



# PIVOT POINT

*Transforming our health-care  
system through personalized  
lifestyle medicine*

**pivvio**

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**With chronic disease resulting in more than 20 million global deaths per annum—four times greater than COVID-related deaths each and every year—it’s clear we have another pandemic to fight.**

**Global health-care costs are spiraling out of control. The traditional model of health care is broken.**

**But there is hope.**

## **WE CAN ADDRESS THE ROOT CAUSE OF CHRONIC DISEASE**

A growing body of evidence unequivocally demonstrates that Lifestyle Medicine, implementing lifestyle choices to improve health, can significantly reduce disease risk and leads to better health outcomes. The evidence shows that Lifestyle Medicine can enable those who have chronic diseases to pivot away from disease towards health.

Unfortunately, many traditional health systems haven’t woken to the reality that Lifestyle Medicine programs have demonstrated the ability to transform lives.

Rather than remaining stuck in a ‘sick care’ model that only manages symptoms via a lifetime of high-cost pharmaceuticals, we need a true health-care model that addresses the root causes of disease to prevent, slow or, in some cases, reverse lifestyle-related chronic diseases.



# **PIVOT TO PIVIO**

It’s time to pivot from a health-care model based on disease treatment to a transformative one that results in chronic disease prevention and reversal. Pivio does just this in the context of a personalized approach. Participants are cared for within a supportive, holistic ecosystem and are encouraged to adopt new, sustainable habits that are life-enhancing and even life-saving.

When you hear the stories of lives transformed through Pivio, you will understand why we are so passionate about what we do. This approach not only transforms health, it restores hope.

**This is our ‘why’.**

**Kevin Jackson**  
Group CEO  
Sanitarium Health & Wellbeing Group

**Only six generations ago, physicians were bleeding ‘toxins’ out of patients with throat infections. We can be grateful for the progress in medicine since then.**

But have you wondered whether future generations will look back in horror at some of the practices we deploy today?

Will they look back in disbelief that we saturated populations with overuse of antibiotics, or prescribed medicines in a model that incentivized repeat customers? Will they look back at the unsustainability of a highly processed, meat-heavy diet, aghast that we failed to pivot to healthier, more sustainable solutions?

Not only do we anticipate a better future, we propose a revolutionary step forward. A step forward to a future where each person can reclaim their health and be offered proactive support that empowers their unique journey. A full-life transformation where those currently afflicted with chronic disease can transform their trajectory to one that offers hope, a future and a life lived well.

**Transformative**

Radical transformation away from chronic disease, towards health and full and abundant living. Therefore, radical transformation in health-care costs. Saving lives, enhancing lives and addressing spiraling health-care costs.

**Proven**

The evidence of efficacy is clear and continues to build. No longer is Lifestyle Medicine the domain of the informed few; ‘mainstream’ is recognizing the outcomes from mountains of rigorous assessments that conclude Lifestyle Medicine works!

**Personalized**

Beyond treating all people as the stereotypical average, rather individuals are understood for where they are on their health journey and offered tailored support, counsel, education, tools and encouragement.

**Supported**

Imagine a Lifestyle Medicine ecosystem that offers end-to-end support and breaks down the barriers that impede people’s ability to live well, truly well.

Welcome to Pivio.

**Cathy McDonald**  
**Executive General Manager –**  
**Health & Wellbeing Services**  
**Sanitarium Health &**  
**Wellbeing Group**

**Daniel Derrick**  
**General Manager –**  
**Personalized Wellbeing**  
**Sanitarium Health &**  
**Wellbeing Group**

**LIFESTYLE-DRIVEN CHRONIC DISEASES  
ARE NOT AN INEVITABLE BURDEN**

# EVERYONE CAN SEEK A BETTER OUTCOME



# STATE OF OUR NATION

In the United States, chronic diseases such as heart disease, stroke, cancer and diabetes are the leading cause of death and disability.

The pharmaceutical and medical costs to support those with chronic diseases are crippling health systems, health plans and self-insured corporations.

Most of all, those afflicted suffer when instead they could thrive.

## **\$3.8 TRILLION**

annual health-care costs  
in the US

## **60% ADULTS**

in the US live with a chronic  
disease and 4 in 10 live with  
two or more

## **24.2 MILLION**

are living with diabetes, costing  
an estimated \$327 billion each  
year in lost productivity

## **PRESCRIPTION DRUGS**

### **46% OF PEOPLE**

over the age of 20 use one  
or more prescription drugs  
at least once a month

### **ANTIDEPRESSANTS**

are one of the most commonly  
used types of drugs for  
ages 20–59

### **LIPID-LOWERING DRUGS**

are one of the most commonly  
used types of drugs for ages  
60 and over

## **OBESITY**

### **>42% OF US ADULTS**

are considered obese, which  
is a key driver of disease

### **NEARLY 1 IN 10**

(9.2%) are considered  
severely obese

### **+\$1,500 HIGHER**

annual medical costs than  
those with a healthy weight



# TIME TO PIVOT

Lifestyle choices are crucial to address the health-care crisis in the United States. Change is overdue for ever-increasing levels of disease, health-care costs and reduction in quality of life.

It is time to create a world that equips people with the knowledge, skills and tools to sustain healthy eating and appropriate exercise regimens; to understand the value of meaningful connection, as well as the negative impacts of stress, harmful substances and sleep deprivation. It is time to address the root causes of many chronic diseases that stem from these drivers. Lifestyle Medicine offers a practical solution for tangible improvement and sustained health.

# THE PIVIO SOLUTION

**Pivio from the Lifestyle Medicine Institute, is built on the scientifically proven principles of lifestyle medicine and the Complete Health Improvement Program (CHIP). CHIP has transformed tens of thousands of lives over 36 years, with demonstrated efficacy as published in more than 40 papers in peer-reviewed journals. Pivio applies each principle, leveraging updated scientific discoveries and using the best of behavior-change science.**

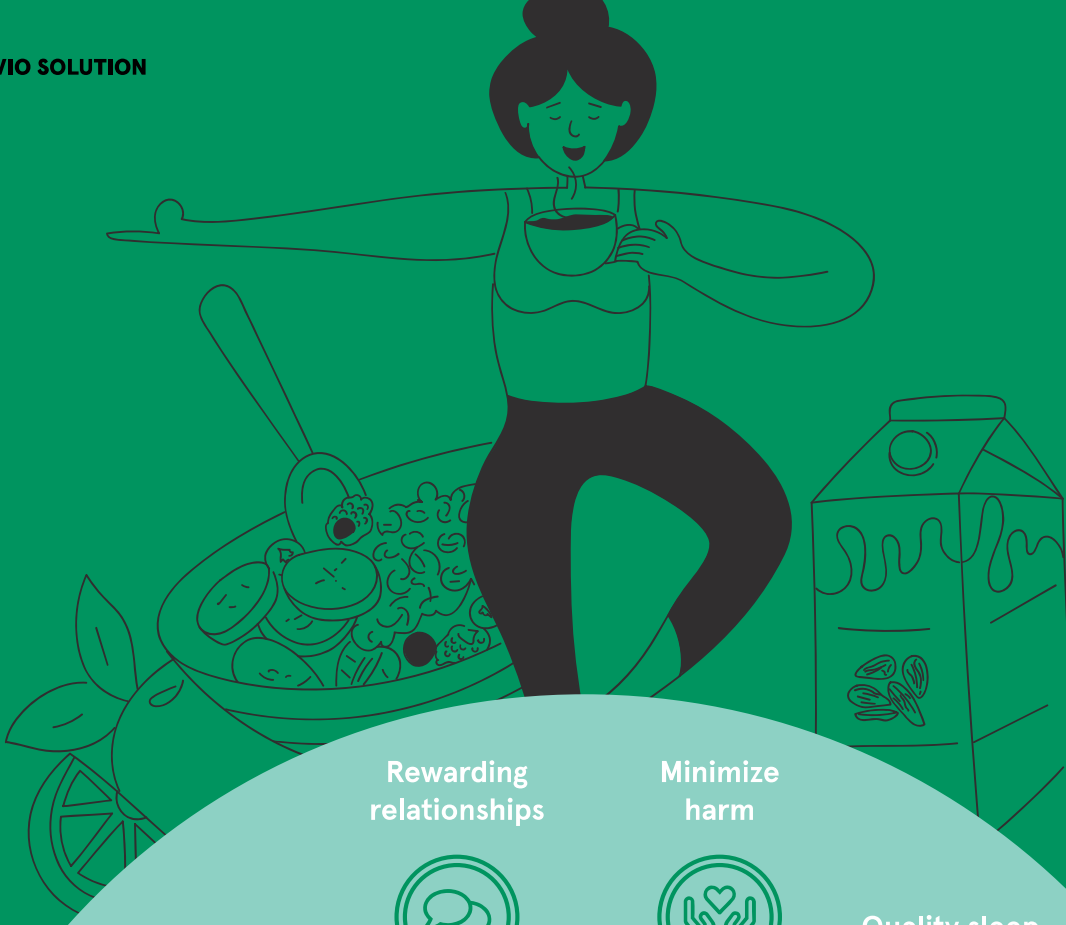
The Pivio solution is centered on educating people about the lifestyle drivers of chronic disease and the options within their control to influence risk factors. Education is coupled with tools to help participants identify barriers and influence sustainable behavior change.

Pivio is delivered in a group dynamic to enable collaborative support from participants. Importantly, participants remain in their home and work environment for the program, allowing them to develop skills and behavior-change techniques within their normal daily routines.

Each group is led by a trained facilitator and is supported by pre-recorded videos, facts sheets, journals, cookbook and online menu planners. The program format incorporates improved accessibility to information and support, remote functionality, integrated health assessments and goal-setting tools to enhance user experience.







Rewarding relationships

Minimize harm

Quality sleep and rest

Move more

Optimal eating

Manage stress

# WHOLE PERSON HEALTH

*Establish health-promoting lifestyle choices*

**Pivio runs for 12 weeks and is based on six key pillars, with a primary focus on diet and activity.**

**1. Optimal eating**

The Pivio solution advocates whole-food plant-focused eating without calorie restriction. Participants are encouraged to eat minimally processed foods, such as fresh fruits and vegetables, legumes and whole grains, drink water and avoid foods containing saturated fat, cholesterol, refined sugars and salt. The further along the optimal eating continuum a participant focuses, the fewer processed and animal foods are consumed and the stronger the health outcomes. The Pivio solution will educate on how to eat for optimal health by cooking or selecting whole-food, plant-based options when at home, at work or eating out.

**2. Move more**

Coupled with dietary changes, participants are encouraged to increase activity levels to 30 minutes of moderate activity each day. We acknowledge that joining a gym or running a marathon is not going to work for everyone. Pivio encourages enjoyable activity and movement to be naturally incorporated into one's typical day. Evidence is clear that activities enjoyed with friends or family and in nature have cumulative and profound effects on one's health.

**3. Rewarding relationships**

The program provides tools and information on the importance of supportive relationships, offered within Pivio's unique group support and accountability framework. It extends into building and fostering the types of relationships that help participants embed health-promoting behaviors and habits.

**4. Minimize harm**

The program advocates minimizing use of substances such as alcohol, tobacco and other harmful and often addictive substances. Pivio provides modules of "Learning how to change ourselves" that equip participants with behavioral skills to deal with real-life challenges and temptations that otherwise impede one's trajectory towards living well.

**5. Quality sleep and rest**

Pivio provides tools and techniques to optimize the quality of both sleep and rest, through core program content, discussions and activities in the group sessions.

**6. Manage stress**

Recognizing that in today's bustling and busy lives full of many competing demands, pressure builds with flow-on effects to choices we make. Pivio proposes an awareness of the causes of stress and how participants can better manage the reality of life to minimize the damaging effects stress can cause.

The Pivio pillars are coupled with behavior-change techniques to help participants overcome individual barriers and to embed them as ongoing lifestyle choices.



# LIFESTYLE

A photograph of a woman and a man in a gym setting. The woman is in the foreground, wearing a grey t-shirt and blue patterned leggings, smiling as she stretches her arms forward. The man is in the background, wearing a dark blue t-shirt, also smiling and stretching. The background is slightly blurred, showing a doorway and a light source.

*Lifestyle Medicine is the  
implementation of lifestyle  
choices to maintain or  
restore health*

# MEDICINE

# THE SCIENCE BEHIND PIVIO

## Lifestyle Medicine

The Pivio solution is grounded in Lifestyle Medicine, which encourages eating predominantly plant-based wholefoods, being physically active, achieving quality sleep, managing stress, avoiding harmful substances and maintaining positive social connections. Despite the benefits of each pillar, most Western and emerging societies have abandoned many of these behaviors and are now confronted with dramatic increases in risk factors and rates of chronic disease<sup>2</sup>.

Mainstream medical treatment focuses on treating or managing existing conditions and symptoms, while often ignoring the root causes. All too often, patients and medical practitioners select the path of least resistance (i.e. medication for symptoms), rather than the more-effective option of treating the root cause and implementing health-promoting lifestyle changes. There is a potential financial conflict between the 'business' of conventional medicine and restoring health to the individual – the profitability of a health-care organization relies on repeated use of their services<sup>3,4</sup>.

## Gaining momentum

The evidence that Lifestyle Medicine can positively impact cardiovascular health, type 2 diabetes, some cancers (e.g. colorectal), autoimmune diseases (e.g. rheumatoid arthritis and asthma), delay the onset of dementia and decrease inflammation is growing<sup>5</sup>. At the same time, public awareness and acceptance of the benefits of Lifestyle Medicine are gaining momentum as research validates personal experiences.

## Addressing the underlying cause

Chronic inflammation is the body's response to stressors such as disease, obesity, poor diet, inadequate sleep and exposure to toxins<sup>6-9</sup>. Inflammation can manifest in many ways and is associated with numerous chronic diseases and their progression<sup>8,10</sup>.

Lifestyle Medicine addresses the modifiable components (diet, activity, sleep, drugs, environmental factors etc) to reduce inflammation and over-ride the expression of some genes that can predispose towards disease<sup>10</sup>. It is an approach to medicine that is purposely focused on influencing the underlying drivers and causes, rather than only treating symptoms. By managing drivers of chronic disease at the source, symptoms can often resolve and the burden on health care can be alleviated.

Lifestyle-driven chronic diseases are not an inevitable burden in life – everyone can seek to reclaim their health and experience better health outcomes.

## COVID-19 IMPACT

COVID-19 had a greater impact on people with certain chronic diseases. People with type 2 diabetes, obesity, hypertension or heart failure were overrepresented in COVID-19 deaths and related severe illness<sup>11</sup>. The likelihood of suffering moderate to severe disease was reduced by 73% ( $p < 0.02$ ) in people who followed a spectrum of plant-based diets<sup>12</sup>. Additionally, there is potential for reduced COVID-19 vaccine efficacy in people with higher central adiposity and hypertension and people who smoke<sup>13</sup>, with the mechanism potentially linked to systemic low-grade inflammation affecting immune response.





## THE PIVIO PILLARS

### Optimal eating

Pivio's Lifestyle Medicine approach advocates plant-based eating. The Pivio solution, while not explicitly vegan, encourages the abundant consumption of whole or minimally processed plant foods, which are nutrient dense and low in energy density. In practice, this takes the form of healthy, plant-centered eating using a broad range of colorful fruits and vegetables, whole grains, legumes and nuts and seeds, providing high levels of vitamins, minerals, fiber and phytochemicals. Reducing or eliminating animal products and highly processed foods is encouraged. This serves to reduce the consumption of dietary fat (particularly saturated fat, trans fats and large quantities of refined sources of omega-6 fatty acids), sodium (salt) and refined carbohydrates and reduces the associated health risks linked with eating patterns high in these foods.

Systematic reviews of research on plant-based eating have reported lower body mass index (BMI)<sup>14,15</sup>, total cholesterol, low density lipoprotein (LDL) cholesterol and blood glucose, as well as protective effects against ischemic heart disease and cancers, including prostate cancer<sup>14,16</sup>. There is also lower incidence of type 2 diabetes in vegan populations<sup>15</sup>. Increased consumption of plant protein is linked to reduced risk of all-cause mortality and cardiovascular diseases<sup>17,18</sup> and, to date, only lifestyle intervention studies featuring plant-based diets have been able to demonstrate regression of atherosclerotic plaque<sup>19</sup>.

Diets rich in whole-plant foods are also rich in polyphenols, which have shown promising results against cognitive decline and all-cause mortality<sup>20,21</sup>. A meta-analysis found a 13% reduction in cognitive impairment and dementia risk per 100g of fruit and vegetable consumption per day<sup>22</sup>. Long-term consumption of foods rich in flavonoids (types of polyphenol phytochemicals) also contribute to adult weight management<sup>23,24</sup>.

The higher-fiber diet associated with plant-centered eating provides the basis for beneficial short-chain fatty acid (SCFA) production by the microbiome (gut microorganisms)<sup>25</sup>. SCFAs provide the body with many benefits, including promoting healthy gut epithelial function and regulation. Dietary fibers are integral in mediating gut regularity, blood glucose control and satiety<sup>26,27</sup>. Conversely, diets that are high in processed foods have been shown to increase food calorie consumption and lead to weight gain<sup>28</sup>. Consuming a broad variety of plant foods (≥30 different types per week) increases microbiome diversity. A high microbiome diversity is thought to provide a robust gut environment, while low microbiome diversity is associated with disease states and higher inflammation<sup>26,29</sup>.

A review found lower inflammatory markers in vegan, vegetarian and pesco-vegetarian overweight-to-obese dieters compared with those following a semi-vegetarian (less frequent meat consumption) diet<sup>30</sup>. Although calorie intake was similar across all dietary groups, those who followed the vegan diet showed greater weight loss and improved metabolic status. Previous research showed greater weight loss in those following a low-fat, plant-based eating pattern versus those following a Mediterranean diet<sup>31</sup>.

Beyond chronic disease, evidence suggests plant-based eating patterns may be linked to better outcomes in those who acquire certain acute diseases. Of relevance in the current pandemic is research that suggests better outcomes for COVID-19 patients who were following a plant-based eating pattern. One study found 73% lower odds of moderate to severe COVID-19, compared with those not following this eating pattern<sup>12</sup>. Another estimated that nearly a third of COVID-19 cases in their study group could have been prevented if either social deprivation was not experienced or a dietary pattern characterized by healthy plant-based foods was in place<sup>32</sup>.



### Move more

The benefits of regular exercise are well studied and now coupled with the emerging evidence surrounding the detrimental impacts of a sedentary lifestyle. With the modernization and development of society, time- and labor-saving inventions have decreased the general activity level of most people in work and recreation.

Western society constructs of desk-based work, inactive commuting and poor access to safe, open, enjoyable environments can lead to sedentary lives. Fortunately, exercise includes any activity that requires energy expenditure (e.g. walking, running, swimming, dancing, gardening and manual labor). The benefits of exercise are dose-dependent and cumulative<sup>34,35</sup>, so while optimum targets for activity exist (150 minutes of moderate to vigorous activity per week), benefits are seen with any increase in activity<sup>35</sup>. There is no requirement to run marathons; for improved health, people simply need to move more.

Recent reviews of published research indicate that exercise provides beneficial long-term effects for the risk of weight gain, obesity, coronary heart disease, type 2 diabetes mellitus, Alzheimer's disease, dementia, hypertension, breast cancer, colon cancer, gestational diabetes, gallstone disease and ischemic stroke, as well as all-cause mortality<sup>35,36</sup>. Weight-bearing exercise has also been shown to play a role in preventing loss of bone-mineral density and osteoporosis<sup>37</sup>. Sedentary populations have a 13% increase in all-cause mortality risk and a lower quality of life<sup>34</sup> and there is little-to-no detrimental risk associated with undertaking appropriate exercise.

The benefits of exercise are more than muscle strength and cardiovascular fitness and prescribing exercise interventions ought to be more widely implemented.



### Avoiding harmful substances

Lifestyle medicine focuses on ensuring the body has all that it needs to thrive, as well as removing substances that are detrimental to health. Poisons, toxins, contaminants or addictive substances arise from lifestyle choices or the environment and can have a broad range of mostly negative health impacts.

Commonly available, socially acceptable and legal drug use involves alcohol and tobacco. Alcohol consumption and any amount of smoking is harmful to health, so abstinence is recommended for optimal health and wellbeing. There is nothing beneficial about smoking from a health, social or financial perspective. Tobacco is the leading cause of preventable disease and death in the United States<sup>38</sup>.





### Quality sleep and rest

The importance of sleep for overall health has long been underestimated. People function poorly when sleep deprived, making poor decisions and experiencing impeded coordination and reaction times. Not only does the body need to physically rest during sleep, but sleep is important for other functions.

Reduced hours of sleep or poor-quality sleep can impact brain health, mood and memory and can contribute to cognitive decline<sup>39,40</sup>, upset the nervous, metabolic and immune systems and have proinflammatory effects<sup>40,41</sup>. There are also increased risks of diabetes, hypertension, cardiovascular and coronary disease and some cancers<sup>40,42</sup>, as well as a shortened lifespan<sup>42</sup>.

During sleep, memories are consolidated and the brain activates cleansing mechanisms to remove waste products.

Overall, it is evident that adequate, restorative sleep is critical to good health, and yet a substantial proportion of populations around the world have sleep problems<sup>43,44</sup>. Fortunately, there are options available to help improve sleep quality and quantity and these are addressed as part of the Pivio solution.



### Rewarding relationships

Social isolation and social support are important drivers of quality of life (QOL) from a physical and mental health perspective. While the research surrounding social support and physical health is complex, there is a clear inverse relationship between healthy social relationships and reduced incidence of chronic physical conditions<sup>45</sup>, improved mental wellbeing<sup>46</sup> and reduced mortality, with people who are socially active living longer<sup>47,48</sup>. Social interaction is beneficial for healthy aging, with loneliness and isolation being predictors of cognitive decline and dementia onset<sup>49,50</sup>.



### Managing stress

The interaction between stress, mental health and physical health is a complex and well-studied area, with many review publications available. Chronic stress impacts how we feel, think and act in the moment and also negatively impacts future health outcomes<sup>51-53</sup>. Stress can arise from many sources (work, marital, family, friends, financial, time pressure etc) and individuals vary in their ability to cope with the same situations/stressors, which adds further complexity to stress research.

Chronic stress, like chronic inflammation, has a negative effect on the body by maintaining endocrine, immune and nervous systems at elevated rates (e.g. adrenaline and cortisol release). The body's response mirrors stress levels with physiological changes in blood pressure, gut function and glucose metabolism associated with the 'fight or flight' response, sending energy stores to muscles and brain at the expense of digestion, growth mechanisms and reproductive processes<sup>54</sup>. Long-term stress causes more lasting effects, impacting the cardiovascular system (hypertension, atherosclerosis) and the immune system<sup>54,55</sup>. Long-term suppression of the immune system can lead to increased susceptibility to illness and malignancy with disease progression or establishment<sup>54-56</sup>. There are links between stress and development of metabolic syndrome<sup>51</sup>, structural brain changes, learning and memory difficulties and cognitive decline. Stress can also drive or reignite disease progression in general<sup>53,55,56</sup>.

Along with direct consequences on the body from prolonged stress, other physical consequences are possible if any 'destructive' behaviors are employed as stress-coping mechanisms (e.g. alcohol and drug use, poor-quality diet and comfort eating or not eating enough nourishing foods)<sup>54,55</sup>. These behaviors compound the impact of a stressful environment.

Quite literally, stress can kill. Maintaining stress levels at manageable levels, through either reduction of stress points or developing better coping skills, is imperative to optimal living.



**While each pillar is important to health and beneficial in isolation, together they work synergistically to promote wholistic health.**

### **Working synergistically**

While each pillar is important to health and beneficial in isolation, together they work synergistically to promote wholistic health. What people eat not only affects their waistline, but also impacts how they feel physically and mentally. Sleep impacts people's ability to manage stress and eat well. Physical activity increases fitness and helps stress management, sleep, weight loss and mood regulation. Rewarding relationships and social interaction positively affect physical and mental health, including the onset of dementia. Aligning lifestyle behaviors in all these areas provides multiple benefits for whole-person health and should be actively prescribed, in conjunction with or instead of resorting to medication.

### **Science-based behavior change**

The Pivio solution is based on behavior-change science, which recognizes that changing patterns of behavior requires strong and stable motivation, self-confidence in success, SMART (Specific, Measurable, Attainable, Relevant and Time-Bound) goal setting, goal tracking, goal review, social support for change and practice to establish habitual behavior patterns that can be maintained. The Pivio solution also addresses the challenging problem of breaking unwanted habits.

The approach is underpinned by behavior-change theories supported by experimental evidence. The program draws on motivational theories such as the Theory of Planned Behavior<sup>57-59</sup>, which highlights key foundations of motivation, and Social Cognitive Theory<sup>60,61</sup>, which emphasizes the role of self-efficacy or confidence in performance for developing stable motivation and taking action.

Acknowledging the limitations of such models in failing to explain the role of emotions in action<sup>62</sup>, the Pivio solution also draws upon self-regulation, self-

monitoring and goal theory<sup>63-65</sup> to highlight how participants can move from motivation to action, including training in if-then planning<sup>66,67</sup>. The model also takes into account how environmental change is critical to behavior change, highlighting the role of changing one's environmental cues and routines<sup>68,69</sup>.

Finally, but importantly, the Pivio solution is based on Context, Executive, and Operational Systems (CEOS) theory<sup>70,71</sup> and on theoretical and empirical work on habit making and habit breaking<sup>69,72,73</sup>. This integrative theoretical model<sup>63</sup> is designed to support participants from their initial aspiration to goal setting, goal review and practice to establish behavior-change maintenance through habit formation. This is crucial to avoiding the yo-yo, change-failing patterns that many behavior-change interventions initiate because their participants fall short of habit establishment.

### **Group meetings**

The Pivio solution utilizes interactive, facilitator-led, group settings as an integral part of the program performance. Evidence suggests that group membership can change members' perceptions, cognitions and behaviors<sup>74-76</sup>. Considerable work has focused on the role of social identification in groups and how social group membership can influence health outcomes<sup>77-81</sup>.

The Pivio model is based on the five overarching understandings about group effectiveness, highlighted in Borek and Abraham's review<sup>82</sup>: (1) group development processes, (2) dynamic group processes and properties, (3) social change processes, (4) personal change processes and (5) group design and operating parameters.

# THE MAGIC OF PIVIO: A SCIENCE BASED IN CHIP

**Change takes energy, knowledge, personal awareness and skills, and it is easier said than done. The Pivio solution provides the knowledge and skills that help people regain control of their health, remove the barriers to healthful habits and enable people to make positive changes for long-lasting benefits.**

Pivio supports participants to make changes across each of its pillars, aiming to reach nationally recommended, and empirically validated, health-gain thresholds in each domain.

The program is based on the Complete Health Improvement Program (CHIP, founded by Dr Hans Diehl in 1986<sup>83</sup>). The published research on this program spans more than 36 years and 40 papers.

The research base includes cohorts from the United States<sup>84-87</sup>, Canada<sup>88</sup>, Australia<sup>89-91</sup>, New Zealand<sup>92</sup>, Philippines<sup>93</sup> and Germany<sup>94</sup>, examining effectiveness against chronic disease risk factors, delivery method and setting<sup>95-97</sup>, intervention length<sup>98</sup> and understanding participant response patterns<sup>99-102</sup>. An excellent summary of CHIP publications until 2014<sup>103</sup> outlines the history and researched outcomes of the CHIP program until that point. Since 2014, an additional 15 papers have been published from existing or new data sets.

The CHIP program is endorsed by:



**The program has repeatedly demonstrated significant benefits across multiple chronic disease risk factors, including:**



**Reductions in fasting blood glucose<sup>88,93,100,104</sup> and are as large as 10% below baseline in some studies<sup>93</sup>**



**Five percent (or greater) beneficial decreases in total cholesterol levels, LDL cholesterol and triglycerides<sup>85-88,91,100,101,105</sup>**



**Significant reductions of approximately 5% in systolic and diastolic blood pressure<sup>88,90,93,100,106,107</sup>**



**Reduced weight and BMI around 3.5%<sup>86,87,104,105</sup>, a benefit seen despite the program not being directed at weight loss or involving calorie restriction.**

Analysis of stratified data has shown that participants entering the CHIP program with the greatest risk levels (highest BMI, hypertension, dyslipidemia etc) gain the most benefit from the intervention<sup>92,95,101,108,109</sup>.

Participants with baseline triglycerides levels over 500 mg/dL or total cholesterol levels exceeding 280mg/dL saw a reduction of up to 44% and 20%, respectively, after undertaking the CHIP program. Similarly, those with initial fasting blood glucose levels above 100 mg/dL decreased by more than 10% compared with less than 5% for those closer to the normal range. Male participants generally improved in more biometric markers than female participants<sup>101,102</sup>, a trend that is not unique. The hypotheses on the difference in response between males and females include hormonal differences, physiological effects (e.g. male propensity for central adiposity, which is more metabolically active) and engagement levels. Notwithstanding the difference, CHIP is effective for all.

Most comparative studies have evaluated CHIP against a control group<sup>96,108,110-113</sup>, with more advantageous post-program changes seen in the treatment (CHIP) arm. Elkoustaf et al.<sup>107</sup> (2019) compared the CHIP program and the Healthy Heart program over a nine-month period to assess impact on cardiovascular disease and risk factors. Both programs benefited participants for cardiovascular disease (CVD) risk factors, with CHIP participants having a significantly greater decrease in BMI than the comparative program (a reduction in BMI of 9.6% compared with 6.1%).

Some smaller studies have examined the impact of the program on mental wellbeing. There is a link between improved mental health status as a result of participating in CHIP<sup>110-112,114</sup>, as well as decreased BMI and alleviation of depression symptoms<sup>108</sup>. Proposed mechanisms for

the improvement to mental health status were improved social connection from the CHIP group environment, enhanced mood from increased exercise and an elevated hope for the future, with changes remaining significant six months after the program<sup>108,110</sup>.

Several studies have conducted follow-up on CHIP participants to assess long-term behavior changes and ongoing health benefits<sup>92,115,116</sup>. In one study, participants with elevated biometrics at the start of CHIP continued to have improved biometrics on average four years post program. Those who continued with full CHIP recommendations had even better biometric results<sup>92</sup>. Other studies following up at 12 months<sup>116</sup> and 18 months<sup>115</sup> did show some recidivism in either behaviors or biometrics since program end; however, improved patterns of eating, exercise and substance use remained, along with improved BMI from baseline. Results were independent of any interim follow-up with participants, indicating that the program is able to produce powerful behavior change.

Due to the nature of the CHIP program, there are limitations with many of these studies, such as reliance on self-reported data, lack of control groups, the Hawthorne effect, variable program adherence and changes in medications during the interventions. CHIP participants are free to adopt as few or as many program recommendations as they choose, and adherence is not assessed. Participants remain in their normal familial and societal settings and, in many cases, choose if they provide biometrics at either end of the program. As many people experience positive changes to biomarkers during CHIP, associated medication may also change, which affects biomarker results. For example, final blood pressure results may be just below baseline levels, however, the participant has been able to stop taking medication.

### Return on investment

With better health, comes financial benefits. Health-care claims can be reduced both immediately and in the future. Participants with reduced health-care needs have fewer visits to the doctor for ongoing issues, fewer pharmaceuticals and fewer downstream major medical episodes such as cancer, stroke and heart attacks.

Two small trials comparing health-care costs before and after CHIP participation calculated a cost savings for health care, pharmaceuticals and medical appointments<sup>97</sup>, and a saving of \$1.80 for every dollar spent<sup>117</sup>. More than 23% of participants were able to cease taking at least one medication after a four-week intervention<sup>97</sup>. This is highly encouraging data. It stands to reason that a program which positively impacts chronic disease and risk factors will also impact the future cost of health care for those individuals.

### Future research

Studying the impact of lifestyle change is complex, multifaceted and a long-term commitment<sup>5</sup>. Future Pivio research will work with improved assessment measures, ultimately linking with wearable measurement devices to minimize self-reported data where possible. The research will utilize artificial intelligence analysis to be able to further tailor the program to a more personalized level for participants' specific needs. There is also opportunity for more focused research using modern data-mining techniques to further elucidate mechanisms of action and determine the extent lifestyle medicine has on disease states<sup>2,5</sup>.

# WHY PIVIO?

## PIVIO OFFERS A FULL TURNKEY SOLUTION

**Pivio addresses the root causes of multiple chronic diseases. Therefore, Pivio can address the spiraling cost of health plans and insurance.**

Pivio is built on the foundation of more than 40 published scientific articles that demonstrate the efficacy of its approach.

Through the Pivio solution, the Lifestyle Medicine Institute offers a full turnkey solution, with support for clients across health systems, physician networks, health plans and self-insured corporations. This includes:

- **Coaching**—We recognize the importance of a well-trained, empathetic behavior-change coach who is there to guide, teach, support and encourage Pivio participants through their transformation. Your patients and employees have a high probability of success if supported by the highly trained, effective coaches provided by the Lifestyle Medicine Institute.

- **Recruitment**—The Lifestyle Medicine Institute can work alongside you as we jointly promote the life transformative benefits of Pivio to those who can most benefit.
- **Reimbursement**—We simplify and administer the realization of Medicare and Medicaid reimbursement. We do the hard work of navigating the ever-changing complexity of reimbursement codes, categories, rules, exceptions and systems to ensure your organization maximizes the levels of reimbursement.
- **Administration**—We offer a no-fuss approach to handling the set-up, logistics, communication, scheduling, systems and technology.

Pivio, from the Lifestyle Medicine Institute, can transform health-cost trajectories. The program can transform lives, restore hope and deliver an ability to live life to the full.



### Coaching



### Recruitment



### Reimbursement



### Administration

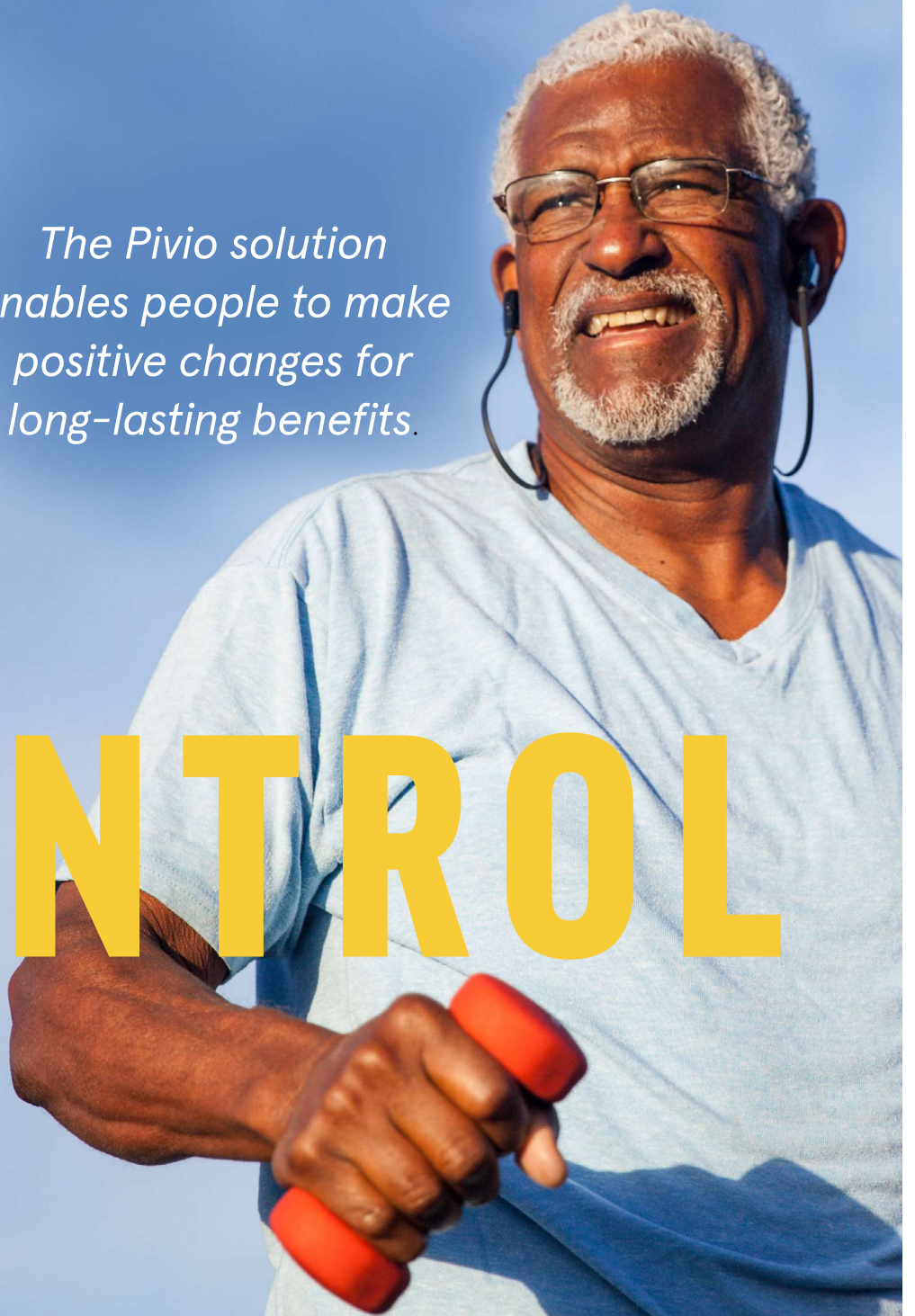




# REGAIN

*The Pivio solution  
enables people to make  
positive changes for  
long-lasting benefits.*

# CONTROL



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**This paper was developed by Lifestyle Medicine Institute to provide an overview of the science base supporting the Pivio solution. Based on an intervention program with more than 36 years of research and 40 scientific papers, Pivio is grounded in a well-established body of evidence enhanced with the inclusion of key behavioral competencies to drive meaningful change.**

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