



The Future of Workplace Health

<https://www.pwc.com/sg/en/industries/pharmaceutical-and-lifesciences.html>



A collaborative, data-driven, evidence-based report

In a recent conversation with Minister of Health, Gan Kim Yong, our discussion included talking about the various stakeholders in Singapore who play vital roles in improving health across Singapore. Minister Gan was absolutely right in pointing out that one of the key stakeholders are employers and that it is imperative for them to play a role through initiatives and working environments that promote better health. Our conversation could not have been timelier as we were in the midst of this collaborative report on improving health in the workplace. The multitude of benefits from paying proper attention to the health of employees or workers are well known and clearly articulated by the World Health Organization.¹ Reflecting on Minister's thoughts and the importance of workplace health promotion made me think of PwC's very own and recently implemented new ways of working and emphasis on workplace health promotion. And then the penny dropped. Rather than the three kilos of weight loss I experienced after moving to our new office being attributed to what I was convinced was the big C or some rare medical condition we doctors often diagnose only in ourselves, perhaps it was the convenient access to healthier food options, the lack of the vending machine I used to get my daily fix of Oreos from, the adjustable standing desks, the extra little walk because of the hot desk system, and the flexible wellness benefits to name just a few. In this collaborative The Future of Workplace Health report with Singapore's Health Promotion Board and Senior Health Economist, Dr. Joanne Yoong, PwC aims to identify the trends and key issues in workplace health based on available data, and propose and share evidence-based recommendations and a framework for interventions.

Dr. Zubin J Daruwalla

Health Industries Leader, PwC South East Asia Consulting

Over the recent years, the Health Promotion Board has continued to shape healthy living behaviours and provide Singaporeans with the impetus to make incremental changes to live more healthily. Encouraging a nation to adopt healthier practices and shift behaviours requires a collective effort. With a large majority of Singapore's population in the workforce, the workplace setting is an important area that HPB will continue to invest in.

In this joint report with PwC on The Future of Workplace Health, we highlight positive trends and concerning issues regarding workplace health promotion, and provide a set of recommendations that may inspire more companies to join us on this journey, and recognise how workplace health promotion can lead to a healthier and more productive workforce.

Throughout this journey of bringing health to the doorstep of workers, our partners have been with us in co-creating solutions. We are thankful for their extensive support, and look forward to furthering our collective efforts to make Singapore a nation of healthy and happy people.

Mr. Sim Beng Khoon

Director (Workplace Health & Outreach), Health Promotion Board, Singapore

With the changing profile of global disease burden, including earlier onset of lifestyle-driven chronic diseases, workplace wellness programs are potentially a key building block for population physical and mental health. Well-implemented, evidence-based programs can help support a healthier and more productive workforce as well as contribute more broadly to a holistic culture of health that lasts beyond the working years. However, in practice, the tangible value of such programs to employers and to society is not often strongly established. Understanding the drivers of economic value in workplace health promotion and how these vary across interventions and stakeholders is a critical first step towards optimizing their design in order to create and maintain an effective and sustainable platform for delivery, and incentivizing more effective participation in this space. As both the future of work and the technologies for delivering health promotion continue to evolve rapidly, this will continue to be an effective area for future research and innovation.

Dr. Joanne Yoong

Senior Economist and Director
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¹World Health Organization, Occupational Health, http://www.who.int/occupational_health/topics/workplace/en/index1.html

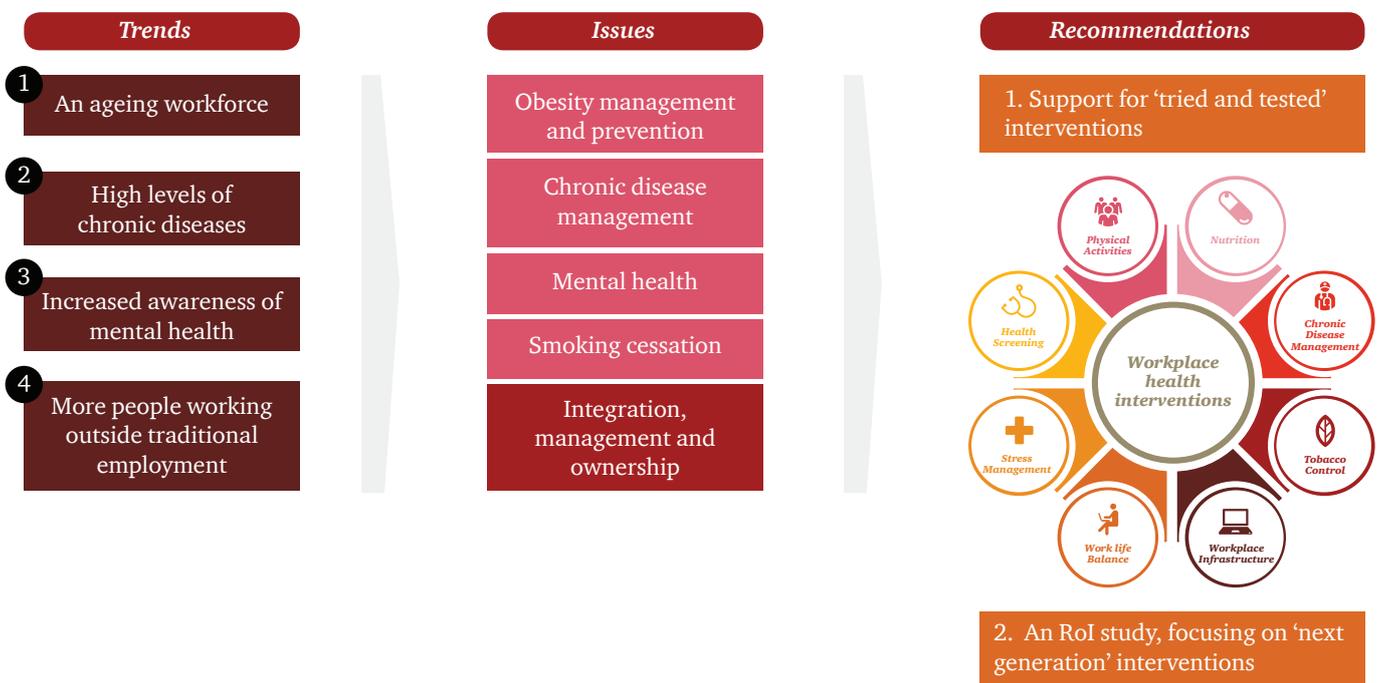
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Executive Summary

With 8 in 10 Singaporeans aged 25 to 64 being employed,² the workplace plays an important role in supporting healthy behaviours and improving health outcomes. Effective workplace health promotion programmes can reduce modifiable risk factors for disease (for example, addressing obesity and reducing tobacco use), as well as improve productivity and reduce absenteeism.³ When designed, delivered and evaluated appropriately, workplace health promotion programmes can lead to benefits for employees, employers, health providers and society at large. There are many stakeholders involved in workplace health promotion. This report builds on the existing work of Singapore's Health Promotion Board (HPB) to identify:

- **Trends** affecting workplace health;
- **Key issues** in workplace health; and
- **Recommendations** to support increased activity and impact by the HPB, including potential interventions based on global best practice and evidence, as well as further work to understand the Return on Investment (RoI) of 'next generation' workplace health interventions.



Trends

Both in Singapore and globally, we are seeing a shift towards:

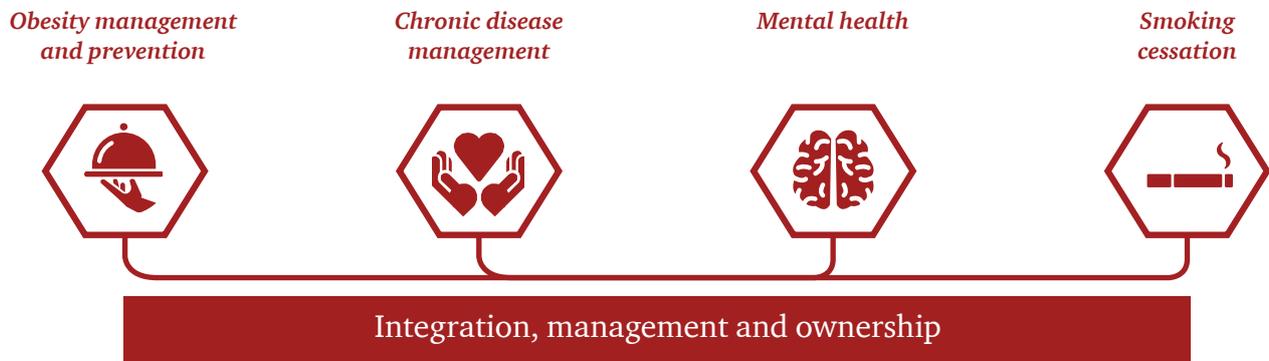
- **An ageing population** – people are living and working for longer, with an increase in the median age of the workforce;
- **High levels of chronic diseases** – long-lasting conditions such as diabetes and cardiovascular disease are increasing, requiring ongoing management in the workplace as well as in the home;
- **Increased awareness of mental health** – the public is increasingly conscious of mental health conditions, including their link to the workplace through stress; and
- **More people working outside traditional employer-employee relationships** – the occupational health impact of 'the gig economy' is yet to be fully understood, with regulatory and other issues still to be addressed.

²Ministry of Manpower (2017), Labour Force in Singapore, <http://stats.mom.gov.sg/Pages/Labour-Force-In-Singapore-2017.aspx>.

³Hendriksen et al (2016), 'Effectiveness of a Multilevel Workplace Health Promotion Program on Vitality, Health and Work-Related Outcomes', Journal of Occupational and Environmental Medicine, 58 (6), p. 575; Health and Productivity Institute of Australia (2010), 'Best Practice Guidelines: Workplace Health in Australia'.

Issues

These trends support an increased focus on preventive health and management of chronic diseases for workplace health promotion programmes. Broadly, the four focus areas of the HPB – obesity management and prevention; chronic disease management; mental health; and smoking cessation – remain valid and important. However, there is a need to focus on cross-cutting success factors – integration, management and ownership – underlying these areas, both at a policy and programme level.



Recommendations

To support increased activity and impact by HPB as we look towards the workplace of the future, we recommend a dual approach:

1. Support employers to effectively implement a range of best practice, evidence-based ('tried and tested') interventions

To support employers to understand the evidence base, we have developed a framework for workplace health interventions, covering 8 categories of interventions. Within each of these categories, we set out a high-level overview of the current state of evidence on the effectiveness of interventions. We support a cross-cutting focus on integration, management and ownership, across these 8 categories.



2. Undertake a study on the Return on Investment (RoI) of workplace health programmes, focusing on 'next generation' workplace health programmes

There is a need to quantify the Return on Investment (RoI) of workplace health programmes, to support further investment by the public and private sectors. This is a complex exercise, which can examine the RoI to employees, employers, health providers and society at large. This exercise also represents an opportunity to evaluate several 'next generation' workplace health programmes – many involving the use of new technologies – which as yet, remain untested.

Workplace Health in Singapore

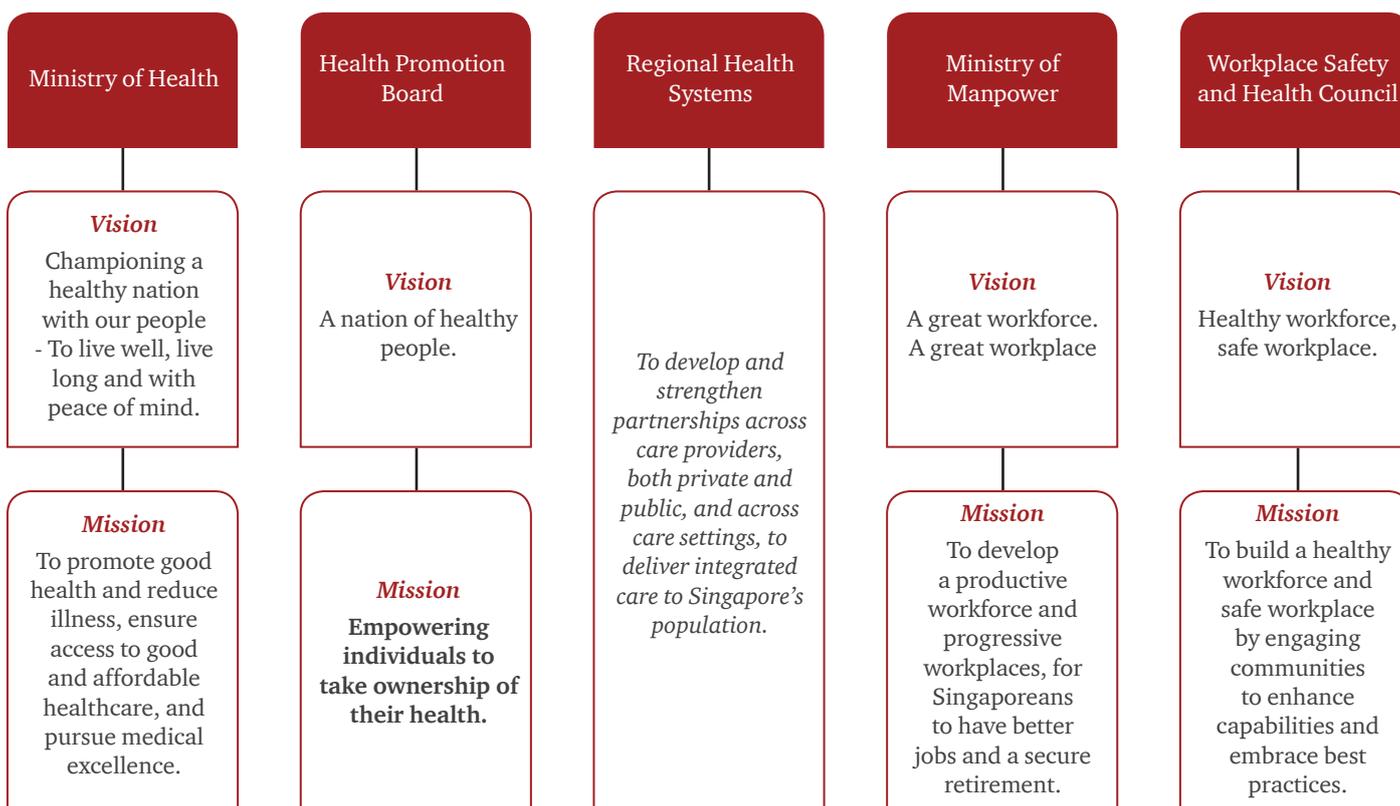
Singapore has one of the highest employment rates in Asia and globally.⁴ In 2017, the percentage of the Singaporean population aged 25 to 64 that was employed was 80.7% (or 2.2 million people nationally).⁵ The workplace is hence an important setting to influence health behaviours amongst Singaporeans. Effective workplace health programmes can positively impact health outcomes and improve business indicators.

According to WHO's Healthy Workplace Framework and Model (2010),⁶ a healthy workplace is one in which workers and managers collaborate to use a continual improvement process to protect and promote the health, safety and well-being of all workers and the sustainability of the workplace. This requires a holistic and integrated approach to manage the work, safety and health aspects, so as to promote the well-being of workers. The following shows the continual spectrum of issues concerning the well-being of a worker.

Government
Management
Worker



In Singapore, the key government entities involved in the well-being of workers include:



Exploring further into the work to promote healthier workplaces across Singapore, this report focuses on the HPB's mandate with an emphasis on four major areas with HPB currently delivering activities through three main approaches – a cluster-based approach; a company-based approach and a sector-based approach.

⁴Ministry of Manpower (2017), Labour Force in Singapore, <http://stats.mom.gov.sg/Pages/Labour-Force-In-Singapore-2017.aspx>.
⁵Ministry of Manpower (2017), Labour Force in Singapore, <http://stats.mom.gov.sg/Pages/Labour-Force-In-Singapore-2017.aspx>.
⁶World Health Organization (2018), WHO's Healthy Workplace Framework and Model, http://www.who.int/occupational_health/healthy_workplace_framework.pdf.

Four focus areas

Obesity management and prevention



Chronic disease management



Mental health



Smoking cessation



Integration, management and ownership

Existing HPB activities

Cluster-based approach

The **Healthy Workplace Ecosystem** - partnering with commercial property developers and building owners to leverage on shared facilities and amenities within a cluster as health touch points to provide healthier meals or to conduct health activities, making healthy living convenient and accessible to all employees

Company-based approach

Supporting companies in setting up workplace health structures, policies and programmes.

- **SME Health +**: co-funded scheme that supports SMEs to implement impactful programmes
- **Workplace Alliance for Health**: HPB awards grants to curated wellness solutions providers, thereby co-funding innovative solutions to be implemented in private mid to large-sized companies.
- **War on Diabetes Package**: a workplace health promotion package for public agencies to implement

Sector-based approach

Bringing customised interventions to the doorstep of mature workers, across 7 priority sectors. The 7 priority sectors include transport & logistics, retail, F&B, cleaning, security, education and healthcare.

The annual **Singapore Health Award**, which rewards workplaces for outstanding initiatives

Pervasiveness of HPB's workplace health promotion efforts (as at end-FY17)

In FY17, HPB's efforts have reached 1 in 10 workers in Singapore, where:

- 250,000 workers have access to programmes offered under Healthy Workplace Ecosystems – including obesity management and prevention (physical activity and nutrition), chronic disease management (health screening and follow up), mental wellbeing and smoking cessation.
- 66,000 workers in 7 priority sectors have access to customised health interventions at their workplaces, covering age-related topics such as chronic disease management, and work-related topics such as ergonomics.
- 35,000 workers have access to company-based programmes such as the SME Workplace Health Package.⁷

⁷Health Promotion Board data (2018).

Analysis of current efforts by companies based on the Singapore Health Award (SHA) 2017

- A total of 204 companies applied for the Corporate Award of SHA 2017, and this contributes to 300,000 workers having access to workplace health promotion programmes at their workplaces between 2015 to 2017 with more than 25% of applications came from SMEs, and approximately 20% from public agencies.
- Of these 204 companies:
 - 179 organise health screening
 - 90 with follow up (either through a call or face-to-face health coaching)
 - 105 organise at least 1 targeted intervention for weight management, chronic disease management or smoking cessation.
 - 148 organise mental wellbeing programmes
 - 197 have holistic work policies.⁸

Some of the positive practices in workplaces identified under the Singapore Health Award 2017

- Positioning of workplace health promotion as a core business and organisation need through including it as part of performance management, with regular updates and feedback of workplace health promotion efforts to senior management.
- Facilitating the planning and implementing of workplace health promotion (i.e. conducting needs analyses and planning programmes specific to identified needs) through e-platforms and working around operational needs. For example, participation can be encouraged through allocating time-off for staff to attend health programmes during office hours, conducting health activities at branch sites, encouraging friendly competition through team-based activities or having app-based health interventions.
- Evaluating workplace health promotion efforts to ascertain effectiveness of programmes through collection and tracking of participation rates, pre- and post- activity responses, organisational indicators (e.g. employee engagement, sick leave rates, etc.) and health indicators (e.g. obesity rates, high blood cholesterol rates, smoking rates etc.)



⁸Health Promotion Board data (2018).

Key issues in workplace health

What are the key trends in our population?



An ageing workforce – the median age of Singapore’s workforce is increasing. The median age increased from 41 years old to 43 years old between 2007 and 2010,⁹ and is projected to increase further in line with overall demographic trends.

High levels of chronic diseases – the prevalence of diabetes among Singapore residents has increased over the decade, and is higher in older populations. Singaporeans have a 1 in 3 lifetime risk of developing diabetes,¹⁰ and over 400,000 Singaporeans currently live with diabetes.¹¹

Increased awareness of mental health conditions – approximately 1 in 8 Singaporeans (12%) has a mental disorder,¹² with the Government seeking to reduce the stigma of mental health conditions and encourage help-seeking behaviour. In 2016, approximately half (52%) of Singaporean workers surveyed said that their stress levels had gone up in the last six months, with long working hours resulting in burnout.¹³

More people working outside traditional employment – there were approximately 200,000 freelancers in Singapore in 2017 (9% of resident employment), with this number estimated to increase (particularly among millennials).¹⁴

⁹Ministry of Manpower (2017), Comprehensive Labour Force Survey.

¹⁰Ministry of Health (2017), National Health Surveys.

¹¹Ministry of Health (2017), ‘Diabetes – The War Continues’, https://www.moh.gov.sg/content/moh_web/home/pressRoom/pressRoomItemRelease/2017/diabetes--the-war-continues.html.

¹²Ministry of Health (2010), Singapore Mental Health Study.

¹³Roffey Park (2016), ‘Working in Asia Survey’ (a survey of 1,000 mid- and senior-level professionals in Singapore).

¹⁴The Straits Times (6 October 2017) (quoting figures from the Ministry of Manpower), <http://www.straitstimes.com/business/economy/growing-gig-economy-cushions-impact-of-weak-job-market>.

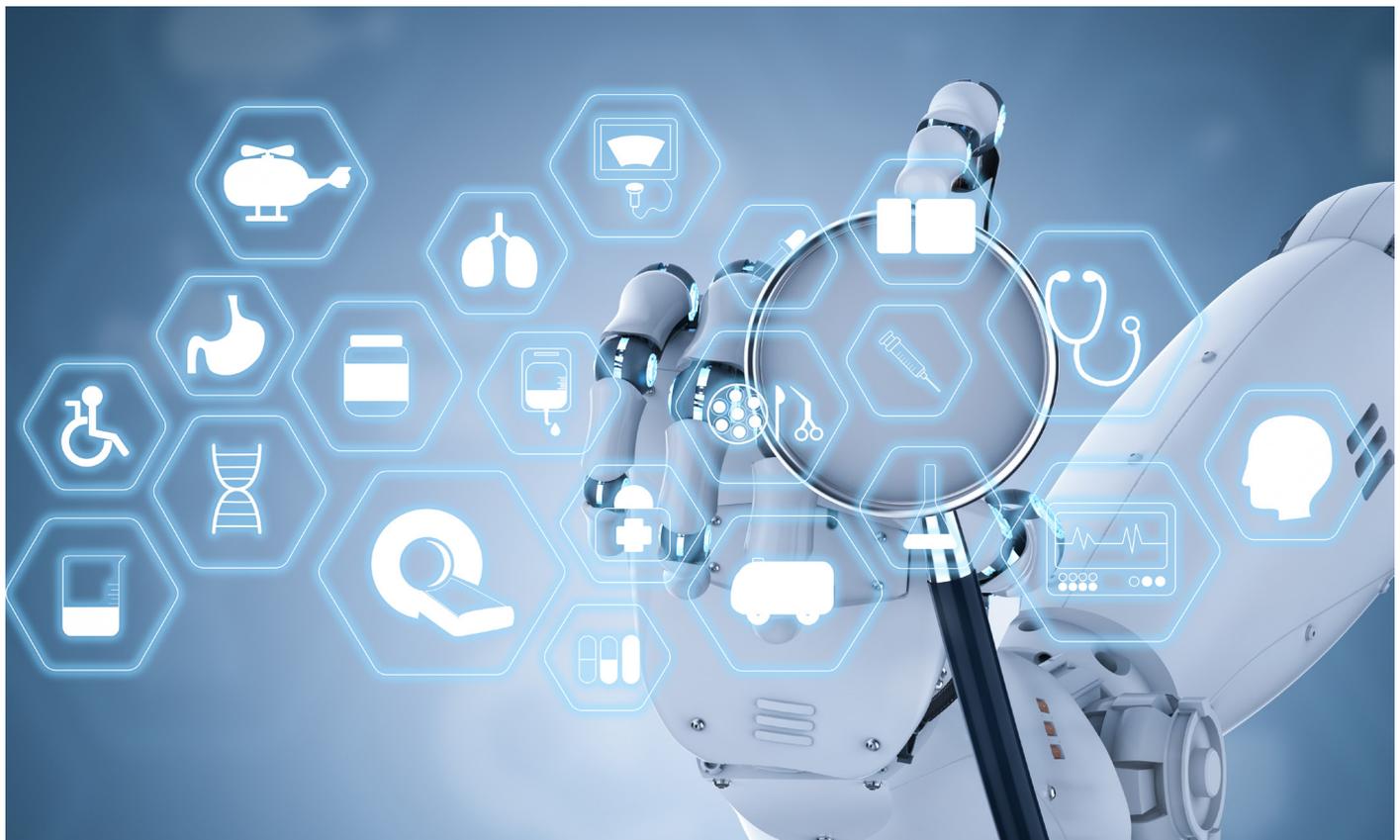
What does this mean for workplace health?

These trends – coupled with an increasing proportion of overweight people¹⁵ and relatively high smoking rates¹⁶ in Singapore – indicate that the HPB’s four focus areas continue to be vitally important.

However, the interaction of these trends and risk factors means that an **integrated approach to workplace health management** is increasingly important. As an example, the trend of an ageing workforce is likely to result in a higher prevalence of chronic conditions requiring management in the workplace. Similarly, the connection between poor physical and mental health is expected to be validated by a joint, nationwide study by the Institute of Mental Health (IMH) and the NUS Saw Swee Hock School of Public Health (SSHSPH), concluding in 2021.¹⁷

Several studies in workplace health promotion have concluded that health promotion programmes are most effective when they:

- Are comprehensive and multimodal,¹⁸ addressing both individual and environmental influences;¹⁹
- Address the fact that health practices are frequently interdependent (e.g. smoking, alcohol use, sleep and exercise patterns);¹⁹
- Are supported by management.¹⁹



¹⁵An HPB study on obesity found that the biggest increase in the proportion of overweight people came, unsurprisingly, during the transition to work: The Straits Times (20 June 2017), ‘Singapore Risks Hitting Obesity Rates of 15% in Seven Years’, <http://www.straitstimes.com/singapore/singapore-risks-hitting-obesity-rates-of-15-in-seven-years>.

¹⁶Smoking prevalence is relatively high in Singapore, compared to other developed countries. Prevalence of smoking (%) of male adults in Singapore was 28% in 2015, compared to 20% in the US, UK and Sweden, and 17% for Australia: World Health Organization (2018), Global Health Observatory Data Repository.

¹⁷National University of Singapore, School of Public Health (2017), <https://www.sph.nus.edu.sg/news-events/news/nationwide-study-connection-between-positive-mental-health-and-physical-health>.

¹⁸Goldgruber, J. and Ahrens, D. (2009) ‘Effectiveness of workplace health promotion and primary prevention interventions: a review’, *Journal of Public Health*, 18(1), pp.75-88.

¹⁹Shain, M. and Kramer, D.M. (2004), ‘Health Promotion in the Workplace Framing the Concept; Reviewing the Evidence’, *Occupational and Environmental Medicine*, 61, pp. 643-648.

What do we mean by integration, management and ownership?

Integration

Workplace health programmes have been shown to be more effective when designed to influence individual, organizational and environmental levels.¹

Programmes have also been shown to be more successful when they integrate workplace wellness with workplace safety, supporting optimal resource use.⁴ On the environmental level, positive impact has been observed when health is integrated into infrastructure, such as ergonomic furniture and accessible staircases.



Management

Workplace health programmes have been shown to be more effective with strong and consistent support from company leaders. This is because management support can:

- generate and preserve programme resources;
- increase legitimacy; and
- provide role modelling.¹

Wellness committees can be a helpful interface between employees and management.²

Programmes should also be made relevant and accessible to all workers, including those working shifts or remotely.

Management should also ensure that programmes are consistently evaluated, to demonstrate quantifiable benefits and enable course correction.



Ownership

Health self-efficacy (HSE) – the belief in one's own capacity to improve and maintain health – has been shown to be an important indicator of healthy decision-making. It has also been associated with increased programme effectiveness in smoking cessation, increased exercise and improved diet.³

Employee-initiated workplace programmes that support a sense of empowerment have also shown to bolster programme effectiveness.

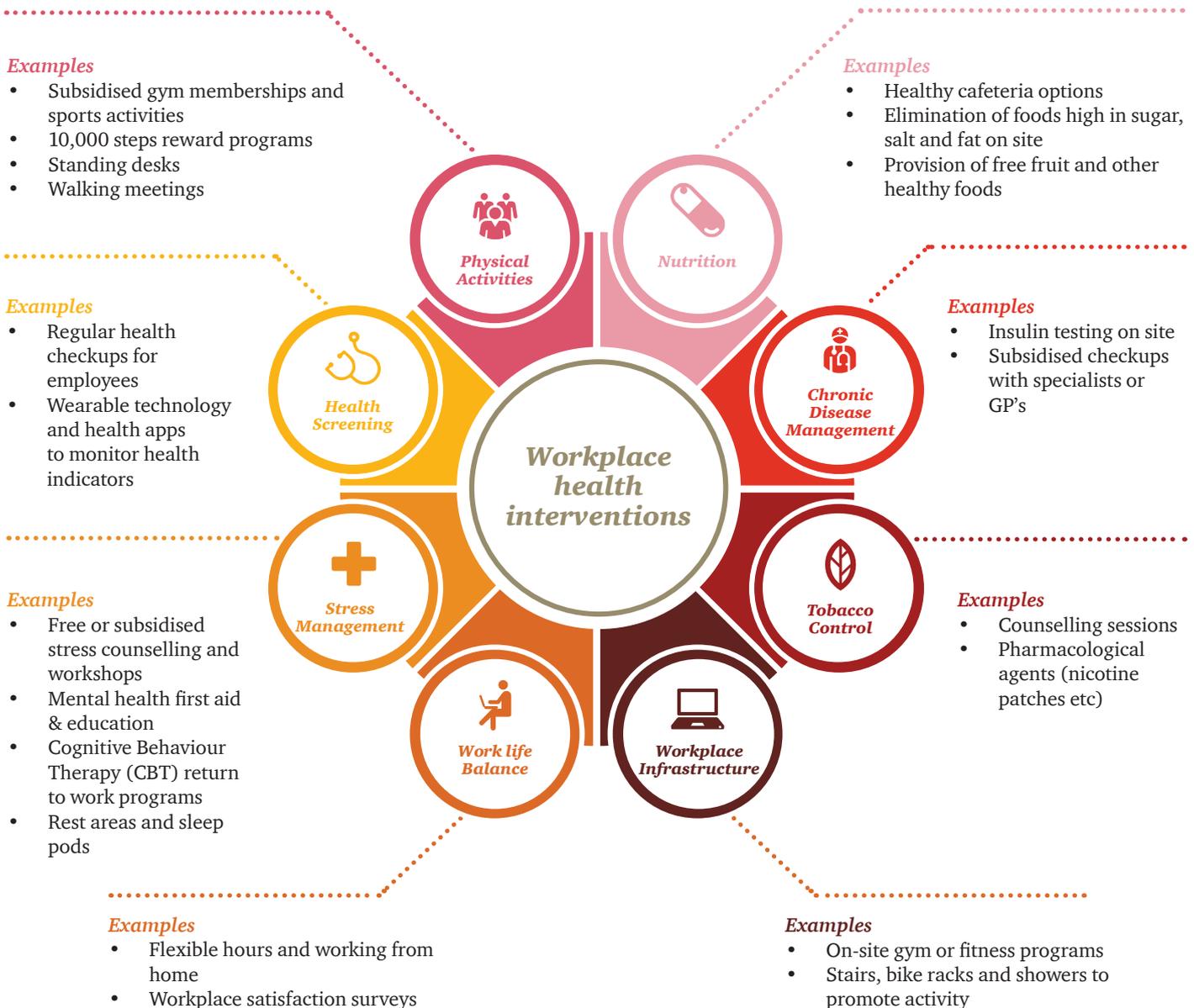
'Next generation' workplace health activities can support an even greater focus on ownership, through wearable technology and health monitoring apps.



A framework for interventions

To support employers to better understand the range of possible interventions available and their complementarity, we have developed a framework of 8 categories of intervention. These are not mutually exclusive – for example, standing desks or treadmills in office cut across both infrastructure and physical activity – however, these are intended to assist employers in their knowledge and prioritisation of programmes. The selection of interventions will depend on each workplace’s population, budget and resources. Underlying the choice of interventions should be a strong focus on integration, management and ownership, as discussed earlier.

Integration, management and ownership



Evidence-based, global best practice



Physical activity

Physical activity initiatives in the workplace, including subsidised gym memberships, pedometer use, walking meetings, and bike-to-work or public transit incentives, have shown significant evidence of benefits. These benefits have mainly been demonstrated in terms of reduction of individual risk factors, although some gains in terms of productivity and reduced health costs have also been identified. New initiatives such as standing desks and Treadmill desks are also being implemented – however, there is currently little evidence to prove the benefits of these initiatives.

A summary of the evidence relating to physical activity

Subsidised gym membership

- Employees with on-site fitness programmes were between 4% and 5% more productive than those without. Furthermore, those employers with such programmes in place experienced a cumulative benefit of \$500 to \$700 per worker per year for physical activity and aerobic fitness.²⁰
- Blue Cross Blue Shield of Minnesota (2007) conducted a year-long study of 74,000 members participating in their “Fitness Discounts” programme. They found that frequent users (defined as using a fitness center at least eight times per month) had insurance claim costs 17.8% lower than non-participants after adjusting for health history, as well as emergency room visit rates and hospital admission rates 38.7% and 41.4% lower than non-participants, respectively.²¹

Pedometer use / 10,000 steps reward programmes

- In one study, the use of a pedometer was associated with significant increases in physical activity, and significant decreases in body mass index (BMI) and blood pressure.²²
- A four-month, pedometer-based, physical activity, workplace health programme was associated with sustained improvements in chronic disease risk factors at 12 months.²³ Improvements were seen in the following risk factors:
 - Self-reported alcohol intake (7.0% more meeting guidelines, $P < 0.01$)
 - Self-reported non-smoking (3.5% more meeting guidelines, $P < 0.001$)
 - Independently measured blood pressure (4.2% more meeting guidelines, $P = 0.001$)
- In a separate study, pedometer-based walking programmes resulted in a modest amount of weight loss (pooled mean weight loss of 1.27kg across 9 studies of pedometer-based walking programmes). Longer programmes (of up to 1 year) lead to more weight loss than shorter programmes (of 4 – 8 weeks).²⁴
- Under HPB’s National Steps Challenge Corporate Challenge Season 1 campaign to encourage 10,000 steps amongst participants, of those who were initially sedentary before the Corporate Challenge, **more than half of them (56%) became active** after the Challenge and met the guideline of 150 minutes of active time per week.²⁵

²⁰Shephard R. (1999), ‘Do work-site exercise and health programs work?’, The Physician and Sportsmedicine Journal, 27(2), pp.48-72.

²¹Frean M. (2012), ‘What is the optimal subsidy for exercise? Informing health insurance companies’ fitness reimbursement programs’, Honors Projects, Paper 43.

²²Bravata DM. et al (2007), ‘Using pedometers to increase physical activity and improve health: a systematic review’, Journal of the American Medical Association, 298(19), pp. 2296-2304.

²³Freak-Poli R. et al (2013), ‘Eight-Month Postprogram Completion: Change in Risk Factors for Chronic Disease Amongst Participants in a 4-Month Pedometer-Based Workplace Health Program’, Obesity Journal, 21(9), pp.360-368.

²⁴Richardson CR. Et al., (2008), ‘A meta-analysis of pedometer-based walking interventions and weight loss’, Annals of Family Medicine, 6(1), pp. 69-77.

²⁵Health Promotion Board data (2018).



Walking meetings

- A pilot walking meeting study in Miami showed that walking meetings increased the average number of minutes participants engaged in combined work-related moderate/vigorous physical activity per week (from an average of 107 minutes per week to an average of 117 minutes per week, over a three-week period).²⁶
- The Harvard Business Review found that people who participate in walking meetings are 5.25% more likely to report being creative in their jobs and 8.5% are more likely to report high levels of engagement in their work.²⁷

Bike to work or public transit incentives

- A study by the University of Glasgow tracked 263,450 people for five years who travelled to work and lived in England, Scotland or Wales. Research indicated that cycling to work has extraordinary health benefits such as lower risk of CVD, cancer, and all-cause mortality. Commuting by cycling and walking were associated with a lower risk of CVD incidence (mean incidences for cycling 0.54, walking 0.73) and CVD mortality (mean incidences for cycling 0.48, walking 0.64).²⁸



Innovative, untested interventions²⁹ relating to physical activity

- Standing desks
- Readmill desks
- Reminders, through screensavers or posters, to get out of your chair and stretch
- Walking groups
- Sponsorship of fun-run entry fees or corporate games teams
- Wireless telephone headsets so employees can move around while on the telephone



²⁶Kling HE. et al (2016), 'Opportunities for Increased Physical Activity in the Workplace: the Walking Meeting (WaM) Pilot Study, Miami, 2015', Preventing Chronic Diseases, 13, pp. 160111.

²⁷Clayton, R. et al (2015), 'How to Do Walking Meetings Right', Harvard Business Review, <https://hbr.org/2015/08/how-to-do-walking-meetings-right>.

²⁸Celis-Morales C. et al (2017), 'Association between active commuting and incident cardiovascular disease, cancer, and mortality: prospective cohort study', British Medical Journal, 357, p. 1456.

²⁹Innovative or untested means that sufficient rigorous, scientific data to support benefits may not be available.



Nutrition

Evidence exists to support the impact of nutrition education, increased availability and affordability of healthy options at cafeteria and vending machines, and the provision of free fruit and other healthy foods. However, the impact of these interventions has mainly been identified in terms of the increased consumption of healthy foods, rather than the reduction of risk factors or other health benefits.

New initiatives such as tax incentives for companies to encourage healthy eating habits and healthy lunch clubs for employees are also being implemented. However, there is currently little evidence to prove the benefits of these interventions.

A summary of the evidence relating to nutrition

Dietary modification interventions and nutrition education

- A systematic review covering programmes in Brazil, the USA, Netherlands and Belgium found that workplace dietary modification interventions alone, and in combination with nutrition education, increase fruit and vegetable intakes (by up to half a serving of fruits/vegetables per day).³⁰

Healthy options cafeteria and in vending machines

- In a study of worksite vending machines, when low-fat snacks were provided at a 50 percent discount, sales increased 93 percent. Increased sales offset the cost of the discount, and profits remained steady.³¹
- In a similar study, sales of healthy items through vending machines were increased by 10% to 42%, following an increase in availability of 50% and price reductions of an average of 31%.³²
- Maine sporting goods manufacturer L.L. Bean, experimented with encouraging healthy eating by subsidising healthy foods and funding the subsidy with a premium on high fat foods, such as French fries. After two months, they found a 50 percent increase in the sale of healthy foods and a corresponding 50 percent decrease in the sale of high fat foods.³³

Provision of free fruit and other healthy foods

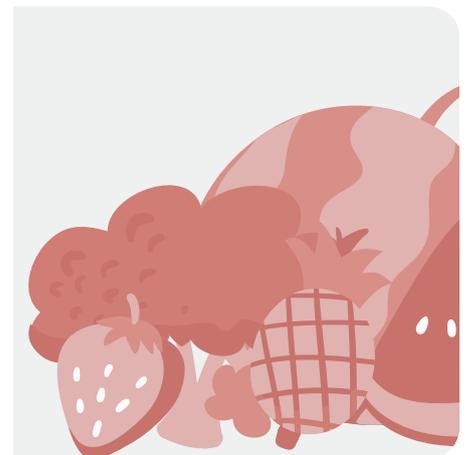
- In comparison to multiple offices in Singapore having a bowl of sweets for visitors, a study by the Johns Hopkins Bloomberg School of Public Health found that ensuring access to fresh fruits and vegetables at workplace meetings and events can increase fruit and vegetable consumption, and will be especially healthy if they replace donuts or other high calorie foods.³⁴
- Research conducted by the UK's original workplace fruit supplier, Fruitful Office, revealed that fresh fruit at people's desks increases an employee's productivity by more than 10 per cent, substantially boosts their energy levels and encourages them to adopt a healthier lifestyle.³⁵

Promoting water consumption

- Workplaces have been shown to increase access to water by adding drinking fountains, water filtration units, or water coolers to the workplace and by offering water in vending machines.³⁶

Innovative, untested interventions relating to nutrition

- Elimination of foods high in sugar, salt and fat on site (e.g. tax incentives for companies to cut sugar intake)
- Healthy lunch clubs, where employees bring healthy ingredients to share
- Workplace challenges (e.g. eat well for a week, competitions to eat more fruit and vegetables)
- Gathering recipes from employees for a healthy cookbook



³⁰Geaney F. (2013), 'The effectiveness of workplace dietary modification interventions: A systematic review', Preventive Medicine, 57(5), pp.438-447.

³¹French, S.et al (2001), 'Pricing and promotion effects on low-fat vending snack purchases: The CHIPS study', American Journal of Public Health, 91, pp. 112-117.

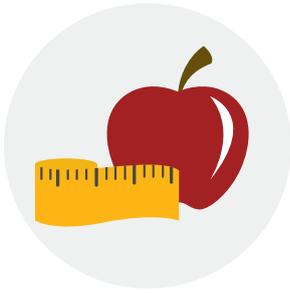
³²French S. et al (2010), 'Pricing and availability intervention in vending machines at four bus garages', Journal of Occupational and Environmental Medicine, 52(1),p. 29.

³³Tufts S. (Employee Health Manager, L.L. Bean) (2003), personal communication.

³⁴Institute for Health and Productivity Studies (Johns Hopkins Bloomberg School of Public Health) (2015), 'From Evidence to Practice: Workplace Wellness that Works'.

³⁵Fruitful Office (2013), 'Research reveals that fruit at work boosts productivity, energy and wellbeing', <https://www.fruitfuloffice.co.uk/about-fruitful-office/highlights/Research-reveals-that-fruit-at-work-boosts-productivity-energy-and-wellbeing/164/>.

³⁶The Institute for Health and Productivity Studies (Johns Hopkins Bloomberg School of Public Health), 'Nutrition and Weight Management in the Workplace – A Guide for Employers'.



Health screening

There is evidence that comprehensive wellness programmes that include screening, regular health check-ups and education help to improve employee health outcomes and to reduce health costs. The use of technology, including wearables, fitness platforms and health apps, is increasing – allowing employees to monitor their health and control their routine on a regular basis. However, at this stage, there is limited evidence to prove the benefits of the use of technology for employers, some of these benefits available in a PwC study last year entitled Digital Health - Challenges and solutions in measuring Return on Investment (ROI).

Health screening however, is the first step to detecting and managing chronic diseases – whether the disease is originally identified within or outside the workplace. For some people who are reluctant or unable to attend health screenings at other locations, health screening in the workplace may be the first opportunity to identify risk factors for chronic disease. However, health screening alone is insufficient to create a lasting impact on the individual's health. Care must be taken to ensure that post screening follow-up is available for workers for maximal impact with technology playing a complementary role with markedly increased follow-up rates as illustrated in the above mentioned 2017 PwC study.

A summary of the evidence relating to health screening

Comprehensive wellness programme (including screening)

- Participation in a wellness programme comprising screening and intervention over five years was associated with a trend toward lower health care costs and decreasing health care use (average annual difference of \$157).³⁷

Regular health check-ups plus educational seminars

- Continuing participation in a workplace health promotion programme consisting of an annual health screening and physical examination, health educational seminars and health exhibitions, has the potential to improve blood pressure levels among employees.³⁸
- Regular health check-ups for employees (e.g. free diabetes check by nurse, with follow-up plan) have been shown to be a cost effective intervention. The U.S. Preventive Services Task Force gave cholesterol screening for males age 35+ and females age 45+ a score of 7 out of 10 in terms of cost effectiveness and disease prevention, making it one of the top 12 highest recommended programmes.³⁹ Screenings for high blood sugar have also been shown to be cost effective, particularly when they target high-risk populations such as obese individuals or older persons.³⁴

Innovative, untested interventions relating to health screening

- Wearable technology and health apps to monitor health indicators – a survey conducted by Springbuk in 2017 found that 35 percent of employers are currently using wearable devices to develop effective, value-driven corporate wellness programmes for employees. Employer platforms are integrating wearable data with clinical, medical claims, pharmacy and biometric data to identify the most promising and actionable opportunities for employers to improve health and contain costs.⁴⁰



³⁷Mattke S. et al. (2013), 'Workplace Wellness Program Study', Rand Health Quarterly 3(2), p.7, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4945172/>.

³⁸Eng J. Y., et al. (2016), 'Impact of a Workplace Health Promotion Program on Employees' Blood Pressure in a Public University', PLOS One, 11(2), p. e0148307, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4739732/>.

³⁹US Preventive Services Task Force (2015), 'Rankings of Preventive Services for the US Population'.

⁴⁰mHealth Intelligence (2017), '35% of Employers Use Wearable Devices for Wellness Programs'.



Tobacco control

There is strong evidence to support the effectiveness of tobacco control in a workplace setting. There are demonstrated benefits of having tobacco-free workplaces, as well as a high impact of individual counselling and group support.

Companies are also offering pharmacological counselling sessions and providing nicotine patches and gums. However, there is limited evidence to prove the benefits of the use of these interventions.

A summary of the evidence relating to tobacco control



Tobacco cessation programmes in the workplace

- Tobacco cessation programmes have been shown to be more effective in a workplace setting than in a clinic setting. A study in 2016 showed cessation rates in a workplace setting to be 44% over a 6-month period, compared to 18% in a clinic setting. This may be attributed to peer support and regular follow-up in the workplace setting.⁴¹

Smoke-free workplaces

- A review of programmes across the United States, Australia, Canada, and Germany found that smoke-free workplaces are associated with a reduction of 3.8% in prevalence of smoking, and 3.1 fewer cigarettes smoked per day per continuing smoker. Based on this finding, if all workplaces became smoke-free, consumption per capita in the entire population would drop by 4.5% in the United States and 7.6% in the United Kingdom. The review concluded that smoke-free workplaces not only encourage smokers to quit or reduce consumption, but also protect non-smokers from the dangers of passive smoking.⁴²



Counselling sessions

- Smoking cessation advice and help to quit was ranked as the highest impact, highest value, and most cost effective service in a recent survey of healthcare practitioners.⁴³
- Employee peer support groups can be formed, combined with telephone quit lines and/or online or face-to-face counselling. Group programmes, individual counselling and nicotine replacement therapy increased smoking cessation in comparison to no treatment or minimal interventions. Self-help materials were less effective.⁴⁴



Innovative, untested interventions relating to tobacco control

- Pharmacological counselling sessions
- Distribution of agents such as nicotine patches and gums

⁴¹Ransing R., et. al. (2016), 'Outcome of Tobacco cessation in workplace and clinic settings: a comparative study', Journal of International Society of Preventive & Community Dentistry, 6(5), pp.487-492, <https://www.ncbi.nlm.nih.gov/pubmed/27891317>.

⁴²Fichtenberg C. (2002), 'Effect of smoke-free workplaces on smoking behaviour: systematic review', British Medical Journal, 325, p. 188, <http://www.bmj.com/content/325/7357/188>.

⁴³Maciosek, M. V. et al (2006), 'Priorities Among Effective Clinical Preventive Services: Method', American Journal of Preventive Medicine, 31, pp. 90-96.

⁴⁴Cahill K. (200*), 'Workplace interventions for smoking cessation', Cochrane Database of Systematic Reviews (online).



Chronic disease management

There is evidence to support the claim that workplace interventions, through counselling and physical activities, can help manage chronic conditions such as diabetes and cardiovascular diseases. Companies can also play a significant role in managing weight and reducing obesity.

A summary of the evidence relating to chronic disease management



Counselling on diet and physical activity for chronic diseases

- Nutrition, and physical activity programmes in the workplace are critical elements in addressing type 2 diabetes – particularly when combined with offering regular, free or low cost on-site screening, counselling, and follow-up for type 2 diabetes in adults with high blood pressure (i.e., hypertension). The U.S. Preventive Services Task Force found that people at risk for cardiovascular disease benefit most from diabetes screening. Screening people with high blood pressure for type 2 diabetes allows the disease to be diagnosed and treated before it causes certain complications.⁴⁵
- Health interventions, including group counselling on diet and physical activity for cardiovascular disease prevention, have been shown effective in dietary intake modification, leading to significant cholesterol level reduction after a two-year follow up. Total mean total cholesterol levels were reduced by 0.38 mmol/l.⁴⁶
- Of the 3,000 taxi drivers and bus drivers who took part in a pilot health screening cum health coaching intervention programme in Singapore, 1 in 4 improved from abnormal to normal in their health status across either BMI, blood cholesterol, blood pressure or blood glucose.⁴⁷

Weight control programmes

- One year participation in a weight control programme is significantly associated with a reduction of body mass index (BMI) (kg/m²) of about 0.15 in the same year.³⁷
- The worksite is ideal for implementing interventions to reduce obesity. Systematic reviews of individual-based behavioural interventions have demonstrated a consistent finding of moderate weight loss. The effect size of worksite interventions is small when considered on an individual basis, but when these results are applied across large populations of workers, the potential impact is much larger.⁴⁸
- Some employers have chosen to provide subsidised access to commercial programmes on weight management. In selecting such commercial programmes, companies should be mindful to ensure that there is strong scientific evidence supporting the effectiveness of these programmes.

Innovative, untested interventions relating to chronic disease management

- Demonstrations to help build cooking skills, and providing employees with a family friendly recipe box to encourage them to make healthy meals at home
- Engage a nutritionist to provide advice on a company's catering policy

⁴⁵US Centers for Disease Control (2018), 'Workplace Health Strategies', <https://www.cdc.gov/workplacehealthpromotion/health-strategies/index.html>.

⁴⁶Moy FM. et al (2008), 'Dietary modification in a workplace health promotion program in Kuala Lumpur, Malaysia', *Asia-Pacific Journal of Public Health*, 20(1), pp. 166–72, <https://www.ncbi.nlm.nih.gov/pubmed/19533877>.

⁴⁷Health Promotion Board data (2018).

⁴⁸Thorndike A. (2011), 'Workplace Interventions to Reduce Obesity and Cardiometabolic Risk', *Current Cardiovascular Risk Reports*, 5(1), pp.79-85.



Workplace infrastructure

There is evidence to support the health benefits of workplace infrastructure interventions, including open and accessible staircases. Many of these interventions, an example being promoting taking the stairs if you're going, "1 up, 2 down" aim to increase physical activity, and are covered under this category. However, workplace infrastructure can go beyond physical activity to also include improvements in air quality and ventilation, water quality, access to natural light, and thermal and olfactory comfort.

Innovative ideas such as subsidised ergonomic consultancies or participatory ergonomics are also being implemented, but have limited evidence to support the benefits.

A summary of the evidence relating to workplace infrastructure

Holistic approach to workplace infrastructure design

- The WELL Building Standard takes a holistic, best practice approach to workplace infrastructure. It was developed by integrating scientific and medical research and reviewing existing literature on environmental health, behavioural factors, health outcomes and demographic risk factors. Employers who have implemented the WELL Building Standard have reported a 27% reduction of staff turnover compared to the previous year (Cundall), and that 80% of employees believe their new office environment supports greater productivity (CBRE Spain).⁴⁹

Onsite gym or fitness programme

- A study conducted in the UK in 2008 found that employees who visited the gym during the day time reported managing their time more effectively, being more productive, and having smoother interactions with their colleagues.⁵⁰
- An American company that provides comprehensive worksite wellness support – including access to an on-site fitness centre, individual health coaching sessions, and exercise instructors – found that high levels of physical activity have contributed to an overall health risk reduction of 9 percent, and an estimated return on investment of \$1.70 for every dollar spent.⁵¹

Open and accessible staircase

- There is strong evidence that point-of-decision prompts are effective in increasing the use of stairs. The approach of using signs placed by elevators and escalators to encourage stair use was found to be effective based on sufficient evidence.⁵²

Positioning of screens and document holders

- A review of studies on placement of computer screens and document holders found that a document holder placed lateral to the screen was most preferred position to reduce neck discomfort among occupational typists. Head posture and muscle activity increases when the document is placed flat on the surface compared to when placed on the document holder.⁵³

Innovative, untested interventions relating to workplace infrastructure

- Subsidised ergonomic consultancy/participatory ergonomics



⁴⁹International WELL Building Institute, <https://www.wellcertified.com/>.

⁵⁰Coulson J. C. et al (2008), 'Exercising at work and self-reported work performance', International Journal of Workplace Health Management, 1(3), pp. 176-197. https://www.researchgate.net/publication/235275530_Exercising_at_work_and_self-reported_work_performance.

⁵¹American Cast Iron Pipe Company (2016), 'The Health Project Winning Programs'.

⁵²Soler R et al (2010), 'Point-of-decision prompts to increase stair use. A systematic review update', American Journal of Preventive Medicine 38(2), pp. 292-300.

⁵³Ambusam et al (2016), 'Position of document holder and work related risk factors for neck pain among computer users: a narrative review', Journal of Research in Health Sciences, 15(4), pp. 213-217.



Mental health

There is strong evidence to support the impact of specific workplace interventions on specific mental health conditions, including the impact of:

- Individual therapy, especially cognitive behavioural therapy (CBT), in facilitating the recovery of employees diagnosed with depression and/or anxiety;
- Feedback mechanisms and training, in improving stress management; and
- Support for proper sleep, in supporting improved mental health and improved productivity of the employee.

Other interventions, such as on-site yoga, meditation and massage therapy, and availability of rest areas and sleep pods, are expected to result stress reduction and prevention. However, there is limited peer-reviewed evidence to support the benefits.

A summary of the evidence relating to mental health

Support for depression and anxiety

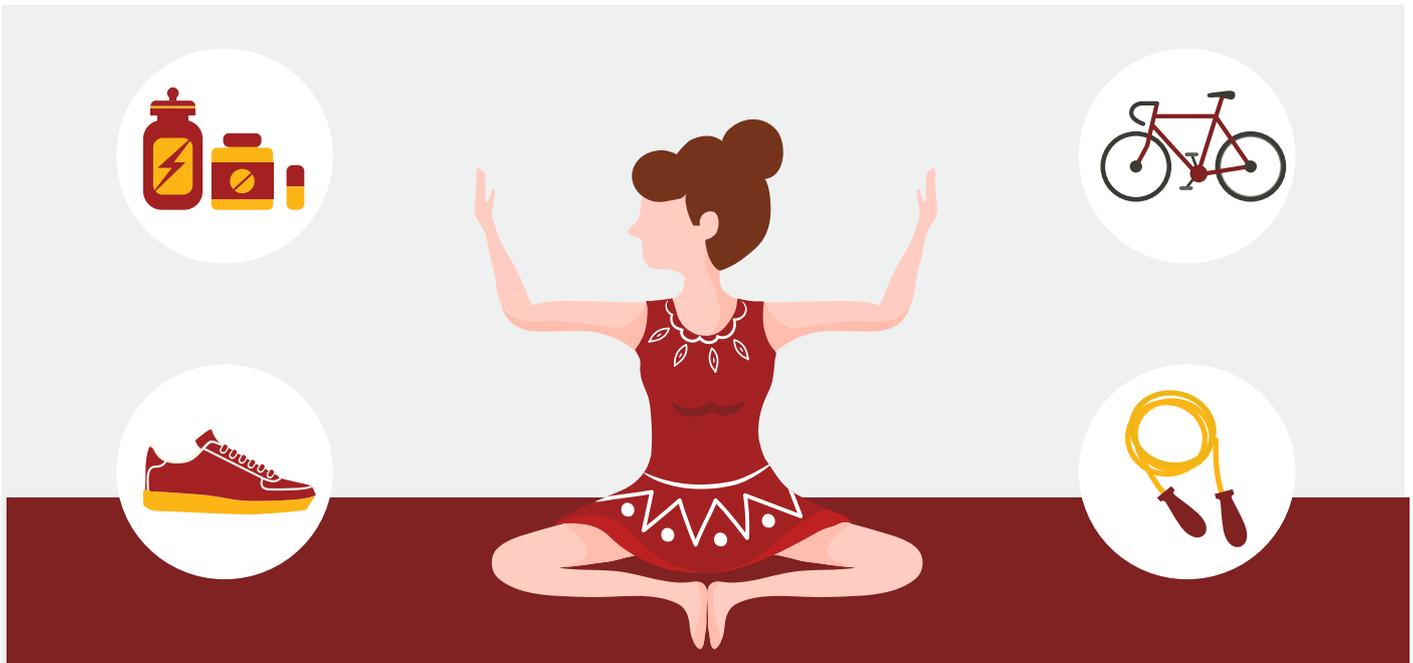
- For people already experiencing common mental health problems at work, there was strong evidence from four studies demonstrating that the most effective approach is brief (up to 8 weeks) individual therapy, especially cognitive behavioural therapy (CBT). The intervention seems to be effective whether delivered face-to-face or via computer-aided software, the latter finding being based on one study.⁵⁴
- Moderate evidence was identified for two primary prevention interventions; enhancing employee control and promoting physical activity. Stronger evidence was found for CBT-based stress management although less evidence was found for other secondary prevention interventions, such as counselling. Strong evidence was also found against the routine use of debriefing following trauma. Tertiary interventions with a specific focus on work, such as exposure therapy and CBT-based and problem-focused return-to-work programmes, had a strong evidence base for improving symptomology and a moderate evidence base for improving occupational outcomes.⁵⁵

Stress management through feedback mechanism and trainings

- Amongst employees who have not manifested with common mental health problems or who are not at high risk, there is moderate evidence from five research papers to suggest that a range of stress management interventions can have a beneficial and practical impact.⁵⁴
- The primary psychosocial stressors identified by labour groups were lack of control over work content and operations, unrealistic task demands, lack of understanding by supervisors and management, and lack of predictability and security about their job future. Psychosocial stressors identified by corporate groups included personality traits, lifestyle behaviours, interpersonal relationships, and family problems, with little emphasis placed on the work environment.⁵⁴
- Recommended stress reduction actions include increased feedback mechanisms allowing employee assistance programmes to pinpoint stressful work environment factors. The use of stress management training in work settings generally focused on stress prevention rather than the treatment of workers with evident stress problems and health risks.⁵⁴

⁵⁴British Occupational Health Research Foundation (2005), 'Workplace interventions for people with common mental health problems: evidence review and recommendations'.

⁵⁵Joyce S. (2015) 'Workplace interventions for common mental disorders: a systematic meta-review', *Psychological Medicine*, 46(4), pp. 683-97.



Supporting healthier sleep patterns

- Studies have shown that morning naps can improve creativity, and afternoon naps can improve employees' sense of wellbeing.⁵⁶
- Insufficient sleep is linked to lower productivity at work, which results in working days being lost each year. Someone who sleeps less than six hours a night loses six more working days a year compared to someone who sleeps between seven and nine hours a night, which is often described as the “healthy sleep range.” Other initiatives to support healthier sleep patterns include use of wearable devices that monitor sleep and physical activity levels, discouraging the excessive use of electronic devices outside of working hours, and sleep pods or nap rooms at work.⁵⁷

Innovative, untested interventions relating to mental health

- Onsite yoga or massage therapy
- Rest areas and sleep pods
- Mental health first aid and education (including training supervisors and managers to detect signs of mental illness)
- Mental health support groups

⁵⁶Potts K. et al (2013), 'Cost Savings Associated with an Education Campaign on the Diagnosis and Management of Sleep-Disordered Breathing: A Retrospective, Claims-Based US Study', Population Health Management, 16(1), p. 7-13.

⁵⁷RAND Europe (2016), 'Why Sleep Matters: Quantifying the Economic Costs of Insufficient Sleep'.



Work life balance

There is evidence to support the benefits of flexitime, compressed working weeks, schedule control, and supervisor support, in terms of employees' wellbeing and productivity. These interventions can be seen as linked to mental health interventions, given the presumed positive effect of work life balance on stress levels. While workplace satisfaction surveys are popular with corporate employers, there is currently no evidence that these lead to improvements in employees' wellbeing.



A summary of the evidence relating to work-life balance

Flexitime and compressed working weeks

- A review of studies on the effectiveness of flexitime and compressed working weeks found overall positive impacts on productivity, absenteeism and job satisfaction.⁵⁸

Schedule control and supervisor support

- A Harvard Business Review finding offers evidence that workplace interventions, such as increased schedule control and supervisor support, can reduce employee work-life conflict. According to the study, adjustments in management thinking about when and where work gets done, and about support for employees' lives outside work, led to the work-life 'holy grail': design of system-wide flexibility (to relieve pressure for people who need it), without burdening those working conventionally, and without requiring individual workers to figure out alone how to balance everything.⁵⁹

Innovative, untested interventions relating to work-life balance

- Workplace satisfaction surveys

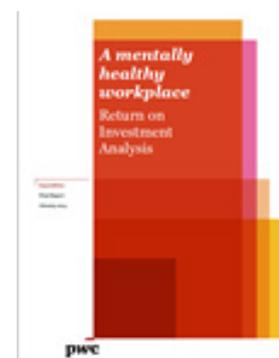
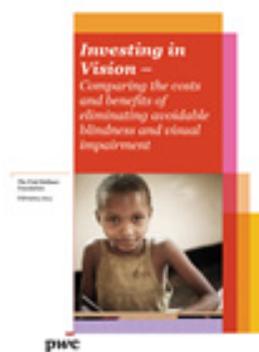
⁵⁸Baltes et al (1999), 'Flexible and Compressed Workweek Schedules: A Meta-Analysis of Their Effects on Work-Related Criteria', Journal of Applied Psychology, 84(4), p. 296.

⁵⁹Harvard Business Review (2014), 'Your Work-Life Balance Should Be Your Company's Problem'.

Measuring the Return on Investment of Workplace Health Programmes

While investment in workplace health programmes is becoming increasingly common, attempts to define and measure the return on investment (RoI) remain limited. This is partly due to the challenge of assessing a diverse range of interventions – ranging from subsidised gym memberships to tobacco cessation counselling – but also due to the complex set of stakeholders involved.

We believe there is a case for developing an RoI formula which can be used to estimate the future value of workplace health programmes, in a robust and transferable manner. This formula should be developed with a view to measuring a range of innovative ('next generation') workplace health programmes, which may collect a wider range of data directly from employees (for example, through wearable technology or mobile apps). PwC has quantified the RoI of a wide range of public and private health interventions in similar contexts, including investments in eye health (for the Queen Elizabeth Diamond Jubilee Trust and the Fred Hollows Foundation), and investments in mental health by employers (for BeyondBlue).



Return on investment – to whom?

The first step in determining an RoI formula is to clarify the end stakeholder – in other words, answering the question: 'Return on investment – to whom?' For workplace health programmes, there are a range of potential end stakeholders:

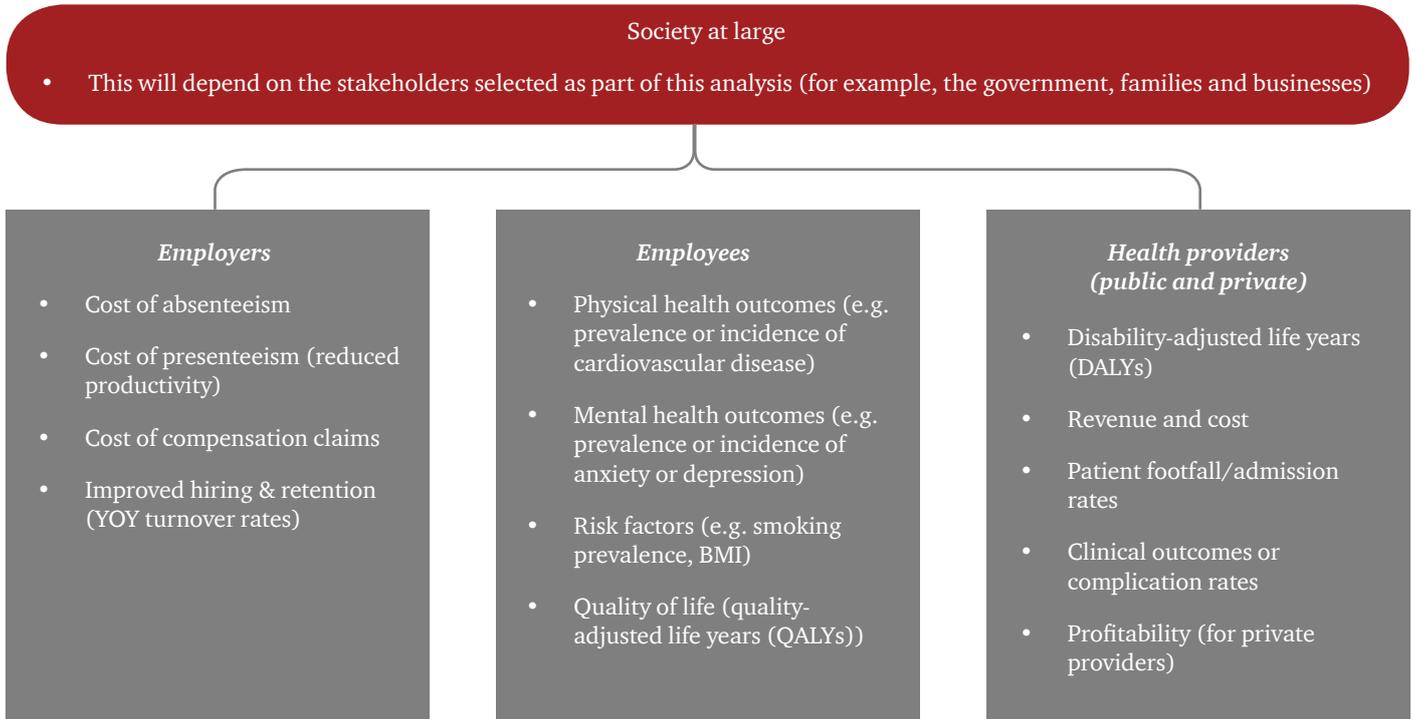
- **Employers or companies** – this is the most common group of stakeholders, when discussing RoI of workplace health programmes. Return is often measured in financial terms, drawing on the cost of absenteeism, presenteeism and compensation claims.
- **Employees** – benefits to employees are often quantified in terms of health outcomes or changes in risk factors.
- **Health providers** – benefits to health providers are also often measured in financial terms, including costs of service provision and/or patient footfall.
- **Society at large** – this would be a more complex exercise covering all benefits to society, including the overall health system and the government as a whole. The RoI model would need to include spill-over benefits and costs (e.g. effects on families and other businesses) and account for overlap across different stakeholder groups.

Return on investment – over what timeframe?

- Another upfront consideration which will shape the RoI analysis is the time horizon. Returns may be estimated across various time frames – for example, over five years, ten years or a lifetime – affecting both: (a) the return itself; and (b) the complexity of the modelling exercise.
- The identification of the relevant timeframe will be linked to the end stakeholder(s) selected. An analysis focusing on society at large (including the government as a whole) may favour a longer timeframe, whereas an analysis focusing on employers may favour a shorter timeframe.

Potential metrics

Depending on the end stakeholder identified, there are a range of potential sources of value that can be used to develop an RoI formula:



Potential data sources

A robust RoI formula depends on the availability of relevant datasets. Potential sources of existing data in Singapore include but are not limited to:

Domain	Potential Sources
Programme effectiveness (surveys linking workplace health programmes to outcomes data)	Health Promotion Board, literature review, expert opinions
Absenteeism Presenteeism Compensation claims	Ministry of Manpower, employer surveys
Physical and mental health outcomes	Ministry of Health and other stakeholders (e.g. Institute of Mental Health)
DALYs QALYs	Ministry of Health, literature review
Risk factors	Ministry of Health, Health Promotion Board, literature review, expert opinions

<i>Domain</i>	<i>Potential Sources</i>
Patient footfall Admission rates	Ministry of Health (public sector) , collaborating health providers (private sector)
Clinical outcomes Complication rates Readmission rates	Ministry of Health (public sector) , collaborating health providers (private sector)
Healthcare prices and costs	Ministry of Health (public sector) , collaborating health providers (private sector)

In addition to the above source from government stakeholders, it is useful for companies to track specific indicators for their workplace health programmes. This is both to support and justify their own investments (cost-benefit analysis), as well as contribute to wider research on effectiveness. At the programme level, it is important for companies to track process and outcome indicators, for example, participation rates and pre-post BMI measurements for a weight management programme. At the organisational level, companies can track absenteeism through sick leave rates, and compensation rates through insurance claims/medical cost claims, etc.

The above table is illustrative only, and the need for specific line items or datasets within each category will depend on the chosen study perspective. It is anticipated that there will be gaps and shortcomings in the availability of necessary data, which will need to be addressed before a return on investment can be usefully calculated. There are various avenues to address these gaps and shortcomings:

- Agreement by government bodies to collect the necessary data, on an ongoing basis
- Funding of specific studies to collect the necessary data, at agreed intervals
- Collaboration with local expert researchers to mine existing survey data (e.g. the Singapore Chinese Health Study) and/or provide consensus driven estimates of RoI parameters for which data are not available
- Use of epidemiological modelling to estimate long-term outcomes over study horizons for which sufficient data is not available
- Using technology to collect the necessary data (or aggregate existing data) – for example, data on risk factors or health outcomes from wearable technology or health monitoring apps, and/or using data exchanges to share and aggregate existing data from health providers.

‘Next generation’ programmes

The development of innovative workplace health programmes, many of which use digital technology to deliver and/or monitor interventions, represents a significant opportunity for measuring the ROI of workplace health programmes. These interventions can potentially fill significant data gaps with comprehensive, real-time data, allowing for:

- Better targeting of individual workplace health interventions; and
- More robust evaluation of workplace health interventions, leading to improved evidence of cost-effectiveness and impact.
- Examples of ‘next generation’ workplace health programmes, which could usefully form part of this exercise, include:
 - Free provision of wearable technology (such as Fitbit) – which monitor sleep patterns, dietary habits, daily exercise levels, kilometres walked, and calories burnt – supported by related activities, clubs and competitions in the workplace;
 - Specific financial or other incentives linked to apps and wearable technology (for example, Earthmiles, which offers points and discount deals to employees based on the number of workouts completed);
 - Apps to address specific issues such as insomnia (for example, Sleepio – a cognitive behavioural therapy (CBT) programme delivered through a smartphone app, which is marketed as a way to boost employee productivity and address anxiety and depression); and
 - Using telemedicine – for example, through making individual therapists and psychologists available online to employees.



Conclusion



In the transformative era that we live in, the future of our workforce is going to be heavily dependent on the future of workplace health. Before embarking on implementing a workplace health programme however, governments and organisations should consider building models to help calculate the return on investment of such programmes. Not only will this ensure money is well spent by allowing the testing, tweaking and tuning of such programmes to ascertain their feasibility prior to implementing them, but also saves time and minimizes risk to all stakeholders. Are you prepared for The Future of Workplace Health?



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