



AN ANTIDOTE FOR RISING CARE COSTS

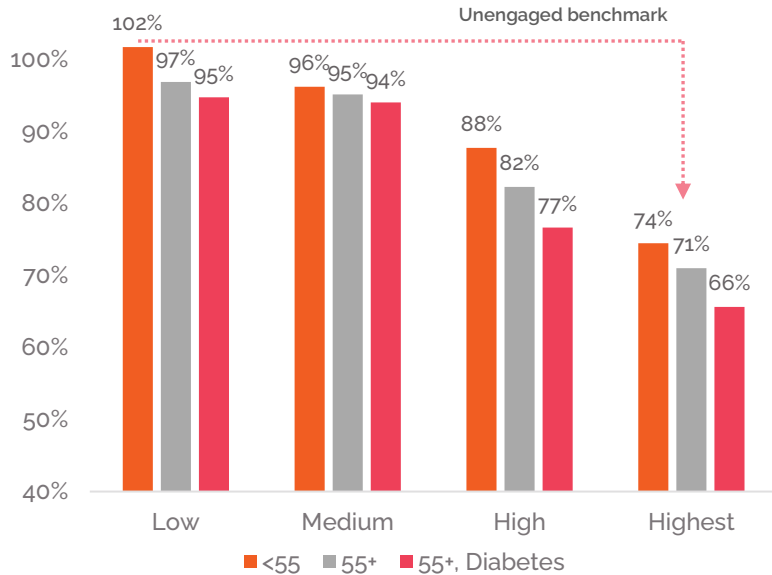
CREATING LAST BEHAVIOR CHANGE

Vitality[®]

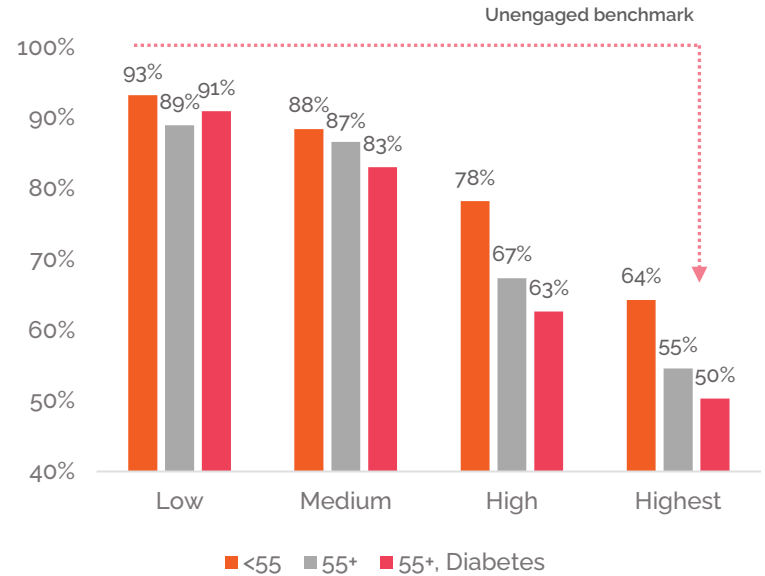
EVIDENCE OF IMPACT

REDUCED HOSPITAL ADMISSIONS AND CLAIMS COSTS

Admission Rate Relativities by Engagement Level



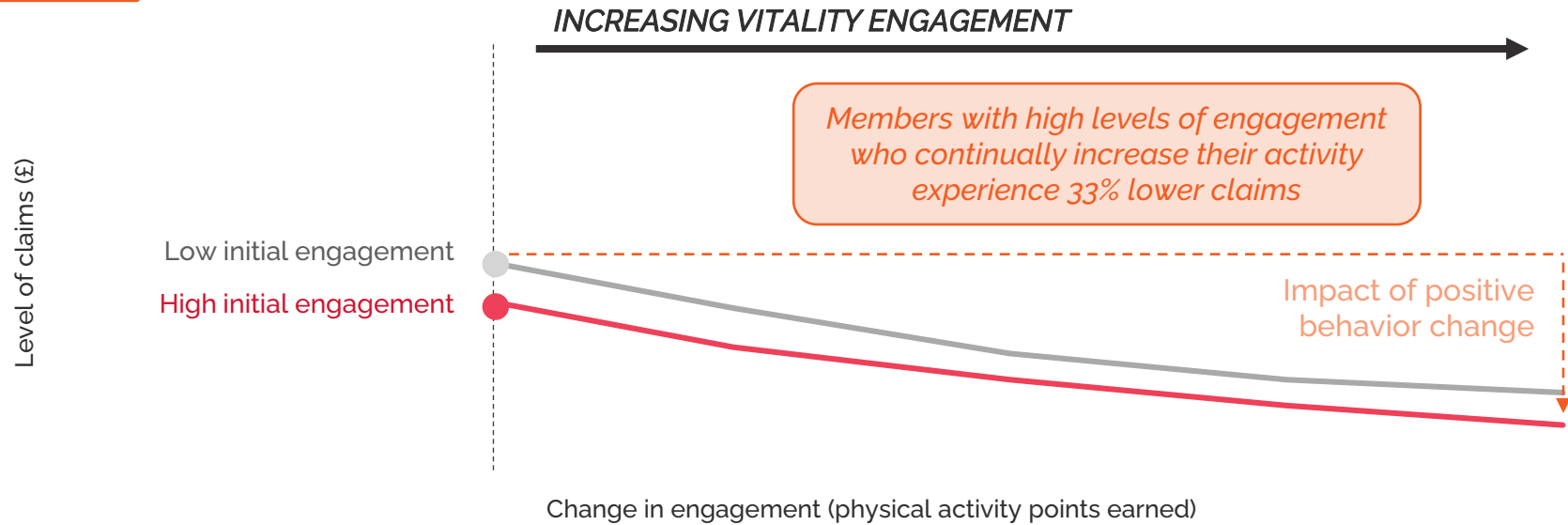
In-Hospital Claims Cost Relativities by Engagement Level



THE VITALITY CLAIMS COST STUDY TRACKED 47,000 VITALITY HEALTH (UK) PLAN HOLDERS OVER 2.5 YEARS

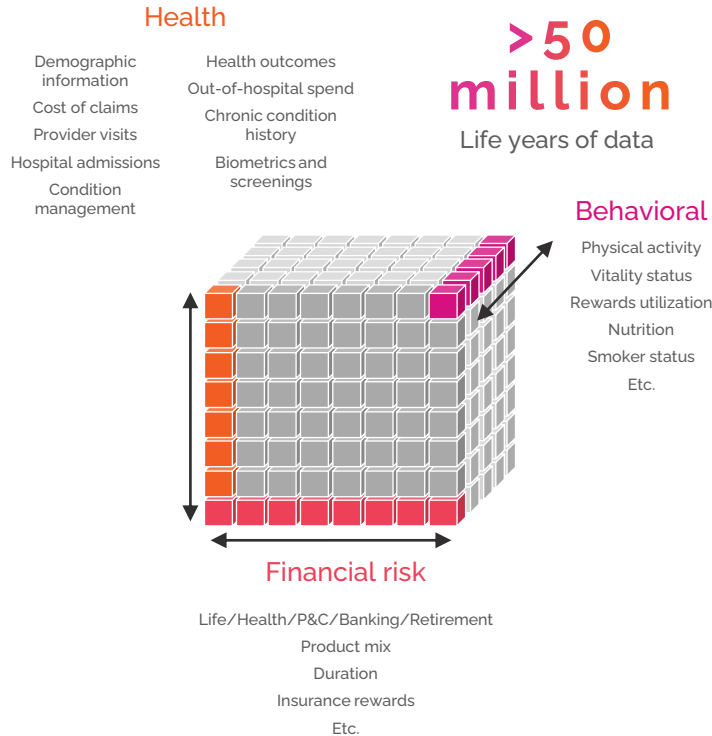


Claims rates for Vitality members based on initial wellness engagement and subsequent increases in health engagement

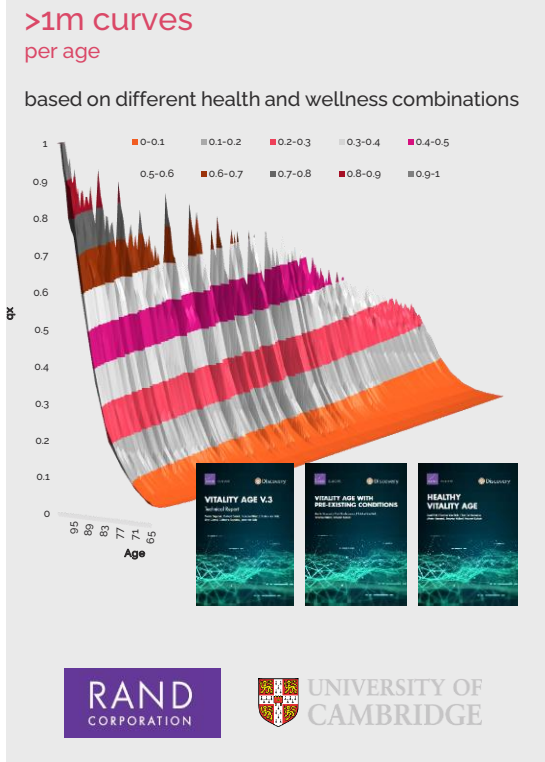


DEEP UNDERSTANDING OF THE IMPACT OF BEHAVIOR

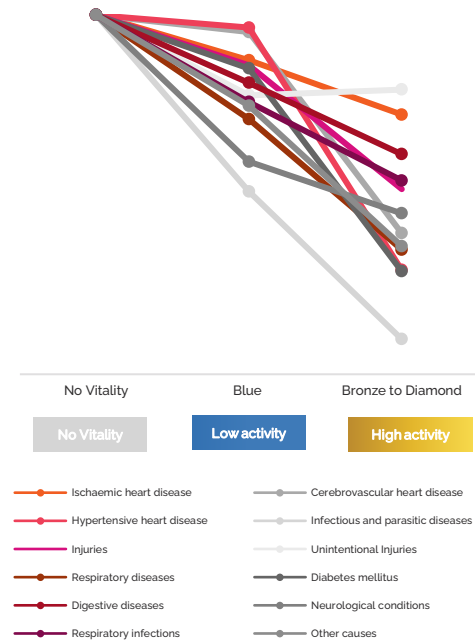
UNIQUE AND POWERFUL GLOBAL DATA SET



LEADING UNDERSTANDING OF BEHAVIOR AND HEALTH GLOBALLY



Standardized for Age, Gender, SE Class, Initial RUB; Rebased to Non-Vitality



VITALITY'S RICH EVIDENCE BASE

Author affiliations



>50

Papers/studies covering a wide array of topics including behavioral science, preventative medicine, nutrition and workplace health, including:

19 With a high-risk individuals focus

23 Covering interventions and care

26 Covering behavior science/change

30

Journals published



Health-care spending attributable to in the USA: an economic attribution a

Application of Machine Learning to Identify Clustering of Cardiometabolic Risk Factors in U.S. Adults

Xiguo Luo¹, David Kim², Jessika Morales³, Ian Duncan⁴
Affiliations: 4 record
PMID: 30869131 DOI: 10.1089/da.2018.0390

Abstract

Aims: The aim of this study is to compare some machine learning methods to investigate the relation and cardiovascular (cardiometabolic) risk for U.S. adults using a cross-sectional dataset from a wellness improvement program. **Methods:** Logistic regression was used to predict risk and produce a ranking of variables. A machine learning method was used to identify subpopulations of interest. Predictors were nonmodifiable and those that are modifiable. **Results:** The population whom 8.1% had diabetes. Using logistic regression, six variables were related and eleven were positively related to cardiometabolic risk. The classifiers (random forest, gradient boosting, and bagging) were applied to the dataset. Each classifier also produced a ranking of variables' importance with a k-medoids clustering algorithm, which were mainly distinguished. **Conclusions:** The study illustrates that machine learning is an important tool in identifying important cardiometabolic risk factors and the potential for interventions based on lifestyle and behavior.



Reduction in Risks

8%

Reduction in at risk members

19%

reduction in **claims cost** for engaged members

40 - 55%*

Reduced disease burden (heart disease, lung disease and diabetes)

Increase in prevention activities

25%

Increase in **healthcare support activities** by members with **chronic conditions**

42%

Boost in **activities** per member per month

21%

Lift in PCP **annual wellness checkup**

SUCCESS OF OUR CLIENTS



C. EVERETT KOOP AWARD WINNING CLIENTS

MCKESSON

\$4.7M

In medical cost savings in 3
years



\$1.4M

In claims savings by highly
engaged members in year 4



\$385

Lower medical and prescription
costs for participants over 3
years

IMPROVING POPULATION HEALTH

164,852 Vitality Members

on average: 3.5 years between first and last reading.



Granular data

Biometric Risk Factors

Body Mass Index

Systolic Blood Pressure (mm Hg)

Diastolic Blood Pressure (mm Hg)

Total Cholesterol (mg/dL)

Triglycerides (mg/dL)

+ Lifestyle Risk Factor

Alcohol consumption (frequency per week)

Physical Activity (average minutes per week)

Fruits and vegetables (daily servings)

Stress (Kessler score)

Tobacco Use



Classified by health risks



0-2

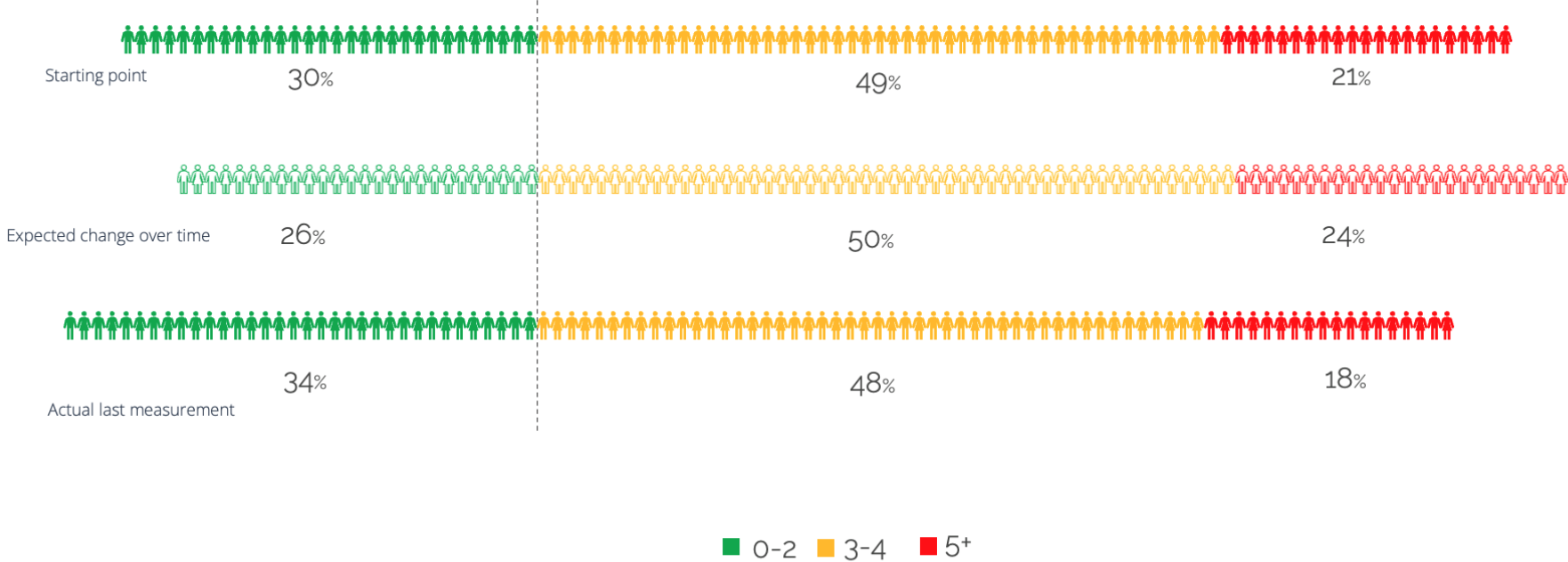


3-4



5+

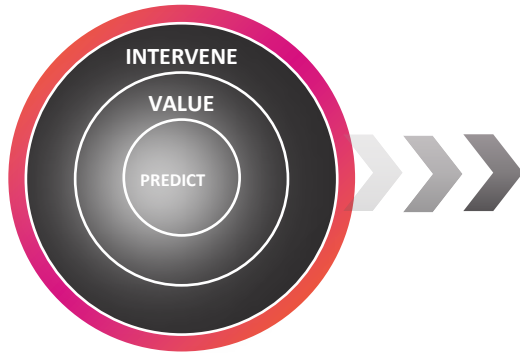
IMPROVING POPULATION HEALTH



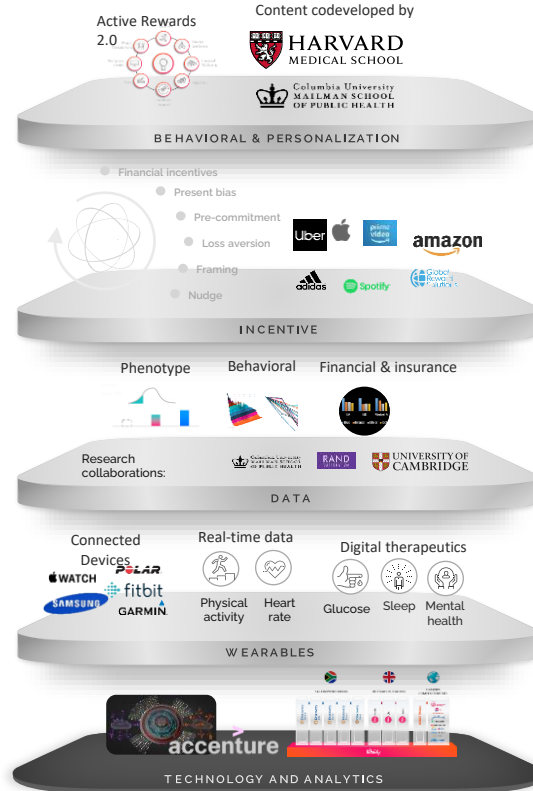
REPLICATING BEHAVIOR CHANGE AT SCALE



A HIGHLY SOPHISTICATED BEHAVIORAL ENGINE



That unlocks a superior value chain in healthcare



Multiple insights from behavioral science: framing, goal setting, loss aversion and financial incentives to help members make healthy decisions

Leveraging these insights, the platform offers multiple rewards constructs which allow employers and health plans to manage member health and optimize spend

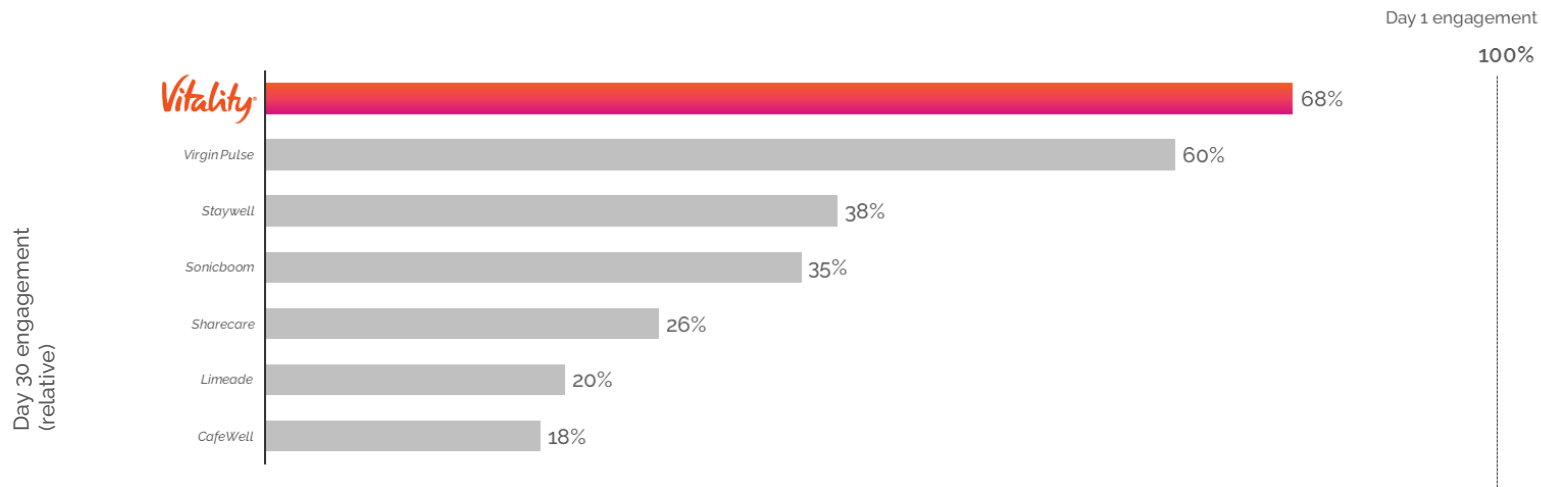
Vitality's data layer pulls together verified data from multiple connected devices, claims data, clinical data and other third-party sources

This enables real-time feedback and personalized pathways for users while also providing segmented and actionable insights to employers and health plans. The program offers modularity and integration with existing systems and processes

SUSTAINED ENGAGEMENT



VITALITY HAS MARKET LEADING ENGAGEMENT, AND CONSUMERS STAY ENGAGED IN THE LONG TERM



66%

Of members complete point earning activities each month

87%

Client satisfaction with engagement results

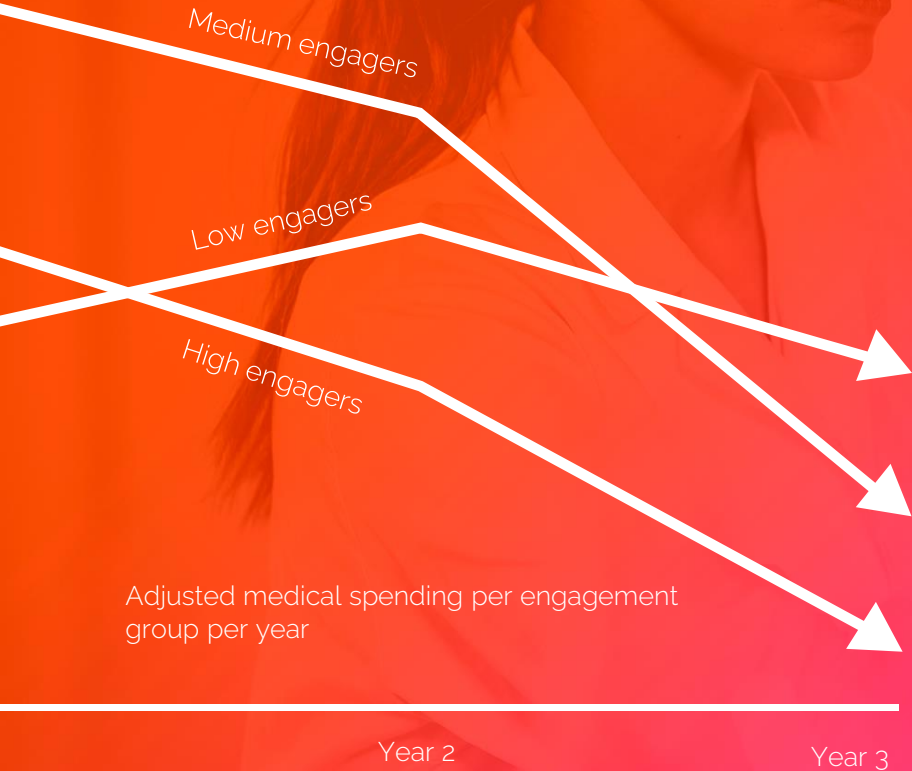
95%

Of members say that Vitality helps improve habits that will continue with them in the long-term

94%

Of engaged members say Vitality keeps them interested year after year

McKESSON



\$4.7M

In medical cost savings for McKesson in 3 years

92%

Increase in activity levels in 3 years

70%

Decrease in low engaged population in 3 years

BEHAVIORAL INSIGHTS



PRESENT
BIAS

96%
FAT
FREE

4%
FAT

FRAMING





LOSS
AVERSION



A word cloud of behavioral economics terms. The words are arranged in a circular pattern around the central text 'BEHAVIORAL ECONOMICS'. The words vary in size and orientation, creating a dynamic visual effect. The background is white with a vertical orange-to-pink gradient bar on the left side.

**BEHAVIORAL
ECONOMICS**

OPTIMISM BIAS FAIRNESS
HINDSIGHT BIAS MENTAL ACCOUNTING OVERCONFIDENCE (EFFECT) RECOGNITION HEURISTIC SUNK COST FALLACY
HEURISTIC DECOY EFFECT MYOPIC LOSS AVERSION (BEHAVIORAL) GAME THEORY ZERO PRICE EFFECT SCARCITY (HEURISTIC)
DECISION STAGING RATIO BIAS HALO EFFECT FAST AND FRUGAL DIVERSIFICATION BIAS
TRUST COMMITMENT GAMBLER'S FALLACY (HOT-COLD) EMPATHY GAP IDENTITY ECONOMICS ALTRUISM
AMBIGUITY (UNCERTAINTY) AVERSION SELF-CONTROL FRAMING EFFECT PEAK-END RULE PARTITIONING NAIVE ALLOCATION
INEQUITY AVERSION HERD BEHAVIOR INERTIA SOCIAL PREFERENCES TAKE-THE-BEST (HEURISTIC) STATUS QUO BIAS
PRESENT BIAS ANCHORING (HEURISTIC)
HONESTY HEDONIC ADAPTATION DISPOSITION EFFECT
INFORMATION AVOIDANCE COGNITIVE BIAS PREFERENCE
UTILITY (MYOPIC) PROCRASTINATION DEFAULT (OPTION/SETTING)
INTERTEMPORAL CHOICE SOCIAL PROOF HOMO ECONOMICUS
DUAL-SYSTEM THEORY RECIPROCITY SOCIAL NORM TIME (TEMPORAL) DISCOUNTING
CONTROL PREMIUM MINDLESS EATING NUDGE RISK-AS-FEELINGS
EFFICIENT MARKET HYPOTHESIS PROSPECT THEORY PAIN OF PAYING EGO DEPLETION ACTION BIAS DUAL-SELF MODEL IKEA EFFECT
PRE-COMMITMENT REGRET AVERSION AFFECT HEURISTIC SATISFICING OVERJUSTIFICATION EFFECT ELIMINATION-BY-ASPECTS
CERTAINTY/POSSIBILITY EFFECTS CONFIRMATION BIAS PRIMING (CONCEPTUAL) LICENSING EFFECT LOSS AVERSION LESS-IS-BETTER EFFECT
(ECONOMIC) BUBBLE REGULATORY FOCUS THEORY CHOICE OVERLOAD BOUNDED RATIONALITY HABIT
PREFERENCE REVERSAL ENDOWMENT EFFECT DECISION FATIGUE
SCARCITY (PSYCHOLOGY OF) AVAILABILITY HEURISTIC
REFERENCE DEPENDENCE REPRESENTATIVENESS HEURISTIC
CHOICE ARCHITECTURE COGNITIVE DISSONANCE PROJECTION BIAS

EXAMPLES OF BEHAVIOR CHANGE

Healthy

- Annual flu shot
- Depression Survey
- Pre-renewal Information
- Cancer Screening
- Annual check-up / wellness exam
- Use a wearable device to monitor activity
- Check-in with a wireless scale

- Increasing Physical activity
- Managing weight
- Sleeping better
- Dealing with stress

At-risk /
chronic

- Annual check-up / wellness exam
- Annual flu shot and other vaccinations
- Register for disease management program
- Use price transparency / care navigation tools
- Sign up for automatic prescription refills
- Use telemedicine offerings

- Increasing Physical activity
- Managing weight
- Medication adherence / Rx Sustained fillers
- Using network providers
- Managing a chronic condition

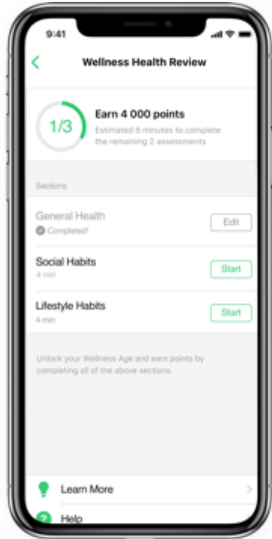
Simple / once-off behavior

Ongoing habit

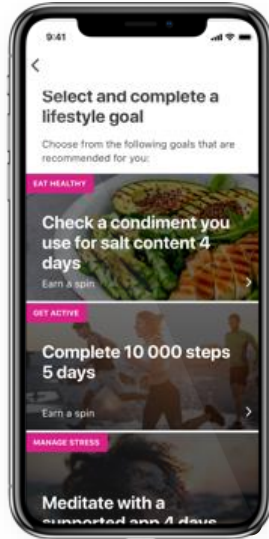
SCIENCE BACKED, PROVEN SET OF CAPABILITIES THAT CAN BE TAILORED TO UNIQUE BEHAVIORAL NEEDS



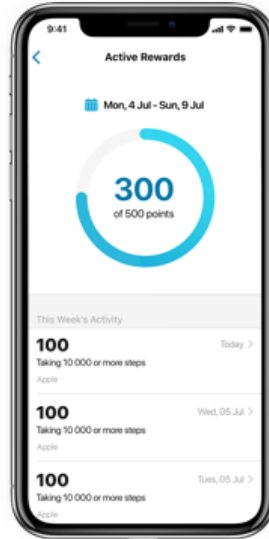
Assessments



Personalized Goals



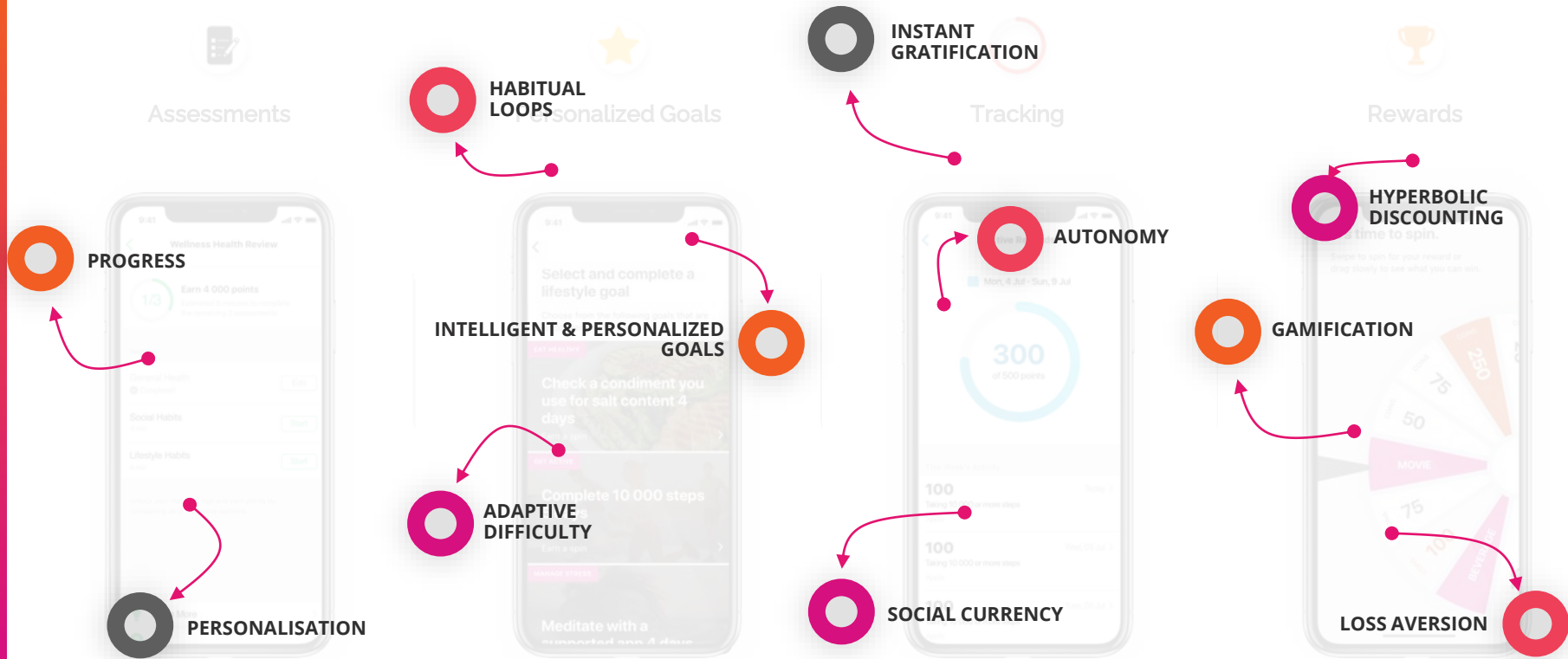
Tracking



Rewards



SCIENCE BACKED, PROVEN SET OF CAPABILITIES THAT CAN BE TAILORED TO UNIQUE BEHAVIORAL NEEDS



PRESENT BIAS

LOSS AVERSION

FINANCIAL INCENTIVES

FRAMING



PRE-COMMITMENT

Broadening Access

Incentivizing Behavior Change

Sustaining Improvements

CASE STUDY: INCENTIVE DESIGN



Get Apple Watch



Get Active



Get Rewarded

34%

average increase in activity levels
for people with Apple Watch



Increase in activity for high-risk groups improved:



200%



160%



109%

422,643 participants · 3 years · 3 countries

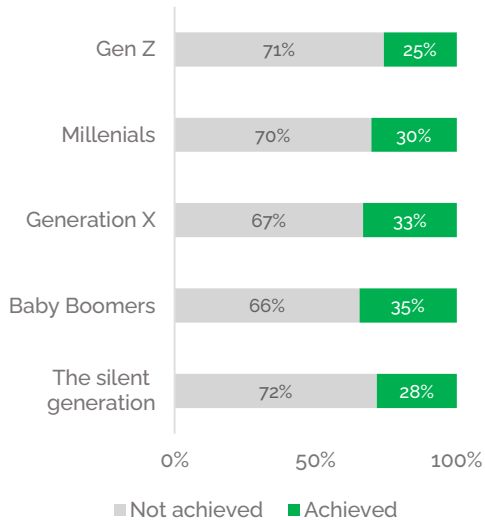


AT-RISK POPULATIONS

SUCCESS IN OLDER POPULATIONS

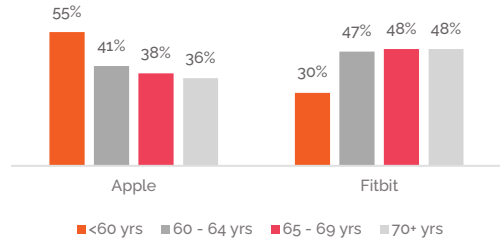
We have seen similar goal achievement rates in older populations on one of our major US health plan clients

Member demographics and Active Rewards Progress (All time)



Vitality members >60 were found to use devices and engage with the program

Rate of Apple and Fitbit events were similar across populations

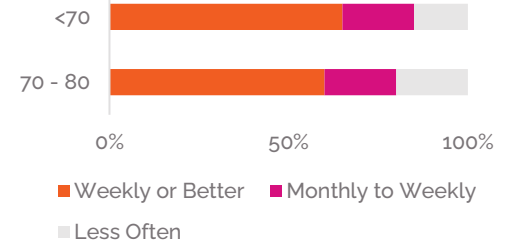


Older members (>60 yrs.) had high levels of engagement in VHR, health check, activity and preventative care

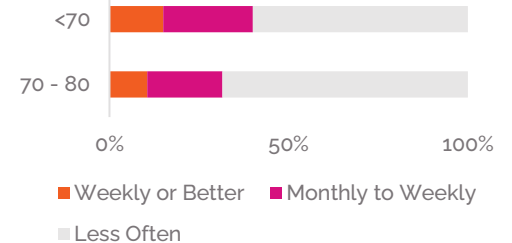
- >50%** Members completed the VHR
- >44%** Members with verified workouts
- >36%** Members received a flu shot

In our partnership with John Hancock, we have engaged older populations digitally

Mobile app usage amongst seniors was similar to younger populations




Website usage amongst seniors is similar to younger populations



Research indicates that use of pulse oximeters for remote monitoring reduces mortality in high risk individuals

Discovery data shows reduction in high risk member mortality

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SAMJ RESEARCH

The impact of routine pulse oximetry use on outcomes in COVID-19-infected patients at increased risk of severe disease: A retrospective cohort analysis

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Background. The phenomenon of silent hypoxaemia has been described in patients with COVID-19 pneumonia, which is characterised by low oxygen saturation levels of <90% in those who appear clinically well and do not show signs of significant respiratory distress. Objectives. To assess the impact on clinical outcomes for high-risk COVID-19 patients using a pulse oximeter to monitor oxygen levels in a home setting.

Methods. We performed a retrospective cohort analysis using data from a large South African insurance company, categorised as high risk, based on age and specific underlying clinical conditions, or from predictive administrative claims data. The impact of pulse oximetry home monitoring on COVID-19 clinical outcomes was assessed using Cox proportional hazard models.

Results. Between 2 March 2020 and 31 October 2020, of 38 660 patients analysed, 8 115 were in the high-risk population. The mortality rate for the evaluated high-risk population was 1.35%. After adjusting for age and comorbidity, the high-risk group was found to have an adjusted hazard ratio of 0.52 ($p < 0.0001$). No statistical significance was observed between the control groups for admission to hospital, admission to intensive care and ICU and use of mechanical ventilation. High-risk patients had a lower median C-reactive protein (CRP) level on admission ($p = 0.03$). After adjustment for CRP, the high-risk group was associated with an increased mortality ($p < 0.0001$), while the statistical significance in mortality by CRP was lost.

Conclusions. High-risk COVID-19 patients who used a pulse oximeter to monitor oxygen saturation levels had significantly lower mortality rates compared with other high-risk patients. The mortality benefit may be explained by lower initial CRP levels.

S Afr Med J. Published online 3 September 2021. <https://doi.org/10.7196/SAMJ.2021.1110101538>



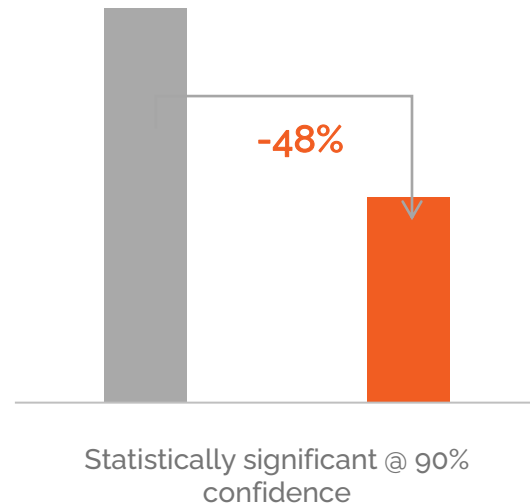
“

High-risk COVID-19 patients who used a pulse oximeter to monitor oxygen saturation levels had significantly lower mortality rates compared with other high-risk patients.

”

0.52

Adjusted hazard ratio

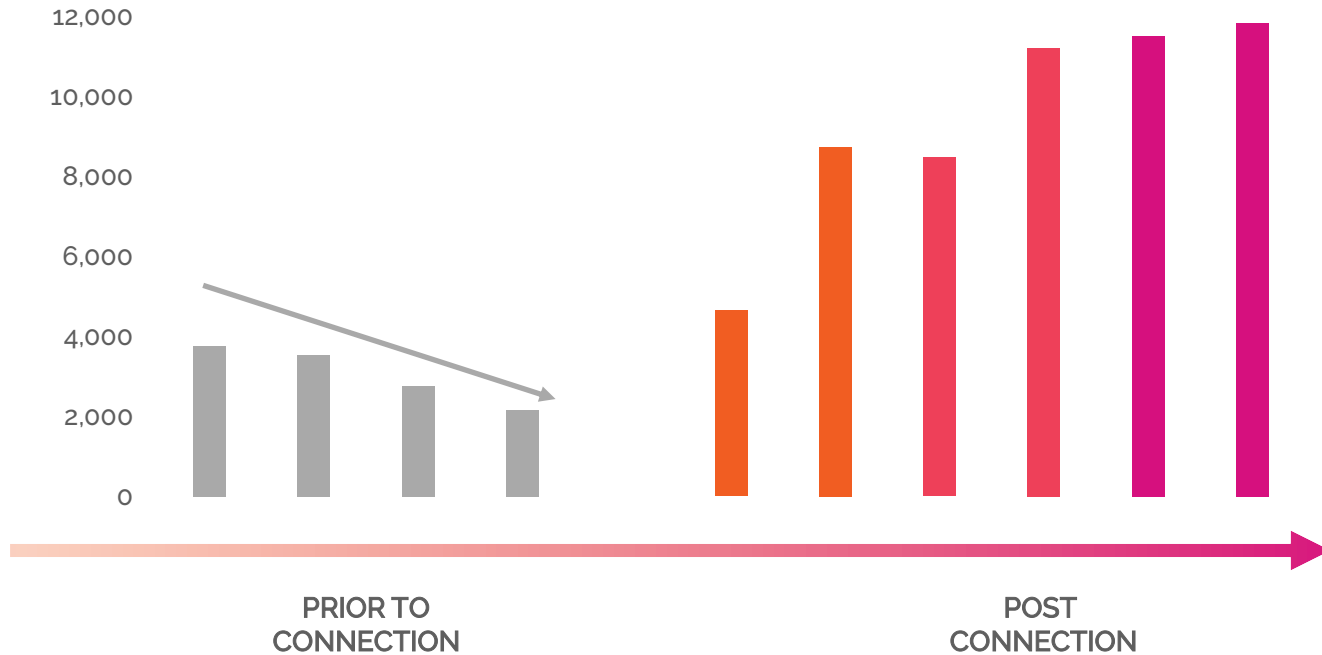


Source: Discovery Health Medical Scheme

RIGHT CARE, RIGHT PLACE,
RIGHT TIME

WEIGHT MANAGEMENT ATTENDANCE AFTER CONNECTING TO VITALITY

MCKESSON



PARTNER ECOSYSTEM

Setup to maximize long-term network effects

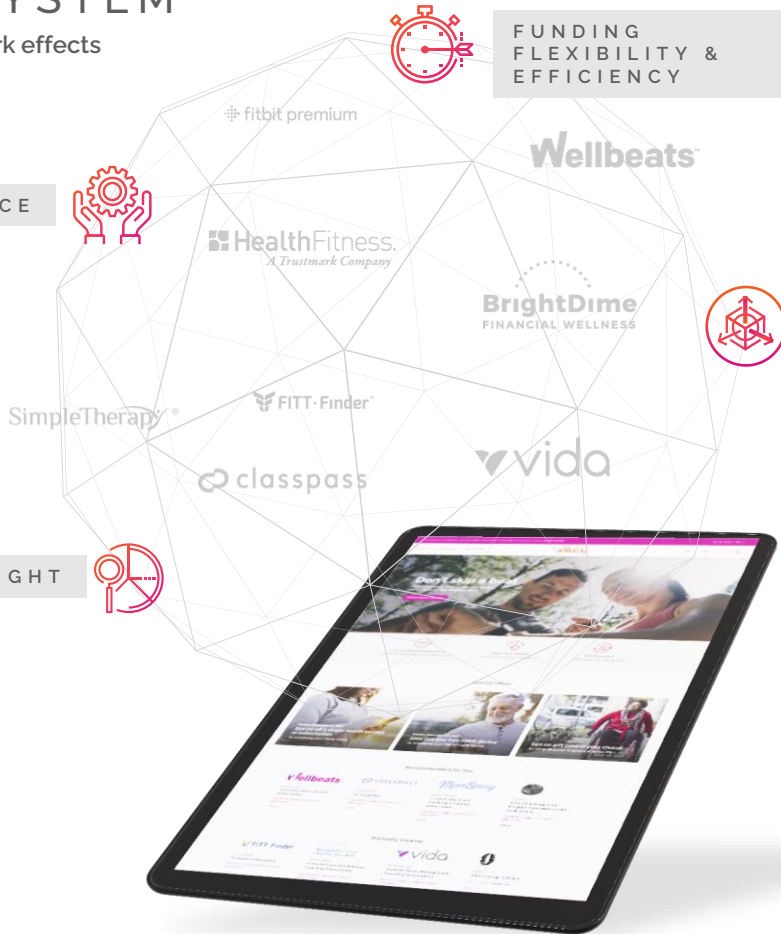
Strategic communication
Responsive to employee needs
Drives engagement

GUIDANCE



Partner usage data
Unique insights
Gauge employee sentiment

INSIGHT



Funding flexibility
Market-first PAYG funding
No risk on budgets

EASE AND
PERSONALIZATION

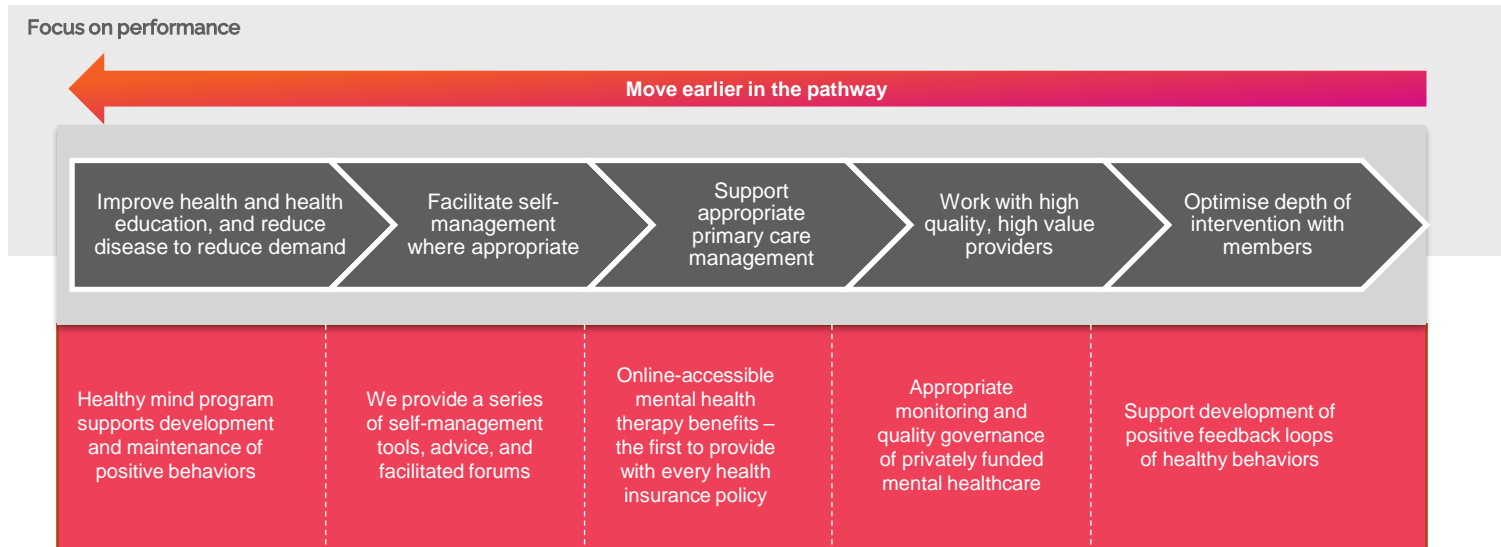
One contract
One partner
Puts the choice in members' hands

GATEWAY FLEX

Our **open architecture platform** offers choice to members and drives them to the **right solutions at the right time**

DUE TO SUCCESSFUL MEMBER ENGAGEMENT, OUR INSIGHTS ENABLE EARLY INTERVENTIONS AND DIRECTED CARE FOR MENTAL HEALTH

Mental Health Pathways provide support at every step



EACH OF OUR HEALTH AND DISEASE PATHWAYS HAVE MULTIPLE POINTS OF INFLUENCE IMPROVING OUTCOMES AND COST OF CARE

Our data-driven Musculoskeletal Pathways provide valuable insights throughout the care journey



PRE-SYMPTOM

SYMPTOM TRIAGE

AUTHORIZATION

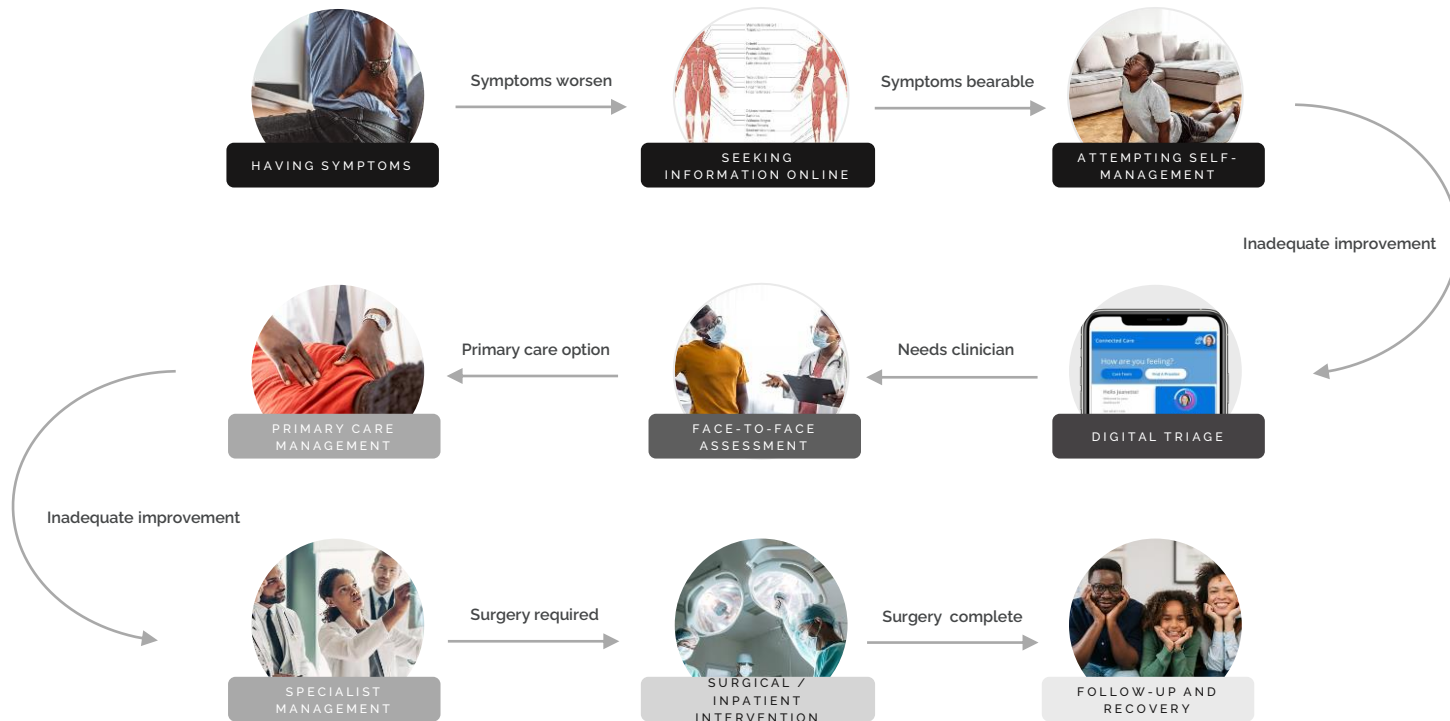
FINDING CARE

RECEIVING CARE

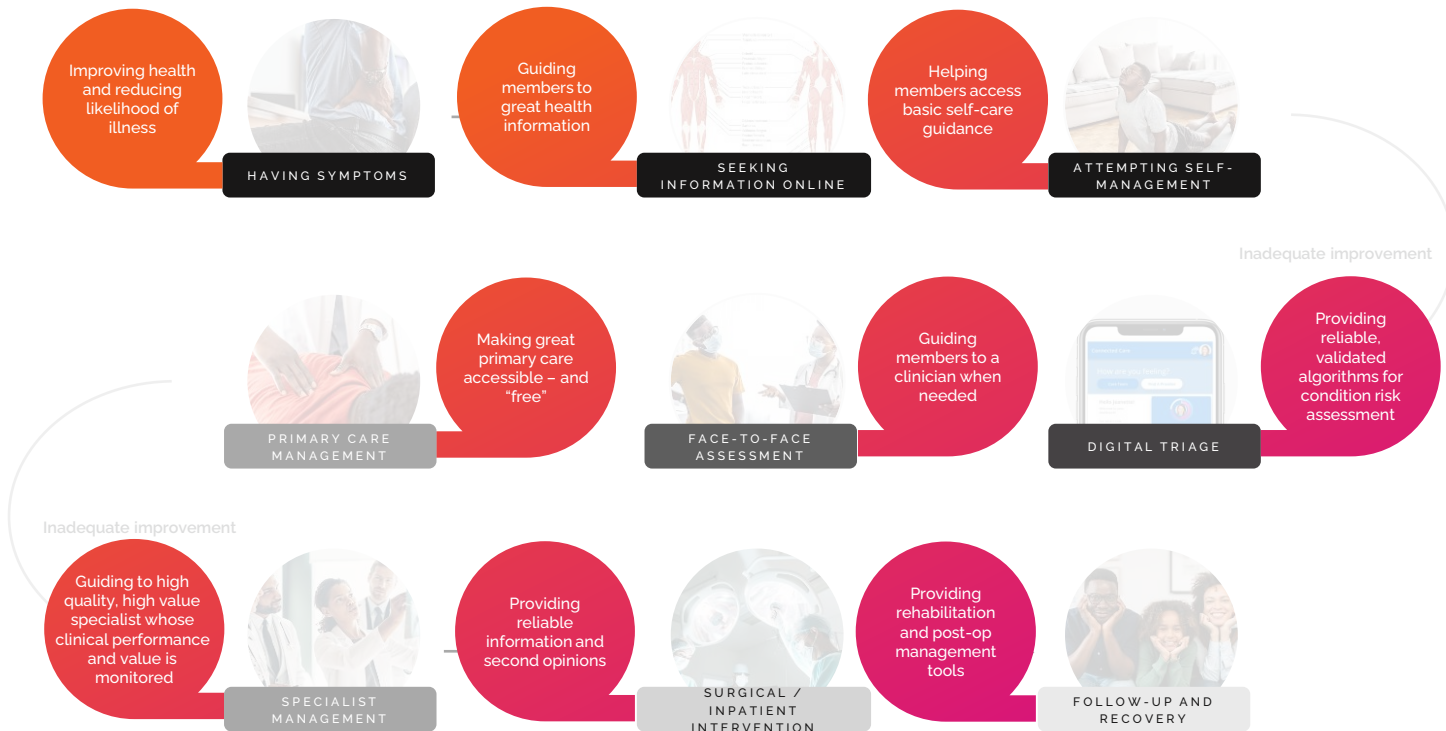
POST-CARE RECOVERY

TRACKED INFORMATION

FOR MUSCULOSKELETAL CARE, WE SYSTEMATICALLY EVALUATE “WHERE” AND “HOW” TO INFLUENCE BEHAVIOR...



... AND ARE ABLE TO POSITIVELY INFLUENCE CUSTOMERS AT EACH STEP

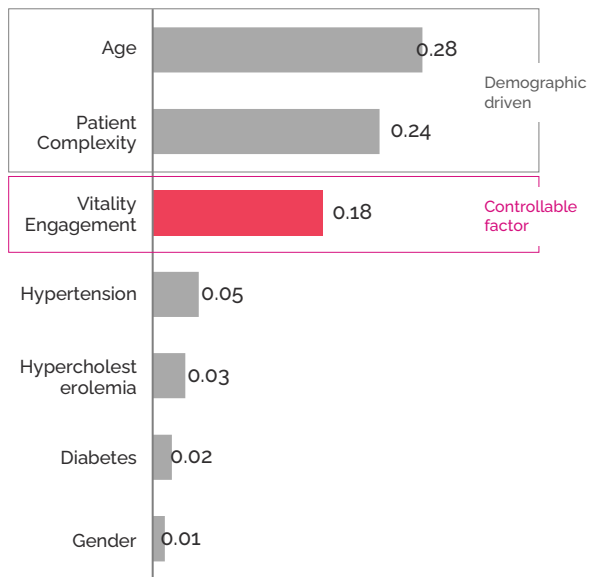


LEARNINGS FROM COVID

WE'VE LEARNED THAT LIFESTYLE FACTORS AFFECTING NCDs ALSO AFFECT COVID-19 MORTALITY AND MORBIDITY

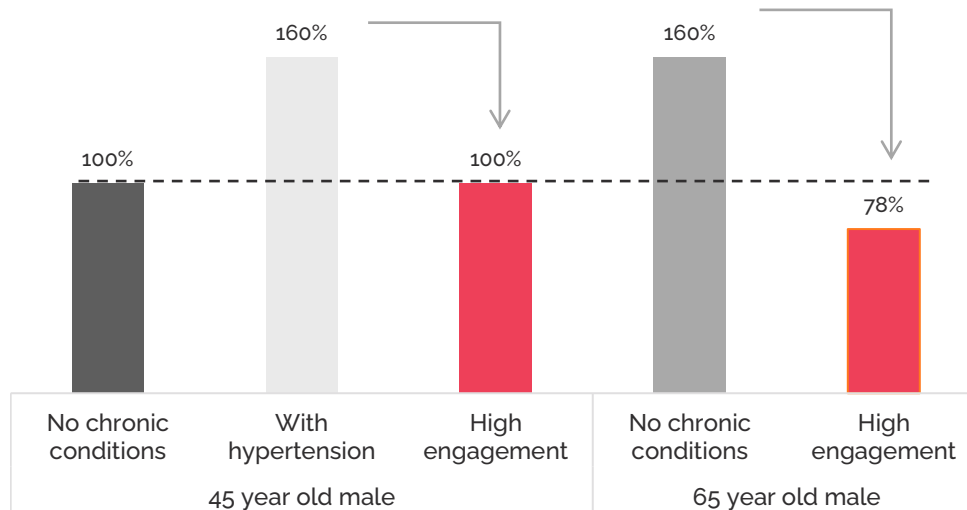
Top contributing COVID-19 risk factors

Risk factors for COVID-19 hospital admission



Vitality engagement is a driving factor in improving COVID-19 resilience

COVID-19 mortality risk by health status and engagement



Elevated risk of chronic condition is modulated

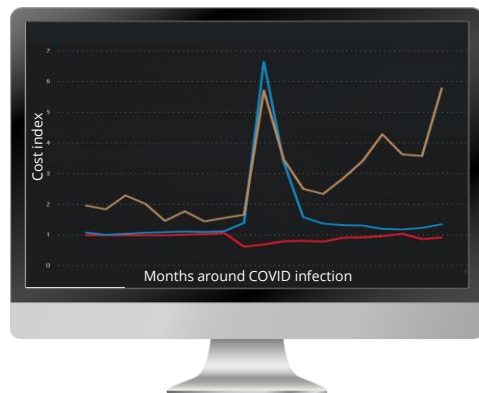


Elevated risk of aging is modulated

LONG COVID TRENDS ARE BEGINNING TO EMERGE

EVIDENCE OF LONG COVID EMERGING IN HEALTHCARE CLAIMS

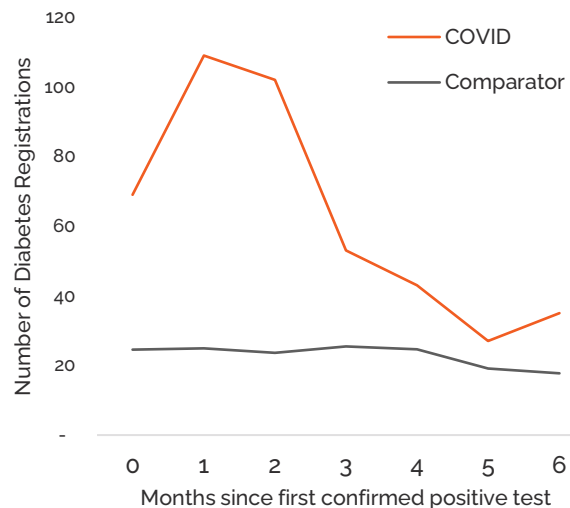
- Claims data post initial COVID suggest a lagging, extended COVID effect
- Those with poorer pre-existing health status are more at risk



- Cost for non-COVID positive
- Cost for members with single COVID infection
- Cost for members with REINFECTION

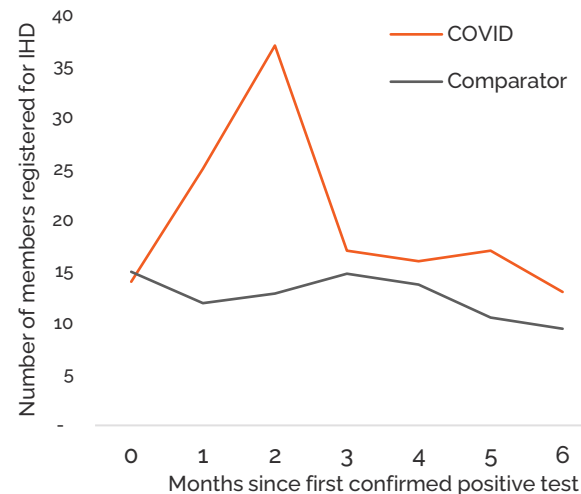
ONSET OF DIABETES MELLITUS POST COVID

2.75X Higher risk of developing Diabetes
5x higher if hospitalised



ONSET OF CARDIAC CONDITIONS POST COVID

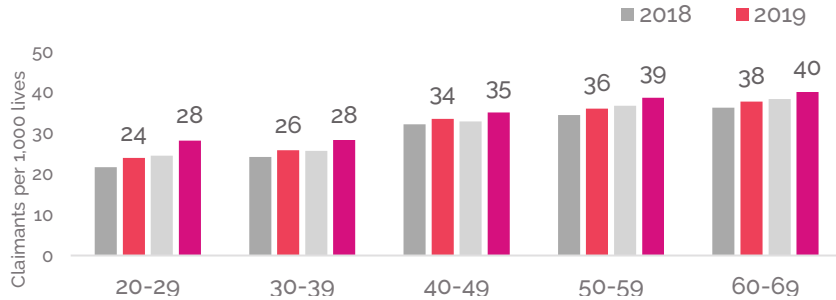
1.5X Higher risk of developing a
Cardiac condition
3.5x higher if hospitalised



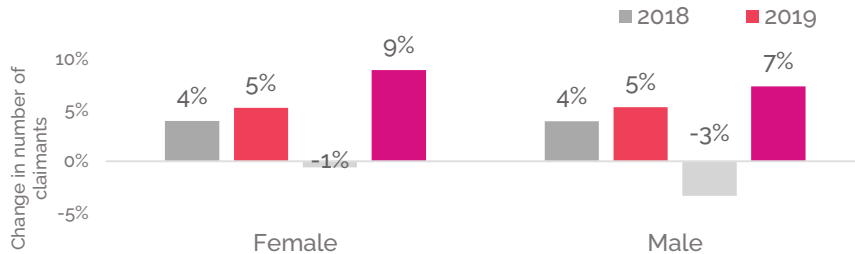
GROWING MENTAL HEALTH ISSUES AND EARLY INDICATIONS THAT PRODUCTIVITY GAINS ARE LEADING TO BURNOUT

Growing mental health issues, particularly amongst females

20.2% increase in Psychosocial claims for 25-29 age group (2019-2021)

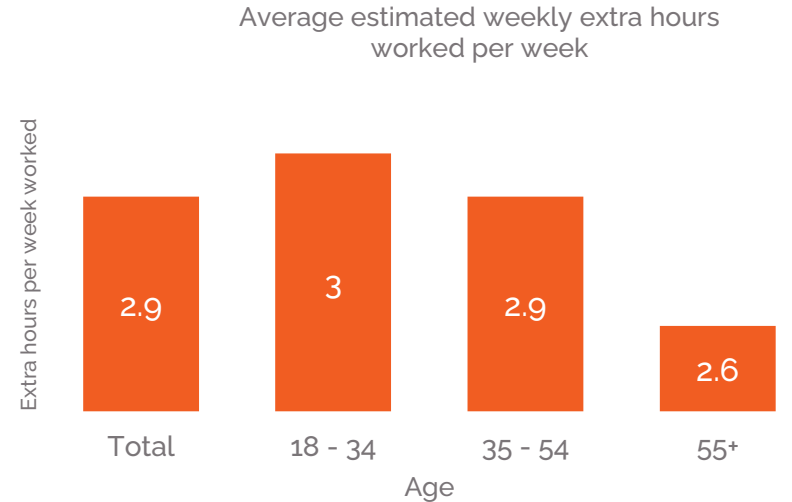


8.2% increase in Psychosocial claims for Females (2019-2021)



Employees are working harder but this may be just a productivity honeymoon ahead of long term burn out

40% of people are replacing the time that is gained from their commute with extra time working





THANK YOU

Vitality[®]