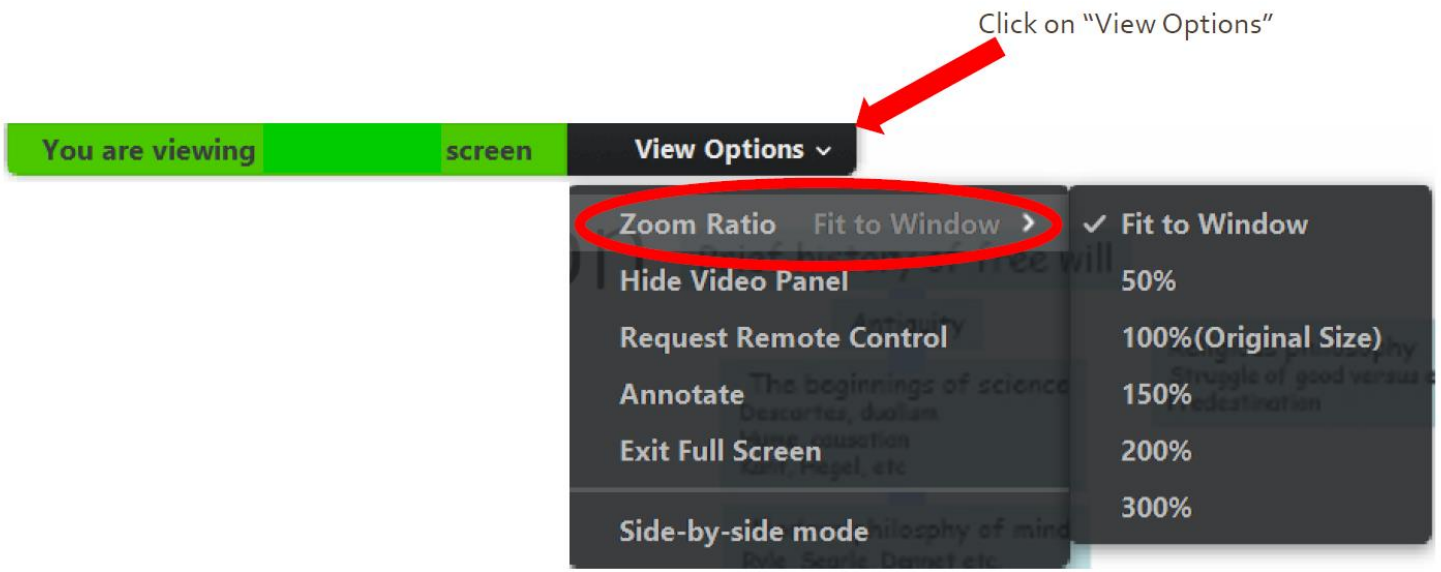
Volunteer opportunity:

NUTR 207 Nutrition and Health

Time: (M) 1:05 – 2:25 pm,
(R) 2:35 – 3:55 pm
(Eastern Standard Time)

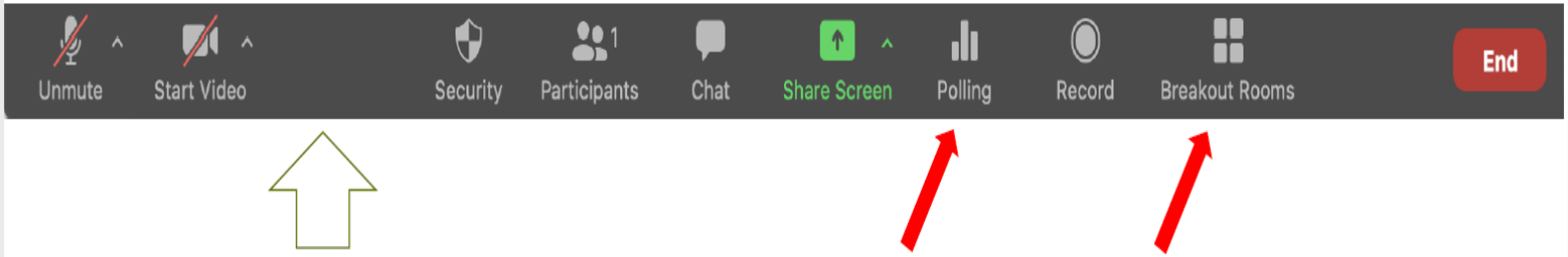
Zoom tips

Increasing the font size during screen sharing



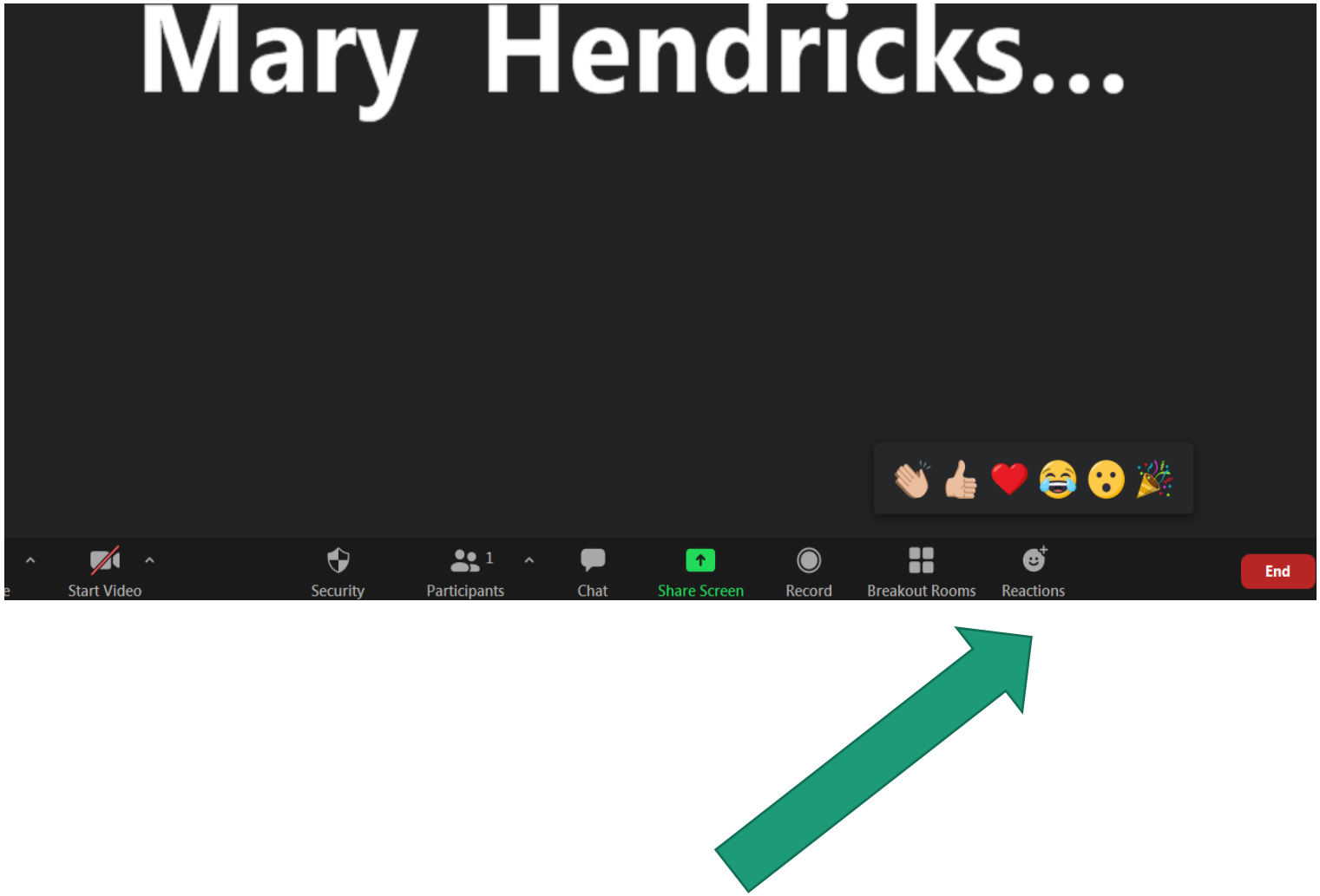
Navigating the Zoom window

- Participant view

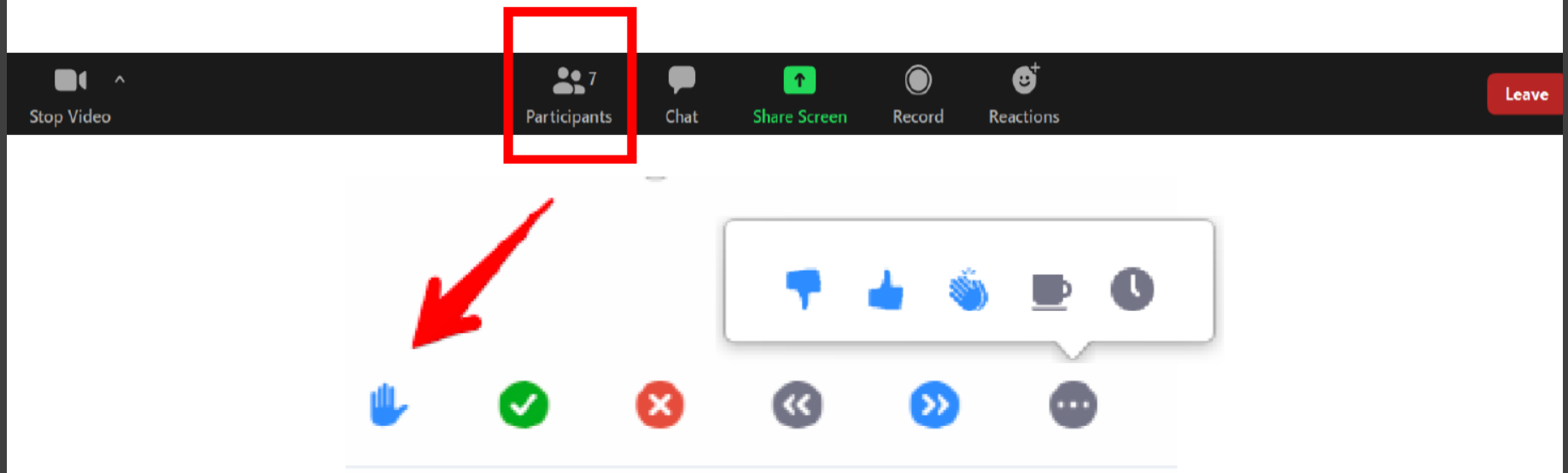


- Host view

Zoom Reactions



Reaction icons



Click on "Participants" to see a list of the participants and various reaction icons on the bottom of that list.

Zoom tips.

Creating a meeting

You can create meetings from different locations:

- Desktop client
- Mobile app
- Web portal (www.zoom.us)

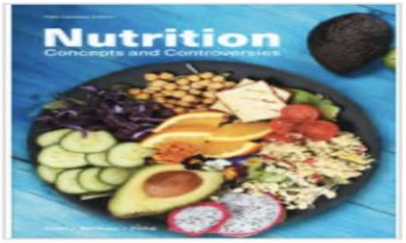
always sign in with your McGill ID

- **myCourses –> use this to schedule classes**

Course outline

Required text available at:

https://lejames.ca/nutrition-concepts-and-controversies



Nutrition Concepts and Controversies, 5th Edition

Sizer/Sizer/Whitney/Whitney/Piché - ©2021

ISBN10: 0-17-689286-9
ISBN13: 978-0-17-689286-9

eBook	$74.95
Paperback	$129.95

Additional References : * Understanding Nutrition , 15th Edition, 2019 (e-book available through McGill libraries, link provided on MyCourses). Ellie Whitney; Sharon Rady Rolfes, ISBN-10: 1-337-39269-3, ISBN-13: 978-1-337-39269-3

Evaluation

Evaluation:

Quizzes	30%	Quizzes using MyCourses Quiz function. The lowest grade on **one** quiz will be dropped.
Group Assignment	20%	Internet vs Evidence based science group project (submit on MyCourses under Assignment function)
Food Analysis Activity	20%	Food analysis interpretation for cases (submit using both MyCourses quiz and Assignment function)
Final Exam	30%	Comprehensive (multiple choice, TF, short answer) The final exam is comprehensive covering the entire term with more emphasis on Module 12 which was not covered by a quiz at the end of the term.

Quizzes for each Module:
Quizzes are to be done independently and individually. Quizzes will be timed and, once started, you will have 40 minutes to complete. Quizzes will be available for completion from the last class of that module until 1 pm of the day of the next class (either a Monday or a Thursday). There are eleven quizzes, one for each module (Modules 1 to 11). **The lowest grade for one quiz will be dropped.** Ten quizzes will count equally for 30% of the final grade (each quiz worth 3% of the total grade). If a quiz is missed, the grade will be zero.

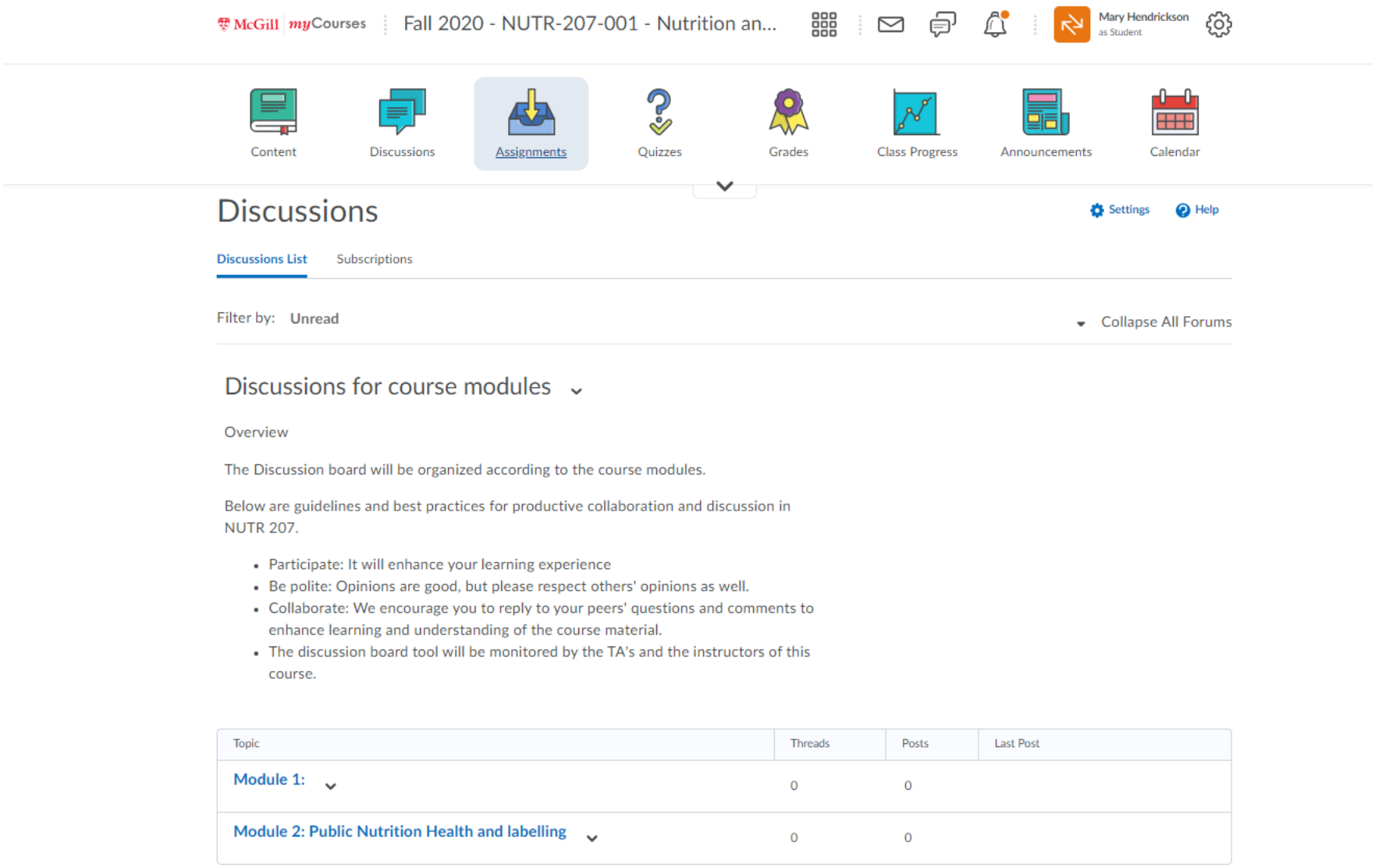
Late work for the Internet vs Evidence Group Assignment or the Food Analysis Activity: There will be a 1% deduction from the total grade of the course per day late. Example: If the activity is worth 20% (20 marks) and is one day late, then there would be a deduction of 1, resulting in a highest maximum grade of 19% (19 marks). **Students are responsible to ensure that they have properly uploaded the correct documents by the due date.** If you upload a document and later realize that you want to make a change, you can upload the revised version and leave a note for the TA concerning which version they should correct (i.e. more than one document can be uploaded). Documents need to be uploaded in a format that the TA will be able to open (such as Word, pdf or PowerPoint).

Grades and Evaluation: Grades will be posted on My Courses in the Gradebook.
Final grades will be rounded up at 0.5 and round down at 0.49 for the letter grades, so 79.5 will round up to an A-.

COURSE SCHEDULE (subject to change)

Class Module	Date	Zoom Lecture Topic, instructor, Description	Due Dates
1 Module 1	R Sept 3	Course outline Science Behind Nutrient Requirements: M Hendrickson (Required Textbook Chap. 1)	Practice Quiz: "Due" Sept.14 at 1pm (no marks)
2 Module 1	R Sept 10	DRI Nutrient Requirements (Chap.2): M Hendrickson	Quiz 1 on Module 1 ***Due Thurs Sept 17 at 1 pm***
3 Module 2	M Sept 14	Public Health Nutrition Messages: M Hendrickson Translating Nutrient Intakes into Healthy Food Choices, CFG, Functional foods (Chap 2)	
4 Module 2	R Sept 17	Food Composition, Food Labelling (Chap 2): M Hendrickson Internet vs Evidence Group Assignment guidelines and groups (pre-recorded)	Quiz 2: Module 2 ***Due: Mon Sept 21 at 1 pm*** Internet vs Evidence Group Assignment ***Due: Oct. 15 at 11:30 pm***
5 Module 3	M Sept 21	Anatomy, digestion and absorption. *(Understanding Nutrition Chapter 3, 2019, Chapter 3: pages 69 - 85) S. Phillips	Quiz 3: Module 3 ***Due: Thurs Sept. 24 at 1 pm***

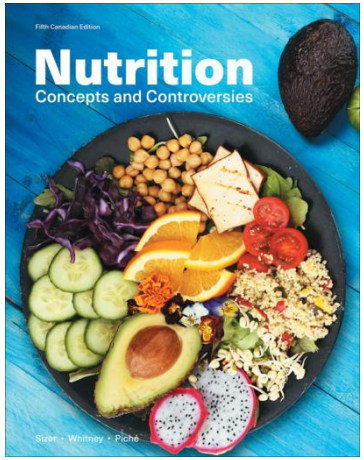
MyCourses Discussion Board



Food Choices and Human Health

Chapter 1

And …



Learning Objectives

- Discuss how a particular lifestyle choice can either positively impact or harm overall health.
- Define the term *nutrient* and list the six major nutrients.
- Recognize the five characteristics of a healthy diet and give suggestions for using them.
- Describe and give an example of the major types of research studies.

A Lifetime of Nourishment

- **Nutrition:** The study of how food nourishes the body
- **Food:** Any substance the body can take in and assimilate; a source of nutrients
- **Diet:** The food and beverages a person usually eats and drinks
  - Not referring to restrictive weight-loss plan

What is a Nutritious Diet??

3 minute Zoom breakout room activity

- You will randomly be assigned to a group and then CLICK JOIN

1. Introduce yourself to fellow students
2. Discuss: what you think a nutritious diet is?
3. Select one student to type in 1 answer in the Zoom chat box for your group

- You will automatically be returned to the Zoom class at the end of the group activity.

Characteristics of a Nutritious Diet

A,B,C,M,V Principles:

A Lifetime of Nourishment

- A well-chosen array of foods will prevent malnutrition
  - Malnutrition includes:
    - Nutrient deficiencies
    - Nutrient imbalances
    - Nutrient excesses

A Lifetime of Nourishment

- Foods consumed have a cumulative effect on your body
  - The effects become obvious with age
  - Diet has a significant impact upon long-term health prospects

How Powerful Is a Nutritious Diet in Preventing Disease?

Table 1–1

Leading Causes of Death in Canada, 2018*

	Total
1. Malignant Neoplasms (Cancer)**	79,536
2. Diseases of the Heart**	53,134
3. Cerebrovascular Diseases (stroke)**	13,480
4. Accidents (unintentional injuries)	13,290
5. Chronic Lower Respiratory Diseases	12,998
6. Influenza and Pneumonia	8,511
7. Diabetes Mellitus**	6,794
Total Deaths (all causes)	187,743

*Adapted from Statistics Canada, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310039401

**Diet-related chronic diseases.

#6: COVID 19 to date 2020= 9130

Nutrition and Disease

Not all diseases are equally influenced by diet.

Figure 1–1

Nutrition and Disease

Not all diseases are equally influenced by diet. Some are almost purely genetic, like the anemia of sickle-cell disease. Some may be inherited (or the tendency to develop them may be inherited in the genes) but may be influenced by diet, like some forms of diabetes. Some are purely dietary, like the vitamin and mineral deficiency diseases.

Other Lifestyle Choices

- Besides diet, other factors affect health:
  - Tobacco use
  - Alcohol use
  - Substance abuse
  - Physical activity
  - Sleep
  - Stress
  - Conditions at home and work
  - Isolation
- McGill support:

https://www.mcgill.ca/wellness-hub/self-help

Health effects of dietary risks in 195 countries, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017

*GBD 2017 Diet Collaborators**

Lancet 2019; 393: 1958–72
Published Online
April 3, 2019
http://dx.doi.org/10.1016/S0140-6736(19)30041-8

See Comment page 1916

*Collaborators listed at the end of the paper

Correspondence to:
Prof Christopher J L Murray, Institute for Health Metrics Evaluation, University of Washington, Seattle, WA 98121, USA
cjlm@uw.edu

Summary

Background Suboptimal diet is an important preventable risk factor for non-communicable diseases (NCDs); however, its impact on the burden of NCDs has not been systematically evaluated. This study aimed to evaluate the consumption of major foods and nutrients across 195 countries and to quantify the impact of their suboptimal intake on NCD mortality and morbidity.

Methods By use of a comparative risk assessment approach, we estimated the proportion of disease-specific burden attributable to each dietary risk factor (also referred to as population attributable fraction) among adults aged 25 years or older. The main inputs to this analysis included the intake of each dietary factor, the effect size of the dietary factor on disease endpoint, and the level of intake associated with the lowest risk of mortality. Then, by use of disease-specific population attributable fractions, mortality, and disability-adjusted life-years (DALYs), we calculated the number of deaths and DALYs attributable to diet for each disease outcome.

Findings In 2017, 11 million (95% uncertainty interval [UI] 10–12) deaths and 255 million (234–274) DALYs were attributable to dietary risk factors. High intake of sodium (3 million [1–5] deaths and 70 million [34–118] DALYs), low intake of whole grains (3 million [2–4] deaths and 82 million [59–109] DALYs), and low intake of fruits (2 million [1–4] deaths and 65 million [41–92] DALYs) were the leading dietary risk factors for deaths and DALYs globally and in many countries. Dietary data were from mixed sources and were not available for all countries, increasing the statistical uncertainty of our estimates.

Interpretation This study provides a comprehensive picture of the potential impact of suboptimal diet on NCD mortality and morbidity, highlighting the need for improving diet across nations. Our findings will inform implementation of evidence-based dietary interventions and provide a platform for evaluation of their impact on human health annually.

Funding Bill & Melinda Gates Foundation.

Introduction

The relationship between dietary habits and chronic non-communicable diseases (NCDs) has been extensively investigated.[1–5] Long-term randomised trials with NCD endpoints have not been feasible for most dietary factors, but synthesis of other lines of epidemiological evidence, including long-term prospective observational studies

factors.[10–19] These efforts, although useful, had several important limitations, including insufficient geographically representative data on dietary consumption, inaccurate characterisation of population distribution of dietary intake, insufficient accounting for biases of different sources of dietary assessment, standardisation of the intake to 2000 kcal per day, and insufficient accounting

- https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(19)30041-8/fulltext
- https://www.medicalnewstoday.com/articles/324897

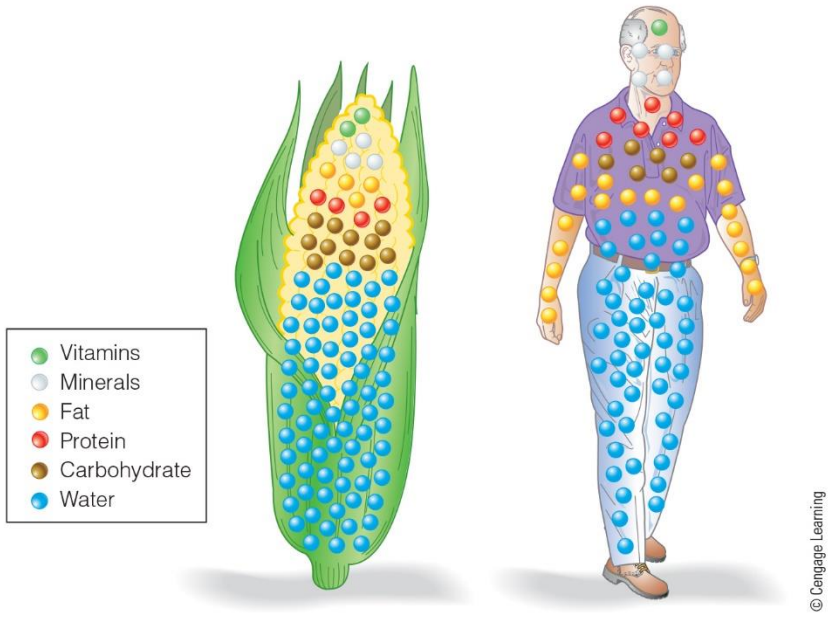
The Nutrients in Food

- **Nutrients:** Components of food required for the body's functioning
  - Roles:
    - Provide energy
    - Building material
    - Maintenance and repair
    - Support growth

Materials of Food and the Human Body

Figure 1–2
Materials of Food and the Human Body

Foods and the human body are made of the same materials.



Foods and the human body are made of the same materials

The Six Classes of Nutrients

Nutrient	Organic	Inorganic	Energy-yielding	Macronutrient	Micronutrient
Carbohydrates	✓		✓	✓	
Lipids (fats)	✓		✓	✓	
Proteins	✓		✓	✓	
Vitamins	✓				✓
Minerals		✓			✓
Water		✓			

Nutrients in Food

- **Essential nutrients:**
  - Nutrients that the body either cannot make, or cannot make fast enough, from other raw materials
  - Nutrients that must be obtained from food
    - If not obtained, deficiencies will occur
  - Include: Water, some lipids, parts of proteins and a form of CHO, vitamins and some minerals

Energy in the Body

- Body uses macronutrients
- Bonds between the nutrients' atoms break
  - Energy is released
    - Can be used or stored
- Macronutrients
  - Provide raw material for building tissue and regulating body activities
  - Proteins regulate digestion and energy metabolism

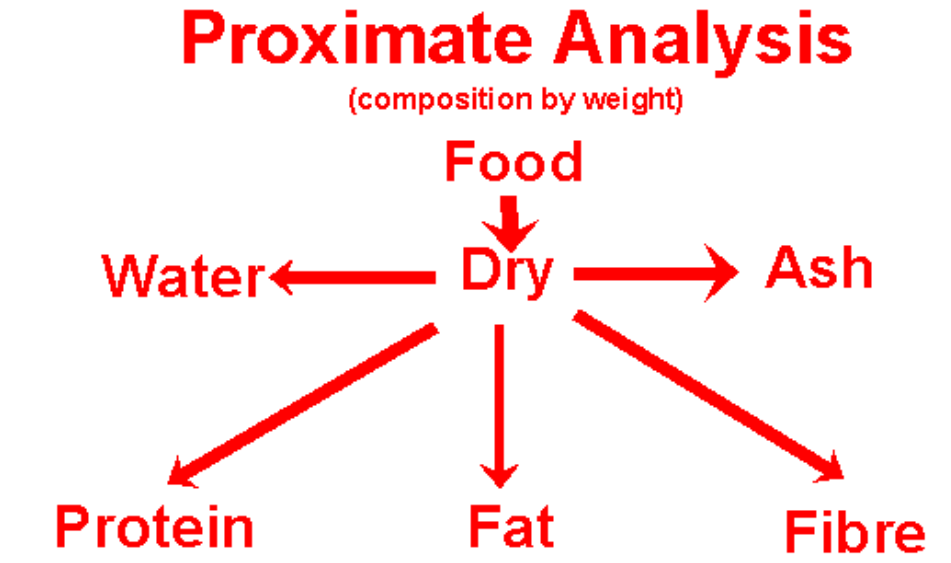
The Vitamins

- 13 organic vitamins
  - Each has a special role
- Facilitate energy release
  - Almost every bodily action requires assistance from vitamins
- Vulnerable to destruction
  - Heat (from cooking), light, and chemicals

Minerals and Water

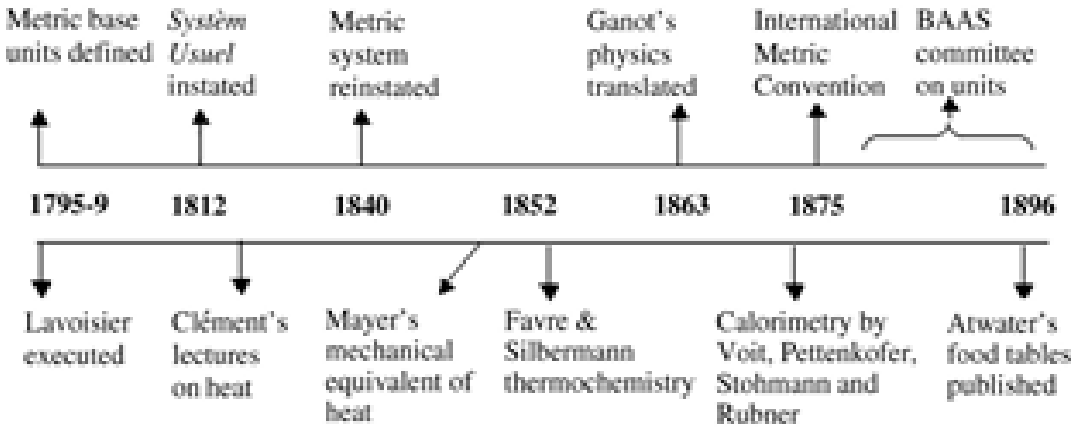
- Minerals
  - 16 essential minerals
  - Other minerals are environmental contaminants
    - Example: lead
  - Indestructible
    - Can leach into water during cooking
    - May be lost during food processing
- Water
  - Environment for nearly all body processes

How to calculate the composition food ?



CHO = Food - water - protein - fat - fibre - ash

Figure 1 Timeline of 19th century events in the history of the metric system and calorie. BAAS, British Association ...

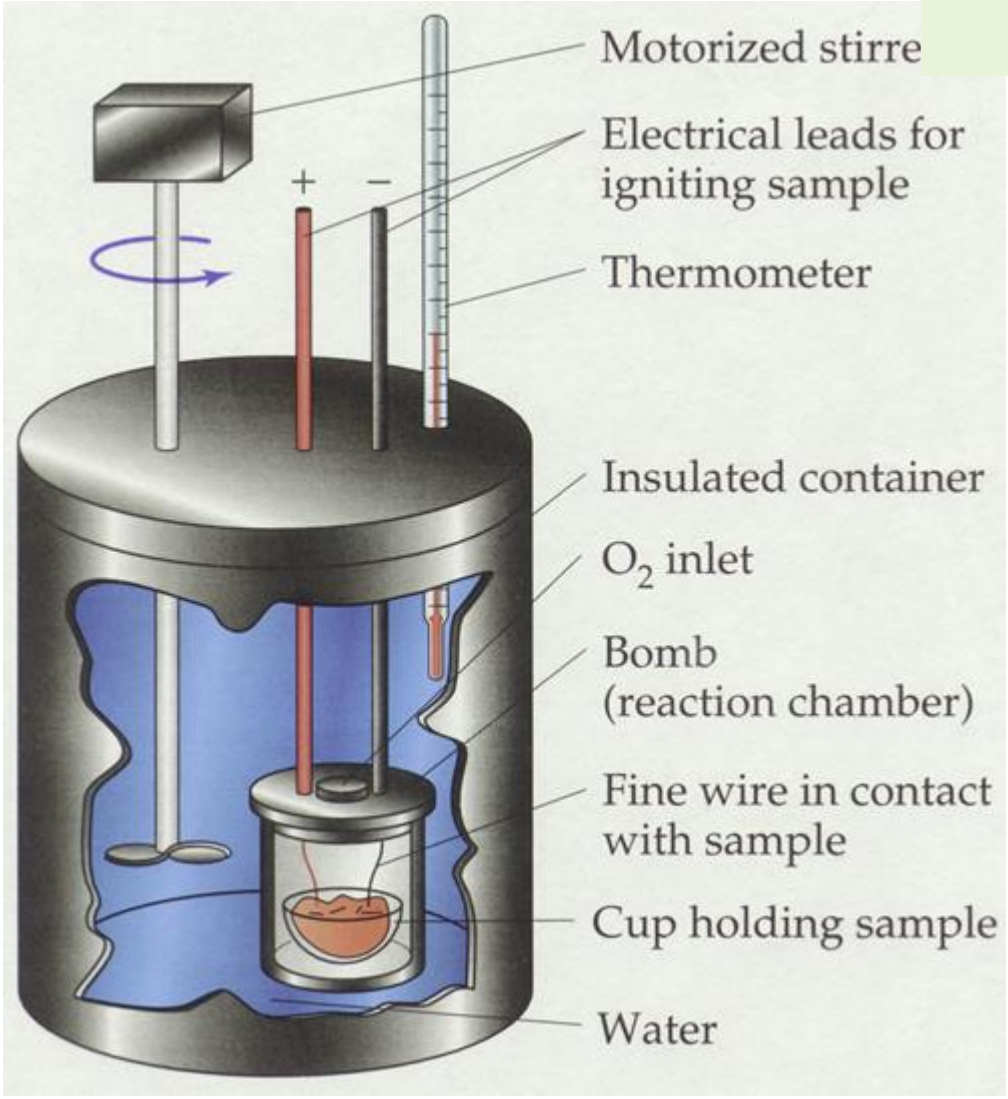


J Nutr, Volume 136, Issue 12, December 2006, Pages 2957–2961, https://doi.org/10.1093/jn/136.12.2957

https://academic.oup.com/jn/article/136/12/2957/4663943

Bomb Calorimeter
(combustible energy)

When food is burned E is released
Measured by: Kcal or kJ
1 kcal equals 4.184 kjoules



Measures temp changes

(Sample is burned)

Where temp. increase from burning food is measured

Energy Values (kcal/g) of Macronutrients

Kcal/g	Pro	Fat	CHO	Alcohol
Combustible Energy	5.65	9.4	4.15	7.0
Digestibility (%)	92%	95%	97%	
Digestible Energy	5.25	9.0	4.0	
Urinary Loss	1.25	0	0	
Metabolizable Energy	**4.0**	**9.0**	**4.0**	**7.0 kcal/g**

EtOH= kcal, but not classified as nutrient as it interferes with growth, maintenance and repair

Burger time! You do the math:

1. Total Energy ____ kcal

- Protein: 23 g
- Fat: 29 g
- CHO: 44 g

2. What % of energy is supplied by fat?

Science of Nutrition

- Foundation in several other sciences
  - Biology, biochemistry, physiology
- Nutrition is a relatively young science and includes:
  - Clinical nutrition
  - Community nutrition
  - Public health
  - Food policy
  - Food science
- Tremendous growth
  - Knowledge gained from sequencing the human genome
    - **Nutritional genomics…** the new frontier

thebmj Visual summary

A timeline of nutrition research

While food and nutrition have been studied for centuries, modern nutritional science is surprisingly young. This timeline shows how developments in the early 20th Century have persistently shaped our understanding of the field, at times limiting our knowledge of the complex links between dietary patterns and health.

Era of vitamin discovery

1910

Single nutrient is born

Identification of vitamins proved the nutritional basis of serious epidemic deficiency diseases, which could be treated with food based dietary strategies, and synthetic vitamins

- Beriberi: B_1
- Pellagra: B_3
- Scurvy: C
- Rickets: D

1920

Isolation and synthesis of all major vitamins

A, B_1 – B_{12}, C, D, E, K

1930

Recommended daily allowances

During the Great Depression and World War II, guidelines were prepared for total calorie intake and selected nutrients

- Protein
- Calcium
- Phosphorus
- Iron
- Vitamins

1940

1950

Commodity crops, fortification

1960

Food as a delivery system

Nutrition policy and agricultural technology focused on increasing staple calories and selected micronutrients

Fat *v* sugar

Ultimately, the emphasis on fat won scientific and policy acceptance

Developing countries

Protein *v* calories

Scientists disagreed on the relevance of the calorie *v* protein component of infant and child malnutrition. Industry created and promoted protein enriched formulas and baby foods in developing countries.

1970

Chronic diseases

1980

Dietary guidelines

Nutrition science and policy guidelines in high income nations shifted to try to address not only nutrient deficiencies but also chronic disease

Action on hunger

Global community coalesced around elimination of hunger and micronutrient deficiency in lower income nations, including widespread micronutrient supplementation and fortification.

1990

Complex effects

2000

Food, dietary patterns

For chronic diseases, conflicting results of vitamin observational studies *v* supplement trials. Other research advances indicated that foods and diet patterns are more important for chronic diseases than single nutrients.

The double burden

The rapid rise in non-communicable diseases led to emerging recognition of the "double burden": the joint presence of conventionally conceived malnutrition (calorie and micronutrient deficiency) with modern diseases of "mal"-nutrition such as obesity, type 2 diabetes, cardiovascular diseases, and cancer

2010

2020

The future

New dietary complexities

Diet-microbiome-host interactions; specific fatty acids, flavonoids, and fermented foods; personalized nutrition; carbohydrate quality; brain health; powerful influences of place and social status.

Diet-risk pathways

The diversity of pathways increasingly calls into question the wisdom of reliance on any single surrogate outcome

- Blood pressure
- Glycemic control
- Inflammation
- Oxidative stress
- Endothelial health
- Lipids
- Hepatic function
- Adipocyte metabolism
- Cardiac function
- Muscle health
- Brain reward
- Gut microbiota
- Metabolic expenditure

Quality over quantity

For long term weight control, quality and types of foods have different effects and are a more relevant focus than calorie counting.

Processing and additives

Need for rigorous study of possible long term health effects of many modern shifts in crop breeding, agriculture, livestock, food processing, and additives.

Public health

Future nutrition policy must unite modern scientific advances on dietary priorities with creative new approaches for trusted public communication and modern evidence on effective systems level behavior change

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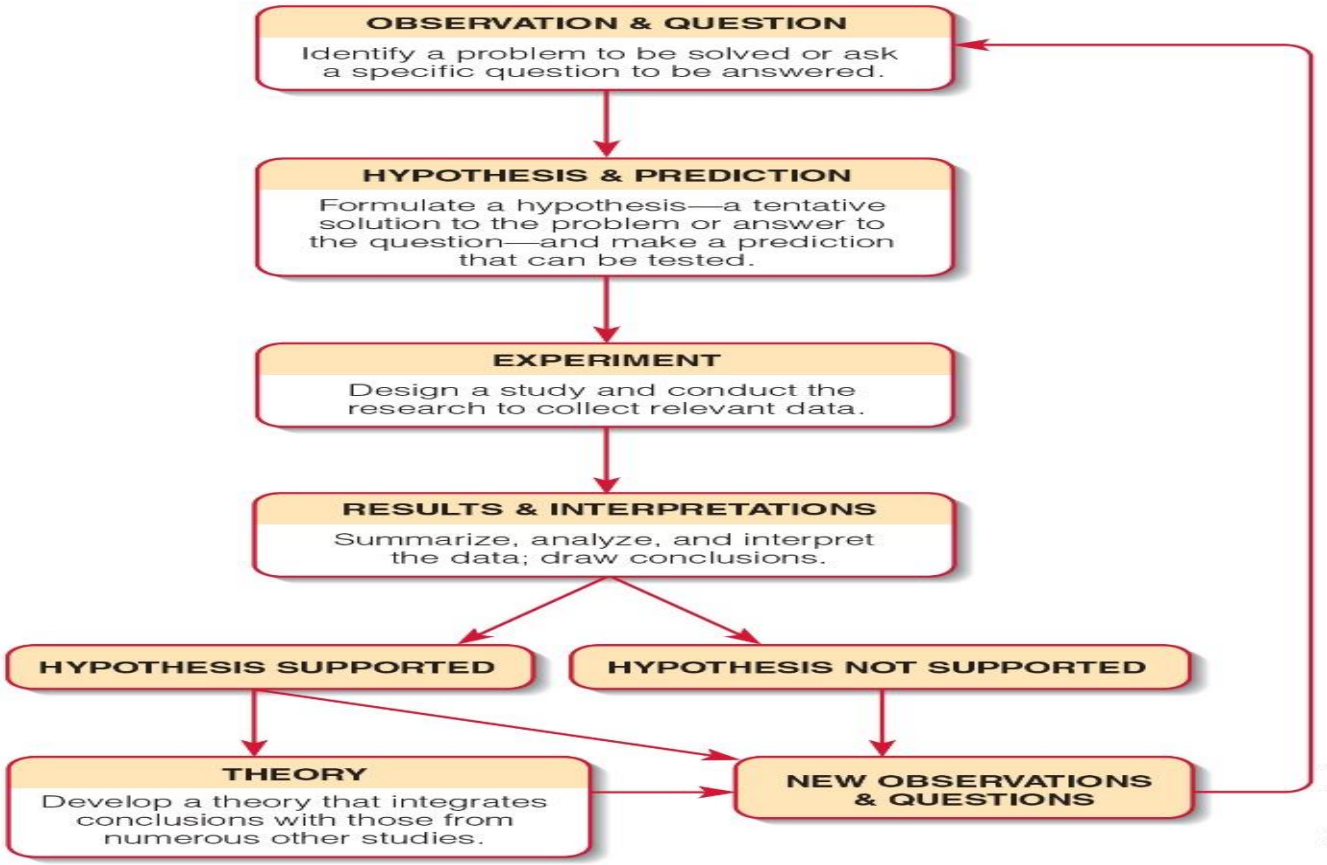
See more visual summaries http://www.bmj.com/infographics

The Scientific Method

Figure 1–3
The Scientific Method

Research scientists follow the scientific method. Note that most research projects result in new questions, not final answers. Thus, research continues in a somewhat cyclical manner.



Conducting Research

- Use of scientific method
  - Systematic process for conducting research
- Research studies
  - Controls
    - Randomization
  - Sample size
  - Placebos
  - Double-blind experiments

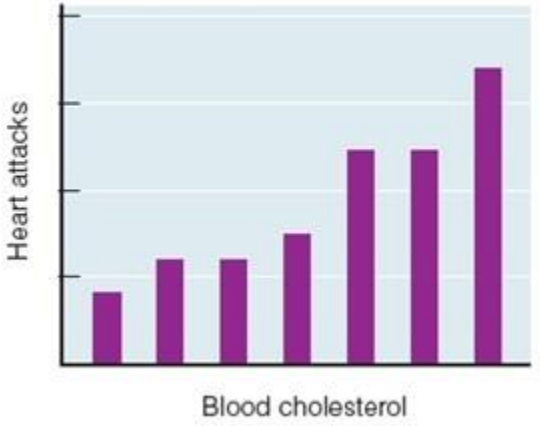
Types of Research—Epidemiological Studies

- Epidemiological studies
  - Cross-sectional studies
  - Case-control studies
  - Cohort studies

CROSS-SECTIONAL STUDIES

CASE-CONTROL STUDIES

COHORT STUDIES



Types of Research—Experimental Studies

- Experimental studies
  - Laboratory-based animal studies
  - Laboratory-based in vitro studies
  - Human intervention (clinical) trials

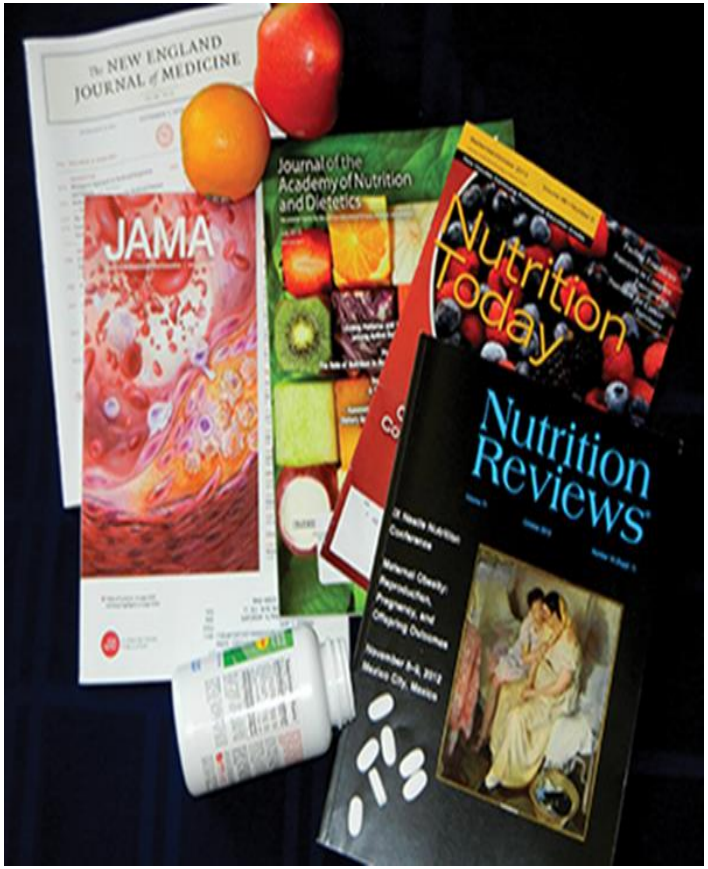
LABORATORY-BASED ANIMAL STUDIES	LABORATORY-BASED IN VITRO STUDIES	HUMAN INTERVENTION (OR CLINICAL) TRIALS
		

Analyzing Research Findings

- Correlations—only show association
  - Positive correlation
    - Not necessarily a desired outcome
  - Negative correlation
  - No correlation – chance or 3rd factor
- Cautious interpretations and conclusions
  - Accumulation of evidence

Publishing Research

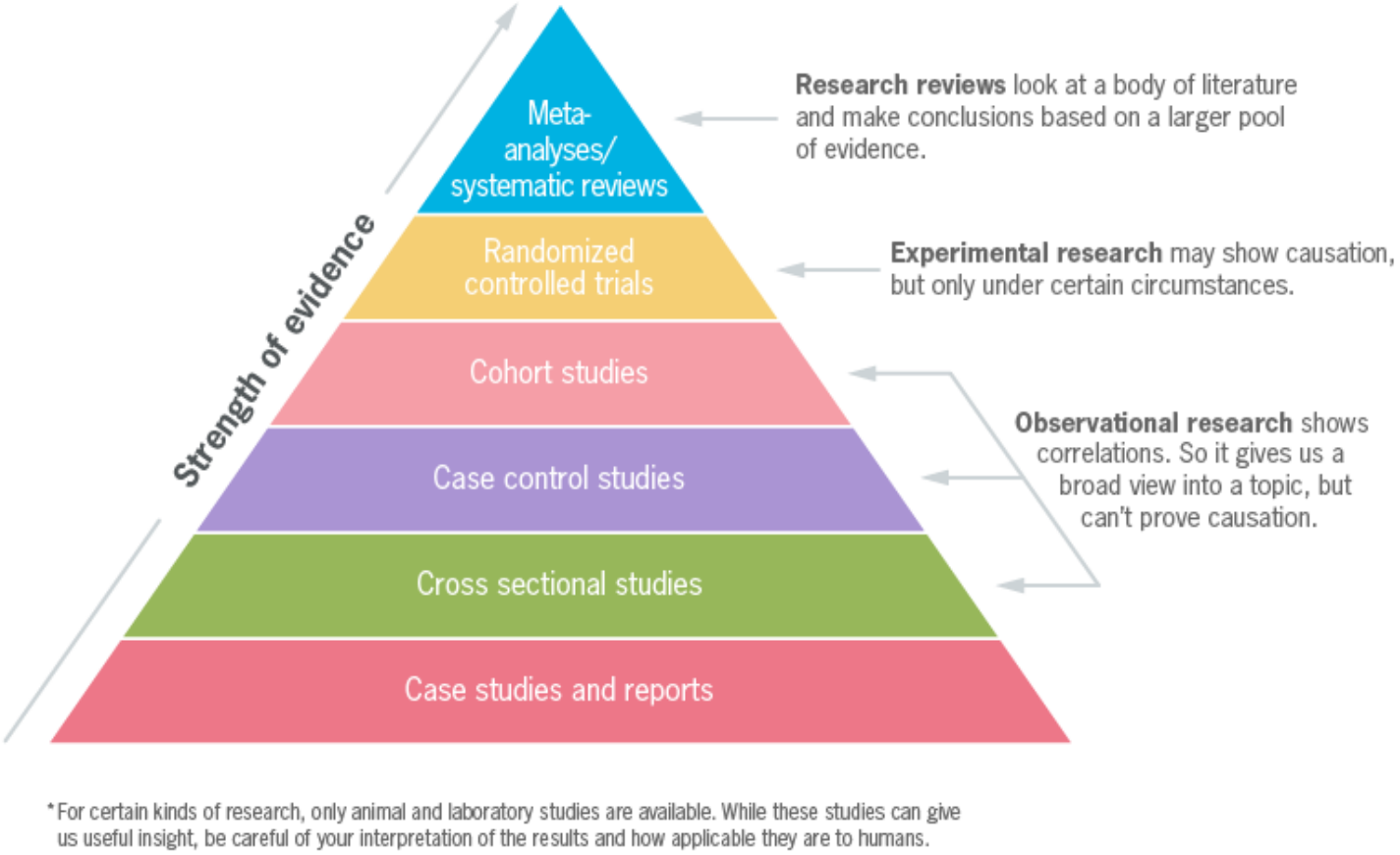
- Peer review
  - Assess research validity prior to publication
- Newly published findings
  - Are preliminary and not meaningful alone
- Findings are confirmed or disproved through replication and reanalysis



The Anatomy of a Research Article

- Abstract
- Introduction
- Review of literature
- Methodology
- Results
- Conclusions
- References

HIERARCHY OF EVIDENCE



*For certain kinds of research, only animal and laboratory studies are available. While these studies can give us useful insight, be careful of your interpretation of the results and how applicable they are to humans.

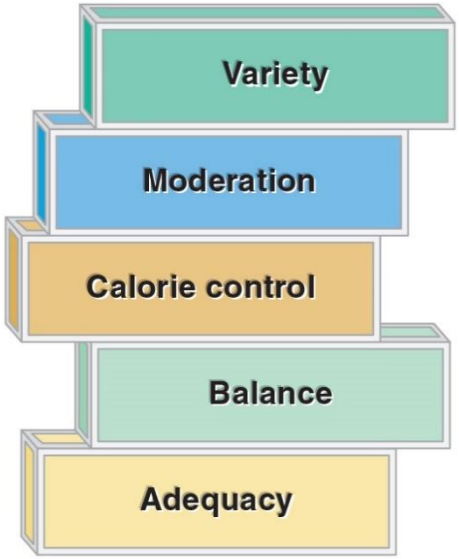
https://www.precisionnutrition.com/how-to-read-scientific-research

Conclusion

- Many people in Canada find it challenging to meet the nutrition goals
- The challenge to the health-conscious eater: To achieve adequacy and moderation at the same time
- Read the research
- Questions?

How Exactly Can I Recognize a Nutritious Diet?

- The A, B, C, M, V principles
- It is important to recognize that ALL five principles must be applied to obtain a nutritious diet



These factors are the building blocks of a nutritious diet.