



## Implications of Excessive Nutrition and Increased Body Height and Weight

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### Abstract

Virtually everyone thinks the increase in height and lean body mass is a desirable attribute. Taller, bigger people are stronger and have advantages in a number of sports. In addition, our society rewards taller people with greater status and income. The question arises whether our bias favoring taller height and associated increased weight is based on scientific evidence.

### Introduction

My colleagues and I have investigated the ramifications of increasing body size for over 40 years. We published over 50 papers, book chapters, and books during this period ([www.humanbodysize.com](http://www.humanbodysize.com)). We also found over 30 other researchers whose findings have agreed with our research. Human body size is a complex subject that has a real impact on individual health, physical performance and survival of our species. In addition, our bias favoring taller, large humans is primarily a societal construct that has subjected at least half the human population to unwarranted feelings of lesser worth.

(Many other researchers, including Hugh Trowell, Geoffrey Cannon, and John Waterlow, have also identified the risk of increasing body size many years ago.) The following summarizes our findings.

### Health and Longevity Findings

Longevity researcher, Andrzej Bartke [1], observed that the idea that smaller individuals are healthier and live longer is not new and considerable evidence support this thesis [1]. In addition, gerontologists Gavrilova and Gavrilov reported that many biologists are “firmly convinced” that smaller individuals within a species live longer [2].

Many researchers are confused by this thesis because it is well-know that larger species tend to live longer; e.g., the mouse vs. the elephant. While the exact reasons for this difference are not known, it appears that the slower and extended growth period of larger species plays an important role in addition to evolutionary genetic changes in defense and maintenance systems. However, mortality and longevity studies for many species have shown that within the same species, the smaller individuals have lower mortality rates and live longer. The most obvious findings are related to dogs. Smaller dogs consistently live longer than bigger dogs. Other studies have also found this to be true for house cats and horses.

Many human studies have had similar results. For example, The Bulletin of the World Health Organization (Bulletin of WHO) published a study of deceased San Diego Veterans showing that shorter men lived longer than taller ones [3]. This 1992 study also showed that shorter deceased baseball players lived longer than taller ones. The findings were based on over 3000 deceased players.

The preceding represents a small sampling of existing findings. Additional studies by various researchers have found that shorter individuals have lower mortality at older ages and greater longevity; e.g., retired West Point graduates, basketball players, Ohio residents, elderly Hawaiian Japanese males, Spanish males, and Native Americans. Of course, shorter, smaller women also live longer than taller, heavier men. The Bulletin of WHO provides several examples of this inverse relation among male-female populations; e.g., California white men were 9% taller than women and had a 9% shorter life expectancy [3].

Shorter, smaller people have many biological factors that are related to better health and longevity; e.g., longer telomeres, lower DNA damage, reduced cancer risk, lower blood pressure and lower hormonal growth factors. Thirty-six such factors have been identified [4].

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In contrast to the above findings, many mortality studies have found that taller people have a lower overall mortality rates. Part of this reason for this conflict is that more tall people are in higher income classes that are also associated with about 5 year longer average lifespan. In addition, most studies showing taller people have lower mortality rates do not track subjects to advance ages or their deaths. Another factor is that several researchers who found shorter individuals live longer did not find an inverse relationship between height and longevity until the individuals were in the 60s, 70s or 80s. In addition, mortality studies can be confounded by short individuals being stunted in height due to childhood malnutrition, infections, illnesses, congenital disorders, or stress/abuse. These stunting factors also negatively impact health in adulthood. In the recent past, shorter people also tended to be more overweight than taller ones. However, recent findings indicate that taller people are gaining weight faster than shorter ones.

### Successful Shorter People

While we tend to focus on tall successful people, such as US presidents, many outstanding achievers have been short, such as James Madison, Andrew Carnegie, David Murdock, Audie Murphy, Bruce Lee, Queen Victoria, Alexander the Great, Einstein, McClintock, Picasso, Juan Miro, Mozart, and Mahler.

More famous shorter people are discussed in *The Truth about Your Height* [3,5].

### Physical Performance

While we generally think of outstanding athletes as being tall and big, many are not. A Finnish study found that several types of elite athletes averaged shorter than the typical military recruit. For example, elite boxers, long-distance runners, cross-country skiers, wrestlers and weight lifters were up to 2 inches shorter than the average military recruit.

Shorter people have greater endurance, faster reaction times and are stronger in terms of their own weight allowing them to more agile. That's why gymnasts, figure skaters, divers, and martial artists are often quite short. For example, a gold medal winner in gymnastics was Simone Biles who was 4'8", Desiree Linden winner of the 2018 Woman's Boston marathon, was 5'1". Men in these sports are often shorter than average.

### Impact on Food, Water, Energy and the Environment

A world population of 1 billion people could probably handle an average height of 6' and 200 lb. However, with a possible future of 10 billion people, such a large size would stress our planet to the point of collapse. For example, if we in the US grew 10% taller and maintained the same body proportions (add an extra 33 pounds), we would require roughly 50 million more tons of food a year. Water needs would increase by 30 trillion gallons. We would also need about 70 million acres of additional farmland to grow our food on. Energy needs would go up by 15 quadrillion BTUs. In addition, we would produce 1 billion more tons of carbon dioxide. Trash would increase by 30 million tons, and natural resource consumption (metals,

minerals, etc) would increase by 400 million tons a year. Note that these increases only apply to the US on an annual basis [5].

### How Tall can we get?

Under natural conditions, the world would probably reach an average of 6' or 6'1" in male height. However, if this becomes our average height and we still believed taller is better; parents may resort to genetic engineering to give their children an advantage over other children. If this practice becomes widespread, future humans could become 6'5" or more.

### What should we do About Our Future?

Nutrition is the key to physical growth and health. The World Cancer Research Fund and American Institute for Cancer Research [6] have stated: industrialization has promoted chronic diseases. The food system developed during urbanization and industrialization has promoted increased height, weight and chronic diseases. Basically, we have become over-nourished from birth, which explains increases the modern growth of height, weight, obesity, and chronic diseases. However, reduced animal protein and calories slows growth and improves our future health and longevity. Nutritional biochemist Colin Campbell [7], who has studied the health implications of high animal protein intake for 50 years, recommends reducing animal protein because it promotes taller height and chronic diseases in adulthood. Nutritionists should focus on a healthy plant-based diet that is closer to the minimum acceptable caloric and protein standards that currently exist. The WCRF/AICR 2007 report recommended keeping children and adolescents near the low end of the normal BMI range (18.5 -24.99). The Okinawans in the recent past had the longest life expectancy in the world and the highest percentage of centenarians. They fed their children a healthy diet that was substantially lower than mainland Japan and they grew up to be shorter than the mainland. Based on the Okinawan experience and other populations with high numbers of centenarians, a slow and moderate decline to 5'7" or 5'8" in male height seems feasible.

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