

**CORPORATE VITAMIN ACCESS & EDUCATION
PROGRAM – A PERSPECTIVE ON RETURN ON
INVESTMENT (ROI)**

Vous Vitamin LLC



INTRODUCTION

Vous Vitamin's Corporate Vitamin Education & Access Program will help companies improve their employee's wellbeing, and in turn, improve the company's productivity and profitability through the impact of personalized nutrition. The program will deliver savings to employees who would normally purchase over-the-counter vitamins, help them stay accountable through a subscription, offer them a tailor-made vitamin that meets their specific needs, and educate them about the importance of vitamins and their health. Through this program, employers will not only benefit from a healthier and more productive workforce, but they will also receive data on the overall trends of their employee's health, which can serve as a tool to improve workplace culture and understand the challenges employees are facing.

The following report will outline nine health areas that vitamins have the potential to improve and will delve into each one.¹ Within each health improvement, this report will outline the possible benefits of vitamin usage such as increased productivity and profits, or other intangible benefits such as improved workplace culture or better brand reputation. The report will then calculate the ROI to the employer, quantifying the impact of Vous Vitamin's Corporate Vitamin Education & Access Program. Alongside the written explanations, this report also includes three illustrations which run through some specific examples of quantifying vitamin usage and ROI. Each illustration showcases the process of calculating ROI as well as the savings from vitamin usage which are also probability weighted to account for realistic participation and employee enrollment in the program. The illustrations showcase the savings for a company of 250 employees annually and over five years. The five year savings from taking vitamin D to improve mental health, iron to decrease fatigue, and vitamin D to improve immune health are \$1,219,589-\$1,266,888, \$945,545, and \$888,000 respectively.

HOW DOES THE PROGRAM WORK?

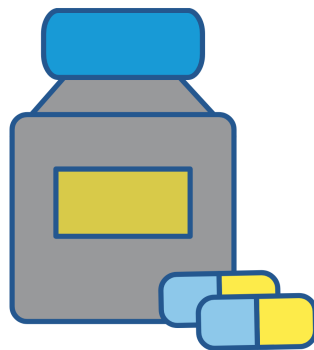
Vous Vitamin's Corporate Vitamin Education & Access Program gives employees the opportunity to create a vitamin pill specifically tailored towards their needs. This program not only provides employees with a vitamin solution which is more effective than their self-chosen over-the-counter mix of vitamins, but it also delivers economic savings to them. The average employee spends approximately \$465 annually on vitamins out of pocket.² With Vous Vitamin's program, employees can pay as little as \$225 for a six month subscription. Even when comparing this on an annual basis, employees still experience savings and benefit from a good-quality personalized product rather than a less effective mix of self-chosen vitamins. The partnership with Vous Vitamin comes at no cost to the employer; employees are free to take advantage of the resources and products as they choose.

¹ The examples in this report are meant to be illustrative of the evidence behind certain nutrients. The actual vitamin formulas will vary by nutrient composition and dosage levels.

² L.E.K, "[Top 8 Insights From the 2018 Beauty, Health & Wellness Survey](#)".

Alongside the product, employers also gain access to Vous Vitamin's content library which includes 100+ articles about a range of vitamin-related topics written by board certified physicians. Employers are free to share any of this content with their employees and Vous Vitamin also provides opportunities for co-hosted webinars, Q&A sessions, and presentations from Vous Vitamin's co-founders Dr. Romy Block, MD and Dr. Arielle Levitan, MD.

Once partnered with a corporation, Vous Vitamin will provide the employees with a 25% discount code which they can use when purchasing vitamins through Vous Vitamin's website. Employees will start by taking the Vous Vitamin Quiz on their website to outline any health concerns or areas they would like to target. Their results will then be used to create a personalized vitamin pill, which can then be delivered right to their doorstep via a subscription package; this not only makes it easy to engage with the program, but also keeps employees accountable.



MULTIVITAMINS & THEIR USAGE

Multivitamins are often used to address nutritional gaps in an individual's diet; these vitamins differ in content, however, have generally been proven to provide benefits to health and wellbeing, which translate over to ROI to an employer. Improvements to mental health, blood pressure, and weight loss have been observed from multivitamin usage; a study conducted by Northern Arizona University coupled multivitamin supplementation alongside nutrition education and a diet regime to measure the impact on employee health and productivity. After 12 weeks researchers observed a mean weight reduction of 21 pounds, a median systolic blood pressure decrease of 6.00 mm Hg and a median diastolic blood pressure decrease of 10.00 mm Hg. They also observed a 60% decrease in depressive symptoms and found a significant increase in workplace attendance.³

A meta-analysis of multivitamin usage also explored benefits of multivitamins on chronic diseases. A multivitamin containing ascorbic acid, vitamin E, β -carotene, selenium, and zinc was found to have a "31% reduction in overall cancer incidence" and a "37% reduction in overall

³ ResearchGate, "[Worksite Nutrition: Is a Nutrient-Dense Diet the Answer for a Healthier Workforce?](#)".

mortality” in men. A vitamin B-complex was associated with a 22% reduction in risk of myocardial infarction (MI) in men and a 33% reduction in risk of MI in women.⁴ Multivitamins have also proved to have an impact on immune health; in a double-blind placebo controlled trial which tested infection outcomes on participants “ 57% of the placebo group reported illness-related absenteeism versus 21% of the treatment group” and “ Similarly, 89% of diabetic participants in the placebo group reported one or more absentee days compared with 0% of diabetic participants in the treatment group.”⁵

Multivitamins have also proved effective at filling nutritional gaps in diets; an Australian study testing a supplement containing “approximately 50 vitamins, minerals, and herbs” was found to improve contextual recognition memory in men.⁶ Filling these nutritional gaps with a multivitamin has proved important to employee productivity. The International Labour Organization reported that “inadequate nutrition can cut productivity by up to 20 per cent.” They also found that lost productivity accounts for approximately US\$3.9 billion in the United States, “reflected in 39.2 million lost work-days, 239 million restricted-activity days, 89.5 million bed-days and 62.6 million physician visits.”⁷ This improvement in employee health and workplace productivity proves important to employers, as approximately 50% of employees state that ROI is a significant factor in the health benefits they choose.⁸

Some studies have reported negligible effects of vitamins on health and wellbeing, however, many of these studies are flawed due to their size or scope. Additionally, these studies review general multivitamins on a large population, while Vous Vitamin’s solution is centered around a personally-tailored vitamin for an individual, therefore many of the critiques of general multivitamins do not hold true for Vous Vitamin’s product. Drawing on information from the National Health Interview Survey, researchers found that regular multivitamin users reported 30% better overall health than those who didn’t take multivitamins. However, there was no actual difference in the five psychological, physical, or functional health outcomes that were assessed and therefore the benefit was merely self-reported.⁹ The results of this study can be contested, as it looked at a sample of 21,603 adults in the United States all of whom took different multivitamins, each with a different make-up of vitamins and minerals. Additionally, this study used a large sample size of unique individuals with specific health concerns; the general multivitamins may not have accurately been able to cater towards each individual’s specific needs.

⁴ BMC, “[Addressing nutritional gaps with multivitamin and mineral supplements](#)”.

⁵ ACP, “[Effect of a Multivitamin and Mineral Supplement of Infection and Quality of Life](#)”.

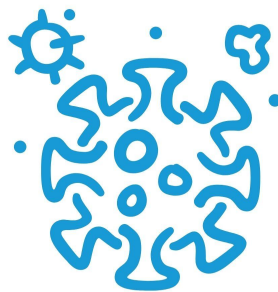
⁶ BMC, “[Addressing nutritional gaps with multivitamin and mineral supplements](#)”.

⁷ ILO, “[Poor workplace nutrition hits workers' health and productivity, says new ILO report](#)”.

⁸ NCBI, “[Work productivity loss from depression: evidence from an employer survey](#)”.

⁹ BMJ, “[Health benefits of multivitamins/mineral supplements may be all in the minds of users](#)”.

Researchers from Johns Hopkins University have stated that multivitamins don't often address the specific nutritional deficiencies an individual is facing and that because of this they are better off acquiring the vitamins they need from their diet.¹⁰ This is why Vous Vitamin's personally-tailored multivitamin is effective, as it is made specifically for the person taking it; the composition of the vitamin is targeted towards the individual's concerns. Discussing the impact of multivitamins, Dr. Howard Sesso, an associate professor of epidemiology at the Harvard School of Public Health, stated that results of multivitamins have been mixed. But that "multivitamin supplementation is low risk and low cost, and it helps to fill potential gaps in the diet that people might have."¹¹ For example, individuals following a vegetarian or vegan diet can often be deficient in iron, vitamin B12, and calcium, which they would then need to supplement with vitamins.¹² Similarly, the paleo diet puts individuals at risk for low vitamin D and calcium levels, which would also need to be addressed through supplementation.¹³ Agricultural practices have also led to less nutrient intake over the past half century; nutrient-depleted soil has resulted in a decline in the amount of "protein, calcium, phosphorus, iron, riboflavin (vitamin B2) and vitamin C" found in fruits and vegetables.¹⁴ Additionally, the rise of highly processed diets in the United States can also lead to other deficiencies; studies have found that consuming a higher intake of processed foods can lead to deficiencies in "vitamins B12, vitamin D, vitamin E, niacin, pyridoxine, copper, iron, phosphorus, magnesium, selenium and zinc."¹⁵ Therefore, an employer would be wise to invest in Vous Vitamin's targeted vitamin program for their employees as a way to address nutritional gaps in their diets and, in turn, as a way to increase ROI.



VITAMINS AND IMMUNE HEALTH

Increased immune health has many benefits for employers especially during and coming out of the pandemic. Specifically, better immune health can result in fewer absences, which would keep project timelines on track and promote better collaboration between employees. Studies have found that vitamins D, C, and E can all benefit immune health. In a study researching the effects

¹⁰ Johns Hopkins Medicine, "[Is There Really Any Benefit to Multivitamins?](#)".

¹¹ Harvard Health Publishing, "[Do multivitamins make you healthier?](#)".

¹² NHS, "[Vegetarian and vegan diets Q&A](#)".

¹³ UC Davis Health, "[Is the paleo diet safe for your health?](#)".

¹⁴ Scientific American, "[Dirt Poor: Have Fruits and Vegetables Become Less Nutritious.](#)"

¹⁵ NCBI, "[Impact of ultra-processed foods on micronutrient content in the Brazilian diet?](#)".

of fever after inoculation, researchers found that “fever after inoculation was twice as likely in February as in June.” They also found that the vaccine was 8 times more likely to result in infection (fever) in the winter rather than the summer. They concluded that vitamin D levels were higher in June than in February and named vitamin D as the “seasonal stimulus.”¹⁶ Vitamin C has also been shown to improve immunity in patients by reducing the average hospital stay of pneumonia patients by 19% as opposed to without vitamin C supplementation.¹⁷ Additionally, researchers found that Vitamin E supplementation was associated with a 63% lower rate of rehospitalization, however researchers qualified that these results largely depended on patients’ ages, smoking history, and location.¹⁸

The benefits to immune health from vitamins D, E, and C all have an impact on the number of absences employees take each year. A report from the Society for Human Resource Management found that the average productivity loss from absences in the United States was 31.1%. The report also observed that in the United States the productivity loss of the co-workers dealing with the absence was 29.5% and the productivity loss of the supervisor was 15.7%.¹⁹ These decreases in productivity have a significant impact on profitability. **Comparing these results to a study conducted by the Gallup Organization, researchers found that companies that experience an 18% decrease in productivity also observe a 23% decrease in profitability.**²⁰ Through the supplementation of vitamins D, C, and E, employers may observe a decrease in absences and therefore a more productive and engaged workforce.

¹⁶ NCBI, “[Epidemic influenza and vitamin D](#)”.

¹⁷ NCBI, “[Vitamin C and Immune Function](#)”.

¹⁸ NCBI, “[Regulatory role of vitamin E in the immune system and inflammation](#)”.

¹⁹ Society for Human Resource Management, “[Total Financial Impact of Employee Absences Across the United States, China, Australia, Europe, India and Mexico](#)”.

²⁰ Gallup, “[The Powerful Relationship Between Employee Engagement and Team Performance](#)”.


IMMUNE HEALTH + VITAMIN D

Assumptions:
Company of 250
Annual salary of \$80K


EMPLOYEE JOURNEY WITHOUT VITAMIN D SUPPLEMENTATION

 Employee is in good health



 Employee experiences the common cold approximately 3 times a year according to the CDC



 Employees miss approximately 4.4 days of work a year due to illness. For an average salary of \$80K this would be a loss of \$1,408 annually per employee



\$1,760,000
For a company of 250 employees, this is equal to a loss of \$1,760,000 over 5 years



\$1352,000
For a company of 250 employees, this is equal to a loss of \$352,000 annually

WITH VITAMIN D SUPPLEMENTATION¹



For employees deficient in vitamin D, this would cut the risk of infection in half



Savings \$176,000²
Annual savings due to vitamin D supplementation



Savings \$888,000
Savings over 5 years due to vitamin D supplementation

PROBABILITY WEIGHTED BREAKDOWN

If only a percentage of employees take part in the program due to low enrolment, compliance, or adherence there would still make a large impact

70% Engagement

1 year
\$123,200

5 years
\$621,600

50% Engagement

\$88,000

\$444,000

30% Engagement

\$52,800

\$266,400

- Alongside vitamin D, vitamin C and E have both been proven to have benefits to immune health. Vitamin D has been proven to reduce the risk of cold infection by 10% and by 50% in subjects who are already deficient.
- The calculated benefits of a decrease in days missed are significant, however, there are also decreases in productivity to co-workers and supervisors in addition to the personal loss of productivity. report from the Society for Human Resource Management found that the average productivity loss of the co-workers dealing with the absence was 29.5% and the productivity loss of the supervisor was 15.7%. Specifically for coughs and colds, the estimated productivity loss is 26.4%.
- The common cold results in employees taking days off which leads to direct losses, however, it also leads to them being less productive and engaged when they are at work during the duration of their cold. A study between the Queens Schools of Business and the Gallup Organization found that in businesses with lower engagement scores they observed an "18% lower productivity, 16% lower profitability, 37% lower job growth, and 65% lower share price over time."
Sources: Harvard Business Review, "Proof That Positive Work Cultures Are More Productive". Society for Human Resource Management, "Total Financial Impact of Employee Absences Across the United States, China, Australia, Europe, India and Mexico". CDC, "Common Colds: Protect Yourself and Others". NCBI, "Impact of cough and common cold on productivity, absenteeism, and daily life in the United States: ACHOO Survey". NPR, "A Bit More Vitamin D Might Help Prevent Colds And Flu". Personnel Today, "Sickness absence increases to 4.4 days per worker".

VITAMINS AND RESPIRATORY ILLNESS

Vitamins have the potential to decrease the likelihood of respiratory illness, particularly Covid-19. These benefits can lead to less absenteeism from employees and greater workplace productivity. A study found that "Taking probiotics, omega-3 fatty acids, multivitamins or vitamin D was associated with a lower risk of SARS-CoV-2 infection: by 14%, 12%, 13% and 9%, respectively, after accounting for potentially influential factors, including underlying conditions and usual diet."²¹ Additionally, a study published by UChicago also found that patients who were deficient in vitamin D were 1.77 more likely to test positive for Covid-19.²² Vitamin D has also been shown to help improve other respiratory illnesses. Studies have found that a higher serum level of vitamin D has been associated with a lower risk of tuberculosis; studies have also found that vitamin D supplementation may prove beneficial to patients suffering from cystic fibrosis. Furthermore, studies have also noted that vitamin D may be able to reduce pathogen load and decrease exacerbation in chronic obstructive pulmonary disease.²³ Improvements in asthma have also been associated with vitamin A, C, and E intake.²⁴

²¹ BMJ, "Multivitamins, omega-3, probiotics, vitamin D may lessen risk of positive COVID-19 test".

²² JAMA, "Association of Vitamin D Status and Other Clinical Characteristics With COVID-19 Test Results".

²³ NCBI, "Vitamin D and respiratory health".

²⁴ SpringerLink, "Pollution and respiratory disease: can diet or supplements help? A review".

Decreasing the risk of respiratory illness is extremely beneficial to employers in the current climate. Minimizing the likelihood of contracting Covid-19 will reduce absenteeism resulting in higher productivity and fewer economic losses during and coming out of the pandemic. A study from the National Bureau of Economic Research found that Covid-19 has reduced within-firm labor productivity by 2-4% with a decrease as large as 14% in some fields.²⁵ **Decreases in absenteeism and productivity have led to losses of approximately \$2,660 per employee annually, and therefore Vous Vitamin's program may result in considerable benefits for employers.**²⁶

VITAMINS AND CHRONIC DISEASE PREVENTION

Chronic disease prevention can help minimize the risk of future absenteeism or job vacancies. Folate, vitamin C and E have been proven to play a role in reducing the risk of contracting a chronic disease. Higher intakes of folate and vitamin B6 have been associated with a lower risk of coronary heart disease. For men, folate ingestion from a multivitamin was proven to lead to a 25% reduction in colon cancer risk. For women, good levels of folate were associated with a 75% reduction in colorectal cancer risk and a 25% reduction in breast cancer risk; consuming high levels of vitamin C was also found to reduce the risk of contracting breast cancer in women by 20%. Studies also observed a 44% risk reduction of contracting major coronary disease in women who took more than 67mg/d of vitamin E. Vitamins E and A have also proven effective in treating osteoarthritis; studies reported an improvement in symptoms of 22%, however more research is needed in this area.²⁷

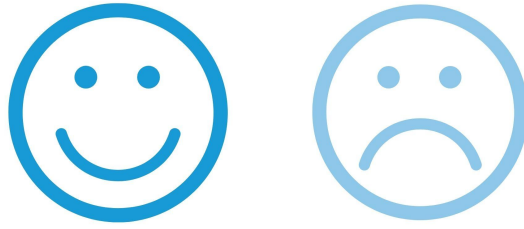
These reductions in the risk of contracting a chronic disease and absenteeism have been measured; **a study reported that during a 4-week period absenteeism varied between 0.9-5.9 hours per employee and work impairment varied from 17.8-36.4%.**²⁸ This loss in work time leads to a significant decrease in productivity. As reported by the Society for Human Resource Management, absenteeism can lead to a 31.1% loss in productivity from the individual, and a 29.5% and 15.7% productivity loss in co-workers and supervisors respectively. Through the supplementation of folate, vitamin C, and E, employers may experience fewer absences among their workforce which can in turn improve the productivity of the entire team.

²⁵ NBER, "[The impact of Covid-19 on productivity](#)".

²⁶ Investopedia, "[The Causes and Costs of Absenteeism](#)".

²⁷ JAMA Network, "[Vitamins for Chronic Disease Prevention in Adults](#)".

²⁸ ResearchGate, "[The Assessment of Chronic Health Conditions on Work Performance, Absence, and Total Economic Impact for Employers](#)".



VITAMINS AND DEPRESSION

Decreasing the prevalence of depression has the ability to increase employee wellbeing, general workplace morale, result in lower levels of error and higher productivity, and cause fewer illnesses and absences among staff. Vitamins D and B2 have both been proven to help individuals dealing with depression. A study conducted by the University College London found that participants who had at least 75 ng/mL compared to 25 ng/mL of vitamin D faced a 43% lower risk of depression as well as a 67% lower risk of panic.²⁹ Additionally, the US National Health and Nutrition Examination Survey found that individuals who were deficient in vitamin D were 85% more likely to have depression compared to those with normal vitamin D levels.³⁰ Researchers have also found that vitamin B2 has a correlation with risk of depression.³¹

Studies have found that employees who suffer from depression report higher lost productive time (LPT) compared to employees without depression. The study hypothesized that on average in the United States, this LPT is equivalent to approximately \$44 billion annually, which is an excess of \$31 billion compared to employees who do not suffer from depression.³² **Zooming in, a study that explored different methods to compensate for employee LPT due to depression found that the average company in the United States realized a \$617 loss per employee in traditional compensation, \$649 per employee in traditional compensation adjusted for production disruption, and \$316 per employee in traditional compensation adjusted for friction costs.**³³

The effects of depression can also have effects on employee engagement. A study from the Gallup Organization has found that engaged workers provide companies with a 23% increase in productivity and a 66% increase in overall employee wellbeing. The study also found that more engaged employees also provided the company with a 10% increase in customer loyalty.³⁴ Your company's employee program may help employees with their depression not only on a corporate

²⁹ MentalHelp.net, "[Vitamin D and Depression](#)".

³⁰ MentalHelp.net, "[Vitamin D and Depression](#)".

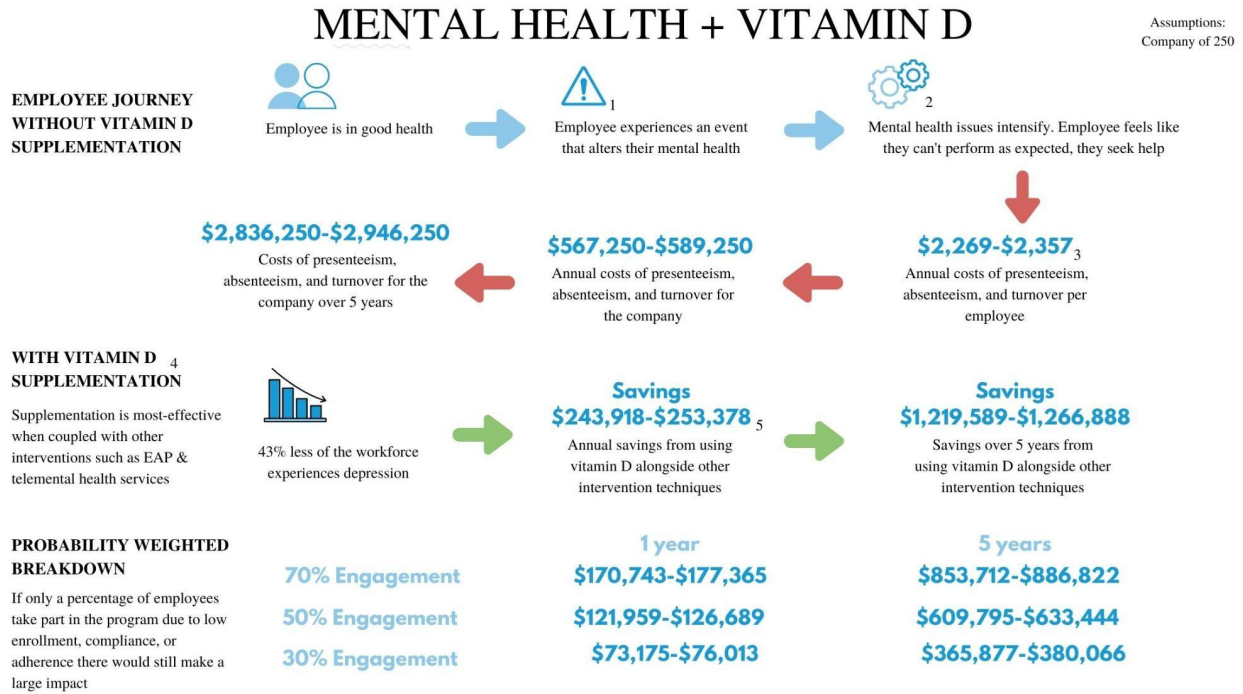
³¹ NCBI, "[Associations of dietary B vitamins intakes with depression in adults](#)".

³² JAMA Network, "[Cost of Lost Productive Work Time Among US Workers With Depression](#)".

³³ NCBI, "[Work productivity loss from depression: evidence from an employer survey](#)".

³⁴ Gallup, "[The Powerful Relationship Between Employee Engagement and Team Performance](#)".

level and provide benefits to the company, but also help them on an individual level in their personal lives.



1. Younger people are disproportionately affected by poor mental health. 30-39 year-old experience the highest prevalence of mental health issues.
 2. According to Business in the Community the top reasons for mental-health problems in the workplace are increased workloads, pressure, and lack of support
 3. The lower value is the average cost per employee in the private sector and the higher value is the average cost per employee in the public sector
 4. The US National Health and Nutrition Examination Survey found that Vitamin D helps with mental health issues. Alongside vitamin B2 has also been shown to improve mental health.
 5. These values take into account the costs of lower productivity, absences, and the costs of finding replacements. However, there are other immeasurable benefits to a decrease in mental health issues such as improved employee engagement. A study from the Gallup Organization has found that engaged workers provide companies with a 23% increase in productivity and a 66% increase in overall employee wellbeing. The study also found that more engaged employees also provided the company with a 10% increase in customer loyalty.
 Sources: Deloitte, "Mental health and employers Refreshing the case for investment". MentalHelp.net, "Vitamin D and Depression". Gallup, "The Powerful Relationship Between Employee Engagement and Team Performance".

VITAMINS AND STRESS

Workplace stress can lead to issues with productivity, competitiveness, public brand image, increased absenteeism, presenteeism, reduced motivation, job satisfaction, and an increased rate of staff turnover.³⁵ Vitamin B-complexes have proved effective in reducing stress levels; a study that focused on a vitamin B-complex on work stress found that with a 90 day administration of the treatment, there was a 19% improvement in personal strain – a measurement of “occupation stress, psychological strain and coping resources through the assessment of relevant environmental and physical characteristics.”³⁶ A meta-analysis also reported that of 10 studies measuring the benefits of a vitamin b-complex on stress, 6 reported a benefit of supplementation.³⁷

³⁵ ILO, “Workplace Stress: a collective challenge”.

³⁶ Wiley Online Library, “The effect of 90 day administration of a high dose vitamin B-complex on work stress”.

³⁷ NCBI, “A Systematic Review and Meta-Analysis of B Vitamin Supplementation on Depressive Symptoms, Anxiety, and Stress: Effects on Healthy and ‘At-Risk’ Individuals”.

Workplace stress can affect individuals productivity, but can also lead to further injuries and illnesses, exacerbating the negative effect on ROI. A report from the International Labour Organization measured the monetary impact of stress on employers. **In the United Kingdom “losses due to work-related stress, depression or anxiety amounted to the equivalent of 9.9 million days, representing forty-three per cent of all working days lost due to ill-health during the period 2014/2015.”** and in France “the total cost of job strain in 2007 was estimated as between €1.9 and €3 billion.”³⁸ Through Vous Vitamin’s Quiz, employees can indicate their concerns with workplace stress, and receive a tailored multivitamin to meet their needs and benefits their employers.

VITAMINS AND MIGRAINES

Vitamins D, B6, B2 (riboflavin), magnesium, and coenzyme Q10 all have the potential to decrease the effects of migraines. A study published in the NCBI found that with each 5ng/mL increase in vitamin D serum, there was a 22% decrease in the likelihood of developing a migraine.³⁹ Another study reported that patients who took a vitamin D supplement experienced a 50% reduction in the number of days their migraines lasted.⁴⁰ Similarly, studies have found that vitamin B6 supplementation results in a 19% reduction in headache severity and 18.5% decrease in migraine frequency and a 10% decrease in migraine duration.⁴¹ Additionally, researchers measuring the effects of vitamin B2 on migraines found that of the 60% of “responders” who reacted to the dosage saw a 50% decrease in their migraine frequency.⁴² Studies also found that magnesium supplementation patients experienced a 50% reduction in pain, and that magnesium levels were generally lower in patients who suffered from more migraine attacks.⁴³ It has also been proven that 61.3% of patients who took a Coenzyme Q10 supplement reported a greater than 50% reduction in the duration of their migraines.⁴⁴

The reduction in the frequency, duration, and severity of migraines is beneficial to employees who currently suffer from them, but is also beneficial to employers and their companies. In blue collar fields, employers can directly see an increase in revenue through better productivity, fewer absences, and a reduced rate of error. In white collar fields, employers can see the same measurable increases in revenues, however, they also benefit from immeasurable benefits in the form of healthier employees who form better relationships in the workplace, more actively network, and build a more professional reputation for the company. The decrease in migraines would most likely reduce absences and result in employees who feel energized and engaged more of the time. A study conducted by the Boston Consulting Group found that highly engaged

³⁸ ILO, “[Workplace Stress: a collective challenge](#)”.

³⁹ NCBI, “[The Role of Vitamin D in Primary Headache—from Potential Mechanism to Treatment](#)”.

⁴⁰ NCBI, “[The Role of Vitamin D in Primary Headache—from Potential Mechanism to Treatment](#)”.

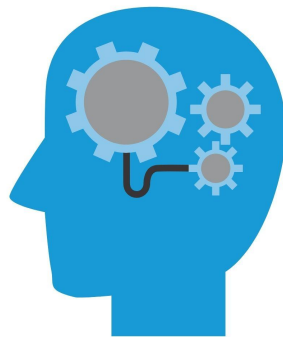
⁴¹ ScienceDirect, “[The effects of folic acid and pyridoxine supplementation on characteristics of migraine attacks in migraine patients with aura: A double-blind, randomized placebo-controlled, clinical trial](#)”.

⁴² NIH, “[Effectiveness of high-dose riboflavin in migraine prophylaxis. A randomized controlled trial](#)”.

⁴³ NCBI, “[Blood Magnesium levels in migraineurs within and between the headache attacks: a case control study](#)”.

⁴⁴ Wiley Online Library, Cephalgia, “[Open label trial of coenzyme Q10 as a migraine preventive](#)”.

workforces have reported “25% higher profit growth and an earnings-per-share growth of almost four times. These engaged organizations have also shown a 22% higher-than-average total shareholder return and 18% higher productivity.”⁴⁵ This increase in employee engagement would also have an impact on customer retention and profitability. A study from Bain & Co reported that just a 5% increase in customer retention can lead to a 75% increase in profitability.⁴⁶ The usage of certain vitamins has a large impact on the percentage of employees who suffer from migraines and using Vous Vitamin’s program would be a cost-effective and targeted option to help these employees personally and also boost employee engagement.



VITAMINS AND MEMORY

Improved memory can be extremely beneficial to employers in increasing productivity, revenue, and profit. Vitamins E and B12 have been researched and have proven successful in improving memory. Researchers found that vitamin E deficiency was consistently associated with a worse cognitive performance.⁴⁷ A study also reported that with the long term use of vitamin C and E together, individuals were found to be cognitively 1.5 years younger.⁴⁸ Researchers also found that usage of vitamin B12 has consistently been associated with decreased rates of cognitive decline.⁴⁹ Although these effects are more pronounced with older age, the trends still hold true for younger populations.

An increase in cognitive function can help improve the higher level benefits of vitamin usage which are more difficult to measure such as building a better reputation for the brand and building more effective and useful client relationships. According to the Harvard Business Review “70% to 80% of market value comes from hard-to-assess intangible assets such as brand equity, intellectual capital, and goodwill.”⁵⁰ With improved cognitive functioning across the

⁴⁵ The Boston Consulting Group, “[People Productivity](#)”.

⁴⁶ The Balance Small Business, “[How to Boost Your Profits With Relationship Marketing](#)”.

⁴⁷ NCBI, “[Effects of Vitamin E on Cognitive Performance during Ageing and in Alzheimer’s Disease](#)”.

⁴⁸ NCBI, “[Effects of Vitamin E on Cognitive Performance during Ageing and in Alzheimer’s Disease](#)”.

⁴⁹ Cambridge University Press, “[Vitamin B₁₂ status, cognitive decline and dementia: a systematic review of prospective cohort studies](#)”.

⁵⁰ Harvard Business Review, “[Reputation and Its Risks](#)”.

workforce, companies can not only maintain their market value, but even grow by focusing on these intangible assets.



VITAMINS AND FATIGUE

Decreased fatigue or increased energy is extremely important in ensuring both blue collar and white collar workforces are performing to the best of their ability. Vitamin B12 and iron have both been reported to help decrease levels of fatigue, and magnesium and vitamin D has been reported to help improve sleep. Researchers have discovered that vitamin B12 deficiencies have been linked to “diminished energy and exercise tolerance, together with fatigue and shortness of breath.”⁵¹ Furthermore severe deficiencies of vitamin B12 alongside folate can result in anemia which reduces “endurance and work performance.”⁵² Iron deficiencies have also been associated with lower mental health and vitality and higher fatigue scores in women.⁵³ In one study which focused on fatigue in women, mean total fatigue scores improved by approximately 29% from the control group to the supplement group.⁵⁴ Additionally, magnesium was shown to increase sleep time, sleep efficiency, and a decrease in sleep onset latency; all of which improve sleep and decrease fatigue.⁵⁵ Lower Vitamin D serum levels have been associated with shorter sleep duration and a lower proportion of REM sleep.⁵⁶

Aside from leading to a decrease in productivity and profits, sleep deprivation is related to many chronic illnesses such as “coronary heart disease, diabetes, hypertension, overweight and obesity, and chronic stress and psychological problems.”⁵⁷ Increased fatigue and decreased sleep has led

⁵¹ NCBI, “[Vitamins and Minerals for Energy, Fatigue and Cognition: A Narrative Review of the Biochemical and Clinical Evidence](#)”.

⁵² NCBI, “[Vitamin and mineral status: effects on physical performance](#)”.

⁵³ The BMJ, “[Iron supplementation for unexplained fatigue in non-anaemic women: double blind randomised placebo controlled trial](#)”.

⁵⁴ The BMJ, “[Iron supplementation for unexplained fatigue in non-anaemic women: double blind randomised placebo controlled trial](#)”.

⁵⁵ NIH, “[The effect of magnesium supplementation on primary insomnia in the elderly: A double-blind placebo-controlled clinical study](#)”.

⁵⁶ Journal of Endocrinology, “[The interfaces between vitamin D, sleep and pain](#)”.

⁵⁷ NCBI, “[Trouble Sleeping Associated with Lower Work Performance and Greater Healthcare Costs: Longitudinal Data from Kansas State Employee Wellness Program](#)”.

to “decreased task motivation, longer reaction time, reduction of alertness, impaired concentration, poorer psychometric coordination, problems in memory and information processing, and poor judgment.” Studies have measured productivity in terms of absenteeism and presenteeism, and found that in total lost work performance due to sleep deprivation is 20.3% of which 7.1% is due to absenteeism and 13.2% is due to presenteeism. **The same study also found that there was an annual individual-level loss of \$2,280 when controlling for comorbidities.**⁵⁸ **Fatigue can also lead to an increase in workplace injuries; a report written by the International Labour Organization estimated the costs of occupational injuries and diseases in 2007. In total they approximated that \$249.6 billion were lost. This measurement consisted of \$67 billion, \$139 billion, and \$43.5 billion of medical costs, lost employee wages and benefits, and lost home production respectively.**⁵⁹

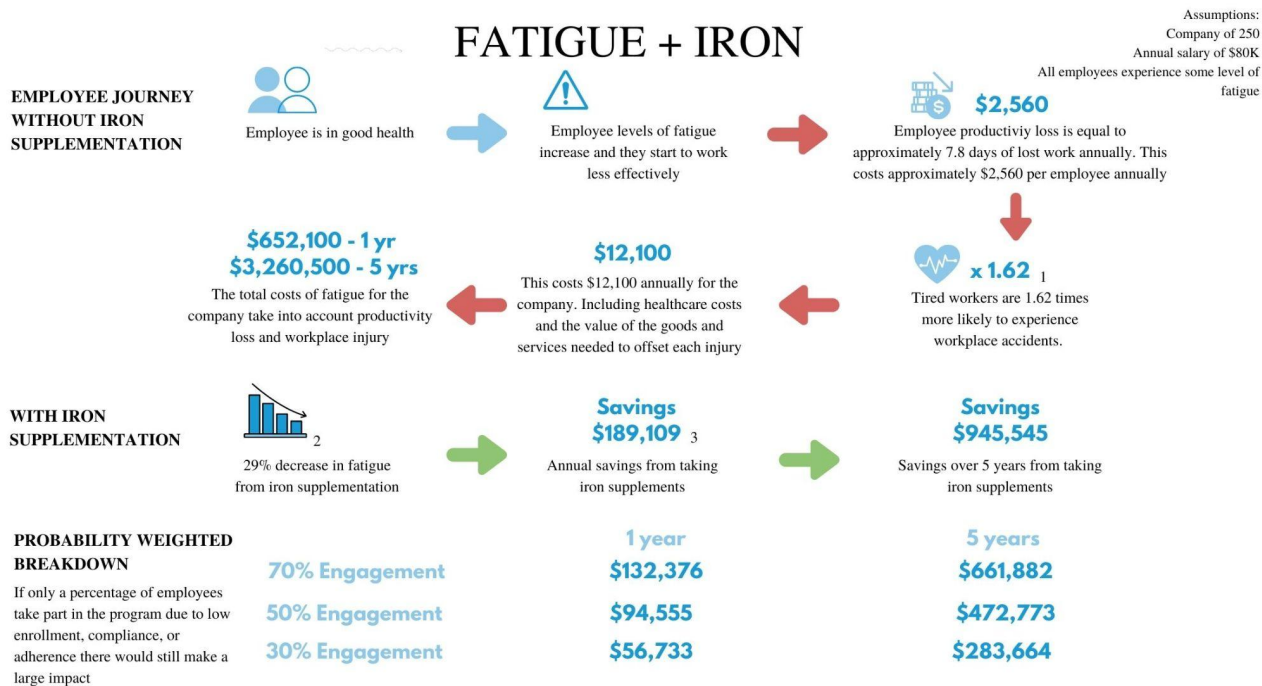
Improved energy levels can also help with employee engagement. A study between the Queens Schools of Business and the Gallup Organization found that in businesses with lower engagement scores they observed an “18% lower productivity, 16% lower profitability, 37% lower job growth, and 65% lower share price over time.” They also said that “businesses with highly engaged employees enjoyed 100% more job applications.”⁶⁰ Decreased fatigue among employees may also lead to a better work environment; more energized employees may feel more connected to their co-workers and may collaborate more easily. Researchers have reported that failing to provide a positive work culture can result in a “33% decrease in operating income and an 11% decrease in earnings growth.”⁶¹ Energy levels clearly have a large impact on workplace culture and productivity, and employers would be remiss not to recognize fatigue as an area they can capitalize on to improve their profitability.

⁵⁸ NCBI, “[Insomnia and the Performance of US Workers: Results from the America Insomnia Survey](#)”.

⁵⁹ ILO, “[Estimating the Economic Costs of Occupational Injuries and Illnesses in Developing Countries: Essential Information for Decision-Makers](#)”.

⁶⁰ Harvard Business Review, “[Proof That Positive Work Cultures Are More Productive](#)”.

⁶¹ BCD Network, “[The ROI of company culture: Why companies should look at culture’s impact on profit](#)”



1. Depending on the field of work, this increase in likelihood of workplace injury can be larger

2. Vitamin B12 and iron have both been reported to help decrease levels of fatigue, and magnesium and vitamin D has been reported to help improve sleep. The 29% decrease in fatigue has been observed in a study reporting on the effects of iron supplementation on females. This benefit also carries over to males; a study researching the benefits of vitamin D supplementation on fatigue for both males and females reported a decrease of approximately 10% on the Fatigue Assessment Scale after vitamin D supplementation.

3. A decrease in fatigue also causes other immeasurable benefits such as increases in employee engagement. A study between the Queens Schools of Business and the Gallup Organization found that in businesses with lower engagement scores they observed an "18% lower productivity, 16% lower profitability, 37% lower job growth, and 65% lower share price over time." Decreased fatigue also improves workplace culture, researchers have reported that failing to provide a positive work culture can result in a "33% decrease in operating income and an 11% decrease in earnings growth."

Sources: NSC, "Work-related Fatigue", NSC, "Work Injury Costs", U.S. Bureau of Labor Statistics, "Employer-Reported Workplace Injury and Illnesses, 2010", BMI, "Iron supplementation for unexplained fatigue in non-anaemic women: double blind randomised placebo controlled trial", BCD Network, "The ROI of company culture: Why companies should look at culture's impact on profit", Harvard Business Review, "Proof That Positive Work Cultures Are More Productive", NCBI, "Vitamin and mineral status: effects on physical performance", NCBI, "Vitamins and Minerals for Energy, Fatigue and Cognition: A Narrative Review of the Biochemical and Clinical Evidence", Medicine, "Effect of vitamin D3 on self-perceived fatigue".

VITAMINS AND WOMEN'S HEALTH (PMS, MENOPAUSE, PREGNANCY)

PMS affects approximately 3 out of 4 menstruating females and can cause emotional and behavioral changes as well as physical changes such as headaches, fatigue, and muscle pain. Once a month a combination of PMS symptoms can prove a challenge to many women and may cause an increase in absences and a decrease in productivity. A study which researched the effect of riboflavin or vitamin B2 from food sources on PMS found that "women in the highest quintile of riboflavin intake 2-4 y before the diagnosis year had a 35% lower risk of developing PMS than did those in the lowest quintile."⁶² Studies also found that magnesium supplementation was effective in reducing PMS symptoms. Researchers found that taking a magnesium supplement reduced PMS symptoms by 35.1% (assessed by the investigator) and 33.5% (assessed by the patient).⁶³ Another study found that taking magnesium in combination with vitamin B6 was effective in reducing PMS symptoms.⁶⁴

⁶² NCBI, "Dietary B vitamin intake and incident premenstrual syndrome".

⁶³ ResearchGate, "Pilot Study of the Efficacy and Safety of a Modified-Release Magnesium 250mg Tablet for the Treatment of Premenstrual Syndrome".

⁶⁴ NCBI, "Evaluating the effect of magnesium and magnesium plus vitamin B6 supplement on the severity of premenstrual syndrome".

During menopausal transition, females experience changes in their bodies and often need vitamin supplements to support themselves during this change. Researchers suggest that females take vitamin A and B2 supplements to reduce the risk of bone fracture, vitamin B12 to reduce the risk of cognitive decline, and vitamin D to reduce the risk of hyperthyroidism.⁶⁵ In addition, vitamin D supplementation during menopause has also been shown to improve the health-related quality of life by causing fewer issues with “mobility, usual activities, depression and anxiety.”⁶⁶ These benefits would all have impacts on employer ROI by ensuring that employees maintain good health and are able to keep performing regularly.

Vitamin supplementation during pregnancy is also extremely important. Ensuring that employees take the appropriate supplements during pregnancy can ensure that themselves and their child are healthy, and that they can also maintain their work performance during pregnancy. Iron deficiencies in females have been proven to have an effect on neonatal iron stores, birth weight, and may cause cognitive problems in childhood. Additionally, calcium supplementation can also reduce the risk of low birth weight and pre-eclampsia and vitamin D supplementation is also beneficial to females who are already deficient. Folate supplementation is also extremely vital for pregnant females; a deficiency can lead to “congenital malformations, anemia, pre-eclampsia, intrauterine growth restriction, and abruption placentae.”⁶⁷

Reducing the effects of PMS symptoms can result in fewer absences and more alert and engaged employees. Similarly to the reduction in absences from improved immunity, these absences can lead to an average productivity loss of around 31.1% and an additional 29.5% decrease in productivity of coworkers according to a report from the Society for Human Resource Management.⁶⁸ Ensuring good health during menopause and pregnancy can also be beneficial to employers. Employees who are feeling more alert and engaged provide better return on investment to the company. A study from the Boston Consulting Group found that between the top quartile and bottom quartile of companies regarding employee engagement, the top quartile experienced 10% higher customer ratings, 21% higher in sales profitability, and 20% higher in sales production.⁶⁹ Additionally, supporting women with their health during these periods may mean that women feel more valued in the workplace and build a closer-knit workforce as well as reinforcing employee loyalty to the company.

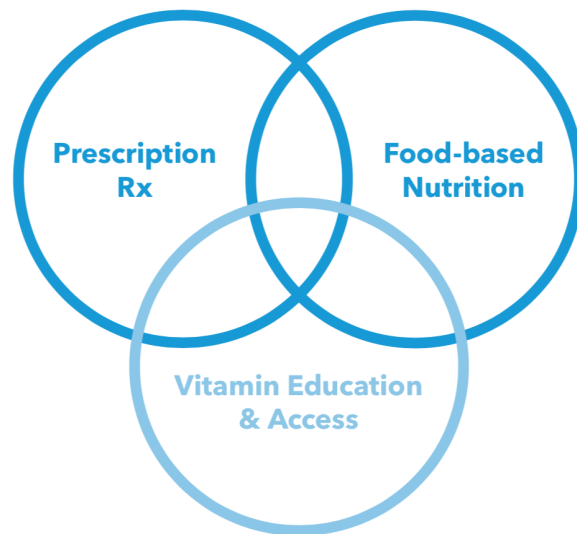
⁶⁵ Climacteric, “[Menopause and age-driven changes in blood level of fat- and water-soluble vitamins](#)”.

⁶⁶ NCBI, “[Selected vitamins and quality of life in menopausal women](#)”.

⁶⁷ European Journal of Obstetrics & Gynecology and Reproductive Biology, “[Influence of mineral and vitamin supplements on pregnancy outcome](#)”.

⁶⁸ Society for Human Resource Management, “[Total Financial Impact of Employee Absences Across the United States, China, Australia, Europe, India and Mexico](#)”.

⁶⁹ Gallup, “[Gallup 2016 Q12® Meta-Analysis Report](#)”.



CONCLUSION

The usage of vitamins to supplement an individual's diet has been researched and proven to result in specific health benefits. Through Vous Vitamin's personalized and targeted program, employees have the opportunity to access a vitamin tailored to their needs rather than navigating through the confusing vitamin aisles. This personalized vitamin not only targets their specific health concerns, but also delivers them economic savings.

Through their personalized supplement, employees will be able to see improvements to their immune system, respiratory health, mental health, migraines, cognitive function, and fatigue, as well as help prevent chronic diseases and support them through PMS, menopause, and pregnancy. All of these benefits have the potential to improve engagement and decrease absenteeism and presenteeism, which in turn increase productivity and profits for the company; these benefits also reach further than profits by also garnering intangible benefits such as increased networking with clients, building a company reputation, and fostering a healthier workplace environment. Vous Vitamin's program will not only provide employers with these benefits, but also educate employees about the usage of vitamins in their daily lives; Vous Vitamin's content library is the largest content library relating to vitamin usage authored by physicians and employers can reference, distribute, and refer their employees to this library. Many employers overlook the importance of vitamin usage to their workforce and instead focus on healthy lifestyles and healthy eating; while these areas are important, proper vitamin usage is also crucial for employee health. Vous Vitamin's specialized employee program can help fill this gap in health and knowledge and deliver measurable results.