

# Human Inclusive Economic Development: The Link between Health, Industry, and Productivity

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## Abstract

### **Human Inclusive Economic Development: The Link between Health, Industry & Productivity**

This paper examines the necessity to reconcile modern economic development approaches to growth with the original concept of scarcity; this demands consideration of the health and environmental impacts of industrialization on the working population which in turn impacts productivity and growth. Current literature reviewed included medical anthropology research, health and fitness research, cardiologist and other medical doctors expertise, economics reports, government status quo approaches as well as media coverage. The experimental component of the research involved personal experiences over 9 years of learning how to reach a level of optimum health. The essay provides evidence of a growing body of research indicating that health and economic growth in the developed world are interconnected through the poverty trap which needs to be renamed the malnutrition trap. Increases in toxic loads on the human population from manufacturing goods and services, and industrialization of agriculture have caused what is recently termed by doctors as the metabolic syndrome which includes a list of chronic health conditions that can be avoided. These diseases are caused by inflammation and toxins in industry which negatively affect the productivity of the current and future working populations, as well as economic growth. Economic growth must be redefined within a framework that acknowledges the impact on human health which encompasses the scarcity of resources and the environment; this is accomplished by providing incentives for consumers and producers to focus on behaviours that maintain and improve health. This paper defines health and constructs a human inclusive approach to economic development with the purpose of achieving economic development and growth by focusing on the productivity of the current and future working populations.

## **Introduction**

Economics is concerned with the efficient allocation of scarce resources to meet the needs of society in the best way possible to ensure continued human survival within the earth's capacity and human capability. The mainstream economic development models are mainly focused on increasing economic growth which is measured by gross domestic product (GDP); GDP is the total amount of services and goods produced within an economy's geographical borders. These models support economic growth at faster rates every year, in an effort to increase standards of living through increased consumption and some form of investment in capital in the forms of human, mechanical or financial capital. These models basically ignore scarcity which is opposed to the basic principles of economics, as resources are directly connected to the environment, sustainability and human health to maintain lifestyles or survive as a species. In the current growth and development discourse, the issues of scarcity of resources, sustainable growth and the interconnectedness of human health and productivity have been excluded.

Mainstream development economics has been heavily focused on explaining growth and the relationship to GDP through the use of various models. These models include the Harrod-Domar and Solow Models of growth, Romer and new approaches to growth like the Big Push Model and the O-ring model. Assuming a closed economy with full employment for simplicity, the exogenous models of economic development, models not explained from within the model, are the famous Harrod-Domar and Solow Models. The Harrod-Domar model hypothesizes that growth relies on the savings rate of a country with a constant capital per output ratio; it implies that a developing country cannot save enough to get to a richer state so it needs to fill this gap with foreign aid or private foreign investment. The Solow model is based on the Harrod-Domar

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model, but incorporates a fixed labour supply, depreciation and population growth rates. It talks in terms of capital per capita and output per capita and sees developing countries as having capital constraints because they cannot save enough to buy capital; it does not matter where they are in their growth stage because it is assumed that they will reach the steady state that every developed country has; this concept is termed absolute convergence. The Solow Model is more flexible in that it makes it possible for all countries to get to the same level of development once they reach the capital per capita ratio of industrialized countries. In the Solow Model, the only thing that can change a steady state with a constant capital output ratio is a shock in technology that can impact output per capita. Limitations characterize both models, the Harrod-Domar Model has limitations that are not realistic such as the fixed capital output ratio, the assumption that all types of investment have a positive return in the future, and that there is no unemployment. The Solow Model limitations include not knowing what causes technological growth in this model, the model having one sector which is not reality, that all rates are given such as the population and savings rate, and unconditional convergence is not supported by data because countries with similar technologies do not necessarily have similar capital per capita ratios.

Romer , is an endogenous model which is explained from within the model, assumes that all firms are symmetric, produce homogenous goods, and that growth per capita is affected by population growth, elasticity of the firm level capital to output ratio, and the elasticity of the nationwide capital stock. It takes in to consideration externalities like human capital whereby job training, health and education do improve productivity of workers in addition to physical capital. The problems with this model include how in reality sectors are not symmetrical, and due to a

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lack of institutions imperfect capital markets exist in developing countries which pose obstacles in borrowing to finance projects.

The Big Push Model is a new approach model which discusses the coordination failure associated with an economy trying to become industrial. The firms that want to industrialize face the decision of who will be the first to industrialize; each firm needs to evaluate the costs associated with being the first to industrialize and whether revenues exceed the costs of higher wages, and whether costs associated with labour training are going to go elsewhere by benefiting other firms at the first firm's loss. Due to this coordination problem, the industrialization of society is held back, however the government can use policies to fix the coordination problem and have its economy enter industrialization; industrialization is seen as the ideal outcome by mainstream development economics.

The O-Ring Model is another new approach model that discusses positive assortative matching in production and how skill level and knowledge increase productivity. The model relies on assumptions of perfect competitive markets, perfect capital markets, a closed economy, and an inelastic labour supply which is independent of wage. In a perfectly competitive market, work wages are equal to the marginal product of labour since labourers get paid according to their productivity. This means that labourers would want to work with other skilled labourers to maximize productivity and get paid a higher wage. One implication of this model is that because developing countries do not have as much skilled labour, they are going to experience a brain drain where skilled workers will go where they will be paid a higher wage. In order to increase productivity, human capital must be increased in this model and developing countries have to pay higher wages and invest in human capital to keep skilled workers from going to more industrialized countries where the pay is greater.

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These theories discuss and try to explain GDP increases as absolute measures in economic development. These measures are flawed in giving a full and accurate picture because GDP alone does not take into consideration poverty, inequality, pollution, degradation of the environment, and non-monetary resources like unpaid labour and self-consumption. Also, none of these models acknowledge the scarcity issue at the heart of the economic problem which is tied to the environment and human health. In response to this, a few efforts have been launched and the United Nations Development Program Report now includes the New Human Development Index which attempts to measure development in terms of standard of living in relation to health or longevity, education, and income. To compare countries accurately, the world adopted the usage of Purchasing Power Parity (PPP) in US dollars. PPP is the number of units of a foreign country's currency required to purchase an identical quantity of goods and services in the foreign country's market as \$1 would buy in the USA. Using data with PPP adjustments, inequality and poverty measures were created. Three common measures used to understand inequality are the Lorenz curve, the Gini-coefficient and the Kuznets ratio. The Lorenz curve shows how equal/unequal an economy is amongst itself in a graphical representation of the share each poorest quintile or decile in a country has as a percentage share of national income. The Gini-coefficient illustrates the Lorenz curve in numbers as a ratio ranging between perfect inequality to perfect equality where zero is perfect equality and 100 is perfect inequality. Lastly, the Kuznets ratio measures the disparity between the richest 20% of the country over the poorest 40 % and this number when compared to other countries can help us see the state of income redistribution per country. These approaches acknowledge that mainstream economic development theories do not capture the full picture related to growth but

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do not have significant weight in economic growth measurements as countries like Canada do not have data to put GDP into context.

In the economic development discipline, poverty is measured using different universal poverty levels called poverty lines which establish a level of income per day that is the cut-off before being considered really poor. The United Nations millennium goals include halving the number of people living under \$1 per day between 1990-2015. The Foster-Greer-Thorbecke (FGT) Index includes many poverty measures. These measures include calculating the headcount index in a country, the total poverty gap per country, the average poverty gap for individuals in the country, the average income shortfall among the country's poor, and the normalized poverty gap which illustrates the percentage of the country below the poverty line.

The human development aspect of growth is often discussed in mainstream development literature only from the point of view of poverty in non-industrialized countries. Poverty is a misnomer; its primary concern is addressing malnutrition, often defined as not having enough food, or the absence of good quality food to induce productivity and growth. Discussions around the human development aspect of growth need to replace the word poverty with nutrition which allows for productivity and human health to be viewed from a different perspective as will be argued in this paper. This would expand the discussion to include the reality that material wealth does not necessarily result in improved health. The industrialized or “wealthy” world is experiencing chronic levels of obesity, insulin resistance, stroke, adult onset diabetes, and heart attack among other diseases; contributing to this is a condition called silent inflammation from industrialized agriculture and toxins used in industrial production and behaviours. This paper will argue that modern economic development requires a new framework based on increasing productivity and efficiency while accommodating sustainability, creating a healthy global

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environment, and most importantly a healthy population. The health of the working population is the basic production input in executing work and innovation in industry. Therefore, the state of health of the working population should be the major measurement of economic development across nations, as the health of the working population significantly impacts productivity and economic growth.

This paper will discuss the possibilities of a new economic development model that captures the essence of economic growth by focusing on the very productivity needed to induce growth, mainly a healthy current and future working population which is connected to the environment connected to health, and sustainability.

### **The Malnutrition Trap vs. The Poverty Trap**

Mainstream development theories function around the idea that growth affects poverty, and poverty affects growth; this concept is referred to as the poverty trap (Appendix A). The poverty trap explains how the cycle of low income leads to general family malnutrition causing increased illness, and decreased adult and children productivity levels. The poverty trap also suggests that malnutrition will fuel even lower incomes resulting in more poverty and more malnutrition in a repetitive cycle, hence being called a trap. Poverty and education are viewed as significantly affecting the economic growth dynamic because healthier and educated people are more productive; several problems arise from this approach.

First, GDP or national income is not equally shared among countries' respective populations; therefore, income per capita measures are misleading which means subsequent measurements based on this approach are equally misleading. Secondly, individual indebtedness or consumer debt is a reality in rich or developed countries (Appendix B). The USA is an example where 98% of bankruptcy filings are classified as non-business; in 2007, USA consumer debt hit a record \$2.5 trillion, increasing from the 1959 level of 16% of disposable personal income, to 24 % (Fergusson, 2008, p.61-62). While the USA may have a respectable GDP and income per capita, the reality is that most Americans are in debt due to low incomes. From an economic development perspective, comparing poor countries to rich countries is not an accurate comparison because while rich countries have access to more reliable capital markets and poor countries do not, they are not better off due to consumer indebtedness (Appendix B). A second problem is that world currency is pegged to the American dollar. As countries, including Canada, need American dollars in their foreign cash reserves, it never really matters whether the USA is in debt or is having a financial crisis. For example, oil can only be purchased using American

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dollars by Canada and all other countries in the world. Another problem stems from the United States printing American money for global usage; it never really hurts the American economy because inflation effects are shared worldwide as the money is not concentrated within its borders. This provides an explanation for why the American government can be trillions of dollars in debt, but still be considered the richest and most powerful country in the world. This also explains why China purchases so many American Bonds and continues in their pro-industrialization behaviours, following the American model (Xianrong, 2011). This is evidence that other countries should not copy the American model of economic growth because they do not have the power of selling as much of their currency the way the USA does.

Economic development discussions need to redirect their focus to center around the human development aspect of growth and replace the word poverty, in the poverty trap concept, with nutrition. This would allow for the inclusion of the reality that material wealth does not necessarily result in improved health. The industrialized or “wealthy” world is experiencing chronic levels of a host of diseases currently termed by the medical community as the metabolic syndrome which includes obesity, insulin resistance, stroke, adult onset diabetes, and heart attack (Grundy, 2003); contributing to this is a condition called inflammation caused from industrialized agriculture and toxins used in industry. Japan is aware of the connection between health and productivity, and is trying to address the emergence of the metabolic syndrome, referred to as metabo, by instituting legal waistline measurements for the Japanese working population to combat these diseases (Nakamura, 2010). While the poverty trap explains how poverty affects growth and how growth affects poverty; this should be renamed the malnutrition trap where nutrition affects growth and growth effects nutrition, and form the basis for the human inclusive model to economic development.

### **Economic Gains from Health Induced Productivity**

Economic development needs to be redefined to connect health and productivity with economic growth through the mechanism of jobs and work performed by individuals. It would require producers to consider questioning whether their producing behaviours maintain health or promote it. This would create economic activity focused on manufacturing products efficiently and in a sustainable fashion which would result in measures to decrease pollution, and environmental and health damage. Economic growth focusing on sustainability was suggested as early as 1987, by the United Nations Brundtland Report as “...development that meets the needs of the present without compromising the ability of future generations to meet their own needs”; however, there was no focus on the health of the working population.

According to the Canadian Medical Association Journal, 1 in 5 Canadians has the metabolic syndrome, which is a fancy way of saying that 1 in 5 Canadians has an impaired metabolism. The most prevalent symptoms of the metabolic syndrome are obesity, low levels of high density lipoprotein (HDL) ,and double the risk of heart disease, and diabetes (The Canadian Press,2011). The Heart & Stroke Foundation (HSF) reports that 1 in 3 Canadians die of heart disease & stroke while emphasizing that heart attacks happen every 7 minutes in Canada, and strokes happen every 10 minutes (HSF, 2012)<sup>1</sup>. Heart disease costs Canada over \$20.9 billion every year in physician services, hospital costs, lost wages and decreased productivity (HSF, 2012, *STATISTICS*). In 2004, Canadian acute care hospitals dealt with 2.8 million sick Canadians which was an increase of 14% from 2003 (HSF, 2012, *STATISTICS*). Strokes cost the Canadian economy \$3.6 billion every year in physician services, hospital costs, lost wages and

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<sup>1</sup> Reference here includes both webpages in the HSF website listed in the references section for this point.

decreased productivity; the heart & stroke foundation also reports that Canadians spend a total of 3 million days in the hospital due to stroke (HSF, 2012, *STATISTICS*).

The connection between productivity and health is demonstrated in the American Milken Institute 2007 report, *An Unhealthy America: The Economic Burden of Chronic Disease, Charting a New Course to Save Lives and Increase Productivity and Economic Growth*<sup>2</sup>. This report focuses on seven chronic diseases: cancer, diabetes, hypertension, stroke, heart disease, pulmonary conditions, and mental disorders. The report quantifies the total impact on the economy due to these diseases at a whopping \$1.3 trillion of which lost productivity was quantified at \$1.1 trillion per year. The report also stated that these diseases cost \$277 billion annually to treat. The report also forecasted economic loses assuming current disease trends for 2023 by estimating a 42% increase in the occurrence of the previously mentioned chronic diseases totaling a loss of \$4.2 trillion in economic output and medical treatment costs.

A healthy Canadian population results in a more productive Canada in which productivity will contribute to economic growth and reduce preventable medical conditions, this results in a health cost saving for all Canadians, and reduced strain on the free Canadian health care system Canada would be more severely impacted than the USA by the medical costs from the metabolic syndrome associated diseases because of the free health care system as was just illustrated. This will in turn impact the Canadian tax paper in addition to resulting in significant economic output and productivity losses. The Milken Institute report found that lower obesity rates alone can induce productivity gains of at least \$254 billion and avoid \$60 billion in treatment expenses each year. The report stresses how investment in better health results in significant increases in economic growth over the long run in the USA (Bedroussian, 2007).

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<sup>2</sup> Pages 1-2 summarise the research findings of the report

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This paper proposes a framework for quantifying economic development based on the foundation that a healthy current and future working population is a productive population, associated with automatic sustainable economic growth. This approach considers sustainability as a side effect since healthy populations are a by-product of a healthy environment geared towards human survival. Another important factor in this argument is that the driving mechanism of the market can be conscious consumerism; a process of consumer decision making focused on promoting and or maintaining current and future population health. Economic development based on this framework would increase the demand for health promoting products and eventually lead to increased reduction of health damaging products and behaviours.

### **The Framework for Human Inclusive Economic Development**

Based on the premise that a healthy population is a productive population, governments should promote conscious consumerism and less indebtedness (Appendix B). This could be achieved by creating incentives to make markets work toward real development or growth that is shared by the whole population. Real growth is driven by productivity which is connected to the health status, both physical and mental, of each person in the working population (Bedroussian, 2007). This model suggests that nations should measure growth, development, and productivity in relation to the number of healthy people in a population whose bodies are free of disease, instead of GDP. GDP is meaningless as a measure of growth due to the reality of unequal income distribution per capita, and its incomplete understanding of pollution and illness side effects that contribute to the deterioration of productivity, human health, environment and sustainability.

Efforts to support sustainability included establishing guidelines like the life cycle assessment of products which focuses on having manufacturers consider how the creation of their products impacts human health and the environment; this assessment can suggest altering the manufacturing process to manage undesirable environmental/health effects. Extended Producer Responsibility programs demonstrate another option which moves the responsibility of managing the post-consumer phase of products from the taxpayer and government to the actual producer. Another example of a global initiative to create new programs for dealing with the environmental impact of economic development is the Greenhouse Gas Protocol which focuses on climate change (Greenhouse Gas, 2011). Frameworks and guidelines “... for a holistic, strategic approach to the organization’s environmental policy, plans and actions” do exist within the ISO 14001, the International Standards Organization. The Ecological Footprint Analysis offers a method for measuring “...the natural resource consumption associated with human

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activity" (Bunker, n.d.). The Daly Rules focus on how renewable resources such as fish should not be used at a rate that exceeds their regeneration rate; how non-renewable resources including fossil fuels, should not be consumed faster than renewable substitutes can be found to replace them, and that pollution and waste should not be created faster than the natural environment can absorb, recycle or render them harmless (Sustainable Water Resources Round Table, n.d.). These ideological recommendations validate how current economic development can find ways to avoid the consequences of pollution currently associated with economic development/growth on the environment and human health.

New approaches to economic development can happen if governments take responsibility and develop policies and legislation based on credible research and practices. Legislation can be broadened to include promotion of the health of the current and future working populations. Such initiatives could include life cycle assessments for all manufactured products, extended producer responsibility programs to reduce pollution by consumers and producers, and application of the standards included in the ISO 14001. All levels of government need to adopt changes by creating incentives to encourage consumer and producer behaviours to reduce the costs of pollution, environmental degradation and poor human health. Positive sustainability and human health outcomes are accommodated for in the human inclusive model of economic growth. Increasing the level of current and future working population health results in automatic increases in productivity that yield economic output gains, and savings in healthcare expenditure for preventable chronic diseases like the metabolic syndrome (Appendix C). To do this, it is necessary to address what constitutes health within the context of this model.

## **Human Health and DNA**

In order to consider a health based approach to economic development, it is necessary to examine the concept of health. Health is an ambiguous term and is often considered in conjunction with fitness. Surprisingly, the terms health and fitness have no universally agreed upon definition in the field of medicine, as medicine is concerned with pathology or disease (McGuff, 2009, p.1). Dr. Doug McGuff explains health and the underlying causes of the metabolic syndrome in a 2009 DVD lecture, *Ultimate Exercise Diet Seminar: What to Eat, What Not to Eat*, and a book he co-authored with John Little entitled *A RESEARCH-BASED PROGRAM FOR STRENGTH TRAINING, BODY BUILDING, AND COMPLETE FITNESS IN 12 MINUTES A WEEK*. Dr. McGuff explains that the human body is dynamic and is always balancing between breaking down, catabolism, and building up, anabolism. The human blood-clotting system is an example of this balancing act since it is balancing between blood viscosity and coagulability to ensure a smooth flow of blood and control bleeding that should occur without clogging arteries or producing infarcts. Other examples of continuing catabolism and anabolism include balancing blood PH and gases, hormone levels, electrolytes and fluid levels (McGuff, 2009, p.2-3).

The beginning point for discussing human health is at the cellular level starting with DNA. DNA is the self-replicating molecule that constructs human bodies, so when discussing people, we are basically discussing DNA. DNA has evolved over millions of years in a context that is much different from 21<sup>st</sup> century industrialized lifestyles. DNA has evolved within a hunter-gatherer context for the majority of human existence up until the advent of agriculture, approximately 10,000 years ago. In a hunter-gatherer society where food was not always readily available, humans experienced a predominant internal catabolic state during periods of famine.

While that may seem dangerous, research into calorie restriction and life extension found that the majority of DNA repair occurs in catabolic physical states. In periods of famine or catabolism, DNA focuses on cell repair for longevity in an energy deficient environment to survive. In an energy rich environment or anabolism, insulin; a signaling hormone; has developed over millions of years to signal the storage of fat and to indicate a safe environment for DNA replication via human offspring. DNA's goal is to make copies of itself into the future through human offspring; this process involves growth and differentiation or aging. Aging is cellular degeneration and when DNA is in a safe energy rich environment, it wants to focus on the offspring's cellular growth and differentiation because it is not worried about dying from famine. Depending on whether there is famine or an abundance of energy stipulates whether DNA will either focus on DNA repair to promote longevity, or growth and differentiation to promote DNA replication.

Human health can be negatively impacted outside the understanding of the context in which DNA has evolved, and a newly identified enemy is the metabolic syndrome and an understanding of metabolism is necessary to combat it (Appendix C). Mainstream thinking describes metabolism as each individual's ability to burn calories. This is linked to a widely accepted theory that weight gain results from a surplus of calories consumed, in excess of an individual's personal capacity to burn them off ,and of course how each approach can help each individuals enhance their metabolism (Bauer, 2006). Personal experience with this approach to health has prompted me to do further research as the concept is based on dogma and no real science. Metabolism is what occurs in every cell in the human body and is referred to as cellular metabolism. It is how the body works, processes energy and repairs itself. Dr. McGuff stresses how metabolism has evolved over millions of years within the hunter-gatherer era and is familiar with metabolizing energy in that context. Dr. S. Boyd Eaton; MD, Medical Anthropologist;

supports Dr. McGuff's work and has confirmed that "99.99% of our genes were formed before the development of agriculture" (Gedgaudas, 2011, p4). Agriculture is the process of cultivating plants and animals over the past 10 000 years for human energy consumption. Dr. McGuff stresses that agriculture has significantly affected how humans metabolize energy for consumption for about 4000 years, mainly due to macronutrient ratio consumption, imbalance between catabolism and anabolism, and factory farming practices. Dr. McGuff comically refers to this problem as having "a Fred Flinstone body in a George Jetson world". Comparing current agricultural food intake with the ancestral way of eating to survive sheds light on the underlying causes of the metabolic syndrome. Further understanding requires an assessment of health from the viewpoint of DNA and its evolutionary context.

Health is linked to DNA in a hunter-gatherer context in as much as it allowed a person to survive in that environment; today the loose concept of health is linked to longer lifespans due to advances in the medical industry which are associated with increased fitness. It may seem odd to take the hunter-gatherer lifestyle as a precedent for health due to their reported shorter lifespans but Dr. McGuff explains that lifespans were cut short in the hunter-gatherer context due to disease, predators, childbirth and trauma irrespective of their level of fitness. He explains how medical advances are not responsible for increasing life expectancy or longevity of the human race in the 20<sup>th</sup> century; technological advances are responsible for longevity by manipulating the environment to be more in tune with the evolutionary past. He elaborates on how living longer lives makes humans face conditions that are not in unison with human evolutionary biology like high population densities in cities in comparison to the ancestral era. Population density in the ancestral era would suggest the rapid spread of disease, but this risk has been mitigated today by the invention of the sewer system dealing with waste management. To further mitigate the spread

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of disease, modes of transportation like subways and cars help to decrease population densities. Drugs or exercise are not the main factors responsible for enhancing lifespans in the 20<sup>th</sup> century. It is the distance humans can place between them and contagious disease combined with technology that determines longevity. There have been advances in medicine but these advances cannot compare with advances in engineering when it comes to longevity promotion or longer lifespans (McGuff, 2009, p.8-9). Understanding DNA and its mechanisms of longevity through cell repair, and replication through growth and differentiation is important when trying to combat the chronic diseases summarized in the metabolic syndrome (Appendix C). This is important because these DNA signals are prompted by energy or food availability which is connected to health promotion or DNA survival, and productivity connected to economic growth.

### **Understanding the Interplay between Food and DNA**

In the discussion of human health, the behaviour of DNA in relation to food intake or energy availability in the environment is important. This is important due to the kind of signals that energy availability has on whether DNA will either promote longevity or replication. Food is being considered for the purpose of this paper as anything that enters the human body orally or through the skin, eyes, nose etc... This broader concept of food is used to account for the numerous toxins that enter the body other than through the stomach. So the term food will include items like shampoos, fragrances, moisturizers, medications, fluoride in the water, household cleaners in addition to food eaten.

Food eaten by humans is comprised of three major macronutrients: carbohydrates, proteins and fats. The ratio of consumption between these macronutrients greatly differs from ancestral diets to modern diets. For hunter gatherers, the most difficult macronutrient to find was carbohydrates. This is due to there being more fauna, wildlife, than flora, plants in the wild. In the hunter-gatherer context, in addition to fauna being easier to find, periods of abundance of energy or food were few and far between. Even at times where flora, plants, were available, humans could not sustain themselves just from flora especially since flora grew seasonally. Flora does not have the satiety factors associated with fat and its signaling hormones Leptin and Grehlin that tell the human brain that it is full (McGuff, 2009, DVD). Today, the agricultural way of eating is carbohydrate laden, and does not involve energy expenditure for its consumption the way hunting did in the ancestral era. A lack of high intensity energy expenditure due to the industrialization of food creates an imbalance between the catabolic and anabolic internal physical states where no DNA repair is occurring due to an abundance of energy which accelerates aging or cellular degeneration. In such a rich energy environment

where the rarest macronutrient is the most abundant, DNA is signaled by a hormone called insulin to focus on DNA replication. Insulin has two jobs; the first job is to signal DNA to focus on longevity or cell repair in periods of famine by slowing cellular metabolism due to less energy abundance or catabolism. Insulin's second job in periods of energy abundance or anabolism is to signal DNA for growth and differentiation as it increases cellular metabolism for pro-creation. Over millions of years, DNA or the human body has been trained to pro-create in periods of energy abundance which are signaled hormonally when there is an abundance of the least abundant or rarest macronutrient or carbohydrates. Dr. Doug McGuff suggests that this is why some girls are getting their periods around 9 years of age in comparison to 15-17 years old at the beginning of the 20th century; there is just too much carbohydrates in the average North American diet (McGuff, 2009, DVD).

The only macronutrient that causes a significant blood sugar response or a spike in insulin is carbohydrate. Fat is the only macronutrient that does not cause any blood sugar response or an insulin spike. Today, there is constant energy abundance and a disproportional representation of macronutrients; the macronutrient that was the rarest during the ancestral way is the most abundant macronutrient today. This unique evolutionary environment has been accelerated over the last two decades due to more flora or plant consumption especially consumption of seed head of plants or grains like wheat and corn. Medical anthropologists teach that plants are like humans and are transport vehicles for their own DNA, and as such have developed mechanisms to protect their DNA from consumption by predators (Croxton, 2011). These mechanisms include lectins and phytic acid in their contents which when consumed wreak havoc on the predator in question like cyanide found in apple seeds (McGuff, 2009, DVD). Lectins are anti-hormones or poisons that are mostly concentrated in the seed head of a plant

which is its reproductive machinery. Phytic acid binds to minerals in grains like calcium, magnesium, iron and zinc which inhibit the human body from absorbing them; it can also leach minerals already present in the body leaving an individual with mineral deficiencies (Croxton, 2011). While soaking, fermenting and sprouting may tackle the problems from phytic acid, carbohydrates are sugars and the body will metabolize them into energy that is first used to fill glycogen stores while any excess is stored as fat (Croxton, 2011).

Insulin encourages fat storage, and increases when there is carbohydrate in the blood so Dr. McGuff elaborates on how fat consumption needs to increase because it is the only macronutrient that does not cause insulin to increase. Dr. McGuff clarifies that anytime a person loses weight or fat off of his/her body, their body consumes his/her own fat stores; this is where the notion of eating fat to loose fat comes in and modern day misconceptions surrounding cholesterol arise. The focus on defining health continues with the intention of connecting this notion of health to the current and future working population's productivity levels by addressing misconceptions like false correlations between increased cholesterol levels and heart attacks (HSF, 2011).

### **Understanding the Interplay between Fat, Cholesterol and Inflammation**

To further the discussion of how a healthy working population contributes to increased productivity, it is necessary to examine the role of fat in the diet. The topic of fat in the body is surrounded by numerous misconceptions that require clarification. When fat is discussed in the context of this paper, the fats being discussed are omega6 fats, omega3 fats as well as cholesterol. Dr. Doug McGuff, who is an emergency room doctor, was perplexed with emergency room patient cholesterol profiles and why patients with so called “good” cholesterol profiles came in with heart attacks while patients with so called “bad cholesterol” profiles experienced no heart attacks. His research led him to realize that cholesterol was not the cause of heart disease but a side effect of inflammation which is the underlying cause of the metabolic syndrome including heart disease. The metabolic syndrome refers to a host of chronic disease conditions that impair cellular metabolism, and when cellular metabolism is compromised, patients are at risk for heart disease due to increased inflammation in their blood. Dr. McGuff explained inflammation by the use of the following chart in his DVD lecture (2009):

Comparison	Omega 6	Omega3
Average American Diet Today	20	1
Hunter-Gatherer Regular	1	1
Hunter- Gatherer when fruits/flower season in bloom	4	1

Today, the average North American Diet has an Omega 6 to Omega 3 ratio of 20:1 while the highest ratio during DNA evolutionary development was 4:1. Omega 6 fatty acids are precursors to important hormones in the body with a ying-yang balance to them and when ingested are turned into an inflammatory hormone called Araechodonic Acid. Araechodonic

Acid (AA) is very inflammatory because the body uses it to defend itself when it's being threatened by the immune response of conjuring white cells to kill off the health threat. Omega 3 fatty acids are converted in the body to Eicosapentaenoic Acid (EPA); this is an anti-inflammatory hormone found in good fish oil supplements. So a ratio of 20:1 of AA to EPA for the average North American develops a chronic systemic inflammatory state which has profound implications on cardiovascular disease.

Dr. McGuff explains that cardiovascular disease is associated with the lining of the blood vessels which are usually silky smooth but in a situation of chronic systemic inflammation, this lining is inflamed and rough like sandpaper. This inflamed state of the blood vessels triggers a dangerous situation whereby a cascade of platelets aggregate and form a blood clot. If this blood clot is in the right place, it will result in heart attack, stroke or even gangrene necessitating in an amputation. Cholesterol is actually the body's way of responding to inflammation by patching the areas of inflammation to stem health risking blood clot formations.

Cholesterol is the most ubiquitous fat floating around in the blood of a human body. It is necessary for the structural integrity of cell walls, is a necessary precursor to the production of sex hormones, and makes up the insulation of the nervous system. Cholesterol has such a bad reputation for increasing risk of heart disease when it does not cause inflammation. Cholesterol exists to combat inflammation among many other functions it has in the body. There are two types of cholesterol, high density lipoprotein (HDL), and low density lipoprotein (LDL). Dr. McGuff explains that the human body is 70% water and cholesterol is a fat or lipid, and lipids are not soluble in water; therefore, cholesterol combines with a protein to reach areas of inflammation in the body, hence the term lipoprotein. The body is an erectus with blood vessels running throughout the whole body, depending on the site of the inflammation that the

cholesterol needs to patch, the body will send either high density lipoprotein (HDL) or low density lipoprotein (LDL). An example to illustrate this concept is how heavy logs are moved to different locations by a strong stream current much like HDL, and how leaves falling from a tree on top of the same stream would float to the sides of the stream much like LDL; it all depends on the site of the inflammation and how to reach it quickly. According to Dr. McGuff, high LDL counts are a side effect of inflammation, cholesterol does not cause inflammation but an unbalanced ratio of omega6 fats (found in flora) and Omega3 fats (found in fauna if it is wild) are the underlying issue . Currently, LDL is labeled the bad cholesterol as high levels in the blood are associated with increased risk of heart disease (Heart and Stroke Foundation, 2011). Dr. McGuff further elaborates that statin medication only manipulates the LDL count in the blood but does nothing to combat actual inflammation while having adverse health side effects (2009, DVD).The inflammation crisis in North America is associated with a number of chronic diseases like obesity and diabetes (McGuff, 2009, DVD); these diseases are categorized as the metabolic syndrome because inflammation affects cellular metabolism which is the underlying cause of these chronic diseases via the inflammation vehicle. Inflammation can be combatted by changing the omega3 to omega6 ratios in the average diet with fish oil that is wild caught and high in EPA. Some people advocate for a vegan or vegetarian diet and believe that plant sourced omega3 can replace animal omega3; unfortunately, the body does not absorb most of the plant sourced omega3; also, grains and plant foods are high in omega6 fats which promote inflammation and can put vegans and vegetarians at an increased risk for the metabolic syndrome. Omega3 fat consumption is not much easier for carnivores in North America due to factory farming practices that alter animal feed among other things. Factory farmed beef and even fish does not have proper omega3 content, and often contains high omega6 content due to

being fed grains instead of grass for beef and algae for fish (Eat Wild, 2009, Appendix D).

Personal experience finding grass-fed feed resulted in learning that organic beef is not grass-fed in Canada; cows are just fed organic grains which do nothing to combat inflammation but actually enhance its inflammatory effects. Personal experience also made it clear that grass-fed cows are sometimes grain finished so a consumer has to inquire whether the beef is grass-fed and grass-finished to avoid further promoting inflammation. Grass-fed and grass-finished cows are also quite lean and have a different flavour from factory farmed beef. McGuff also explains how it is also necessary to note that factory farmed cows do not handle grain consumption well, and spend the last week of their life standing in their own excrement which means that humans can get Ecoli poisoning. To avoid Ecoli poisoning, factory farmed cows have to be pumped with antibiotics to protect those who consume it that ingest it as well. This extends to factory farmed fish as well, these fish are no longer fed algae and fed grains instead; their fat does not contain the proper omega3 content but is full of omega6 fats (Mark's Daily Apple, 2011). Eating factory farmed salmon will further promote inflammation unless it is wild caught or fed algae due to the increased omega 6 content it will deposit in the blood of a human body. Doctors are not as aware about these practices and the average population member is unaware about this as well. The health Canada food guide for example does not mention any of this, and actually promotes healthy whole grains and wants the regular person to limit their fat intake (Health Canada, 2011). The heart and Stroke foundation also states on its website, emphasis added, that “Your diet can influence your risk for heart disease and stroke. Eating habits that will lower your risk include eating a high-fibre, lower-fat diet, eating lots of vegetables and fruit, and eating portions of food that are in line with your level of physical activity”; unfortunately, the link has not been made yet that this advice isn't working and that clean fat consumption is necessary to combat

inflammation, and that vegetables and fruits increase inflammation in large quantities due to their omega 6 and sugar contents. If the advice of the Heart and Stroke foundation was working, why is there such terrible occurrence of heart disease in Canada as previously discussed in the

*Economic Gains from Health Induced Productivity* Section on pages 12-13 of this paper. This is a very serious issue and the current medical community is not making these statistics any better so there is clearly a problem with the status quo approach; modern research has given evidence backed solutions to the metabolic syndrome that not only can stop heart disease but reverse it.

Dr. William Davis, author of *The Wheat Belly*, has had success curing heart disease, and Dr. McGuff as an emergency room doctor embraces this approach in addition to any medical anthropologist work discussing grains. An excellent book by Nora Gedgaudas, CNS & CNT, called *Primal Body, Primal Mind: Beyond the Paleo Diet for Better Health and a longer life* is a thorough review of medical literature that further confirms the solutions available to combat this problem with the metabolic syndrome. This is necessary because increased health of the current and future working populations will reduce health care costs in Canada and increase productivity which promotes economic growth. The government is responsible for this system failure as is Health Canada; work needs to be done to re-structure the bureaucracy inhibiting preventative measures from reaching the average Canadian and costing the economy in productivity and a burdened health care system (Ran Ran, 2007). A report by McMaster University's Ran Ran entitled *Health Care in Canada: not private, but non-profit* describes how "...the Canadian healthcare system's quality and universality has been a point of pride at home and abroad (Steinbrook, 2006). Unfortunately, the increasing costs of new technologies and prevalence of chronic diseases are overburdening the traditional system, thereby threatening its sustainability (Lewis et al., 2001) Despite structural reforms and promises of more effective practices, long wait

times and decreased quality of care continue to plague the public health sector (Steinbrook, 2006)" ( Ran Ran, 2007, p.1) Not only does the current approach to economic development impair health and productivity inhibiting economic growth, but it is costly on the healthcare system in Canada that is overburdened with preventable chronic diseases. Dr. McGuff states that there is no predictive value of cholesterol profiles for future risk of heart attack, and testing should involve measuring omega3 to omega6 ratios in the blood. Wasting money on using blood tests that do not help diagnose disease risk and recommending inhibiting fat in the average diet due to medical misconceptions, and promoting factory farming of food are costly in an economic and healthcare sense for Canadians. The next section will elaborate on how to go about testing for inflammation to resolve the underlying issue of the metabolic syndrome which constitutes the majority of chronic diseases in North America affecting the current and future working populations' health and economic productivity.

### Testing for Inflammation<sup>3</sup>

To test for inflammation in the blood, the ratio of omega6 to omega3 needs to be tested for by testing for AA and EPA which are what these fats respectively become in the body. There are laboratory companies in the USA that have developed this test but it is not so common and is hard to find as a result. Dr. Barry Sears; author of Toxic Fat: When Good Fat Turns Bad, researcher and renowned scientist, has said "I firmly believe that it predicts your likelihood of developing cancer, Alzheimer's and heart disease decades before these diseases manifest themselves". Silent Inflammation is another name for inflammation, and the gold standard for measuring this is called the test for AA/EPA. It is the gold standard because it can predict the development of chronic or degenerative illnesses decades in advance. Dr. Sears also establishes that the ideal ratio of AA/EPA needs to be 1:3 and anything above or under puts a person at risk for the ramifications of silent inflammation. He explains that the body needs a balance of AA and EPA; the body needs a balance of pro-inflammatory eicosanoids to help fight off infection and help the body repair tissues. The rating based on Dr. Sears work is as follows:

AA/EPA Ratio	Risk Assessment
1:3	Low Risk
3:8	Moderate Risk
9:15	High Risk
>15	Very High Risk

Dr. Sears indicates that a lower AA/EPA ratio requires a balance of "good" and "bad" eicosanoids in the body. An AA/EPA ratio of less than 3 but not less than 1.5 is considered to be ideal. Anything exceeding 15 means a high level of inflammation in the blood or Toxic Fat Syndrome and requires immediate dietary attention. If the ratio of AA/EPA is greater than 3, the

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<sup>3</sup> This section is referenced from "Measuring Silent Inflammation In Your Body" that was retrieved from <http://www.expert-anti-aging-advice.com/measuring-silent-inflammation.html>

person is at greater risk for developing many diseases which include heart attack, cancer, and Alzheimer's. Other tests for silent inflammation include fasting insulin levels, Triglyceride/HDL ratio, Highly Sensitive C-Reactive Protein (hsCRP), and Body Fat or Waist Measurement.

Fasting insulin levels help quantify silent inflammation because insulin stimulates the production of AA from omega6 fats; an ideal fasting insulin level is 5.0 uIU/ml and a good level is anything less than 10 uIU/ml. The higher your fasting insulin level, the more inflammation your body is producing; this test can be performed in most laboratories. Research has shown that if your fasting insulin level is greater than 10 uIU/ml, the person is 5 times as likely to develop heart disease.

Triglyceride/HDL Ratio is another secondary test for silent inflammation; it tests whether an individual's level of fasting triglycerides (TG) divided by his/her HDL cholesterol is greater than 2. If this is the case, the individual has increased silent inflammation. Research has shown that individuals with a TG/HDL ratio less than 2 have half the risk of developing heart disease. Highly Sensitive C-Reactive Protein (hsCRP) is the most well-known test for silent inflammation today. Initially, the discovery of this test made the cover of TIME magazine and research showed that elevated levels of hsCRP were more accurate in predicting heart disease risk than high cholesterol levels. Unfortunately, it is not the most reliable because others internal health conditions can impact the levels of hsCRP like being overweight, having type 2 diabetes, and high blood pressure; conditions which are rampant in North American society. This makes the ability of hsCRP to predict heart disease, much less accurate and research has not found any evidence that decreasing hsCRP levels will decrease silent inflammation. Some examples of why this test's results are easily compromised include how aspirin is an anti-inflammatory drug but it

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will not lower hsCRP levels; also, vitamin E will lower hsCRP levels but it does not significantly decrease inflammation or prevent cardiovascular disease.

Body Fat or Waist Measurement can provide an indirect evaluation of silent inflammation since weight gain is associated with insulin levels. Ideal fat measurements for men and women are 12 to 15% for men, and 20 to 25% for women; waist measurements in excess of 40 inches indicate significant risk for heart disease and insulin resistance for men while for women it is an excess of 35 inches.

The gold standard test for inflammation is the AA/EPA test and it is offered in some laboratories in the USA but is not as easy to find; one lab that offers this test is Metametrix Clinical Laboratories in Atlanta, Georgia. Canada needs to have this test available for Canadians and eliminate other tests that are costly and do not help diagnose and stop disease like HDL and LDL cholesterol profiles.

To help reduce the increasing occurrence of high levels of inflammation, government and health professionals need to begin recommending high quality omega3 supplementation. The few doctors recommending omega 3 supplements to their patients do not instruct the patient to look for a supplement with the highest EPA content. Some patients take an omega3,6,9 which exacerbates the situation by increasing the inflammatory omega6 in the human body when the average North American diet has a ratio of 20:1 of omega6 to omega3 already. Omega3 supplements should be consumed in liquid form to avoid any possible omega6 content that may be in the gel capsules derived from factory farmed beef. This should be given to everyone regardless of age especially children, the future of the country.

It is important to make note that fat is the only macronutrient that does not produce an insulin or blood sugar response and so does not promote fat storage, a balance of good fat, EPA,

and bad fat, AA, is necessary to combat inflammation which impairs cellular metabolism and results in the metabolic syndrome. It is worth re-stating Dr. McGuff's idea that anytime an individual loses weight, he/she has consumed his/her own body fat; fat burning requires fat consumption. Fat also triggers Grehlin and Leptin hormones that signal to the brain that it is full and fat enough and makes an individual feel satiated (McGuff, 2009, DVD). The Health Canada Food guide needs to be reworked to incorporate recent research finding as it promotes grains and restricts fats or promotes inflammation (Health Canada, 2011). The Health Canada Food guide needs to be inverted to incorporate a high fat diet with a balance of AA/EPA, and low carbohydrate consumption.

It is appropriate to define Health in this discussion after this coming of terms; the most fitting definition has been delivered by Dr. Doug McGuff and John Little in their Book *Exercise Science* and describes health as “A physiological state in which there is an absence of disease or pathology and that maintains the necessary biologic balance between the catabolic and anabolic states” (2009, p.3). Having defined health, it is appropriate to discuss fitness next, and how it is related to health as the framework of how to promote health to increase productivity of the future and current working populations is being formulated.

### **Defining Fitness in the Proper Health Context**

Having discussed health and defined it to help clarify how to induce working population productivity measures, the next step is to discuss the topic of fitness. Dr. McGuff and John Little have defined fitness in contrast to health as “The bodily state of being physiologically capable of handling challenges that exist above a resting threshold of activity” (McGuff, 2009, p.9); they define exercise as “A specific activity that stimulates a positive physiological adaptation that serves to enhance fitness and health and does not undermine the latter in the process of enhancing the former” (McGuff, 2009, p.9). This is saying that exercise should result in a positive physiological adaptation that does not negatively affect health while positively impacting the body’s physical ability to handle challenges above its resting activity threshold. To better understand these definitions, metabolism needs to be discussed in more detail.

Metabolism needs to be explained explicitly at this point; it is a fundamentally misunderstood concept on which many approaches to fitness/health have been based. Metabolism occurs in every cell in the human body and can be best understood by focusing on the cell unit. Dr. McGuff explains in his DVD lecture that there are only 2 types of cellular metabolism: aerobic and anaerobic.

Essentially, there is an insulin receptor at the head of each cell where glucose enters the cell, and this is where anaerobic metabolism occurs first via a process called glycolysis. Anaerobic metabolism produces two ATP, chemical name for energy, and pyruvate which is a waste product of anaerobic metabolism; this is a quick process. The mitochondria then takes this pyruvate and in the presence of oxygen; hence the label aerobic metabolism; metabolizes pyruvate via the Krebs cycle and produces 36 ATP which is a lot of energy. Aerobic metabolism produces more energy than anaerobic metabolism but it does this at a slower rate. The energy

produced is stored in muscle and the liver cells as glycogen and the excess is stored as fat. Dr. McGuff elaborates that on average, muscle glycogen stores can hold about 200g of glycogen while the liver can hold about 70g of glycogen he states that one bagel and a caramel latte from Starbucks would be enough to fill glycogen stores (McGuff, 2009, DVD). There are 2 major problems here; one involves DNA and the other involves cellular metabolism.

DNA slows down cellular metabolism in catabolic periods of famine when there is no abundance in energy as it focuses on longevity and cell repair to keep the DNA host alive. In periods of anabolism or energy abundance, however; metabolism speeds up and the focus for DNA is on growth and differentiation as cell repair and longevity are not a primary concern due to focused attention on offspring creation. Growth and differentiation encourages cellular degeneration or aging due to absence of cell repair focus by DNA.

The second problem involves the body's response to having an overload of glucose that it can no longer metabolize once it fills up all glycogen stores; the body does not want to overstuff the liver and muscles because this would result in glycation, sugar binding to proteins, which would muck up the metabolic machinery much like pouring syrup on a computer keyboard (McGuff, 2009, DVD). To avoid glycation, cells need to protect the body by decreasing insulin sensitivity on insulin receptors of liver and muscle cells while increasing insulin sensitivity on fat cells to store the excess glycogen as fat. This is the cellular metabolic position that the average North American is situated as he/she exhibits the metabolic syndrome or impaired metabolic function. The metabolic syndrome indicates that glucose cannot get into the muscle and liver cells because they are full, and since there is no catabolism or high intensity exercise to empty these glycogen stores, the excess sugar in the blood needs to be removed by being stored as fat. The implications of this information are significant because it means that resolving this problem

of impaired metabolic function resulting in excess weight gain involves high intensity exercise to empty glycogen stores. Now, if this is combined with the cessation of consuming pro-inflammatory foods (mostly grains), and consumption of anti-inflammatory omega3 fats, we can actually look at a very feasible way to protect the health of current and future working populations by increasing health and inducing productivity gains in the economy. McGuff further explains how anaerobic metabolism can activate rapidly when a human is faced with a life or death situations or extreme exertion with high intensity exercise. He explains that glycolysis, in anaerobic metabolism, activates rapidly when the body is faced with a high intensity activity level to deliver energy to working muscles for longer periods. Contrasting this to the biological evolutional hunter-gather context relates this survival mechanism to a time when humans hunted and were hunted, and had to expend energy to get energy. When this happens, the person would be making more pyruvate than the aerobic cycle can use in the Krebs cycle so pyruvate stacks up in the cell and is converted by lactate dehydrogenase into lactic acid. If this persists, the person gets a lactic acid burn in the muscles which is good because it means that this individual would have cleaved so much energy and emptied his/her glycogen stores prompting the restoration of insulin sensitivity on liver and muscle cells while decreasing insulin sensitivity on fat cells which repairs cellular metabolism assuming inflammation is being combatted and the risk of blood clot formations is little. If exercise is going to benefit health through the fitness venue, it needs to empty glycogen stores; this has nothing to do with burning calories which is what mainstream fitness and health recommends.

People think cardio machines are good for the heart and weight lifting is good to build muscle and in the process they believe that both speed up the metabolism to burn fat (DiscoveryHealth.com, 2012). The confusion arises from the aerobic element of cellular

metabolism and its incorrect association with cardio machines due to its usage of oxygen to create energy. A lot of people today believe that improving aerobic capacity means doing cardio machine workouts but the heart muscle is not a component of cellular aerobic metabolism. Improving aerobic cellular metabolism is connected to improving anaerobic metabolism which supplies it with the pyruvate it needs to create energy. Dr. McGuff elaborates that if an individual is focused on improving their aerobic capacity, he/she must allow aerobic metabolism to perform at its highest level when recovering from lactic acid after a high intensity workout. He emphasizes that muscle is the basic mechanical system being served by aerobic metabolism; when muscle is strengthened, its support systems including aerobic capacity are also strengthened (McGuff, 2009, p.22-25).

Dr. McGuff describes obesity today in North America as an overflowing tub with a stopper and a running faucet; to turn off the faucet to stop the tub from overflowing is to eat the hunter-gatherer way to combat inflammation which causes blood clot formations, and to remove the stopper and empty the tub; high intensity-low impact workouts are necessary to empty glycogen stores and restore insulin sensitivity without hurting the body (McGuff, 2009, DVD).

Exercise in this framework is an activity that stimulates a positive physiological adaptation serving to enhance fitness and health without undermining health by fitness. The earliest documented incident of exercise activity damaging health dates back to the Greeks. In 490 BC, Pheidippides ran 25 miles to Athens to announce the Greek victory over the Persians after the Battle of Marathon; after he announced that the Greeks won, he dropped dead. Since those times, marathons were born as this type of athleticism was aspired to without the same end (McMicken, n.d.). In addition to this, cardio machine users are misled into believing that inputting their height and weight measurements before starting a cardio workout actually

calculates the amount of calories they burned during their workout. Cardio machines calculate the basal metabolic rate or what a user burns calorically by just sitting there and doing nothing with his/her measurements, cardio machines do not serve as an indicator of actual calories burned (Carlyle, 2011). Humans are energy efficient and in groups can hunt down anything in the wild; if humans were so metabolically inefficient that doing a cardio workout for 30 minutes burned 300 calories, humans would be extinct as a species (McGuff, 2009, DVD).

The human body is energy efficient and ATP, energy produced by cellular metabolism, is the currency of metabolism and its usage is at a cost. The average North American is faced with an abundance of energy or food especially carbohydrates, and labour saving technology doesn't permit as much energy expenditure to occur in comparison to the environment DNA evolved. This results in a compromise in human health and chronic inflammation with its consequences including insulin resistance and obesity. The average North American person's level of physical activity is of such low intensity that catabolism doesn't occur in any significant sense which does not allow for any physiological adaptations to occur that increase fitness without hindering health (McGuff, 2009, p.7). This means that physical activity is not responsible for health enhancement, and if some weight loss may occur from what is deemed a light cardio workout on a machine, this is due to such subnormal levels of catabolism (breakdown) in relation to the DNA evolutionary context that it yields an initial response that eventually leads to what is commonly referred to as having a weight loss plateau (Schwartz, 2010), this weight loss freeze cannot be overcome unless cellular metabolism is repaired through glycogen store depletion and the proper fat ratio consumption. A small improvement in health is not the optimal road to health especially with this established understanding of DNA and metabolism (McGuff, 2009, p 7).

Personal experience confirms that this approach is correct as I was not able to attain a flat stomach until I started incorporating Dr. McGuff's diet and exercise advice. Following this advice not only allowed me to overcome the dreaded weight loss plateau, but has freed time once dedicated to the gym to more time to enjoy life as it is all about efficiency, and targeting the source of the metabolic syndrome, impaired cellular metabolism, and not the symptoms which include stubborn belly fat. The road to health using this approach allows for efficiency in health consumption by increasing productivity in everyday life activities and allowing for more time to perform these activities.

Earlier, food was defined as anything that enters the human body by means other than the stomach because evolutionary biology did not occur in an industrialized context where cosmetics and chemicals were ingested by the human body; this ingestion of chemicals also affect cellular metabolism and contribute to the metabolic syndrome. Personal experience with going organic, and using non-toxic products before implementing Dr. McGuff's suggestions had induced a significant weight loss for me of about ten pounds in four weeks. The health of the current and future working populations in Canada is within the context of an industrialized economy that involves significant exposure to toxins, and to learn how this affects health is to learn how to reduce its impacts on cellular metabolism for maximal economic productivity gains.

### **Stubborn Fat<sup>4</sup>: The Causes**

Ensuring a productive current and future working population means combatting the preventable chronic metabolic syndrome conditions associated with illness. Fat storage is also caused by toxin buildup in the human body from non-organic, factory farmed produce and industry. This occurs via the use of pesticides and herbicides that are sprayed on the crops and find their way into the soil and plant cells humans consume. Research into obesity and difficulty with losing weight has indicated a connection between toxicity in the blood from the overload of toxins that the liver and kidneys cannot process, and stubborn fat storage. The body acts to protect itself when faced with toxic overload that it cannot purify by removing it out of the blood via fat storage. The reason why this fat storage is stubborn is due to the body's resistance to re-introduce toxins into the bloodstream that it cannot purify. Personal experience confirms this view; I lost almost 10 pounds in a month when I first switched to organic food and natural cosmetic consumption even though I was consuming more food or increasing caloric intake including eating ancient grains but no wheat.

Toxins have an affinity for Fat as the body has to protect itself from internal toxins, by-products of our own metabolic processes and microbial compounds, and external toxins found in chemicals and metals from the environment. Today, there is an unprecedented high level of toxins in our food and environment which exceeds the body's ability to purify and eliminate it. These toxins buildup in the body and interfere with cellular metabolism because they are fat

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<sup>4</sup> This section is referenced from Lucinda Bedogne's internet article "Health Gain- Weight Loss- Part 9: How Toxins Affect Weight and Health" (2012), retrieved from [http://www.myfrienddebbie.com/article\\_master.php?id=897](http://www.myfrienddebbie.com/article_master.php?id=897); and is supported by personal weight loss success experience in-addition to Britta Aragon's internet article "Toxic Alert: Skin Can Absorb What We Apply to It—Including Cosmetic Chemicals"(2009), retrieved from <http://cincovidias.com/toxic-alert-skin-can-absorb-what-we-apply-to-it%E2%80%94including-cosmetic-chemicals/>

soluble or lipophilic. Fat-soluble chemicals need to go through the liver in order to be converted into a water soluble form so the body can detoxify them. These chemicals enter the cells of the body more easily through the fatty layer of cell membranes unlike water-soluble toxins that are more easily eliminated through the urinary system and sweat glands. Toxins can be stored in breasts, prostate and pancreas organs as well. As the liver and fat cells become overloaded, toxins can also be stored in joints, form arterial or intestinal plaque, and be found in cysts or lymph fluids or other fatty areas in the brain. If the toxins find themselves a spot in the brain, they become neurotoxins and are linked to mental diseases like Attention Deficit Disorder, Alzheimer's disease, Parkinson's and even memory and focus problems. The liver itself may become a toxin storing location due to a bad diet. People with weight loss resistant abdominal area fat usually have an enlarged liver with fatty tissue deposits called a fatty liver. High insulin levels in the blood are another reason for why fat cells collect in the liver. Losing weight is very difficult with a fatty liver; such a situation calls for liver detoxification so that it can catch up on detoxifying fat soluble stored toxins everywhere else in the body.

Research studies have linked toxic exposure during critical stages in the development of a fetus to increasing the chances of having a child that will struggle with weight issues as an adult. Dr. Steven Joyal; MD and Vice President of Scientific Affairs & Medical Development for Life Extension Foundation, an anti-aging and wellness scientific research organization; has stated that a clear relationship exists between particular types of environmental toxins found in the food supply and a 73% increase in infant obesity over the past 30 years. In 2004, a hospital study was conducted to test for toxins and environmental pollutants in umbilical cord blood of babies. This blood was tested immediately after birth for 413 different toxins and environmental

pollutants, the test found 287 toxins and chemical pollutants in newborns proving that toxins do transfer from mother to child in the womb and via breastfeeding.

Research also reveals that some toxins mimic hormones involved in weight maintenance and disturb weight loss efforts; these toxins are called endocrine disruptors. An endocrine disruptor at work can block leptin hormonal signals to the brain to indicate satiety and stop food consumption for example.

In addition to all of this, an impaired metabolism can increase appetite and above average fat storage. Adverse effects on overall health from toxins include free radical damage or accelerated aging, inflammation, immune system stress from always combatting toxins, reduced energy, heart strain, and water retention. Toxin reduction efforts with an aim to eliminate toxic intake can contribute to fighting dangerous stubborn fat, and impaired cellular metabolism which is the underlying cause behind the metabolic syndrome. Implementing conscious consumerism can help regulate the markets away from toxin producing behaviours as advocated by this paper's human inclusive model of economic development. The liver needs to be able to do its job of detoxification properly, and it cannot get overloaded so that cellular metabolism can function efficiently, and not contribute to the metabolic syndrome symptoms of weight gain and increased toxicity levels in the human body. Inflammation is caused by a combination of toxin uptake in the current and future working populations in addition to an unbalanced AA/EPA population blood ratio.

As stubborn fat is lost with toxic intake reduction, an individual can feel sick due to increased toxicity re-entering in the blood until the liver can detoxify the person in question; the government needs to take action and regulate industry by taxing toxin producing behaviours to help eliminate the toxin contributing factors of industry. Fluoride is a major toxin that the

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government adds to the public water supply that has to be addressed in order for this picture to be complete as drinking municipal waters does affect the current and future working populations' health affecting their productivity, and economic growth of the economy.

## Toxic Water: Fluoride<sup>5</sup>

Fluoride is a toxin that is deliberately added to the water by the government in an effort to combat tooth decay. However, dentists do not ask patients to swallow fluoride and just place it on the enamel because the benefit comes from the topical application of it, and not its ingestion (CDC, 1999). Research has not been able to find a link between the amount of fluoride a child ingests and level of tooth decay (Warren et al., 2009). Recent dental health surveys employing modern scientific methods not available in the 1930s and 1950s concluded that there is little difference in tooth decay, even baby bottle tooth decay, between those that fluoridate and those that don't fluoridate their water. Fluoridated water is a major issue that populations in the USA and Canada are trying to fight their governments on as is evident by the Fluoride Action Network Campaign efforts. The most recent success for stopping water fluoridation for Canadians occurred on Feb 7, 2012 in Amherstburg, Ontario. The fluoride action network lists the top ten reasons to stop water fluoridation on its website. This list includes the violation of an individual's right to informed consent to medication since there is no way to control how much or who ingests the fluoride once it is in the water supply. Water fluoridation started in the 1940s when 10% of children were expected to get a condition called dental fluorosis, damage to tooth enamel in the form of discoloration and/or mottling in its milder state, while 41% of all American children today aged 12-15 have a form of dental fluorosis (CDC, 2010). Alarmingly, a bottle-fed newborn in a fluoridated area with 0.7-1.2 ppm of Fluoride can consume up to 200 times more fluoride than a breast-fed baby, this increases the risk of dental fluorosis. Other

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<sup>5</sup> This section is referenced from the Fluoride Action Network's website article "Top Ten Arguments Against Water Fluoridation" (2012), retrieved from <http://www.fluoridealert.org/top-10-reasons-against-fluoride.aspx>, in-addition to personal experience with using a reverse osmosis water filter

health ramifications of fluoride consumption include soft tissue damage in the brain, kidneys, and endocrine system, as well as bones or skeletal fluorosis. Modest exposures to fluoride in 24 studies link it to reduced IQ in children; two of these studies suggest that the damage threshold is at fluoride levels found in water fluoridation. Surprisingly, the chemicals involved in fluoridating water are mostly hazardous by-products of the fertilizer industry, and cannot be rid of by sea disposal due to international law. These chemicals were never tested in randomized clinical trials for safety or effectiveness by any regulatory agency in the world, and the U.S. Food and Drug Administration (FDA) classifies fluoride as an unapproved drug. Finally, fluoridation discriminates against low income earners who cannot afford to take measures against fluoride consumption via reverse osmosis filtering of water consumed.

Dr. Paula Baillie-Hamilton; M.D., toxins and weight researcher at the University of Stirling in Scotland; found that 50-60% of toxins are from food while an additional 10-20% are from beverages. This is saying a lot about modern industrialized populations' food sector, and how current economic development approaches to growth are making the population sick. Food comes from the environment and instead of focusing on being green; populations need to focus on human health as going green is a by-product of that health journey. Focusing on achieving population health means fixing the polluting behaviours associated with population illness.

Governments represent a collective interest of a country's population, and need to disseminate this information to the public to create a conscious consumerism movement. A conscious consumerism movement will automatically regulate and discipline industry as markets cannot function without a consumer demand. If consumers are armed with research backed knowledge on health and fitness and base their consumer decisions on this premise, only economic activity supporting health would continue to exist. Health destructive companies

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would go out of business or alter their behaviours to health promoting ones to survive. This movement would stop using GDP and income per capita to measure economic development because the population does not equally share in national income (Appendix B). Governments should instead measure economic development by statistics of health in the working population because that is the very machinery of the economy – the actual person and their productive, creative and innovative capacities. This can be done by linking health performance to employers and employees in their annual job review the way Japan is doing (Nakamura, 2010). To further solidify how the food industry reached such a state, the green revolution movement needs to be discussed.

### **The Green Revolution: To Move Forward, Taking a Look Back<sup>6</sup>**

The green revolution is behind the industrialization of the agriculture sector worldwide. The name is misleading; the green revolution is not about solar energy and wind turbines. It is really about seed performance, modern day genetically modified organisms, population control, state support and authoritarianism.

Academics including Dr. Patel explain that the green revolution was founded as a reaction to communism. The actual term was coined by William Goud in 1968; head of the American Agency for International Development; while addressing the society for International Development in Washington, DC, USA, describing a system of fertilizer, irrigation, improved hybrid seeds, state support, marketing boards, and credit extension services constituting the ingredients for a new agricultural sector that “... is not a violent red revolution like that of the soviets nor is it a white revolution like that of the shah of Iran , I call it the green revolution”. The green revolution was contrasted against communist regimes that were fueled by a hungry, angry, poor working class population and to maintain a class structure, it was in the benefit of the ruling and wealthy class to keep the poor, working class fed to avoid communism. Mexico in the 1940s and India in the 18<sup>th</sup> century are central locations that have helped the green revolution prosper. In Mexico, the Rockefeller foundation and Norman Borlaug were key players in laying the foundation for the green revolution. In 1944, Norman Borlaug gave up his job at DuPont even when his salary was doubled to move to Mexico and conduct experiments to grow food and feed the world. He was involved in sophisticated plant breeding experiments and developed

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<sup>6</sup> This section is referenced from the CBC’s Ideas “Feeding Ten Billion” (2012) episode featuring Dr. Raj Patel, this is retrieved from <http://www.cbc.ca/ideas/episodes/2012/01/11/feeding-ten-billion/>

miracle wheat in 1954. This wheat was spread by the Rockefeller and Ford Foundations globally in the 1950s and 1960s, and in 1970, Norman Borlaug won the Nobel Peace Prize for his work.

The British needed cheap wheat to feed workers in Manchester and Liverpool, and found cheap wheat in India. At the time, India was a feudal society where landlords owned the land and peasants toiled it in exchange for sustenance, it was a moral economy not a capitalist one. The British had at the time come up with what was considered cutting edge economics, and felt that comparative advantage in trade benefited all players in trade, and that Indian landlords should buy labour and sell their wheat to make more money instead of giving it away for free. The idea was that more wheat would be produced and more money would be made by the landlords who had no choice as the British's imperialist violent imposition of capitalism in India took place. The British sincerely believed that capitalism and comparative advantage in trade meant that both countries would benefit by increased consumption and cheaper prices. Unfortunately, international trade and capitalism introduced two new global rules, the first is that one can eat if he/she has money; and the second was that if one has no money, he/she will starve.

The green revolution was not addressing world hunger in as much as it was really about a class struggle. Thomas Malthus was the world's first paid economist, he was paid by the British East India Company to make sure their colonial exploits were profitable. He observed that food production grew arithmetically, so in a straight line, but population growth increased geometrically meaning that at some point population growth and food production are going to intersect. The ramifications of such a finding were that the poor are going to get hungry and will not be able to sustain their progeny and revolt. The fear was that the poor would revolt and grab on to the nearest and newest political ideology at the time which was communism. Communism threatens the power of the rich capitalist class and was to be warded off at all costs. This explains

the intentions behind the Rockefeller foundation's interest in Mexico experimentation work, and the British's imperialist desire to get wheat from India to feed the working populations in Manchester and Liverpool. How is this connected to the modern day and the green revolution? The Arab Spring in 2011 constituted a string of revolutions against different Arab governments which started in Tunisia. It is interesting to note that the last thing President Ben Ali did before he fled Tunisia and his regime was toppled was dropping the price of bread by 30%. His strategy behind reducing the price of bread was to calm the revolution by addressing hunger in the venue of bread, unfortunately for him, the Tunisian population was hungry for more than bread and he was ousted out of power. Today, systems of international trade bind the world together and are relatively new. Global markets for wheat encourage wheat producers to surrender their wheat to corporations that run the world market which are only 140 years old.

Other components of the green revolution are population control, increases in the price of land, and state support. These components are vital because the class struggle depends on controlling the working population by satisfying their hunger and not allowing them to consider communism. American congressional records around the beginning of the green revolution mention fertilizer companies but most companies mentioned were drug companies selling population control drugs.

State support was necessary to support the green revolution because farmers needed to learn how to use these technologies properly in addition to being able to get them at a decent price and getting the crop to market which needed money. Dr. Patel argues that the green revolution drove the price of land upwards globally even in countries that joined the movement late. He says that this is reflected in the 2009 scramble for Africa and how this news was reported in the United Kingdom with awkwardness. He explains that China, India, America and

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Brazil are doing what the British did, mainly finding countries that use authoritarian means to implement green revolution agricultural ways; in Africa, land is relatively cheaper than everywhere else. It is also important to note that data used to support green revolution technologies is from countries with authoritarian regimes where governments force their population to implement these technologies. This data includes how rice production in Indonesia increases by 275 % between 1966 and 2000; Chile had 200 kilo/hectare/year growth in maize since instituting green revolution technologies; and how by the end of the 1990s, 75% of Asia's rice and half of wheat in Africa, Latin America and Asia were grown with green revolution varieties; global population growth increased by 110% between 1950 and 1990, and global cereal production grew by 174% over the same period. This sounds impressive but did the British and the Rockefeller initiatives with Borlaug's work feed the world?

Mike Davis , historian, reported that India experienced 31 serious famines in the 120 years of British rule against only 17 recorded famines in the previous two millennia. Millions of Indians died from being conscripted into the new capitalist political and economic structure or the golden age of liberal capitalism. Violent imperialism imposition actually created the modern international trade system.

Dr. Peter Rosset; Ph.D. in agricultural ecology and executive director of Food First, the Institute for Food and Development Policy; has stated that if China is eliminated from the hunger analysis at the end of the green revolution then world hunger increased by more than 11% from 536 million to 597 million. He also stated that in South America where per capita food supplies rose by 80%, the number of hungry people went up by 19%.

Borlaug's approach and green revolution technologies replaced land usage with increased usage of fertilizer and pesticides which was a 3 time reduction in hectare land usage from 1800

million hectares of land to around 600 million hectares in land to meet world demand. This may seem environmentally friendly but the green revolution had expensive costs. Dr. Patel explains that the green revolution is very healthy today and in its success has monopolized the way people think about food due to a misrepresentation of its history and cost. The green revolution achieved its success by working in authoritarian pro-business states that can violently impose the green revolution way on farmers; creating a capitalist class that is very interested in agriculture with ambitions in agriculture. This resulted in how fertilizer companies today are heavily involved in life science and even financial services; the legitimization of unaccountable and very large agricultural foundations in the world like the Bill and Melinda Gates Foundation; the eradication of knowledge on seed and biodiversity of tremendous value in agriculture; and the least acknowledged of which involves driving the price of land up in countries where it is applied.

The green revolution does have a tremendous opportunity cost in that it uses large resources that involve state support, working population health damage as previously described, and environmental damage. Widespread environmental damage due to these practices, now including genetically modified organisms, include how once pesticides and fertilizers are used, maintaining yields of monoculture requires their continuous usage which have created environmental issues like super weeds and soil erosion. In addition, fertilizer consumption increased by over 4% per year between 1961 and 1998 which accounts for 2% of global energy use; green revolution practices promote a system of agriculture production that demands carbon. Also, green revolution technology sacrifices agronomic resilience by encouraging widespread mono-culture which loses genetic biodiversity that gives resilience to agricultural systems to be

better adapted to climate change. In 1992, a quarter of all irrigated land using green technology suffered from salinization, a problem associated with water irrigation<sup>7</sup>.

Dr. Patel states that it is possible to redirect the resources used to upkeep the green revolution toward another way of agricultural production outside of genetically modified organisms, fertilizers, pesticides, government support, authoritarian regimes, augmentation of land prices, and most importantly the health and environmental damage caused by the green revolution. He said this can be accomplished by a concept referred to as food sovereignty and mentioned how Dr. Rachel Bezner Kerr, a Canadian academic, is doing this in Northern Malawi. Dr. Bezner Kerr's work is of profound importance as the human inclusive model of economic development is concerned; if a Canadian is directly involved in current and future working population health promoting activity outside of Canada to induce economic productivity, then the same thing is possible for Canadians in Canada.

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<sup>7</sup> According to the United States Department of Agriculture, USDA "Over the course of history, thriving civilizations declined in part due to their inability to sustain food production on lands that had been salinized. It is estimated that 10 million hectares are now being lost every year as a result of salinity and/or waterlogging. Many of these problems are caused by excessive use of water for irrigation due to inefficient irrigation distribution systems, poor on-farm management practices, and inappropriate management of drainage water. Inefficient on-farm irrigation practices cause local salinity problems. Local problems increase as a result of poor on-farm drainage. Excessive irrigation increases salt loading in water tables and downstream aquifers which causes regional salinization. Lack of local and regional drainage systems results in lands being put out of agricultural production." Retrieved from <http://www.ars.usda.gov/Aboutus/docs.htm?docid=10201#WhatProb>.

## **Food Sovereignty<sup>8</sup>**

Dr. Rachel Bezner Kerr<sup>9</sup> is an assistant professor at Western University, and has been the research coordinator for the Soils, Food and Healthy Communities Project for 5 years in Northern Malawi. The concept of food sovereignty was established in the 1990s by an international peasant group called La Via Campesina<sup>10</sup>. They wanted to fight for a different agricultural vision in which people have the power to decide how their food system should look like or food sovereignty that involves communities deciding their food and agricultural policy. This approach is a democratic approach where the relations of power preventing this discussion need to be challenged. La Via Campesina suggests that food sovereignty will end all forms of violence against women which is interesting. Dr. Patel supports their view and adds that 60% of hungry people are females which are not surprising given the way capitalism rested on patriarchy. Dr. Patel further suggests that food sovereignty is when equality occurs and democracy takes place; this equality will be with women in the home and outside of the home with the government. La Via Campesina wants agriculture to be removed from the World Trade Organization; Dr. Patel agrees with them and even quotes how Bill Clinton has stated that food should not be treated like a commodity, and that countries cannot develop if they cannot control their own food systems. Dr. Patel further explains that World Bank structural adjustment policies imposed on countries prevent countries from having sovereignty over their food systems which

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<sup>8</sup> This section is referenced from the CBC's Ideas "Feeding Ten Billion" (2012) episode featuring Dr. Raj Patel, retrieved from <http://www.cbc.ca/ideas/episodes/2012/01/11/feeding-ten-billion/Patel>; and Dr. Bezner Kerr's webpage (2011) retrieved from <http://geography.uwo.ca/faculty/beznerkerr/>; and the La Via Campesina's website article "What is La Via Campesina: The international peasant's voice" (2011) retrieved from [http://viacampesina.org/en/index.php?option=com\\_content&view=category&layout=blog&id=27&Itemid=44](http://viacampesina.org/en/index.php?option=com_content&view=category&layout=blog&id=27&Itemid=44)

inhibits their development. To have a dynamic farming system, Dr. Patel describes the urgency in which the relationship between power and farming systems that use urban and agro ecological techniques need to be addressed.

Governments represent a collective interest in countries and the collective interest involves sustainable health, economics and security; governments need to train themselves to be more analytical if they are interested in future survival due to the vast health repercussions brought on by the green revolution. Dr. Patel references The 2008 Agriculture at a Crossroads International Assessment of Agricultural Knowledge, Science and Technology for Development Report which was peer reviewed and involved 400 of the world's top scientists, as having been started by the World Bank and even funded in part by the Canadian government. This report while funded by reliable world organizations was actually repudiated by the Canadian, American and Australian governments for not embracing industrial agriculture even though it was a study by the world's top scientists. The report indicated that agro ecological systems are robust and food sovereignty is necessary; the fifth key message of the report on page 2 stated that:

A vicious circle of poor health, reduced working capacity, low productivity and short life expectancy is typical, particularly for the most vulnerable groups working in agriculture. All persons have a right to sufficient, safe, nutritious and culturally acceptable food. Good nutrition is a prerequisite for health. Although global production of food calories is sufficient to feed the world's population, millions die or are debilitated every year by hunger and malnutrition which makes them vulnerable to infectious diseases (e.g. HIV/AIDS, malaria and tuberculosis). In many developing countries hunger and health risks are exacerbated by extreme poverty and poor and dangerous working conditions. In contrast, in industrialized countries there is also a significant incidence of undernutrition among the poor, and a higher burden of both infectious and noncommunicable diseases associated with metabolic syndromes. AKST has an important role to play in both moving toward food sovereignty, and breaking the malnutrition- poor health-low productivity cycle.

This is confirming what this paper is trying to illustrate through the human inclusive economic development model, mainly that current approaches to economic development are negatively

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affecting the current and future working populations' health which impacts their productivity and further decreases growth and economic development. The human inclusive model to economic development is addressing the current problems from the current approaches to economic development that are pushed by the government at the expense of its own economic growth machinery: the current and future working populations. Dr. Patel, and Dr. Bezner Kerr are living proof of human capital at work , the current political structures inhibiting such academia from being taken seriously needs to be challenged because it is not working in favour of Canada's economic interests.

Dr. Rachel Bezner Kerr's involvement in food sovereignty work in Northern Malawi was by accident since it started as an HIV/Aids hospital project that grew into an experiment involving 5000 farmers. Dr. Bezner Kerr works with farmers to discover new ways of farming without using pesticides and fertilizers in lieu of green revolution technologies which are expensive and toxic. Farmers have discovered that if leguminous trees were grown, that they would serve to fertilize the soil, provide shade cover to increase the amount of time before photosynthesis shuts down in extreme temperatures associated with an increase in yield by 15% with a 15% increase in shade cover; and leguminous trees also provided firewood which was useful. They also found that growing cowpea and perl millet with maize increased the yield of all crops more than the planting with green revolution monocultures. In addition to this, they were able to outperform the 20% yield increase from the use of fertilizer in southern Malawi where green revolution technology was used.

In Malawi, women are involved in agriculture in addition to child rearing, cooking, and fetching water and firewood which means less breastfeeding, and a rise in child malnutrition as their economic involvements in agriculture increased. To avoid child malnutrition, farmers in

northern Malawi wanted to tackle this issue by instituting recipe days where 50 families get together and cook, this associated the value of joy and pleasure in making change happen. These recipe days involve sharing experimental recipes with the newer crops being grown there, and sharing political exchanges on the challenges they are facing in a setting outside of the home. Dr. Patel explains that food sovereignty bring about equality and this situation can involve discussions in the social sphere that otherwise would have been argumentative inside the home especially regarding how men don't do their fair share of the harvest in the Malawi culture, and drink their earning away for example. This type of discussion in a public domain outside of the home goes from a fight to a moment of change; men learn that they need to do more work and child nutrition increases.

This paper is in agreement with Dr. Patel who states that the costs associated with the green revolution are too expensive and no longer sustainable due to expensive fossil fuels, water scarcity, and adverse weather episodes due to climate change. He also confirms how organic and biodynamic farming is better suited for world climate change because it can adapt due to being bio diverse.

Canadians are aware of some of these issues and this is evident by data collected by Agriculture and Agri-food Canada's website in 2008 tracking the growth in the organics industry from 2006 to 2008. The organics industry was valued at \$2 billion in 2008 representing a 66% growth over 2006 when it was valued at \$1.2 Billion. The organics industry is so profitable that Whole Foods an American world leading natural and organic foods supermarket announced that it will be opening a 40,000 square foot Ontario location in Ottawa in 2014 (whole Foods Market, 2011). This suggests that there is a growing awareness about the ramifications of industrial agriculture amongst the Canadian population and that the government needs to work in this

## Human Inclusive Economic Development

direction by implementing food sovereignty and increasing Canadian population health, decreasing the burden on healthcare, and strengthening economic growth and development by promoting productivity.

### **Moving Toward a Healthy Working Population**

Economic development is directly connected to human health because a healthy population is a productive population. Governments need to stop using GDP as a measure of economic development, and need to focus on the health of the current and future working populations by linking it to employment. This means that employers need to share in the cost of health insurance of their workers so that they have an incentive to promote health in the workplace, while employees would have the incentive to keep their jobs and not risk increasing health care costs paid by their employer which might lead to their dismissal. Governments need to rework the Canadian Health care system to capture behaviors that promote health. One suggestion is not to eliminate free healthcare but to have co-insurance payments whereby the health consumer is responsible for a percentage of the fee associated with the doctor's visit for preventable diseases. This can alter the health care system in many ways including creating competition in quality amongst doctors for patients and making it more profitable for doctors to practice in Canada. This also will promote more healthcare conscious consumer choices by each Canadian because they would want to save the money to be spent on medical services by going to the best doctor and focusing on their health. This means that the government would have more tax money to put towards other initiatives like education, while businesses that sell illness promoting products and services will have an incentive to increase its sales by improving their products to make them healthier.

Consumer indebtedness needs to be addressed by the government by promoting consumer fiscal responsibility so Canadians can afford to purchase organics and support the local economy (Appendix B). A suggestion could be providing a tax free incentive on Canadian goods paid by cash or debit to encourage consumers to support local industry, and receive a 13%

savings on their purchases. This will encourage Canadians to become more fiscally responsible and reduce credit usage. It will also support local economy which comes with local job creation as well. Credit card companies will be encouraged to reduce interest rates to increase customer usage which will help reduce consumer indebtedness. The loss of government income in taxes would be balanced out by the share Canadians would be contributing per doctor visit, and taxation of health damaging goods like factory farmed produce. Also, promoting health in business means less sick people suffering from the metabolic syndrome and less government spending in healthcare. Indebtedness from government issued student loans can also stipulate an interest free status of repayment provided the student borrower maintains health through semi-annual medicals held at the university. Students with government student loans can also be forgiven their loan if they open a business that promotes health. These two initiatives would give young Canadians incentives to acquire postsecondary education, become entrepreneurs, and live a healthy lifestyle that promotes productivity. While organics may cost more but this is with current food consumption trends that promote a high carbohydrate and low fat diet that keeps impairing metabolism, and leptin and grehlin hormones that are responsible for feeling satiated. Upon switching to the hunter-gatherer approach to food consumption, leptin and grehlin hormones become operational and Canadians would eat less , and less frequently because they will feel full which decreases costs.

Instituting food sovereignty and supporting organic and bio-dynamic farming should be a top government priority (Appendix D); the first steps would be clear labeling of all products especially in relation to their inflammatory status and carbohydrate content. Meat products would need to stipulate the animal feed at the beginning and end of its life to help consumers make informed nutritional decisions; this would transfer to dairy products as well as they come

from animal sources. As research has established that carbohydrates and factory farmed meat are associated with promoting inflammation and the metabolic syndrome; the government needs to tax them heavily in an effort to reduce consumption and allow companies to change their inflammatory approaches to regain lost business. The government needs to subsidize non-inflammatory organics with the increased tax revenue from factory farmed meat and carbohydrates to make it more affordable for the average Canadian while creating incentives for businesses to enter this health market.

Fluoride needs to be banned from drinking water supplies across Canada, and water clean-up needs to be executed by the Canadian government; in addition to subsidizing reverse osmosis water filters to all households in the meantime giving priority to households with young children. The government needs to also mandate industry to label the fluoride content of their products so that consumers can avoid them, and the government can tax them into extinction.

Canada is severely impacted by the medical costs associated with the metabolic syndrome, or impaired cellular metabolism, because of free health care paid for by the government, and tax payers. Canadian research statistics show that annual losses in productivity due to chronic diseases included in the metabolic syndrome are in the billions of dollars range; therefore, focusing on metabolic disease prevention would automatically save this loss in economic productivity.

The Canadian Food Guide needs to be redesigned, and factory farming practices needs to be phased out as food sovereignty practices has proved to be just as effective without health consequences on the current and future working populations. Several other actions that the government would need to take include:

- 1) Creating a timeline and target date for achieving the use of only environmentally friendly, natural and non-toxic ingredients in household cleaners and cosmetic products. This would have a positive effect in reducing damage to soil and waterways throughout the country which would improve human health.
- 2) Designing educational programs, especially for students, to increase awareness of the toxins in many day-to-day products, the negative effect on their personal health in addition to their damaging impact on the environment. Active campaigns to promote non-toxic cosmetics/cleaning agents have been established by organizations such as the David Suzuki Foundation that the government could collaborate with.
- 3) Incorporating available and new research with the goal of eliminating the metabolic syndrome which includes obesity, insulin resistance, gout, stroke, adult onset diabetes, hypertension, vascular diseases, coronary artery disease and heart attack by consulting with experts in the field such as Dr. Doug McGuff , Emergency Room Doctor and author of *Body Science* with John Little; Dr. William Davis , Cardiologist and author of *The Wheat Belly*; Nora Gedgaudas, author of *Primal Body Primal Mind* and board-certified in Holistic Nutrition® through the National Association of Nutritional Professionals (NANP) and recognized by the Nutritional Therapy Association as a Certified Nutritional Therapist (CNT); professionals in Health Canada like doctors Shiv Chopra, Margaret Haydon and Gerard Lambert ; another option would be to consult with medical anthropologists as opposed to dieticians and nutritionists since they are more specialized in studying the history of human digestion and food intake from a medical perspective. A number of relatively simple government policies could include incentive programs

- 4) Creating incentives for producers to voluntarily implement Extended Producer Responsibility programs where consumers would be encouraged to return end-of-life products to the manufacturer instead of adding them to the general waste stream.
- 5) Taxing residential garbage disposal of non-biodegradable products by weight per household; sanitation engineers would weigh the garbage before taking it and leave a bill. This would result in more households sorting their garbage and using an environmentally friendly method of composting for food wastes. Such a tax would encourage consumers to voluntarily participate in EPRPs by returning end-of-life products to the manufacturer where these products can be properly disposed of or reused in other manufacturing processes.
- 6) Banning non-biodegradable products unless the manufacturer commits to a greater recovery of end-of-life products in a proven environmentally friendly manner.
- 7) Creating incentives for consumers and producers to use only reusable products such as bags, coffee/tea mugs, cutlery and containers in retail outlets. This would promote the reduction of disposable and non-biodegradable products and allow for quicker landfill reuse since the biodegradable materials would have composted within a shorter timeframe. Many cities in Canada have implemented practices of charging for non-biodegradable bags in retail outlets.
- 8) Investing in renewable resources like Bamboo as a replacement for plastic and wood related production of items like paper, cutlery, clothing and other products because it is naturally organic, water resistant, and quick and easy to grow in abundance with no pesticides. This would leave trees to clean the air without compromising material

demands and air quality as well as decreased toxins in manufactured products as will be discussed in further detail in this essay<sup>11</sup>.

- 9) Increasing funding of alternative energy sources that are more sustainable to replace and reduce demands on non-renewable resources. One option would be to create incentives for geothermal energy usage for homes and places of work; this is currently happening in occupied Palestine by Khaled Sabawi as featured on TEDxTalks Ramallah (2011).
- 10) Supporting environmentally friendly organizations in their efforts to increase public awareness of new approaches to human health, the environment and the sustainability of the planet and species.

Such changes are based on ideological efforts that need government backing to gain momentum and become a reality. As the government represents a collective group-interest in society, it can create incentives to support and extend health promoting dynamics to the current and future working populations. Incentives from a human inclusive economic development model perspective involve taxing illness producing economic activity while providing tax cuts for health promoting economic activity which promotes conscious consumerism. Conscious consumerism promotion affects producer and consumer behaviours towards health maintenance

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<sup>11</sup> The information on bamboo is referenced from a few internet articles:  
1)"The Top Ten Reasons Why Bamboo Can Save the Planet"(2008) retrieved from <http://www.bamboogrove.com/why-bamboo-save-planet.html>  
2)"Replacing wood and plastic cutting boards with bamboo" by Rob Endelman (2011) retrieved from <http://www.bamboogrove.com/why-bamboo-save-planet.html>  
3)"Original Bamboo bottles to replace the plastic ones" by desh Raj Sharma(2010) retrieved from <http://www.greendiary.com/entry/original-bamboo-bottles-to-replace-the-plastic-ones/>  
4) "Can bamboo replace all hardwoods?" by David Kurland (2007) retrieved from <http://www.buildinggreentv.com/workshop/foundation-flooring/27>  
5) "Bamboo Flooring Pros and Cons" by Tintin (2011) retrieved from <http://www.buzzle.com/articles/bamboo-flooring-pros-and-cons.html>

## **Human Inclusive Economic Development**

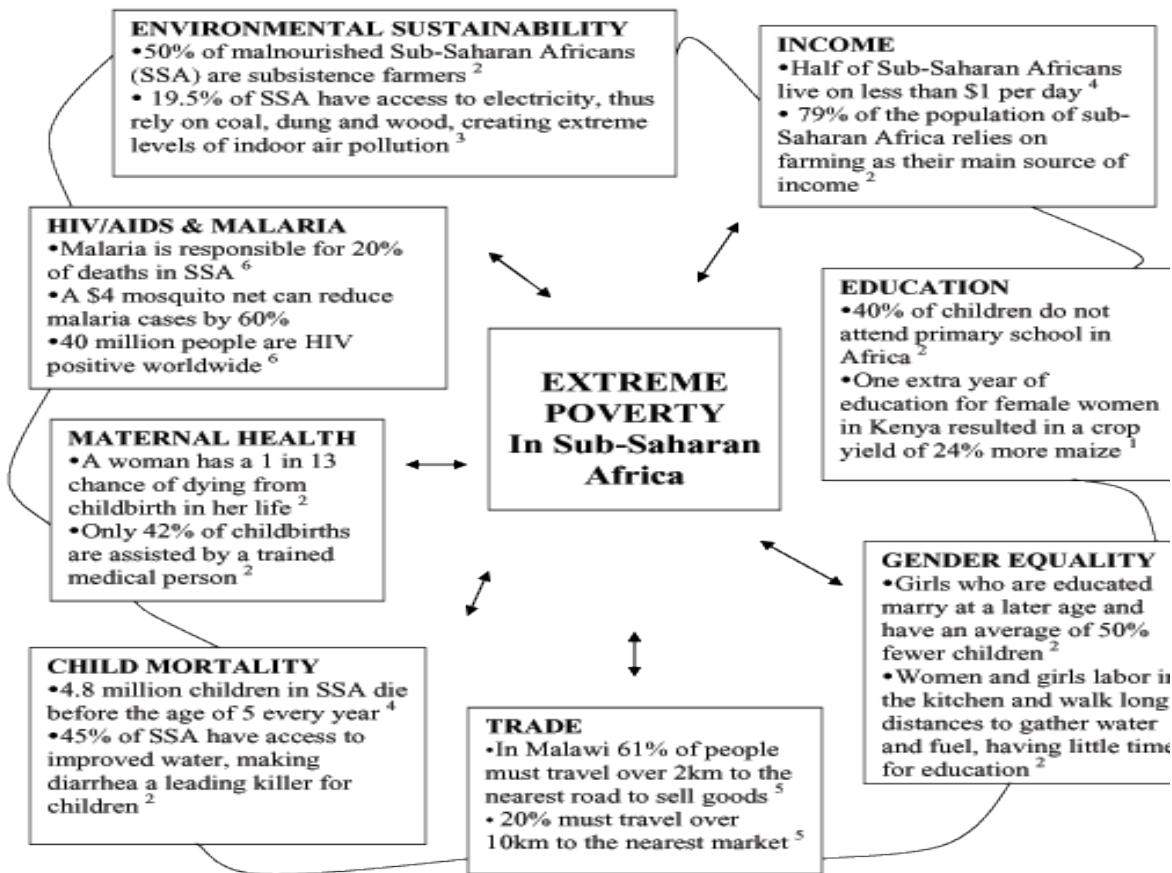
or promotion; this includes environmental protection and sustainability since both are important elements affecting the health of the current and future working populations.

## **Conclusion**

The purpose of this essay is to present a human inclusive economic development framework by illustrating the link between human health, industrialization and productivity. This included reviewing the drawbacks of mainstream approaches to economic development, focusing on how growth through industrialization is hindering productivity by damaging the health of the current and future working population. It noted the necessity of a human inclusive development framework, which is sound economics because it recognizes scarcity of resources and the value of efficiency in their usage. The switch to a human inclusive framework of economic development is possible with government initiatives. It is necessary for the government to create incentives to promote conscious consumerism as the market regulator of health. Conscious consumerism is the idea that economic activity on the part of both the consumer and producer promotes or supports human population health. This change is happening in northern Malawi by way of instituting food sovereignty; Dr. Rachel Bezner kerr of the University of Western Ontario is part of this project. It is apparent that Canadians are open to the idea of human inclusive economic development from the rise in market share of the organics industry in 2008 from 2006 by a whopping 66% (Agriculture and Agri Food Canada, 2010). This increase in the whole foods and organics industry is evidence that an increasing segment of the Canadian population are focusing on health. As the government represents the collective interest of a population, health needs to become a priority. People are the most important resource in production and innovation, and a healthy population is a productive one.

## Appendix A: The Poverty Trap

# The POVERTY TRAP



Sources:

<sup>1</sup> IFPRI Policy Brief. Women- The key to food security: Looking within the household. October 2000. Washington, D.C.

<sup>2</sup> Sachs, Jeffery. Ending Africa's Poverty Trap. March 2004.

<sup>3</sup> International Energy Agency. 2003 World Energy Outlook. Paris.

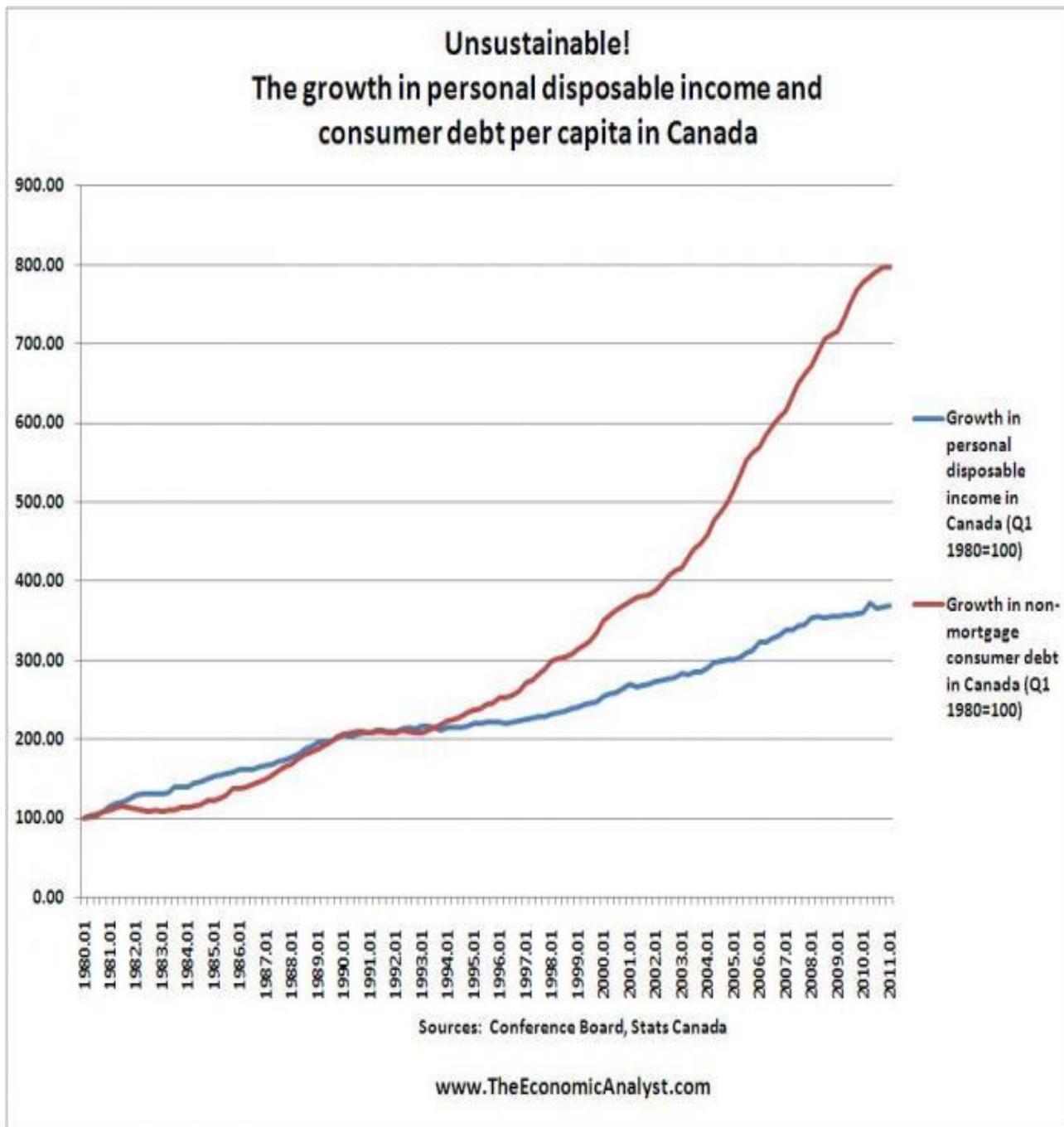
<sup>4</sup> [www.undp.org](http://www.undp.org) <sup>5</sup> Sachs, Jeffery. Investing in Development. UN Millennium Project

<sup>6</sup> [www.unaid.org](http://www.unaid.org)

*The POVERTY TRAP* (n.d.) Retrieved from

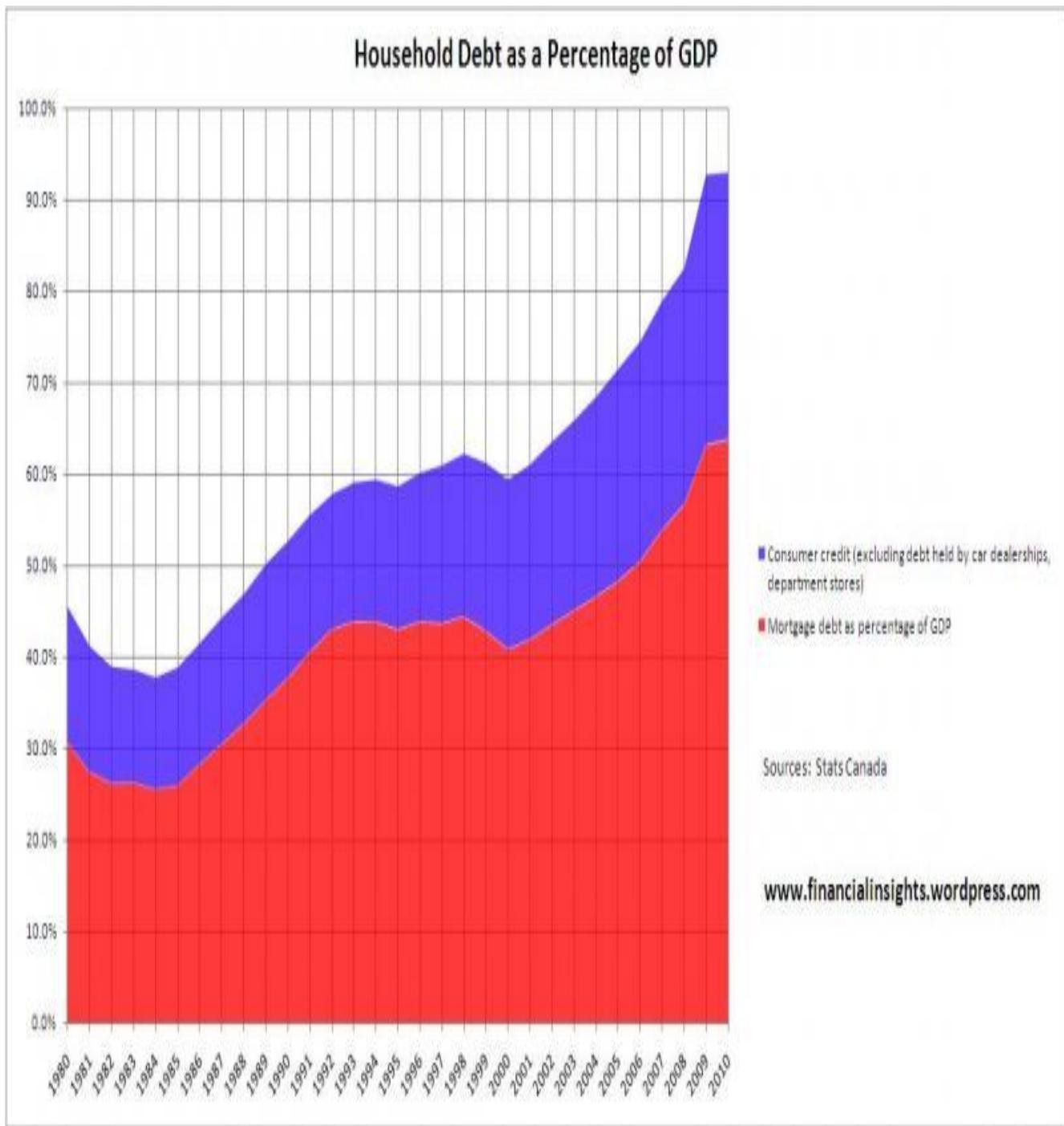
<http://helppoor.files.wordpress.com/2009/05/poverty-trap-mdg-chart.gif?w=600>

### Appendix B: Indebtedness in Canada



*Unsustainable! The growth in personal disposable income and consumer debt per capita in Canada* (n.d.) Retrieved from

[http://www.theeconomicanalyst.com/sites/default/files/u3/income\\_vs\\_consumer\\_debt\\_per\\_capita.jpg](http://www.theeconomicanalyst.com/sites/default/files/u3/income_vs_consumer_debt_per_capita.jpg)

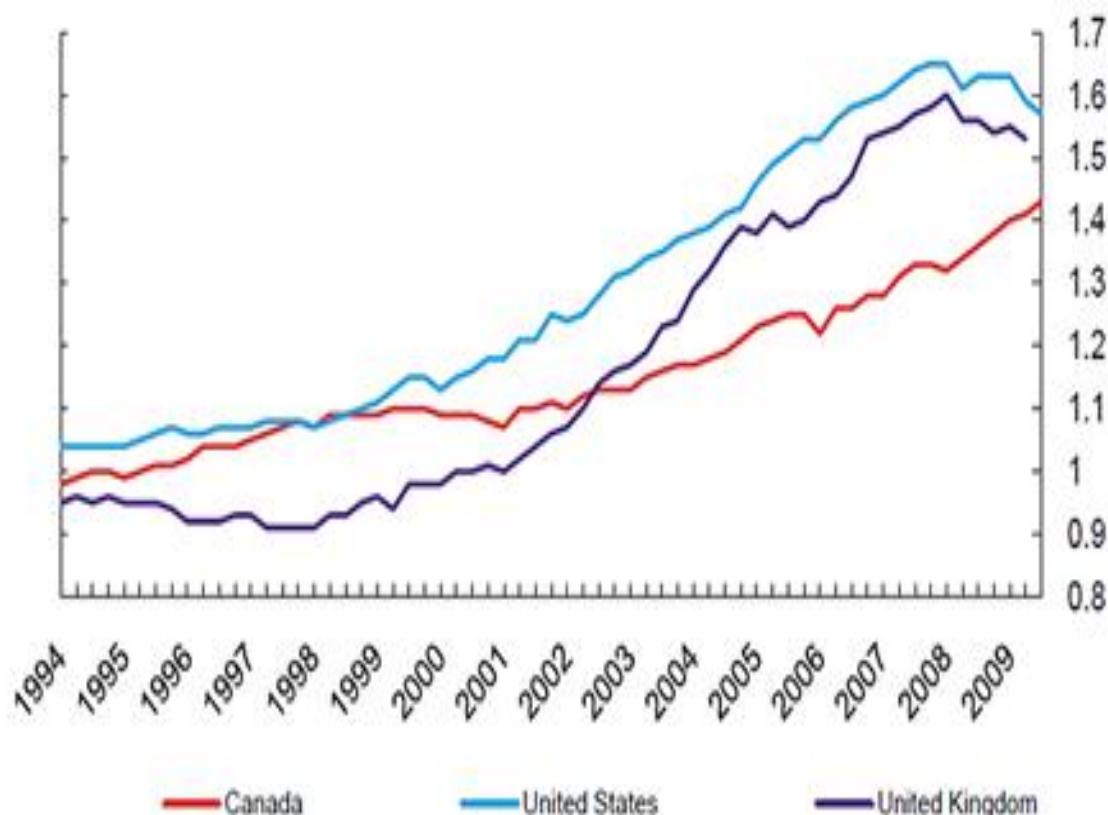


*Household Debt as a Percentage of GDP* (n.d.) Retrieved from

[http://3.bp.blogspot.com/-7s\\_Xki1h3AQ/TfohJ2G8NhI/AAAAAAAACbo/ZKxDI2jhZoU/s1600/household-debt-as-percentage-of-gdp.jpg](http://3.bp.blogspot.com/-7s_Xki1h3AQ/TfohJ2G8NhI/AAAAAAAACbo/ZKxDI2jhZoU/s1600/household-debt-as-percentage-of-gdp.jpg)

**Chart 5: The household debt-to-income ratio is still rising in Canada**

Household debt as a share of personal disposable income



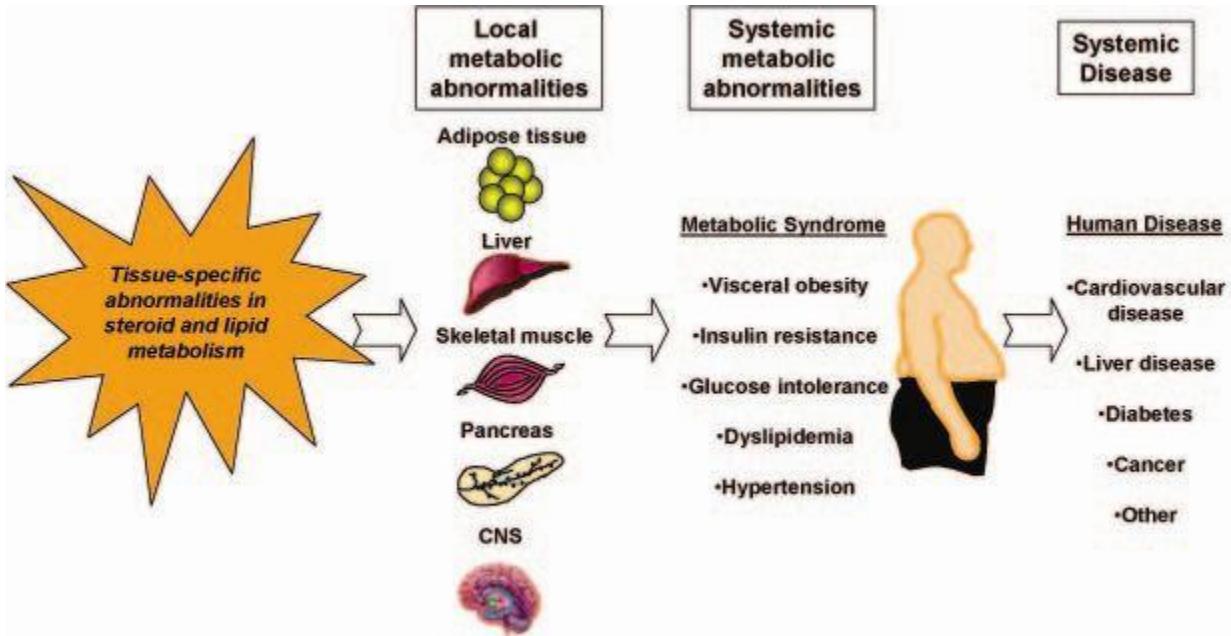
Sources: Statistics Canada, U.S. Federal Reserve,  
U.K. Office for National Statistics

Last observation: Canada and U.S. 2009Q3;  
U.K. 2009Q2

*The household debt-to-income ratio is still rising in Canada, Household debt as a share of personal disposable income (n.d.) Retrieved from*

[http://www.ratesupermarket.ca/images/blog/chart\\_canadian\\_debt\\_income\\_ratio.jpg](http://www.ratesupermarket.ca/images/blog/chart_canadian_debt_income_ratio.jpg)

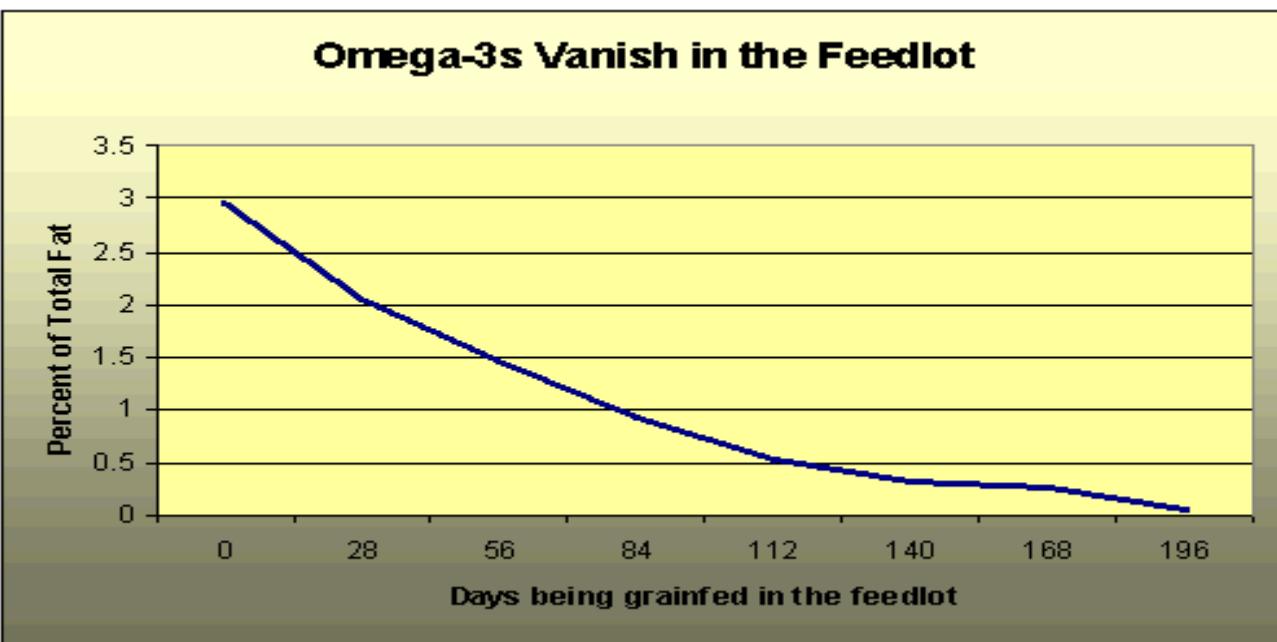
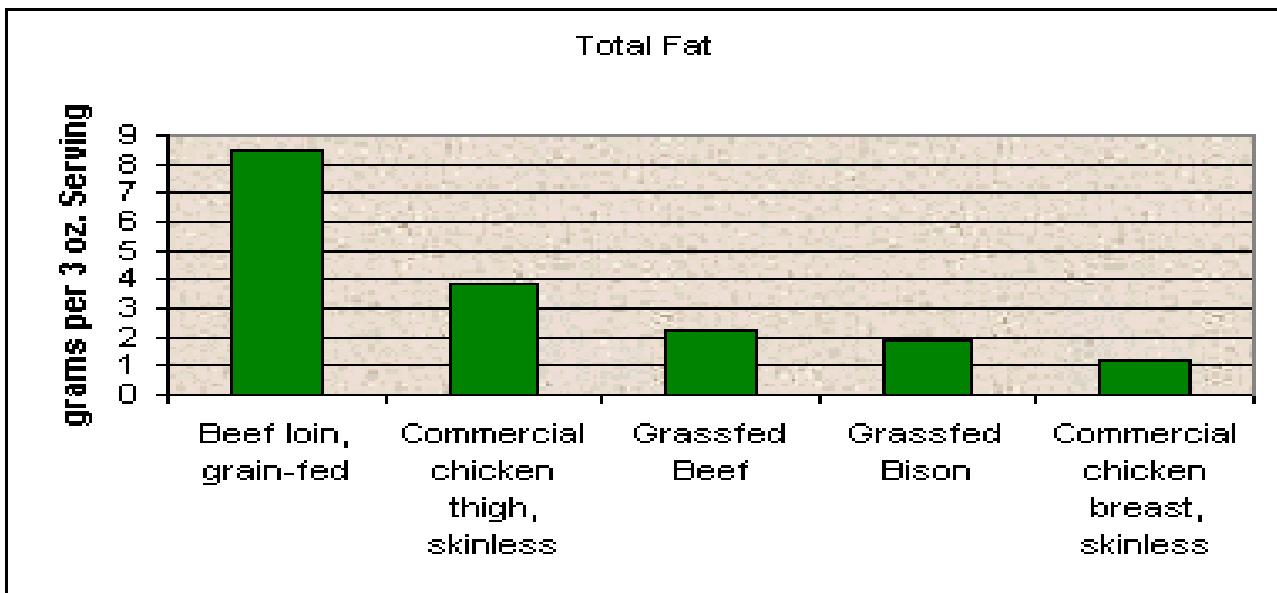
### Appendix C: The Metabolic Syndrome

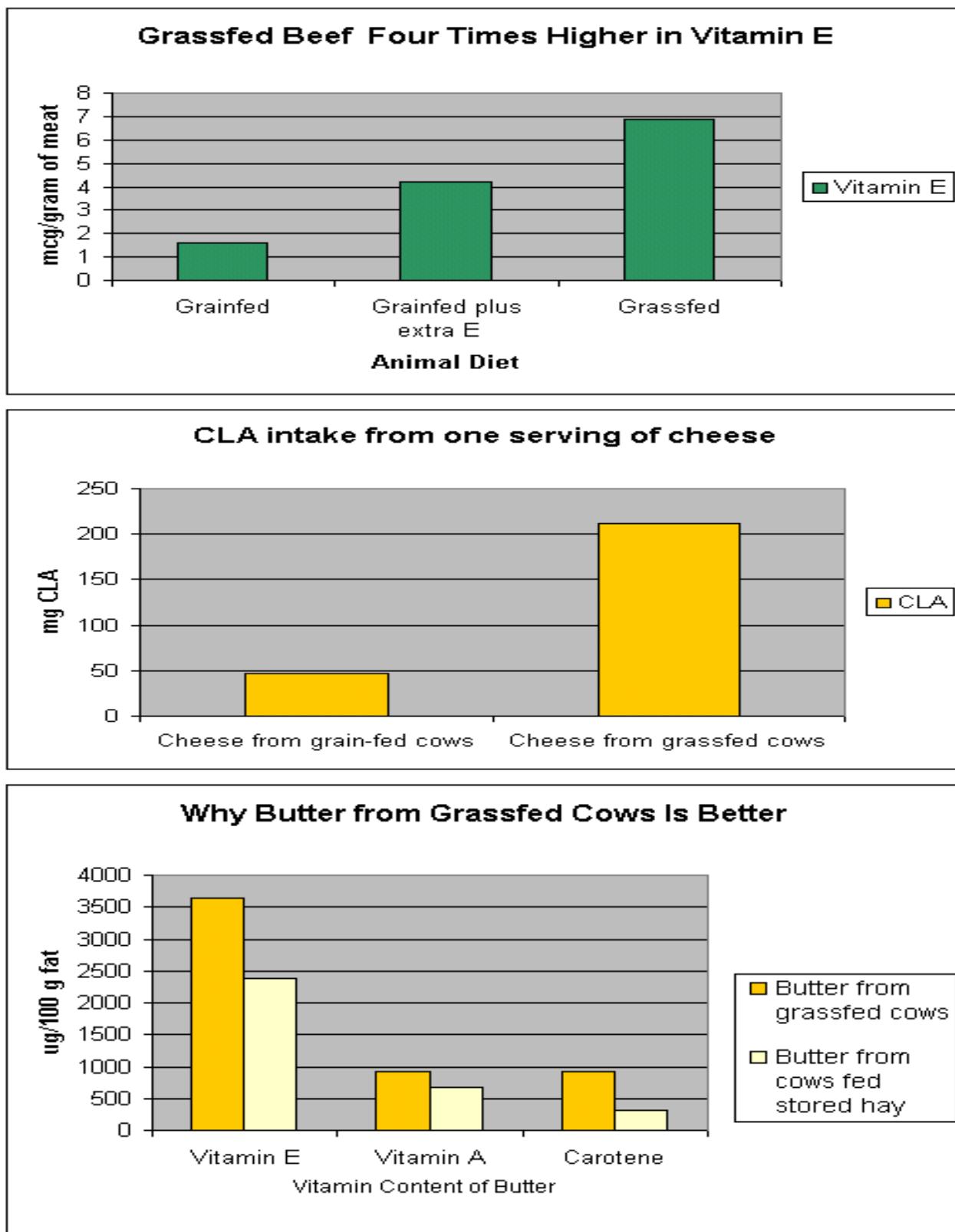


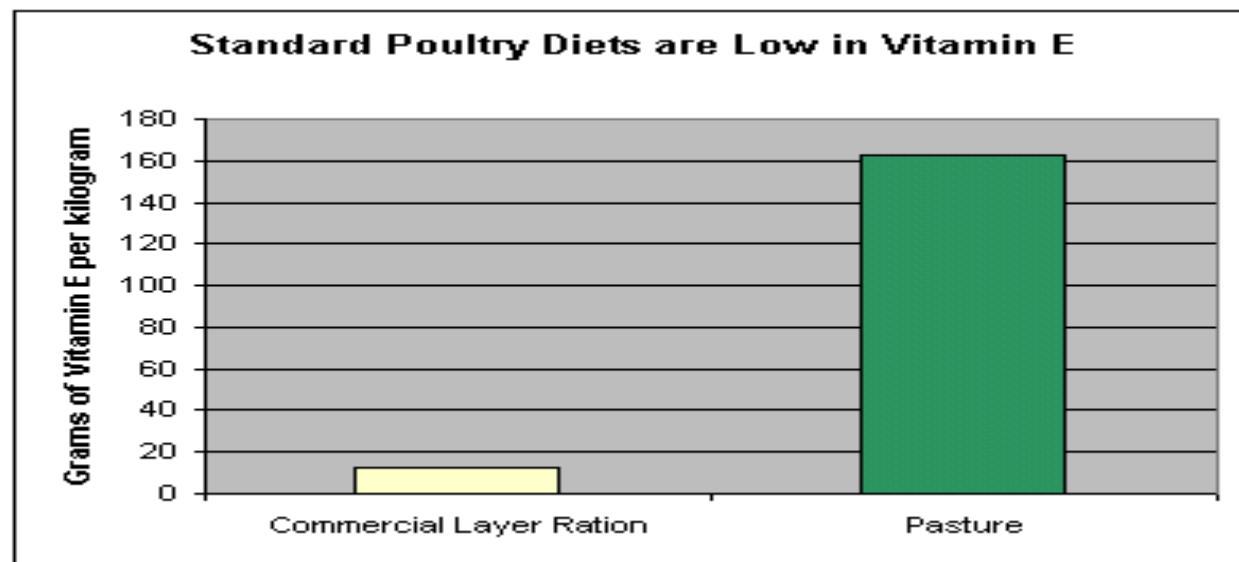
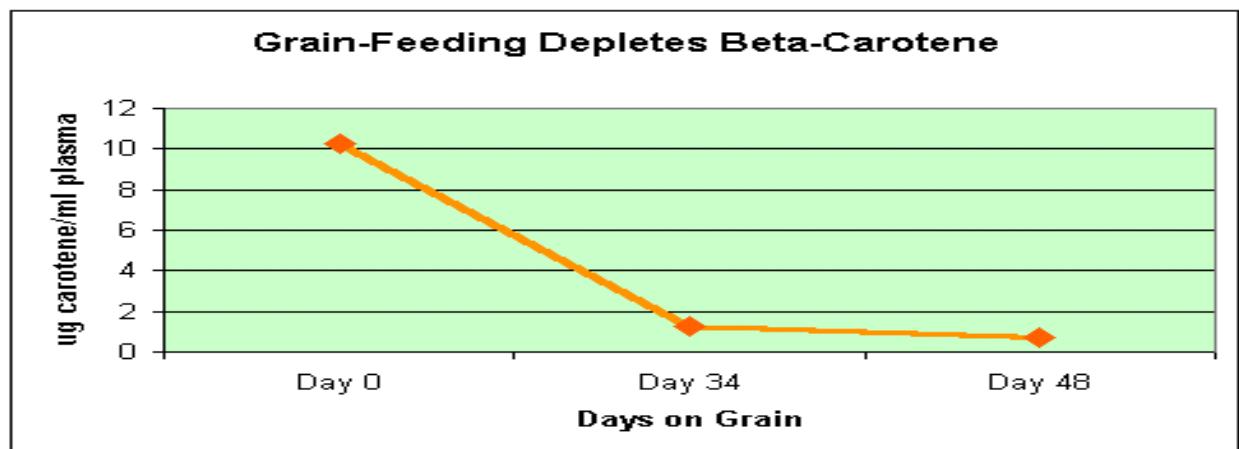
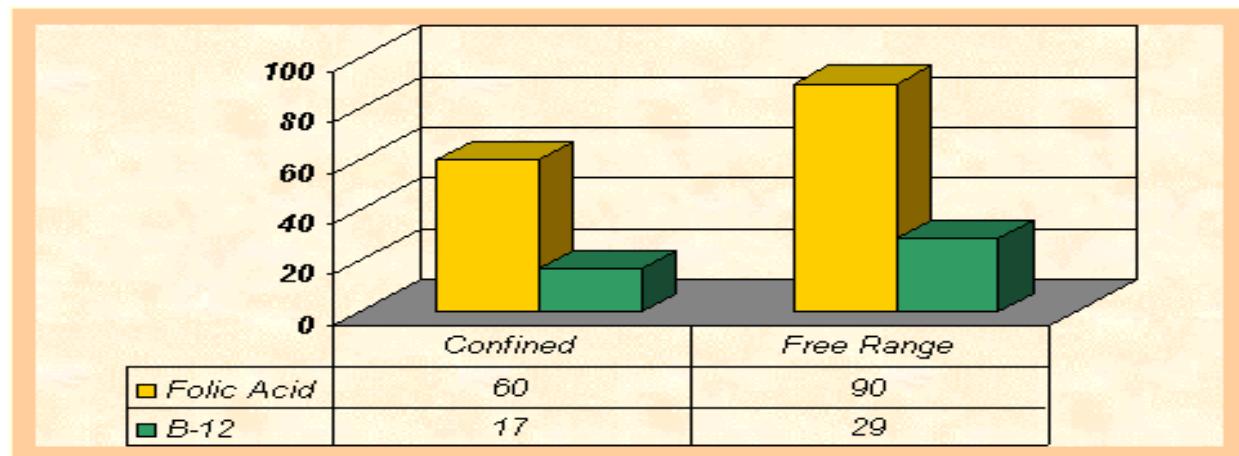
*Tissue-specific abnormalities in steroid and lipid metabolism* (n.d.) Retrieved from

<http://www.kershawlab.pitt.edu/MetSyn.jpg>

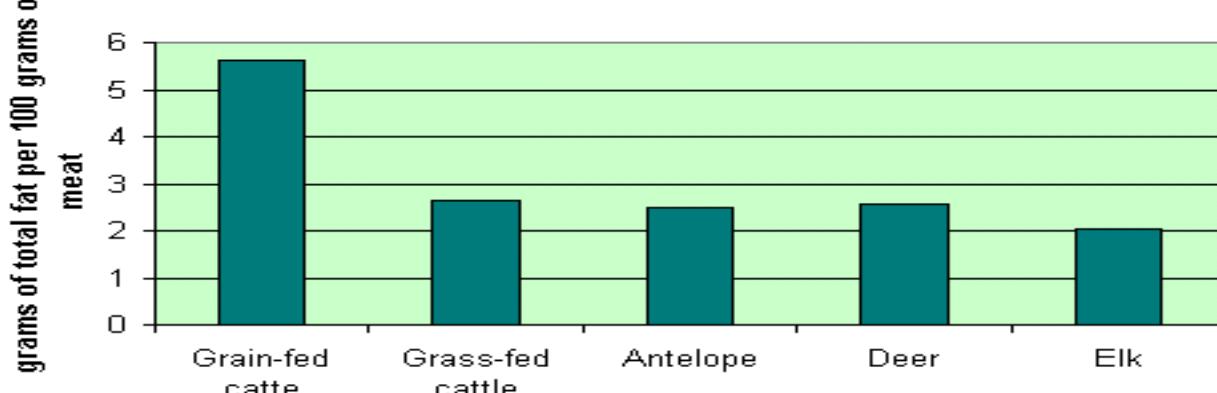
#### Appendix D: Food Nutrition Analysis



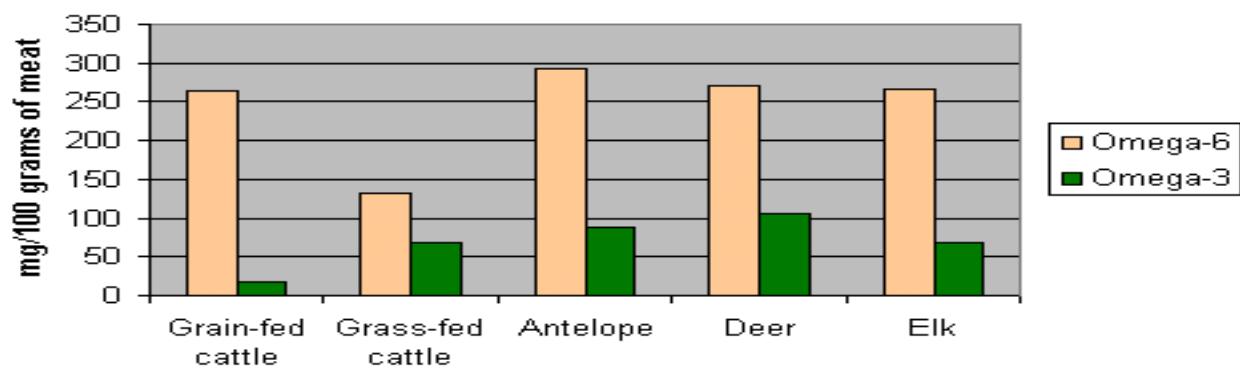




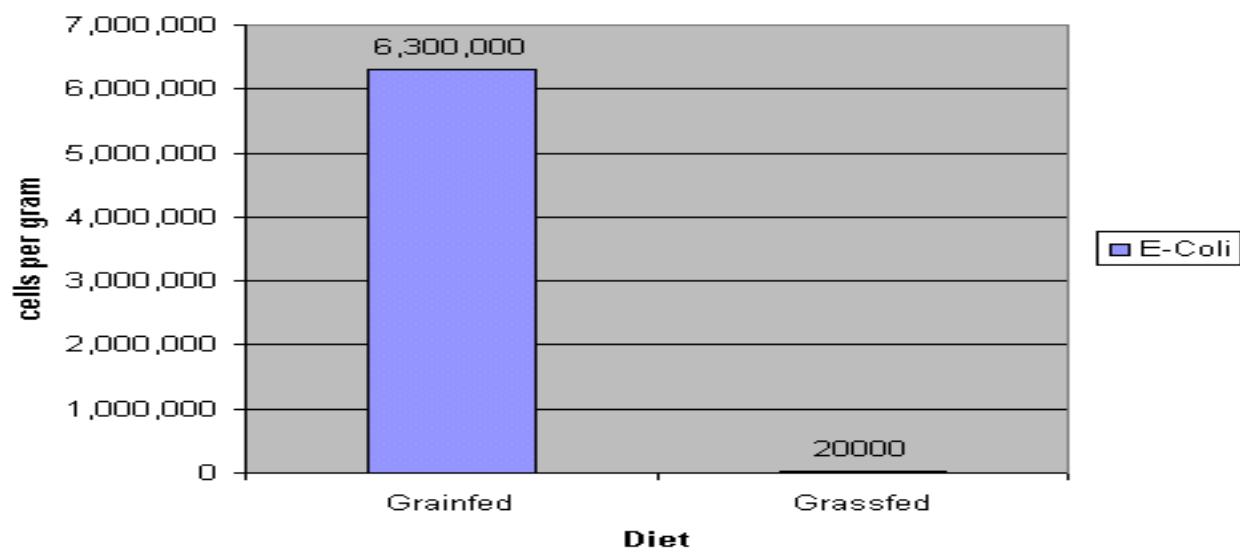
### Grassfed Beef is Similar to Wild Game in Total Fat

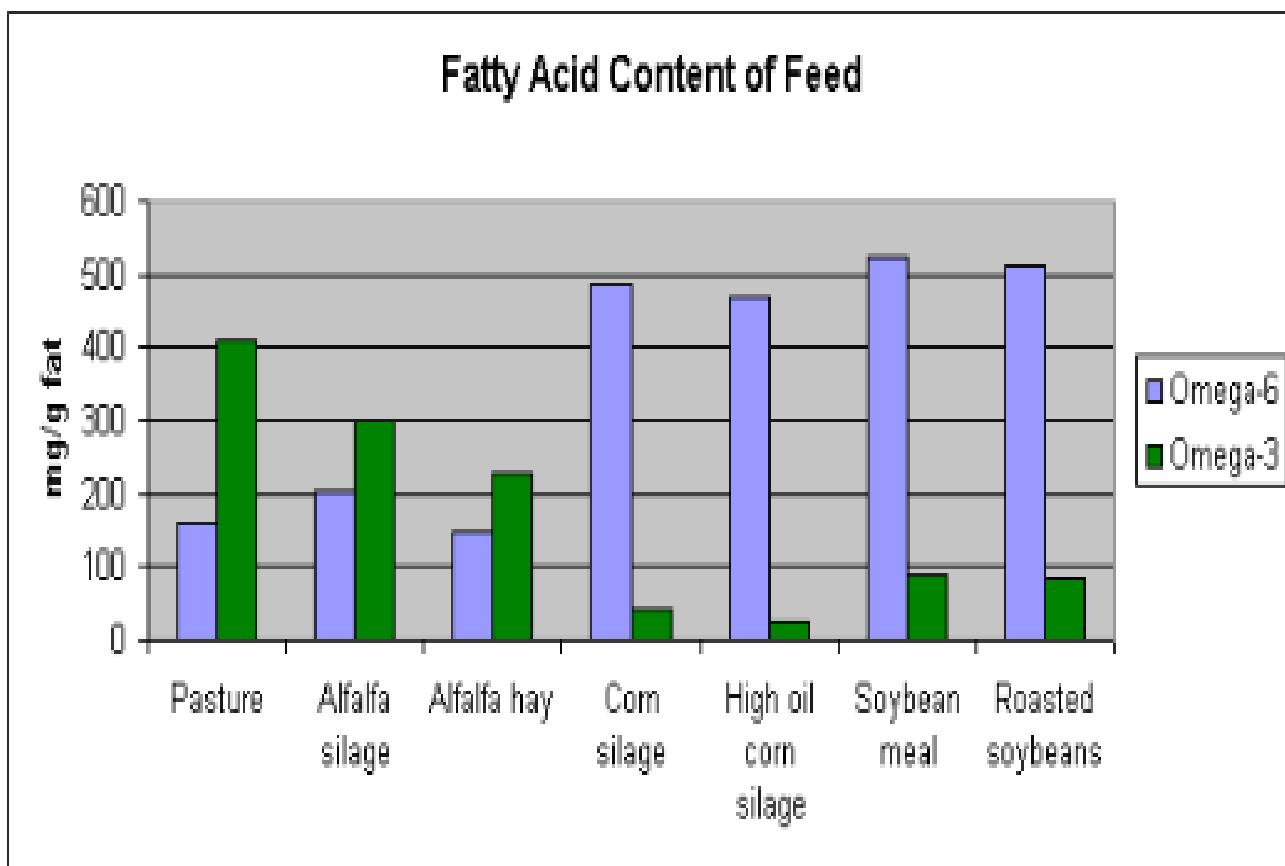
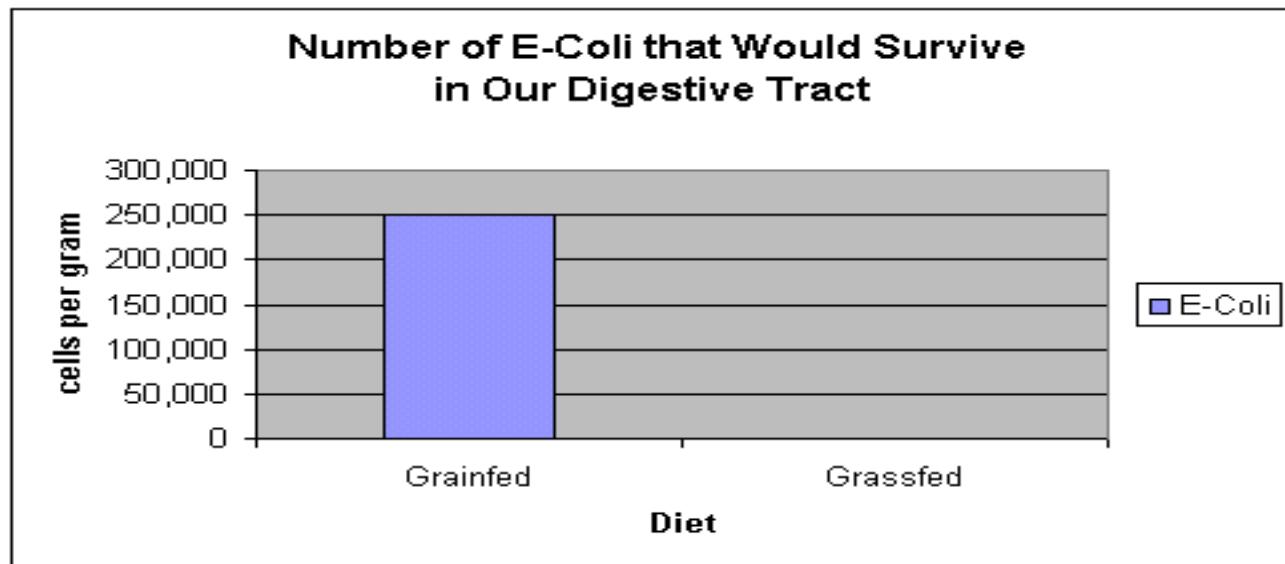


### Essential Fat Comparison



### E-Coli count much higher in grainfed animals





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