



CAN OUR GUT MICROBES AFFECT EMPLOYEE PRODUCTIVITY AND – ultimately employers' bottom lines?

Infections due to antibiotic resistant bacteria in the European Union result in extra healthcare costs and productivity losses each year of at least €1.5bn.¹

***"All disease begins in the gut."* – Hippocrates**

The father of medicine said this more than 2,000 years ago but we're only just starting to discover how right he was. The relationship between intestinal health and overall good health is receiving a great deal of attention these days and with good reason. Recent research suggests that the health of the gut – the forgotten 'organ' – is a cornerstone to overall health and immunity. Your intestines are brimming with bacteria, which plays an important role in a wide range of your body's functions.² Maintaining healthy gut bacteria may help you avoid excess inflammation and limit the activity of free radicals, highly reactive molecules in your body that can cause cell damage.

And while this area of research is new enough that statistics on the exact cost to businesses are few, the fact that there is clearly a link between bad gut health (and all its possible consequences) and work absence means that it should be a topic of interest for employers. In response, MAXIS Global Benefits Network recently released a white paper on the topic, '*Gut health: focusing on our inner economy*' which highlights the impact of the gut microbiome on employee health and suggests ways to help your employees manage their gut bacteria.

Ensuring your employees have a healthy gut microbiome can lead to a happier, healthier workforce with a lower incidence of both acute and chronic illnesses.

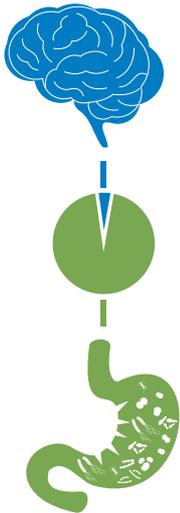
Take a quick look at a few key findings from our gut health white paper here – and visit www.maxis.gbn.com or speak with your account executive to get the complete white paper.



Quick highlights from the gut health white paper

Your gut is your
"second brain."
Ninety-five
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5% receptors in Brain



95% receptors in gut

Why is gut health important?

Our gut is made up of a multi-trillion-strong population of microbes that calibrate many functions, particularly those that are involved in immunity, nutrient absorption, energy metabolism and intestinal barrier function.³

When our microbial communities are disturbed, we can see a big increase in disease susceptibility.⁴ Studies have shown links between this imbalance in the gut and chronic inflammation and metabolic disorders, which can lead to obesity and diabetes.⁴ Changes to the gut microbiome have been associated with infections, inflammatory bowel disease, neurological and neuropsychiatric disorders.⁴

In fact, multiple animal studies have shown that manipulating the gut microbiota in some way can produce behaviours related to autism, anxiety and depression. Scientists have discovered that mice with some features associated with autism had much lower levels of *Bacteroides fragilis* (*B. fragilis*), a common gut bacterium, than did normal mice. Interestingly, when the scientists fed the mice *B. fragilis*, they weren't stressed, antisocial, or had the same gastrointestinal symptoms often associated with autism.⁴

Need more proof? Your gut is your "second brain." Ninety-five percent of serotonin receptors (the hormone known as the happiness hormone) are in the gut, not the brain.⁵ Gut disorders have been linked to psychological disorders like depression and anxiety.⁶ In many cases, if you can heal the gut, you can heal the brain.

Gut bacteria: our body's busiest workers

Let's look at some other important roles played by our gut bacteria:



Aiding digestion: They play an active role in the normal digestion and absorption of food by producing enzymes that aid in the process of breaking down proteins, carbohydrates, and fats.⁷



Manufactures vitamins and amino acids: By producing various metabolites, gut microbes help with the production of some vitamins – particularly vitamin K (needed for blood clotting) and the group of B vitamins (needed for keeping our nervous system healthy and turning food into energy).⁸



Supporting our immune system: Microbes act as a physical barrier, protecting our gut, plugging holes in the lining and joining against encroaching viruses, toxins and undigested food particles.²



Affecting drug efficacy: A healthy gut microbiome ensures drugs work as they are supposed to – and an imbalance in gut bacteria can change that effectiveness. Similarly, certain drugs can themselves bring about a change to the composition of the gut microbes.⁹

Scientists have made major breakthroughs to understand and manage the gut microbiome to improve our health, moods and well-being. These developments could revolutionise the way we approach and treat diseases.

What affects gut health?

Several lifestyle factors directly contribute to an unhealthy gut.



1. Diet, physical inactivity and stress

Most people subsist on processed/fried/fast food. This type of diet damages the intestinal lining and can cause leaky gut syndrome. This happens when the intestinal lining becomes more porous, forming larger holes developing and causing toxins to seep out into the bloodstream from the gut lining.¹⁰

This "leaky gut" syndrome may lead to seemingly unrelated health concerns including irritable bowel disease, Parkinson's disease, rheumatoid arthritis, hyperglycemia, cancers, insulin resistance, obesity and mental conditions (anxiety, depression, autism).^{11,12,13,14}



Irritable bowel disease



Parkinson's disease



Rheumatoid arthritis



Hyperglycemia



Cancers



Insulin resistance



Obesity



Mental conditions

2. Life stages and behaviour

Although your behaviours – like eating and sleeping well – are important, the make-up of an individual's gut bacteria starts very early and is affected by a range of factors.



The womb: babies are born 'sterile', but maternal health plays a key role in microbiota development and in neurodevelopment¹⁵



Mode of birth: normal delivery leads to normal development of the immune system and less respiratory problems¹⁶



Breastfeeding: promotes the growth of probiotics, which can strengthen or promote development of the immune system¹⁷



Life events: major life events – like puberty – can affect gut bacteria¹⁸



Growing old: progressive loss of microbial diversity²

3. Antibiotics and anti-inflammatory painkillers

While antibiotics and anti-inflammatory painkillers are a modern medical miracle, their downside is that they kill good bacteria, too. Studies suggest that extended or overuse of antibiotics can lead to obesity and autoimmune diseases.¹⁹ The increase in unnecessarily prescribed antibiotics has led to a decrease in their effectiveness against certain bacterial infections.

Study: Severely malnourished children in Bangladesh and Malawi

Methodology: The severely malnourished children were treated with a week-long course of a type of antibiotic along with nutritional therapy

Result: Children who received the combination of antibiotics and nutrition gained more weight and faster than the children who just received nutrition alone. The combination of antibiotics and nutritional therapy has become standard of care in outpatient management of severe acute malnutrition.

4. Lack of microbial diversity

Our exposure to microbial diversity, or lack thereof, can pose a challenge to the normal development of the child's gut microbes and immune responses.²⁰

As studies suggest, the critical period in the development of our gut microbiota appears to be the time immediately following birth and infancy. Children require some exposure to germs to "educate" the immune system so it can learn to launch its defence responses to infectious organisms.²⁰

Study: Children growing up in East and West Germany in 1999

Methodology: Researchers compared the health of children growing up in East and West Germany

Result: Children in East Germany had less allergic conditions and asthma due to growing up in dirtier and generally less healthy conditions than the children in West Germany. Further research has found that children in developing areas of the world are less likely to develop allergies and asthma compared with children in the developed world.

Turning insights into actions

Help your employees maintain and promote a healthy gut in the workplace by investing in evidence based, cost effective strategies.



1. Teach, educate and beseech. Use your existing communications vehicles to begin a gut health-education campaign. Offer in-services, webinars, and guest-lectures to help employees change their perception of what gut bacteria is and what it does. Distribute informational packets to explain difference between infections (viral vs bacterial), a healthy diet. Provide an antenatal education regarding diet, proper weight, modes of delivery. Promote judicious antibiotic and painkiller use.



2. Create a culture of well-being. Evaluate the depth of the problem in the workplace. Make gut friendly food/drinks available in the office cafeteria. Distribute a self-assessment test to determine gut symptoms.



3. Minimize negative consequences and prevent further complications. Cultivate a new microbiota by switching to a gut friendly diet. Encourage supplementing with live cultures, prebiotics and probiotics. Develop programs that incentivize employees to exercise and better manage their stress levels.



4. Alter behaviour that has a direct impact. Empower employees to control the factors within their own lives and educate their immune system. Reinforce the role of physical activity in combating obesity – from offering on-site fitness centres, discounted gym memberships, walking programs and company-wide contests. Implement healthy eating, nutrition, and obesity/weight loss programs.

Contact your account executive for copies of our gut health white paper and to discuss how we can help you revolutionise your employees' health and wellness needs.

¹ NCP, 'Effects of Gut Microbes on Nutrient Absorption and Energy Regulation', February 2012

² IJMS, 'Impacts of Gut Bacteria on Human Health and Diseases', April 2015

³ Trends in Neurosciences, 'Gut-brain axis: how the microbiome influences anxiety and depression', May 2013

⁴ Molecular Psychiatry, 'From Gut Dysbiosis to Altered Brain Function and Mental Illness: Mechanisms and Pathways', June 2016

⁵ Justin Sonnenburg and Erica Sonnenburg, 'Good Gut: Taking Control of Your Weight, Your Mood, and Your Long-Term Health', May 2016

⁶ Current Opinion in Biotechnology, 'Bacteria as vitamin suppliers to their host: a gut microbiota perspective', April 2013

⁷ National Heart, Lung, and Blood Institute, 'Bidirectional interactions between indomethacin and the murine intestinal microbiota', December 2015

⁸ Imperial College London, 'Diet swap has dramatic effects on colon cancer risk for Americans and Africans', April 2015

⁹ Clinical Reviews in Allergy & Immunology, 'Leaky gut and autoimmune diseases', February 2012

¹⁰ Institute of Medicine, 'The Human Microbiome, Diet, and Health: Influence of the Microbiome on the Metabolism of Diet and Dietary Components', 2013

¹¹ International Journal of Molecular Sciences, 'Impacts of Gut Bacteria on Human Health and Diseases', April 2015

¹² World Journal of Gastroenterology, 'Brain-Gut-Microbiota Axis in Parkinson's Disease', October 2015

¹³ Trends in Molecular Medicine, 'Microbiota and neurodevelopmental: implications for brain', 2014

¹⁴ Medical News Today, 'Fewer 'good gut' bacteria in C-section infants', August 2013

¹⁵ Nature medicine, 'Partial restoration of the microbiota of cesarean-born infants via vaginal microbial transfer', March 2016

¹⁶ Gut Microbiota Worldwatch, 'Gut microbiota evolution throughout lifetime'

¹⁷ Perelman School of Medicine at the University of Pennsylvania, 'Anti-inflammatory drug and gut bacteria have a dynamic interplay', January 2016

¹⁸ Clin Exp Allergy, 'Too clean, or not too clean: the Hygiene Hypothesis and home hygiene', April 2006

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