



ACTUARIAL SPECIALTIES | HEALTH

The Management of Cardiometabolic Syndrome

Newtopia case study shows weight loss is a key factor

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Cardiometabolic disease continues to be a growing public health challenge and a major economic burden for Americans. The latest report by the American Heart Association¹ estimates approximately 48 percent of adults (121.5 million) have cardiovascular disease (CVD), while the Centers for Disease Control and Prevention (CDC)² found diabetes affects 12.2 percent of adults, with 33.9 percent (84.1 million) having prediabetes. Heart disease was the leading cause of death in the United States in 2017, while stroke and diabetes ranked fifth and seventh, respectively.³

Individuals with diabetes pay approximately 2.3 times more in health care costs per year than individuals without diabetes.

Current and projected economic and societal costs of obesity and its associated comorbidities, in terms of both health care expenditures and quality of life, accentuate the importance of implementing effective prevention strategies. On average, CVD and stroke cost Americans \$351.2 billion from 2014–2015, in terms of both direct health costs and indirect costs from loss of productivity,

and total cost is projected to double to \$622 billion by 2030⁴ and increase to \$1.1 trillion by 2035.⁵ The total direct and indirect estimated cost of diagnosed diabetes was \$327 billion in 2017, with \$237 billion attributed to direct medical costs and \$90 billion to reduced productivity.⁶ Individuals paid approximately \$16,750 in medical costs per year, which was 2.3 times more than individuals without diabetes.⁷

Cardiometabolic disease arises from a complex interaction of nonmodifiable factors (i.e., genetic predisposition, age and sex) and modifiable risk factors (behavioral and lifestyle). Metabolic syndrome (MetS) has been identified as a cluster of five interrelated clinical and metabolic risk factors for CVD and Type 2 Diabetes Mellitus (T2DM) and is a predictor for the development of these diseases. Individuals with MetS have twice the risk of developing CVD over the next five to 10 years compared to individuals without the syndrome, have a five-fold increase in T2DM risk and an increased risk of all-cause mortality.⁸ The five clinical risk factors defining MetS are:

1. Elevated waist circumference
2. Elevated triglycerides
3. Reduced high-density lipoprotein (HDL) cholesterol
4. Elevated blood pressure
5. Elevated fasting glucose

While the exact genetic, behavioral and environmental causes are unclear, metabolic syndrome is tied to increasing levels of obesity (abdominal) and sedentary lifestyles.⁹ Around one-third of Americans have metabolic syndrome, and obesity is seen as the driving force behind its rising incidence.^{10·11·12}

CONTROVERSY OVER METABOLIC SYNDROME

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A syndrome, as defined by Merriam-Webster, is “a set of medical signs and symptoms that occur together and are associated with a particular abnormality.” Not all medical authorities agree that MetS is a syndrome because of the lack of a clear, underlying disease or disorder.

An American Heart Association publication points to a common underlying disorder: “Metabolic syndrome is a true multifaceted syndrome because there is a common underlying pathology ... a current theory focuses on insulin resistance as the unifying component that ties all these metabolic abnormalities together.”¹³ On the other hand, those who do not support MetS as a syndrome

believe that it is “simply a cluster of risk factors without an underlying mechanism.”¹⁴

An increasing number of American and international professional societies, however, are supporting the designation of MetS as a syndrome.¹⁵ The debate over the precise designation of MetS may seem academic to payers, however. A payer is interested in identifying its members who are at risk of developing cardiovascular disease or diabetes and, more important, treating members to prevent disease progression.

METABOLIC SYNDROME INCREASES THE RISK OF COVID-19

There is an emerging and increasing body of COVID 19 literature examining the specific comorbidities of MetS and obesity. MetS is an important risk factor for hospitalization, intensive care unit (ICU) admission and death. A forthcoming paper¹⁶ finds that individuals with metabolic syndrome are at increased risk for poor disease outcomes and mortality from COVID-19. A meta-analysis¹⁷ summarized the prevalence of cardiovascular metabolic diseases in COVID-19 patients and compared the incidence of comorbidities in ICU/severe and non-ICU/severe patients. Patients with previous metabolic diseases may face a greater risk of developing severe conditions. Obesity is a known risk factor for severe COVID-19 symptoms—“insulin resistance is among the strongest determinants of impaired metabolic health, cardiac dysfunction and CVD-related mortality.”¹⁸

BODY WEIGHT REDUCTION AS A CLINICALLY SIGNIFICANT TARGET

Achieving modest weight loss results improved health outcomes, reduced health care costs, and enhanced workplace performance and attendance. The American Heart Association and National Heart, Lung and Blood Institute guidelines state that weight reduction should be a priority for individuals with MetS and obesity to reduce the severity of the metabolic risk factors.¹⁹ Lifestyle therapies for weight loss should incorporate a reduced-calorie and healthy meal plan, physical activity and behavioral interventions.^{20,21} Current clinical guidelines for the management of obesity and overweight adults, which are based on evidence from several clinical trials, state that a weight loss of ≥ 5 percent of initial body weight produces clinically meaningful improvements in health targets, such as reductions in blood glucose, hemoglobin A1c, blood pressure, triglycerides and the risk of developing type 2 diabetes.^{22,23} The resulting benefits in obesity-related medical conditions and cardiovascular risk factors are more pronounced with greater weight loss.

Overall, achieving modest weight loss results in improved health outcomes, reduced health care costs, and enhanced workplace performance and attendance.^{24,25} Newtopia, a company that provides individualized whole-

person coaching that prevents, reverses and slows the progression of chronic disease while enriching mental health, resilience and human performance, utilizes ongoing weight loss tracking as a proxy for measuring the successful reduction of MetS risk.[26:27:28:29:30](#)

INTERVENTION PROGRAM RESULTS

Newtopia's results are achieved through an integrated approach that leverages social determinants of health (SDOH), personality, genetics and behavioral insights and emphasizes one-on-one coaching to help individuals develop and maintain better nutrition, exercise and behavioral well-being habits.

Newtopia embarked on a randomized control trial in collaboration with Aetna to test its personalized habit change program on employees who were at risk for MetS. The results of the trial were published in the peer-reviewed *Journal of Occupational and Environmental Medicine*.[31](#) The study aimed to determine the impact of a targeted personalized program on reducing employees' future risk of MetS and to quantify reductions in medical costs. The study population consisted of Aetna employees (older than 18 years) who had undergone biometric screening and were found to have at least two out-of-range MetS components, one of which had to be waist circumference. Employees were invited to join the program. (Employees who were enrolled in external weight loss/wellness programs were excluded from the study.)

All employees received the results of the evaluation of their MetS risk. Each employee assigned to the coaching program had access to personal coaches and client care managers to help them achieve high levels of engagement and sustained behavioral change, as well as an individualized online portal and mobile application to track nutritional and activity data. Each personalized nutrition and activity plan was tailored to the employee's unique psychosocial profile characteristics and genetic makeup (obesity, appetite and compulsive behavior genes). Employees not randomized to the coaching program were subject to "usual care," with additional MetS risk information.

Eligible participants were randomly assigned to one of three treatment arms (n=945 each group):

1. **Program group 1 (coaching program).** Employees in this group received baseline MetS results and were invited to participate in the program.
2. **Program group 2.** Employees in this group received baseline MetS results and received a specific 12-month prediction of their future MetS risk.
3. **Control group 3.** Employees received baseline MetS results but were not invited to participate in the program.

OUTCOME MEASURES

1. **Enrollment.** Approximately 24 percent of those invited to participate in the program enrolled.

2. **Engagement.** Participant tracking of nutrition or physical activity (manually, electronically or via activity tracker) for at least 12 days per month, and/or participating in at least one coaching or care manager session (phone, email or video). About 50 percent of enrollees continued to be engaged after 12 months in the program.

In assessing clinical and financial outcomes, the study aggregates the results of groups 1 and 2 (those with coaching and those without) and compares with the control group.

1. **Clinical outcomes evaluated.** The study looked at weight and MetS components (waist circumference, triglycerides, HDL, blood pressure and fasting blood sugar). Participants lost, on average, 4.3 percent of their initial body weight (equivalent to about 10 pounds). The bodyweight reduction corresponded to a reduction in metabolic risk factors.
2. **Financial outcomes evaluated.** The study looked at total medical costs, which were calculated on a per-employee per-month basis. Medical costs of participants were reduced by \$122 per participant per month, or \$1,464 per year, compared to the control group. (These savings were equivalent to a 2X return on investment in the first year of the program.)

CONCLUSION

The Newtopia study is unusual in that it is randomized. Participant groups 1 and 2 differed in terms of the information provided to test whether additional risk information would drive higher participation, which it did not (engagement rates were similar for the two groups). The randomization of participants allowed for comparison of the clinical and financial outcomes of participants against a control group.

The key program target—weight loss—showed statistically significant improvement. The improvement in metabolic syndrome measures was also associated with lower costs compared to the controls. Interestingly, the reduction in costs holds both on an intent-to-treat basis (overall cost reduction is significant, though not for individual services), as well as for participants (significantly lower costs for all services except pharmacy, for which costs increased).

The other item of significance in the Newtopia study is the size of the populations: Many studies involve small populations, which makes their results difficult to generalize. The Newtopia program shows that a combination of online/coaching intervention can be delivered at scale, which is important to many health plan and employer purchasers.

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