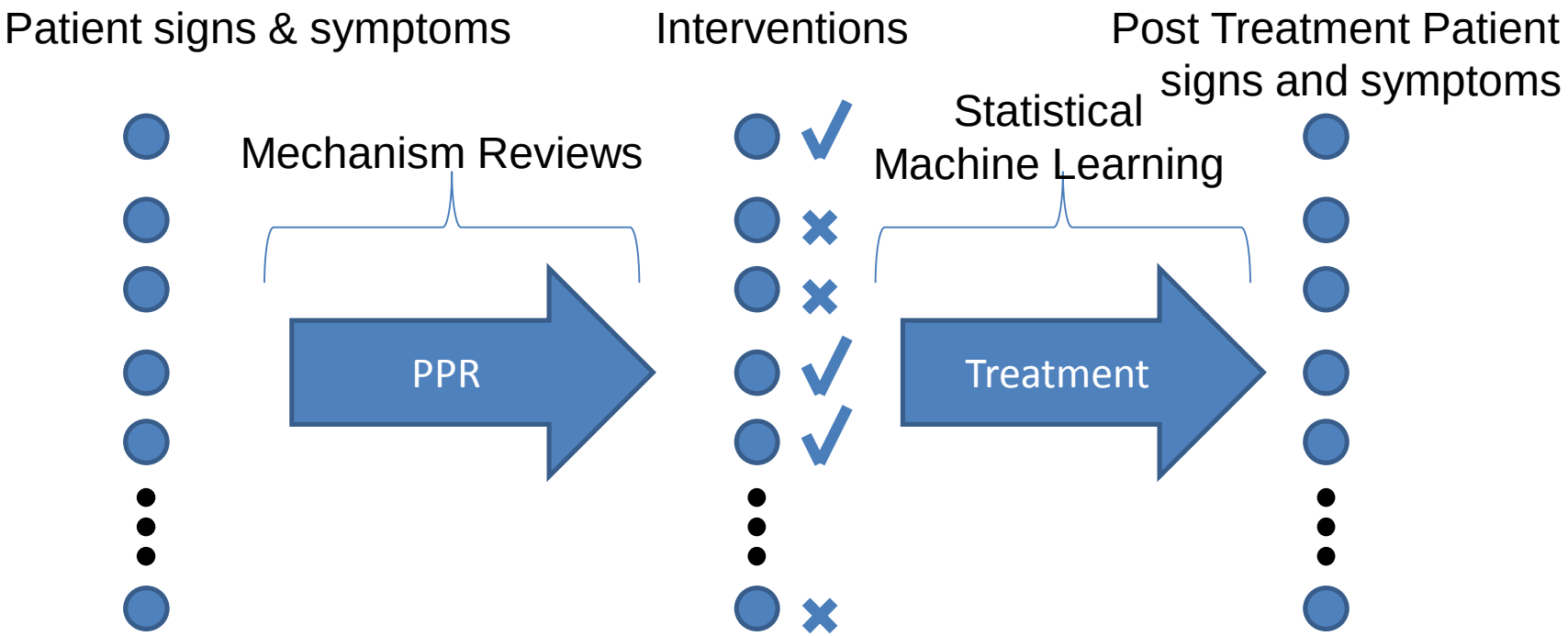
Stratified Medicine



Disease strata, based on pathophysiology. Interventions targeted to ameliorate pathophysiology

Stratified Medicine is a form of personalisation within the current paradigm

Pathophysiological Reasoning



Individual signs, symptoms, health history etc. Pathophysiological reasoning & targeted interventions. SML prediction models.

Plurality of Evidence

- Mechanistic explanations are considered to be a low form of evidence in the evidence hierarchy because mechanistic explanations and predictions come apart in various ways (Andersen, 2012).
- Mechanisms can explain what is happening in a system while failing to provide the basis for prediction when interventions are applied (Andersen, 2012).
- Bereczki (2012) argues that personalised medicine is an upgrade of evidence-based medicine because personalised medicine allows for the use of a range of evidence, including patient preferences and individual expertise.

Personalised Nutrition Practice Approaches, strengths and weaknesses

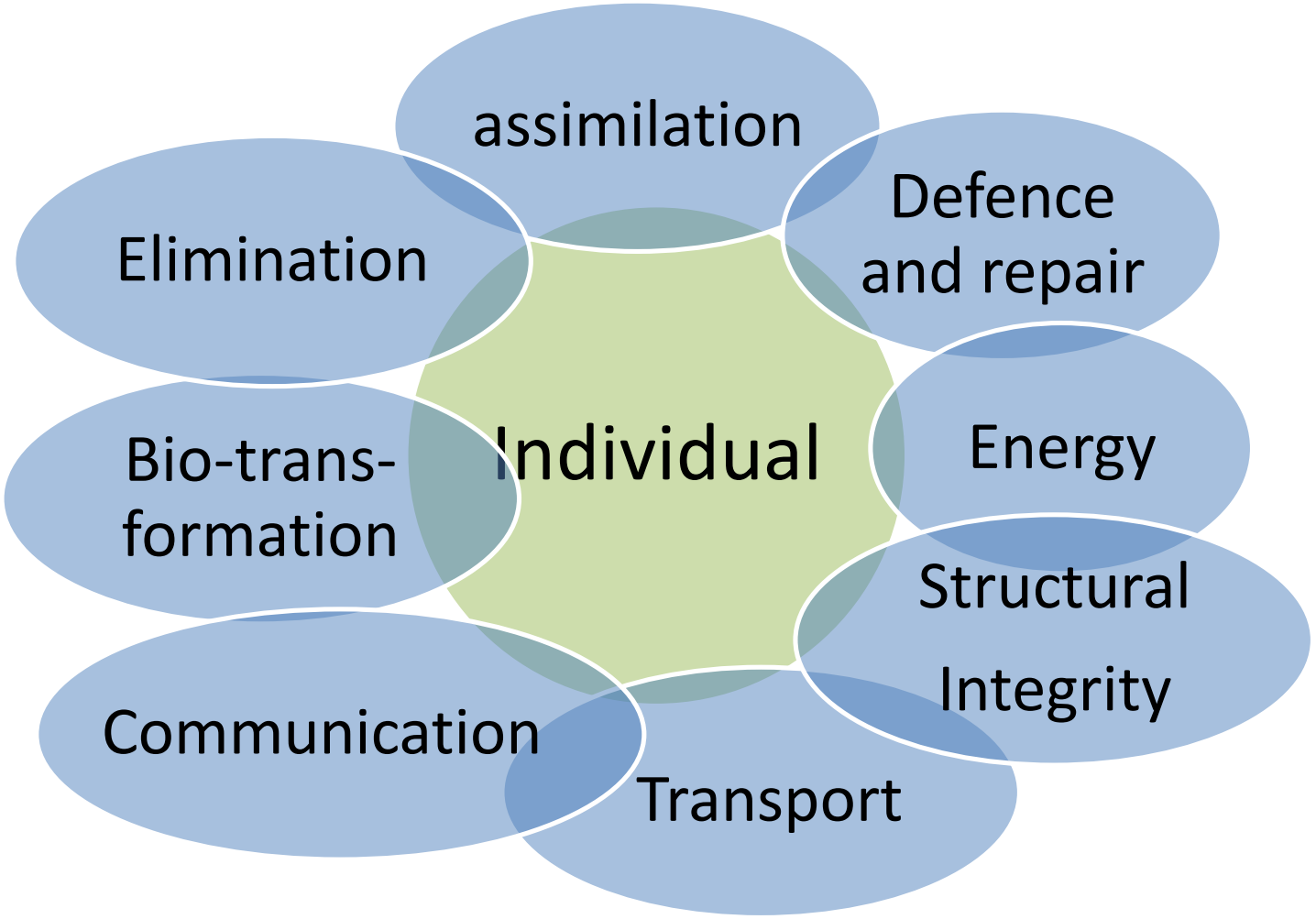
Data Collection

- Practitioners are gathering data in a variety of non-standardised ways
  - Face to face & self developed clinical questionnaires
  - practitioners developed their own clinical data-collection methods to support their own clinical practice approaches
- Gaps – lacking clinical tools which gather data on individual health history, family history, sociocultural influences on obesity as well as goals and outcomes
- Validated tools do exist (dietary intake, physical exercise, quality of life etc.) but these are often research focused and lack clinical utility.
- Overall support in developing standardised data collection tools which do not impact on personalised practice.

Practice Approaches

- Differential diagnosis & clinical guidelines
  - complexity of individuals and disease
  - disease centred
- Beyond the guidelines:
  - time-consuming
  - gives sufficient room to make inaccurate inference from the data
- Laboratory assessments – to personalise
  - Diagnostic & Prognostic
  - Functional and mechanistic tests

Functional Medicine



Pathophysiological Reasoning?

The British Dietetics Association (BDA) process gathers information using an "ABCDEF" structure:

- **A**nthropometry, **B**iochemistry, **C**linical/physical, **D**ietary, **E**nvironmental/behavioural/social, patient-**F**ocused.

The British Association of Nutrition and Lifestyle Medicine (BANT) uses a model which includes categories:

- environmental inputs, gut function, defence and repair, mind and spirit, hormone and neurotransmitter regulation, detoxification, energy production/oxidative stress and structural integrity.

	Evidence Based	Stratified	Personalised
Evidence Source	Clinical Epidemiology	Clinical Epidemiology	Mechanistic evidence (animal, in-vitro, human observational) and Clinical Epidemiology
Clinical Reasoning	Evidence prioritised by Evidence Based Hierarchy	Companion diagnostic together with evidence prioritised by Evidence Based Hierarchy.	Pathophysiological Reasoning and Evidence prioritised by Evidence Based Hierarchy.
Intervention Assignment	Differential Diagnosis. Disease orientated. Person centred.	Disease sub-group. Person-centred.	Mechanism of action of interventions to ameliorate mechanisms of pathophysiology. Person centred.
Use of laboratory Assessment	Diagnostic. Prognostic	Diagnostic. Prognostic. Companion diagnostics.	Diagnostic. Prognostic. Physiological and pathophysiological function assessment.

Evidence Based Personalised Nutrition Practice

Personalised Nutrition Practice

- Robust, standardised and validated tools that gather patient's signs and symptoms, health history, family history, environment, lifestyle, social life, diet, behaviour and other factors which have an impact on physiological processes across a lifespan in a manner that supports pathophysiological clinical reasoning.
- This individual data would be analysed along side anthropometric measures, laboratory assessments and biomarkers for pathophysiological mechanisms.
- Interventions target mechanisms of actions to mechanisms of pathophysiology
- Limited ethical concerns with standardised data collection.

Evidence Based Personalised Nutrition Practice

- New tools should pool data into a new case-by-case evidence base which utilises computational network modelling to predict the efficacy of personalised nutrition interventions.
- Zeevi *et al.* (2015) have already achieved the ability to predict outcomes of personalised dietary interventions aimed at managing post-prandial glycaemic response (PPGR) by utilising a systems biology machine learning approach and monitoring physiological mechanisms which affect PPGR.
- Predicting outcomes for individuals would transform personalised nutrition practice.

Food Science & Technology

- Provides opportunities for all stakeholders including food industry, researchers, health care practitioners, and consumers
  - Pathophysiological reasoning proposed as the approach for Personalised Nutrition Practice.
  - New research opportunities
  - Development of functional laboratory assessments
  - Smart phone developments for tracking individual lifestyle, social, diet and environment influences
  - Target foods and products to support physiological processes
  - Much more..

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