HOW TO USE THIS MANUAL

The course will take on the following structure:

- **Module 1**: The fundamental principles of weight management
- **Module 2**: Macronutrients
- **Module 3:** Micronutrients
- **Module 4:** Hydration and fibre
- **Module 5:** Food labels and portion control
- **Module 6:** Dietary tracking and flexibility
- **Module 7:** The importance of sleep
- **Module 8:** Supplementation for health and performance
- **Module 9:** Habits and the food environment
- **Module 10:** Goal setting and adherence

Each module will build and expand upon those before it, and by the end of this course it is our hope that you can see how intrinsically connected every aspect of what you will learn is to everything else. There is a lot of ground to cover and at times the subject matter will be complex, but it is our aim to make the complex simple and the simple interesting; so stick with it, take notes and never be afraid to get in touch if you get stuck.

All we do recommend, is that after module 1 you take the time to check out the video content before tackling the rest of this book, as it will provide some background knowledge which may make the course itself a little easier to digest.

Pun very much intended. Let's begin.

BTNacademy

MODULE 1

THE FUNDAMENTAL PRINCIPLES OF WEIGHT MANAGEMENT

1. MODULE 1: THE FUNDAMENTAL PRINCIPLES OF WEIGHT MANAGEMENT

1.1. Module aims

- To introduce students to nutrition and health, and explain what health is
- To describe calorie balance, and explain its role in weight management and health
- To explain a calorie surplus and deficit and show how many popular diets make it appear like they have 'the secret'
- To provide different methods to assess calorie needs, in yourself and clients
- To describe and explain the degree of accuracy it is possible and necessary to achieve when counting calories

1.2. How can we impact health with nutrition?

Before we answer the above question, it's important to define what health really is. According to the World Health Organisation, health is:

"A complete state of mental, social and physical wellbeing, not just the absence of illness or disease". This is a very complex statement. Looking at it from the point of view of nutrition, we can take each of those terms to describe different aspects of what eating can mean in a modern environment. For example:

Mental wellbeing: Does the impact your nutrition is having on your body and bodyweight cause you to have poor self-image? Is your approach to food restrictive to the point of causing you anxiety? Is your approach complex to the point of causing you stress? Does your nutritional approach lead to large swings in mood or energy? Does it impact your sleep negatively? Do you have addictive tendencies or binging episodes?

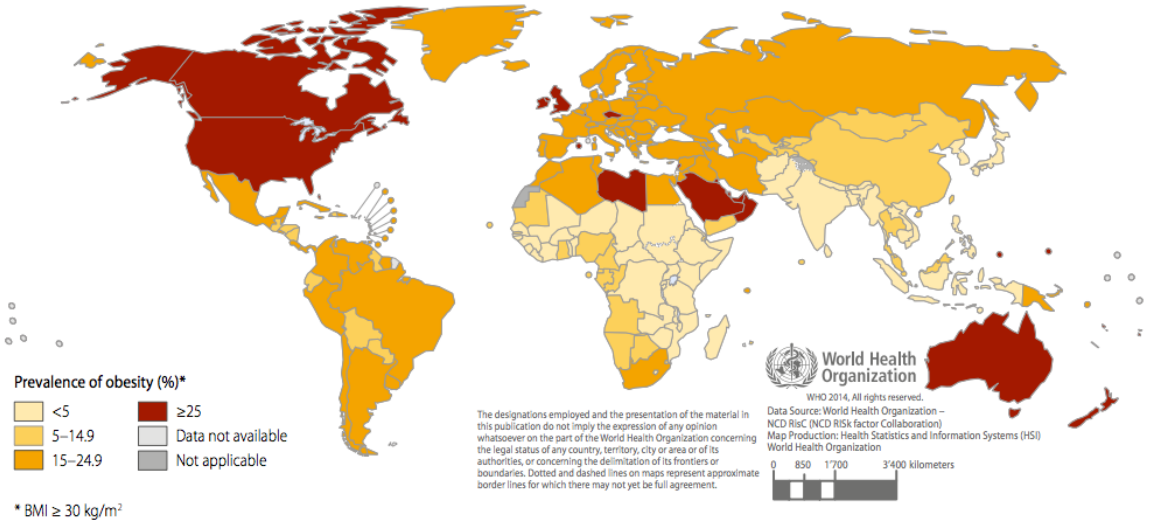
Social wellbeing: Are you able to enjoy eating out at a restaurant with friends? If your social circle are drinking alcohol, are you equipped to deal with that in a manner which doesn't upset your mental wellbeing (whether or not that includes drinking yourself)? Are you able to relax at family dinners, especially over holiday periods? If you are unable to control your food intake, do you withdraw from events? Does your dietary approach leave you unable to maintain a relationship?

Physical wellbeing: Are you over or underweight? Are you malnourished in any way? Are your teeth healthy? Is your blood pressure within normal parameters? What about your lipid markers? Do you have healthy and stable blood sugar levels throughout the day? Are you able to exercise to the levels recommended by the WHO or do you feel too fatigued? Is your digestion poor? Do you feel bloated often, gassy or nauseous?

As you can see, although poor nutritional practices can lead to, contribute to or exacerbate serious issues like diabetes, cancer, morbid obesity and other conditions, there are other ways that poor nutrition or a poor approach to nutrition can impact your health. Some of these can be difficult to spot without looking, even in yourself.

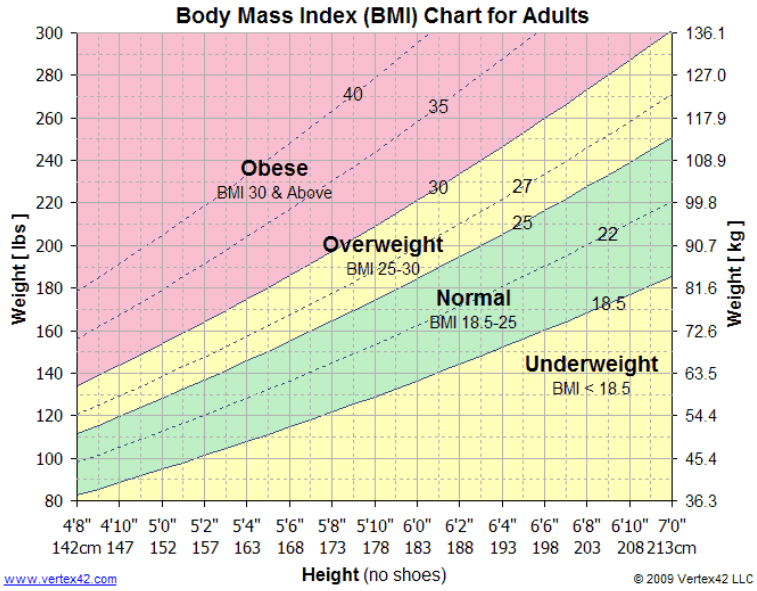
These issues are perhaps more important now than they ever have been. According to WHO statistics: **"In 2014, more than 1.9 billion adults, 18 years and older, were overweight. Of these, over 600 million were obese".** That figure has **doubled** since 1980 meaning that lifestyle related illness (closely tied to food intake) is not only a global epidemic, it is rapidly increasing its impact from generation to generation. See below for "Age-standardised prevalence of obesity in men aged 18 years and over BMI ≥30kg/m^2), 2014" from the WHO.

Fig. 1



Each person has an 'ideal weight' which is the weight estimated to place them at the lowest risk of encountering physical ailment. This is typically illustrated by their Body Mass Index (BMI) which is calculated by dividing your weight in kilograms by your height in metres, then dividing that answer by your weight again. An ideal BMI would be between 20 and 25 for any given height, so a 5 foot 10 male would ideally be between 59 and 77 kilograms.

Fig. 2



The BMI scale often gets discredited in the fitness industry because it doesn't account for muscle mass, but this isn't necessarily the case. A person who has been training somewhat inefficiently, even for a few years, probably hasn't gained nearly enough muscle to offset the BMI's relevance. Therefore, the vast majority of people (basically, everyone other than the very well trained) can safely consider BMI to be a relevant scale for them and can look to it to suggest a rough estimate of a healthy weight. Furthermore, the scale isn't a judgement of anything – having a BMI score above what it should be does not make you a bad person, doesn't make you objectively 'out of shape', and it doesn't necessarily mean that you are unhealthy right now either. The BMI scale is an indicator of risk factors for illness, and in general people who fall way above the healthy range are indeed at greater risk of heart problems including high blood pressure, regardless of what that weight is made up of.

If you are significantly above your ideal weight and very muscular, either you aren't as lean as you could be which brings us back to the above, or you are using certain substances which themselves carry risks. This is a digression, however. The point is that there is an ideal weight for every individual, and this will fall somewhere close to the range which is suggested by the BMI scale (it's a range rather than a fixed number to allow for changes in frame and bone density, for example). The further you are away from this range, the greater your risk of becoming ill at some point in the future, either due to that extra weight or the lifestyle which has led to it.

Note: Being underweight is not much better either. Chronic under-nutrition leads to increased risk of nutrient deficiencies, low energy availability (which causes issues with your hormones and immune system), and potential loss of muscle mass, bone density and even organ mass. Being underweight can be just as lethal as being overweight.

The first step to improving any given situation is arming yourself with the tools and knowledge to deal with it. In terms of improving your health you need to know how to achieve and maintain a healthy weight first and foremost, but you also need to know how to eat, drink and live in a manner which maximises your health at that bodyweight because, there is a lot that can go wrong without you getting too heavy or light, as a result of poor nutrition.

1.3. What is important?

Nutrition can be looked at as an amalgamation of a multitude of topics, rather than as one single entity. It would be a mistake, however, to give all of these topics the same amount of 'mental air time' as they are not of equal importance. You only have a certain amount of time and mental energy with which to consider your nutritional practices on any given day, and by focusing too much on the small details you risk losing sight of the bigger picture.

So, what does that big picture look like? There are numerous ways to illustrate this and we are going to use a triangle which was first popularised by Eric Helms (to our knowledge) because nutritional importance is primarily hierarchical. This means that not only is level one more important than level two, but that without level one the rest of the hierarchy doesn't really 'work' and would fall down. For example, looking at the pyramid below you could be optimally hydrated and making excellent food choices while consuming an ideal amount of

protein, but if your calorie intake isn't where it should be, then you're still going to be unhealthy in the long run due to gaining or losing excessive amounts of weight, and you will not have the success you expect with your body composition.

Fig. 3

You will notice that dietary adherence is the bottom tier. This will crop up a lot throughout this course because it is the single most important factor for long-term success. Adherence underpins everything, but it works both ways and the levels higher up in the pyramid can influence those lower down. The way you approach your nutrition, your food choices, calorie level, macronutrient distribution and fibre intake will directly impact on your adherence, and adherence will in turn, by definition, affect your decisions higher up the pyramid day-to-day. Starting out on a path to improved nutrition is often exciting for people because we are anticipating looking and feeling better, being more confident and (at the root of it all) feeling happier. But 3 weeks down the line when your end-goals haven't magically appeared and you have only the day-to-day activities of your approach to consider, it can often become a little deflating.

People often want a flat stomach or a 6 pack, they want to look great on the beach and feel amazing about themselves, but all that is months away and the reality is that **right now** you're stood in your kitchen drinking a smoothie. You aren't close to your goal yet so you aren't motivated by that, and the excitement of starting something new is gone, too. If the process itself doesn't excite you, you will not stick with it long enough to reach the outcome.

Dietary adherence is something that most people are aware of as important. Unfortunately, we often only pay lip service to this when coming up with an approach. We've all said at some point "I have to be able to stick to it", and **we all know** in theory that someone who crash diets will more than likely gain their weight back and **we all know** that 'it's supposed to be a lifestyle change', but do we really act upon that?

Dietary adherence simply means consistently being on track which of course, in the context of the above definition of health, means that we need to define a track which maintains your social life, reduces stress on your part and doesn't become overly restrictive while also

helping you keep your overall physical health in top condition. This requires some degree of flexibility, but we will get to that later. For now, remember that adherence underpins everything and we will return to this in a later module.

As a final note on the pyramid of nutritional importance, we would like to indicate that some aspects, for example your micronutrient intake, are incredibly important for health. In fact, if you are chronically deficient in some micronutrients (that's vitamins and minerals) you could die – but they appear higher in the pyramid because if you take care of the lower levels (food choice and macronutrients, primarily) then micronutrients will more or less take care of themselves. This pyramid loosely indicates what the key factors are in achieving health through nutrition, but it more accurately depicts the amount of energy and effort you should give over to each aspect of your nutritional approach to make sure you are doing everything 'right'. The amount of energy and time you need to spend on something doesn't necessarily relate to its importance – how often do you consciously make sure that your rate of breathing is appropriate for your oxygen needs?

In short, pay attention to the lower levels of the pyramid more than those above, because it's the former that gives you the most return on investment. Once you have it in line, the latter only needs to be given a small amount of thought as it'll be largely taken care of by default. Of course, it tends to be the things higher up the pyramid which appear to be more interesting because they come closer to being a 'secret ingredient'.

Human beings have evolved to be problem solvers – if you give someone a task, while some of their brain is concentrating on doing it, the other will be almost automatically trying to come up with an idea to make it easier. This is why we use tools. Unfortunately, this leaves us vulnerable to falling for promises of 'quick fixes' and 'magic bullets' when it comes to our nutrition. We would love it if there was a one-line answer to improving your health, but it simply doesn't work that way.

So – let's look at the second wedge of our pyramid.

1.4. What is a calorie?

We imagine that you have heard the word 'calorie' before, but before we can go much further it's probably a good idea to define the term. Calories are measurements of energy, in much the same way as millilitres are a measurement of liquid or centimetres are a measurement of distance. As such, a calorie has a specifically determined and universally agreed value which is 4.184 joules. A calorie is a very small unit, though, so the unit used to determine energy for our purposes here are kilo calories, often represented as kcal or Calories with a capital C, which is equivalent to 1000 calories or 4180 joules.

This unit is the amount of energy required to raise the temperature of 1kg of water by 1 degree Celsius.

It's important to remember that calories have a well-defined and universally agreed value because, ultimately, a calorie is the same regardless of its source. It's a lot more complex than that in practice, as you'll see, but this is worth remembering from the outset.

1.5. What is calorie balance?

Simply put, calorie balance is achieved when your calorie intake from all sources matches your total calorie expenditure, over a given period of time, typically thought of as a 24-hour day, but sometimes considered over longer periods, such as a week.

1.6. Calorie intake

Your calorie intake is the amount of energy you get from food and drink. This can often be very difficult to determine precisely for a number of reasons:

- This would require precise measurement and tracking of everything we eat and drink. This is possible, and we will discuss later why this could even be recommended for a lot of people for various periods of time and for various reasons, but it requires a certain amount of skill, and is by no means a straightforward process
- Food labels, as you will again discover in a later module, are not 100% accurate, and these variances can vary wildly depending on where you are shopping, how many people the food comes into contact with (which increases the occurrence of human error) and how many ingredients the food has
- Even if you tracked every morsel of food, and compared this to data which was accurate to the joule for the specific foods you eat (consider here that two seemingly identical potatoes, of the same variety but grown in different soil will have slightly different nutritional contents due to the nutrients available to them in that soil), you wouldn't be getting the whole story. Your calorie intake is more accurately considered to be your calories 'absorbed' rather than just calories consumed. Around 2-10% of calories consumed will be lost in faecal matter because absorption is affected by food choice (for instance, higher fibre intakes reduce absorption) preparation techniques, the microbes living in your gut, your genetics, and a number of other things, some of which will be discussed in a later section of this module

With that said, it is **very** possible, and even easy (when you know how) to 'ballpark' your calorie intake by measuring things or even using good practiced judgement. While it's impossible to be precise it's practically possible – even easy – to be consistently, roughly accurate. This wouldn't pass in a scientific lab, but it's certainly good enough for most to control their weight.

1.7. Calorie expenditure

Your calorie expenditure is often thought of as the amount of calories 'burned' through exercise, but there is a lot more to the equation than this. Your calorie expenditure (known as Total Daily Energy Expenditure or TDEE) is made up of a few different aspects, explained below.

1.8. RMR aka Resting Metabolic Rate

You have probably heard of BMR before; it is an abbreviation of Basal Metabolic Rate. 'Metabolism' is the aggregation of all of the complex chemical reactions which occur within every cell of your body in order to maintain your existence, and your Basal Metabolic Rate is the minimum amount of energy which is required to fuel all of those reactions, measured while you are asleep. Those reactions and processes include things like protein turnover, which is where proteins are broken down and re-synthesised in every cell of your body, bone metabolism which is a similar process within your skeleton, action potential activity in your nervous system and filtration in your kidneys amongst literally thousands more. As you can see, you don't actually have to **do** anything for this energy to be used.

RMR is very similar, but it is measured while you are awake, and seeing as most research is done using RMR we will talk about that instead.

Note: Your RMR is usually a little higher than your BMR, by 10% or so. It may or may not surprise you to know that your RMR will make up somewhere around 60-70% of your total energy expenditure if you are moderately active. This will, of course, go up or down if you are very inactive or an athlete respectively, because other factors start to make a bigger difference. But the key thing to note here is that you cannot directly affect to any substantial degree the largest component of your daily calorie expenditure.

This is not to say that this number is static as it can be affected by certain environmental factors including calorie balance (broadly speaking, it will go up and down slightly when you are eating more and fewer calories than you require, respectively), hormonal interactions, medications/drugs, your age and health status. It is, for most practical purposes, however, more or less static and determined by your bodyweight and body composition (which describes your balance of fat mass and everything else). In some extreme or unusual cases your RMR could be wildly different to what is expected, but that's beyond the scope of this course.

Each tissue within your body requires a different amount of energy to maintain itself day-to-day. Fat tissue, far from being inert or dead, requires about 4.5kcal per kg per day (so 90kcal if you have 20kg of fat mass, roughly) whereas muscle requires about 13kcal which is of course more, but not so much more that we should buy in to the idea that you radically speed up your metabolism by building muscle, because you don't. On top of that, your liver requires 200kcal per kg whilst your heart needs a humongous 400kcal per kg. Of course, you have significantly more skeletal muscle than liver or kidney tissue and as such your muscle takes up a lot more total energy per day than these smaller organs. Bones require energy too, as does every single tissue in your body at different rates. When all of this is added together, you have an approximate figure for your RMR.

As you can probably work out, your BMR/RMR will vary wildly due to differences in tissue mass. If you're tall or short, carrying a lot of bodyfat or very lean, carrying a lot of muscle mass or very slight, your BMR will be affected and you will probably sit outside of the standard estimated ranges because your tissue distribution is unusual. On top of this, around 15% of

RMR is not predictable from tissue mass, although you would expect that it should be. This fast or slow metabolism phenomenon seems to be natural genetic variance and there is very little you can do about it, but when put into real numbers, the difference is not going to be huge. If two people should have an RMR of 1750kcal, that means that the variance is around 260kcals at a maximum, or 130 calories up or down on their calculated RMR. While some people may indeed have slower metabolic rates than others, the difference equates to a large banana or less, and therefore general estimates can be used and considered to be 'pretty good'. We'll show you how to make these estimates in a later section of this module and then we'll show you how to verify them later in the course.

1.9. TEF: Thermic Effect of Food

Stepping away from the area that you are likely familiar with, let us look at the remaining components of TDEE, starting with TEF. The Thermic Effect of Food (TEF), which is the amount of energy required to process and store the energy containing substrates we consume, referred to as the macronutrients: protein, carbohydrate and fat. The TEF for each macronutrient is different, being estimated at around 20-35% for protein, 5-15% for carbohydrate and 5-15% for fat, though fat is generally considered to land at the lower end of that range and carbohydrate towards the higher end. As a side note, ethanol, which is the alcohol we drink also provides calories and its TEF is around 20%.

TEF is represented as a percentage of total calorie intake, generally rounded to around 10% of the amount of calories you eat, and it typically makes up a very small amount of your total intake.

It's worth noting however, that those who are in a calorie deficit, who are insulin resistant or who have unfortunate genetic predispositions, may have a lower TEF than those who for whatever reason, tend to have a higher TEF per calorie they eat. This could potentially explain a small amount of the difference in calorie intakes needed between individuals, but it is impossible to measure in the real world, and as such we won't talk too much about it during this course beyond making you aware of the fact that it's included in later calculations.

1.10. EAT: Exercise Activity Thermogenesis

Exercise Activity Thermogenesis (EAT) is probably the first thing that people think of when they think about their daily calorie expenditure, and is almost always the first factor that people consider when they are looking to manipulate their expenditure up or down. This is, however, not a great idea.

EAT will generally come to 10-30% of your TDEE depending on your overall activity levels (though for typical modern exercising individuals who exercise for an hour 3-4 times per week this figure is going to be somewhere around the 10-15% mark) and the particular mode of exercise that you partake in. For example, resistance training burns perhaps 100-300 calories per session depending on your volume and training density (reps/sets per unit time). A high-volume session involving squats, deadlifts, leg presses and lunges, for example, will burn somewhere around the higher end, whereas a heavy squat session alongside sets of two on

the deadlift may be equally tiring but won't actually burn that many calories because most of the time is spent resting.

Note: The same principle applies to HIIT training which may be beneficial for other reasons, but isn't great for increasing calorie expenditure because you spend a good chunk of your time resting.

In terms of increasing calorie expenditure, by far the most effective manner is by engaging in cardiovascular activity for prolonged periods of time, but even then, a 60 minute moderate intensity session (you cannot perform high intensity exercise for 60 minutes) would be unlikely to burn more than 600 calories, which equates to around half a pint of high quality ice cream and around 15% of a typical male's daily expenditure. EAT can absolutely make a difference to your TDEE, but how large that difference is tends to be overestimated, especially seeing as increases in EAT tend to lead to fatigue, which will negatively impact our next factor.

1.11. NEAT: Non-Exercise Activity Thermogenesis

Non-Exercise Activity Thermogenesis (known as NEAT and sometimes referred to as Spontaneous Physical Activity or SPA) is the movement you do during the day which doesn't constitute formal exercise done for its own sake – this includes commuting to work, walking around your house/office, fidgeting, playing with the kids and even low-level activities like shaking your leg while sat on the couch and changing your sleeping position.

NEAT accounts for a **huge** amount in the TDEE variance between individuals. Consider two individuals who have the same statistics, but one of them works in an office and the other works as a postman. For simplicity let's assume they would have a TDEE of 2400 if they were completely sedentary – 100kcal per hour.

The office worker will be burning approximately 8% above TDEE per hour at his job shifting position, thinking and typing. That means that each hour of his 8-hour day he burns 108 calories, totalling 864 calories from 9-5. The postman would be walking an average of 1-2mph during that time (accounting for breaks, for example) which equates to an increase of around 100-150% according to Levine et al, meaning that he'd be burning at least 200 calories per hour, or 1600 calories during his workday. As you can see, with a small change in lifestyle, increased NEAT can easily result in a TDEE difference of 1000 calories or more between individuals, which is huge.

Increasing NEAT is often associated with improved body composition and health, whereas increased EAT is typically not. This could be because increased EAT is generally associated with a decrease in NEAT, and as such, we would say that daily activity is typically far more important than strict exercise when it comes to predicting total daily energy expenditure. We will return to the impact that NEAT can have on weight loss later in this module.