THE UNIVERSITY OF SYDNEY

Healthy Sydney University

A policy brief for promoting mental wellbeing in universities

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Contents

Background

The University of Sydney, through its university-wide health promotion initiative Healthy Sydney University, embraces the principles and perspectives of a Health Promoting University, as defined by the World Health Organisation ('WHO')[1] and the Okanagan Charter of Health Promoting Universities and Colleges.[2]

Healthy Sydney University works across the university to support healthy people, build healthy places, develop healthy policies and implement healthy practices. Healthy Sydney University focuses on bringing students and staff together to healthier academic, physical, occupational, psychological and social environments of our University.

The five guiding principles of Healthy Sydney University are:

- Evidence-informed and evidence generating;
- Collaboration between staff and students;
- Holistic view of health and wellbeing;
- University-wide engagement at all levels;
- Population, settings-based approach.

The University of Sydney is a research-intensive university and firmly supports the use of evidence to inform its strategies.

In 2014 and 2015, the Healthy Sydney University Mental Wellbeing working group, made up of staff and student stakeholders, brought together and analysed the published evidence on population or settings-based approaches to mental health promotion in universities.[3]

The aim of this policy brief is to assist the University of Sydney and other institutions in developing university-wide and population-based strategies to promote and support the mental wellbeing of students and staff. This policy brief should be read in conjunction with other recent work in this area, including a separate report through the Winston Churchill Memorial Trust on 'the wicked problem of university student mental health.'[4]

[1] Tsouros, A., G. Dowding, J. Thompson and M. Dooris (1998). "Health Promoting Universities: Concept, experience and framework for action."
[2] University of British Columbia (2015). Okanagan Charter: An International Charter for Health Promoting Universities and Colleges. Vancouver, Canada, University of British Columbia.University of British
[3] Fernandez, A., E. Howse, M. Rubio-Valera, K. Thorncraft, J. Noone, X. Luu, B. Veness, M. Leech, G. Llewellyn and L. Salvador-Carulla (2016). "Setting-based interventions to promote mental health at the university: a systematic review." International Journal of Public Health: 1-11.
[4] Veness, B. (2016). The wicked problem of university student mental health. Sydney, Australia.

Executive Summary

The main aim was to review the effectiveness of population or settings-based strategies and approaches for promoting the mental wellbeing of students and staff within universities.

This policy brief focuses on the papers relating specifically to mental health outcomes (around a third of the papers reviewed). The remaining two thirds of papers were focused on alcohol, tobacco or other drugs; we have included a short summary of these papers in the 'Discussion' section.

A snapshot of the evidence indicates the following areas of interest to universities:

1. **University-level policies:** Policy-based strategies are most effective when they are well promoted and thoroughly explained to all those affected. Creating a policy without explaining it and without instituting measures to enforce it risks poor implementation and reduces impact.

2. **Built environment:** There is inconclusive evidence (mainly due to lack of data) of the impact of the built environment on mental health and wellbeing. More research is needed in this area.

3. **Social marketing:** Marketing and education campaigns may improve the knowledge of students and staff and raise awareness of mental health, but may not necessarily impact mental health outcomes or behaviours.

4. **Curriculum-based strategies:** The integration of mindfulness-based programs as elective or mandatory courses within university curricula has the potential to improve the mental health of students.

5. **Alternate academic strategies:** Changing from a 5 or 3 interval grading system to a 2 grade system (pass/fail) may have a positive impact on the mental wellbeing of students.

6. **Life skills and physical activity programs:** Workshops and programs that increase life skills, use physical activity, or utilise meditation have the potential to promote student mental wellbeing.

7. **eHealth technology**: The use of eHealth interventions (including web-based tools and apps) to promote the wellbeing of students is a promising strategy. eHealth interventions in the mental health space can be cheap, easy to access, and universally available while allowing personalisation of interactive health promotion messages.

8. **Alcohol, tobacco and other drugs**: Promising strategies exist for engaging students and the university community in strategies to reduce the harmful consumption of alcohol.

Overall, we found a lack of evidence of the effectiveness of the various approaches. More work is required to identify the immediate and longer term benefits of population-based interventions for the promotion of mental health and wellbeing within university settings. This was particularly the case in regards to university staff, where very few studies were found and almost none of good quality. The lack of

effective, staff-focused studies is why this policy brief concentrates on student wellbeing.
Overall our findings suggest that mental wellbeing in universities can be promoted and achieved through the creation of supportive university environments for all students and staff.

These environments include: the academic or curricular environment; the physical environment, both built and natural; the occupational or workplace environment; the psychological environment of individuals and services available; and the social environment of the university as a community and organisation.

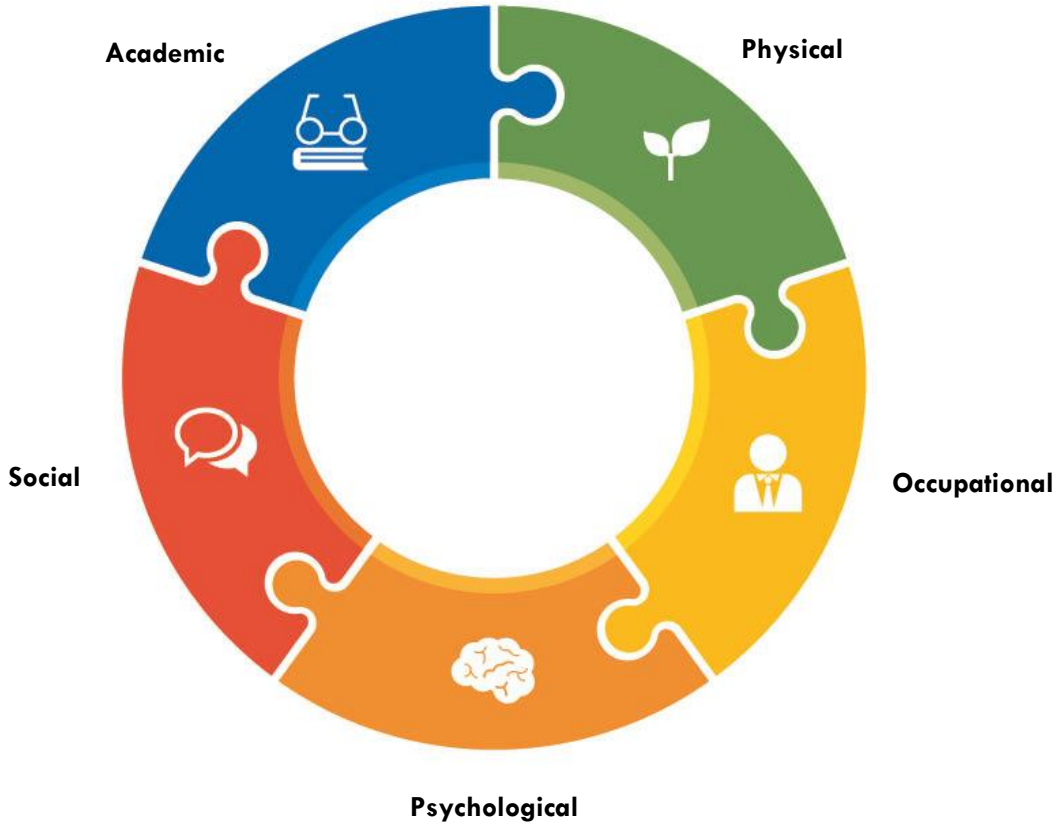

Figure 1: The five types of university environments that support physical and mental wellbeing

Based on the available evidence that underpins this review, we propose four key recommendations which universities can pursue:

- Trial alternate academic strategies
- Infuse mental health knowledge and skills in university curricula
- Develop and promote the use of eHealth technologies
- Build and evaluate healthy physical environments.

Introduction

Mental health is 'a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community.'[5] The promotion of good mental health is critical therefore not only for individual but also for society.

The World Health Organization has also identified that mental wellbeing is impacted by a variety of factors including individual-level factors (such as individual behaviours and characteristics) as well as by broader systemic factors shaped by our 'settings' or socio-economic, political, cultural environments.[6]

Mental health promotion aims 'to create living conditions and environments that support mental health and allow people to adopt and maintain healthy lifestyles.'[7] Mental health promotion thus requires both initiatives at a macro level (eg. interventions that are population-wide, such as policy change) and micro level (eg. interventions targeting individuals' skills). This review focuses on those approaches that will have increasing population impact, though we have also included in the review approaches that are at the individual level but have been scaled up or expanded to impact large groups in the university setting.

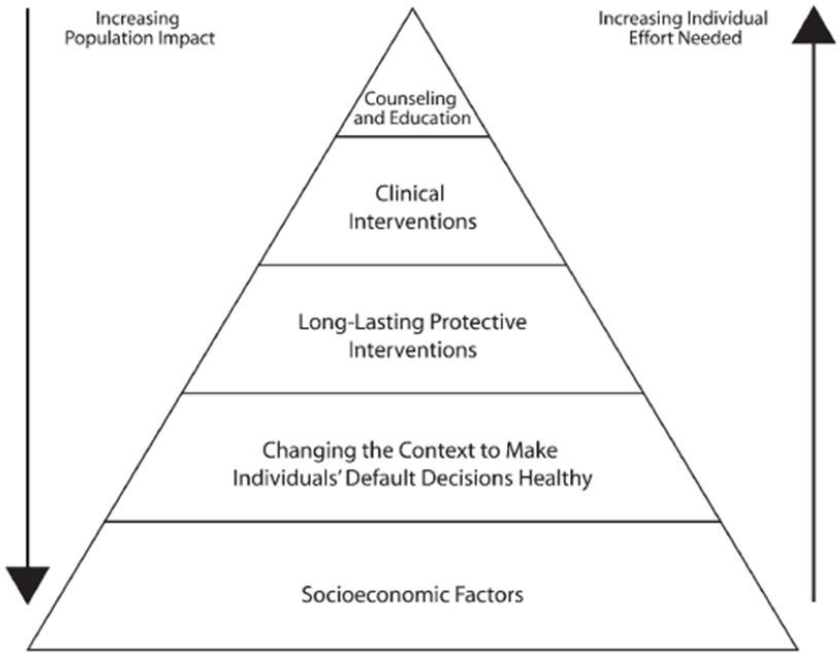

Figure 2: The health impact pyramid[8]

This review identifies that universities are in a key position to promote the mental wellbeing of their students and staff for a number of reasons.

[5] World Health Organization. (2016). "Mental health: strengthening our response." from http://www.who.int/mediacentre/factsheets/fs220/en/.
[6] World Health Organization (2013). Mental health action plan 2013-2020. Geneva, Switzerland.
[7] World Health Organization. (2016). "Mental health: strengthening our response." from http://www.who.int/mediacentre/factsheets/fs220/en/.
[8] Friedan, T. R. (2010). "A Framework for Public Health Action: The Health Impact Pyramid." American Journal of Public Health **100**(4): 590-595.

Universities are places of engaged enquiry through their research and teaching; students develop skills that will propel them into a myriad of careers and opportunities, all the while supported by expert and high achieving staff. Mental wellbeing is vitally important for students so they can achieve their academic and personal goals, enjoy their time at university, and successfully complete their courses. A supportive university environment can also help students learn valuable life or self-coping skills and strategies (such as resilience and stress reduction skills), which are transferrable to a range of post-university settings including workplaces.

However, university students are also a high risk group for experiencing mental ill health due to two main reasons:

- **Age of university students:** Two thirds of Australian university students are aged under 25 years. This is significant because up to 75% of adult mental health conditions emerge by age 24.[9] Additionally, the main cause of death or injury for 15-24 year olds in Australia is suicide.[10]

- **High stress environment:** University can be a challenging environment for even the most robust and resilient student. The combination of academic and financial pressures, employment issues, the transition from school to university and social isolation can lead some students to poor mental wellbeing or even seriously debilitating mental health conditions. It has been found that university students experience higher levels of poor mental wellbeing and psychological distress than the population average.[11,12,13]

The consequences of these experiences of mental ill health may be reflected in poorer exam performance and higher drop-out rates.

In order to guarantee that students can achieve their potential and retain students to completion of their studies, universities must foster a series of conditions and environments that promote and protect student mental health.

However, universities must also consider the needs of their staff. In order to avoid reduced productivity, high stress, and/or poor job satisfaction, universities should create an occupational environment that promotes mental health and wellbeing for their staff. This is particularly important for those staff in roles with a high level of everyday engagement with students – such as lecturers, tutors, pastoral care and student support officers.

[9] Kessler, R. C., P. Berglund, O. Demler, R. Jin, K. R. Merikangas and E. E. Walters (2005). "LIfetime prevalence and age-of-onset distributions of dsm-iv disorders in the national comorbidity survey replication." Archives of General Psychiatry **62**(6): 593-602.
[10] Australian Institute of Health and Welfare (2016). Australian Burden of Disease Study: Impact and causes of illness and death in Australia 2011. Australian Burden of Disease Study. Canberra, Australian Institute of Health and Welfare.
[11] Stallman, H. M. (2010). "Psychological distress in university students: A comparison with general population data." Australian Psychologist **45**(4): 249-257.
[12] Cvetkovski, S., N. J. Reavley and A. F. Jorm (2012). "The prevalence and correlates of psychological distress in Australian tertiary students compared to their community peers." Australian and New Zealand Journal of Psychiatry **46**(5): 457-467.
[13] Larcombe, W., S. Finch, R. Sore, C. M. Murray, S. Kentish, R. A. Mulder, P. Lee-Stecum, C. Baik, O. Tokatlidis and D. A. Williams (2016). "Prevalence and socio-demographic correlates of psychological distress among students at an Australian university." Studies in Higher Education **41**(6): 1074-1091.

Methodology

The following selection criteria was used to review the literature:

- The study used a population or settings-based approach*;
- The study looked at students and/or staff of a university or universities;
- The study measured outcomes relating to mental health or wellbeing;
- The study evaluated strategies designed to improve mental health;
- The study focused on prevention rather than treatment.

In terms of mental wellbeing outcomes, we considered any measure of mental wellbeing, mental health, wellness or mental health related quality of life. Studies using condition-specific outcome measures (such as depression or anxiety) were also included as a proxy for mental health and wellbeing. We also included tobacco, alcohol and other drug-related outcomes, as our Mental Wellbeing working group members saw them as closely related to mental wellbeing.

***Using the term 'population-based':**
These types of interventions target the behaviours of a whole population. They can be cheap and effective, and small changes or 'nudges' on a large scale can be significant. Such approaches or interventions include policies, legislation, social marketing and mass media, and changes to the environment. These approaches require a low level of agency by the population – making the healthy choice the easy choice for everyone.[14]

The most effective population-based interventions or approaches also utilise the concept of primary prevention. Primary prevention is about promoting health and reducing exposure to environments and/or behaviours that increase the risk of developing a particular health outcome or disease. Examples of primary prevention include: setting a minimum age for purchasing and drinking alcohol; tobacco taxes; mass media marketing about healthy diets; immunisation programs in schools.

Primary prevention does not target individuals who have already been screened for particular health behaviours or who have an identified illness. As a result, this review excluded those interventions that were about service provision for staff and students who had an identified mental illness or health behaviour (such as risky alcohol consumption).

On the other hand, individual-based interventions or approaches aim to change individual behaviours. One example is individual and group counselling. These interventions may still be primary prevention, as they are could be aiming to affect healthy individuals without any disease or symptoms, but they require a certain level of individual behavioural change and engagement. In other words – they require a high level of agency.

Our review did include some individual-level approaches, even though they could not be viewed as strictly 'population-based'. For example, apps and e-tools target individual behaviours, attitudes and decision-making, but can be scaled up and widely offered to a large group of people (thereby increasing its impact).

[14] Adams, J., O. Mytton, M. White and P. Monsivais (2016). "Why Are Some Population Interventions for Diet and Obesity More Equitable and Effective Than Others? The Role of Individual Agency." PLoS medicine **13**(4): e1001990.

Findings

An initial search of published literature in this area resulted in over 18,000 papers. After applying more specific benchmarks, 11,754 papers were drawn and analysed for their relation to the research question. 96 studies were included in the review, however for the purposes of this policy brief we have included 99 papers, of which 3 related to the built environment of a university. Grey literature was not included.

Thirty-five papers (approximately a third) focused specifically on mental health outcomes, while another 61 papers (two-thirds of the total number) focused on alcohol and other drug outcomes. More studies evaluated pure population-based interventions (especially policy and social marketing strategies) for the prevention of tobacco and alcohol related outcomes.

In comparison, few studies were focused on evaluating the impact of population-level approaches to improving mental wellbeing. Instead, the biggest group of studies in this area involves academic-based strategies (such as curriculum changes). However, it should be acknowledged that some of the eHealth interventions for the prevention of alcohol misuse had been embedded into academic curricula.

It should also be noted that this policy brief focuses on student mental wellbeing because 95% of the papers we found related to this area. Only 5 papers related specifically to interventions targeting university staff.

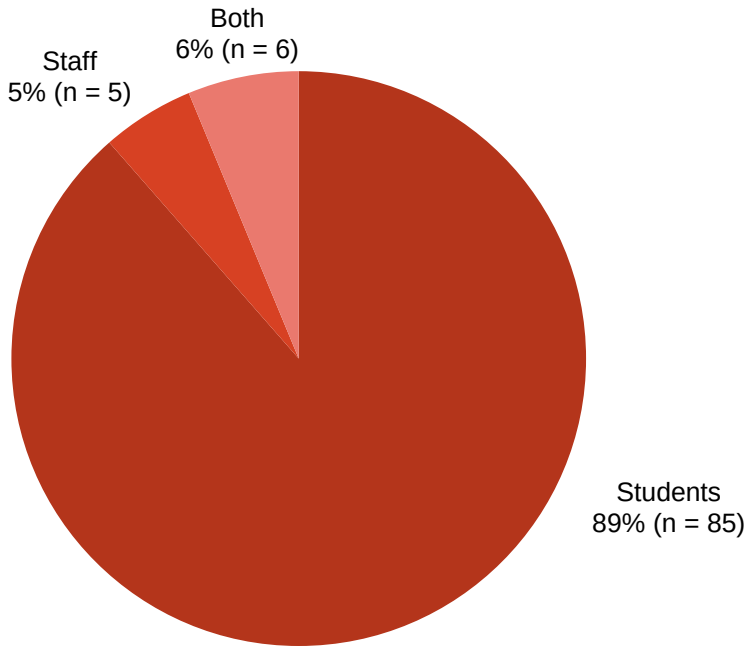

Figure 3: Breakdown of papers based on university population targeted

Discussion

1) University-level policies

There has been little evaluation of university-level policies that aim to promote the mental wellbeing of staff and students. However, a 2014 survey of Canadian and UK initiatives[15] found that:

- Most policies targeted students with an identified medical disability;
- It was important to make mental health issues part of the learning environment through the curriculum, program requirements and by accommodating people with mental health problems;
- Policies around how students with mental health difficulties might take voluntary or involuntary leave need to be more fully addressed;
- Ethical issues should be considered, such as how to protect student confidentiality.

The one evaluated policy we found was a suicide reduction policy, aiming to reduce suicide numbers in the student population. This study found a reduction of 45.3% in the suicide rate once the policy was introduced.[16] It seems that the policy was successful in reducing the suicide rate among undergraduate students, although this trend did not apply to graduate and professional students. The lack of control group, not possible for ethical reasons, precludes further conclusions, however this is an important study monitoring the impact of policy in an under-researched area.

There were several unevaluated papers looking at the effectiveness of policies targeting university staff mental wellbeing.[17,18] These papers suggest that in order to increase workplace wellbeing for university staff, employees need to be involved in the implementation and discussion of defining what a 'healthy workplace' means. This could include involvement strategies where staff participate in decision-making, or have greater autonomy and self-management. Staff in these studies indicated greater job satisfaction and trust in senior management simply from knowing that stress reduction strategies had been introduced, even if the strategies did not change their own health outcomes. This underscores the importance of organisations promoting and explaining workplace health initiatives.

The findings of these papers also echo other research on mentally healthy workplaces.[19] These findings indicate that appropriate employee engagement and work-life balance, including flexibility of hours, are effective strategies to reduce stress and increase mental wellbeing for employees, including those employed in the university sector.

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[15] Olding, M. and A. Yip (2014). Policy Approaches to Post-Secondary Student Mental Health. OCAD University & Ryerson University Campus Mental Health Partnership Project. Toronto, Canada.
[16] Joffe, P. (2008). "An empirically supported program to prevent suicide in a college student population." Suicide & Life-Threatening Behavior **38**(1): 87-103.
[17] Grawitch, M. J., S. Trares and J. M. Kohler (2007). "Healthy workplace practices and employee outcomes." International Journal of Stress Management **14**(3): 275-293.
[18] Pignata, S. and A. H. Winefield (2013). "Stress-reduction interventions in an australian university: A case study." Stress and Health((Pignata S.; Winefield A.H., anthony.winefield@unisa.edu.au) Work and Stress Research Group, Centre for Applied Psychological Research University of South Australia Adelaide, South Australia Australia).
[19] Harvey, S., S. Joyce, L. Tan, A. Johnson, H. Nguyen, M. Modini and M. Groth (2014). Developing a mentally healthy workplace: a review of the literature, The Black Dog Institute, University of New South Wales.

2) Built environment

An active area of research and discussion in recent years is the impact of the built environment on social and health outcomes. For example, how a community is designed might encourage people to do more walking and cycling, thereby reducing obesity. Similarly, how a building is designed might allow more light in office spaces and reduce emotional exhaustion.

We found three papers that looked at the effect of the built environment in universities but none of them were evaluated.

However, the papers do suggest the following recommendations that might improve outcomes for students and staff:

- The creation of stress-reduction spaces like lounges, with access to relaxing music and DVDs, and information about relaxation techniques.[20]

- Making natural spaces part of the university design, such as healing gardens.[21] These places allow people a change of scene and to escape pressures. They also promote social gatherings and physical activity, which are positively associated with improved mental wellbeing.

- Windows are a means to connect students and staff with the external environment. Even people in windowless rooms felt better and more connected to others if a plasma screen was installed with a view of outside.[22]

It seems that the built environment may have an effect on mental health outcomes but more monitoring and evaluation is required. Universities are in an ideal position through which to research and test new ways of designing the built environment to support the mental wellbeing of its inhabitants.

[20] Klainberg, M., B. Ewing and M. Ryan (2010). "Reducing stress on a college campus." Journal of the New York State Nurses Association **41**(2): 4-7; quiz 18-20.
[21] Lau, S. and F. Yang (2009). "Introducing Healing Gardens into a Compact University Campus: Design Natural Space to Create Healthy and Sustainable Campuses." Landscape Research **34**(1): 55-81.
[22] Friedman, B., N. G. Freier, P. H. Kahn, P. Lin and R. Sodeman (2008). "Office window of the future? - Field-based analyses of a new use of a large display." International Journal of Human-Computer Studies **66**(6): 452-465.

3) Social marketing

Social marketing in public health uses commercial marketing media (such as postcards, advertisements, public displays and social media) to promote the health and wellbeing of people.

Focusing on the university environment, we found only two studies that examined social marketing strategies that aimed to improve mental health knowledge and outcomes.

One trial in 28 UK colleges used postcards and posters to educate students about depression and its treatment.[23] The study found that both groups of students knew that depression can be effectively treated. However, the students who read the cards were more likely to recognise the symptoms of depression than in the group who did not have access to the materials.

In the other trial, a range of strategies was introduced across 9 Australian university campuses to improve the mental health literacy of students and staff.[24] The program used emails, posters, campus events, fact sheets and mental health first aid training. The control group of students (who were largely unaware of the various elements of the program) showed no changes to their mental wellbeing and willingness to seek help for mental wellbeing and alcohol consumption. In comparison, the students who were aware of the various elements of the program were more willing to seek help for mental health concerns, or drug and alcohol concerns. Similar results applied for the university staff involved in the trial.

Together, these studies suggest social marketing may help educate students and increase knowledge about mental health and appropriate services for help, but it may not change behaviours or affect mental wellbeing outcomes.

There is also some evidence that social marketing could help to remove or reduce the stigma associated with mental illness. Stigma is an additional challenge for people with a mental illness and removing it is a key goal of public mental health initiatives in order to reduce discrimination and increase access to mental health services.

A recent systematic review considered the effect of strategies designed to reduce mental health-related stigma in university students.[25] The review concluded that the most effective strategies for improving attitudes were based on social contact or video-based social contact, particularly in terms of showing the successful lives of people living with mental illness. It is suggested that dispelling myths about mental illness may assist awareness of and access to mental health services by staff and students.

[23] Merritt, R. K., J. R. Price, J. Mollison and J. R. Geddes (2007). "A cluster randomized controlled trial to assess the effectiveness of an intervention to educate students about depression." Psychological Medicine **37**(3): 363-372.
[24] Reavley, N. J., T. V. McCann, S. Cvetkovski and A. F. Jorm (2014). "A multifaceted intervention to improve mental health literacy in employees of a multi-campus university: A cluster randomised trial." Journal of Public Mental Health **13**(1): 25-39.
[25] Yamaguchi, S., S. I. Wu, M. Biswas, M. Yate, Y. Aoki, E. A. Barley and G. Thornicroft (2013). "Effects of short-term interventions to reduce mental health-related stigma in university or college students: A systematic review." Journal of Nervous and Mental Disease **201**(6): 490-503.

4) Curriculum-based strategies (including mandatory programs)

One way in which universities can promote mental health amongst their students is by instituting opportunities to develop skills and knowledge about mental health as part of the curriculum or course. This is possible through utilising curriculum infusion methods. Curriculum infusion has mostly been used to educate students on issues of high risk drinking and substance abuse.[26] However curriculum infusion provides opportunities within the learning environment to integrate discussion of wellbeing issues into other subject matter being studied, for example mental health.[27]

Georgetown University introduced a program of curriculum infusion across 60 faculties and 25 academic departments, giving a particular focus to mental wellbeing. Wellbeing discussions were had in courses other than those that were health related, such as economics and mathematics.[28] Unfortunately, no assessment of this initiative has occurred at this point in time.

A 2008 study looked at the effects of a mandatory course called 'Health in Modern Society' which discussed healthy lifestyles, mental health and sexual health.[29] Though there was no control group, the study showed that the students who did the course had an increase in positive mental health outcomes.

Monash University looked at the impact of the mandatory 'Health Enhancement Program' on first year medical students.[30] The course included subjects such as behaviour-change strategies and mindfulness-based therapies. After the course, students showed improved outcomes in psychological quality of life, symptoms of depression, reduced hostility and general mental health.

Mindfulness-based therapies have been integrated into several university curricula, particularly in medical schools.[31] A 2013 study found that a six week mindfulness course at a US university increased the psychological health of the participants, though it did not have an impact on anxiety outcomes.[32] Another program which taught medical students stress-reduction relaxation techniques found that after one month students reported a 46.7% reduction in stress.[33]

In another study, psychology students in Norway participated in a 7 week mindfulness-based stress reduction program.[34] There were improvements in general wellbeing and less mental stress, but a detailed analysis found that the benefits were only felt by the female participants.

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[26]Lederman, L. C., L. P. Stewart and T. L. Russ (2007). "Addressing College Drinking through Curriculum Infusion: A Study of the Use of Experience-Based Learning in the Communication Classroom." Communication Education **56**(4): 476-494.

[27] Mitchell, S. L., S. A. Darrow, M. Haggerty, T. Neill, A. Carvalho and C. Uschold (2012). "Curriculum infusion as college student mental health promotion strategy." Journal of College Student Psychotherapy **26**(1): 22-38.

[28] Riley, J. B. and M. McWilliams (2012). Curriculum infusion: Educating the whole student and creating campus change-Georgetown University (Washington DC). Transforming undergraduate education: Theory that compels and practices that succeed. Lanham, MD, Rowman & Littlefield; US**:** 319-323.

[29] Becker, C. M., H. Johnson, K. Vail-Smith, C. Maahs-Fladung, D. Tavasso, B. Elmore and C. Blumell (2008). "Making Health Happen on Campus: A Review of a Required General Education Health Course." Journal of General Education **57**(2): 67-74.

[30] Hassed, C., V. S. Sierpina and M. J. Kreitzer (2008). "The Health Enhancement Program at Monash University Medical School." Explore: The Journal of Science and Healing **4**(6): 394-397.

[31] Dobkin, P. L. and T. A. Hutchinson (2013). "Teaching mindfulness in medical school: Where are we now and where are we going?" Medical Education **47**(8): 768-779.

[32] Bergen-Cico, D., K. Possemato and S. Cheon (2013). "Examining the Efficacy of a Brief Mindfulness-Based Stress Reduction (Brief MBSR) Program on Psychological Health." Journal of American College Health **61**(6): 348-360.

[33] Bughi, S. A., J. Sumcad and S. Bughu (2006). "Effect of brief behavioral intervention program in managing stress in medical students from two Southern California universities." Medical Education Online **11**: 1-8.

[34] de Vibe, M., I. Solhaug, R. Tyssen, O. Friborg, J. H. Rosenvinge, T. Sorlie and A. Bjorndal (2013). "Mindfulness training for stress management: a randomised controlled study of medical and psychology students." BMC Medical Education **13**.

Our findings correspond with those of another review of mental health promotion and prevention strategies for university students.[35] This review specifically looked at strategies targeting individuals. The authors found that:

- Broad education was less effective than skills-based strategies, with the most effective skills being delivered by mindfulness-based programs; and
- Strategies offered as part of classroom curricula were more effective than small group interventions.

However, since most of the studies included as part of these reviews did not use control groups for comparison, or were not evaluated, it is hard to draw firm conclusions. While a benefit for mindfulness-based training may be likely, there remain questions regarding:

- Whether to incorporate mindfulness or meditation-based training for all students in the curriculum ie. mandatory or elective courses;
- Whether these benefits can be maintained throughout university study and beyond graduation;
- Possible risks associated with this type of training for particular students; and
- How these types of training are relevant for non-health related disciplines, as all the research so far has used medical or psychology students.

While some well-designed studies have suggested meditation-based strategies and mindfulness techniques can be useful in promoting mental wellbeing for staff and students in universities, there are weaknesses in the design and evaluation of the studies mentioned in this brief. For example, most of the students who have taken part in these studies are self-selected and tend to be more motivated to participate in these types of interventions.

Nonetheless, further scaling up and corresponding evaluation of these types of strategies could be useful to promote mental health for staff and students on a large scale.

[35] Conley, C. S., J. A. Durlak and D. A. Dickson (2013). "An evaluative review of outcome research on universal mental health promotion and prevention programs for higher education students." Journal of American College Health **61**(5): 286-301.

5) Alternate academic strategies (including changes to academic policy and practice)

Another way that universities can promote student mental health is through changing academic policies or practices for mental health benefit and promotion. The most common type of change we found was in regards to changing the grading scheme of a subject or course. We also found an example relating to teaching practice.

It should be noted that there is research specifically on higher education learning and teaching practices; for example studies have indicated that complex grading systems result in a lower level of deep learning by students.[36] However the only papers included as part of our review were ones that included a measure of mental wellbeing as outcomes.

A number of studies have looked at the effect of grading systems on students' mental wellbeing. For example, one study of 7 US medical schools found that medical students working to a grading scale with three or more levels had higher levels of stress, burnout, emotional exhaustion and depersonalisation.[37]

Several other studies have therefore looked at the effect of changing from a multi-level grading system to a two grade pass/fail system. Students overall reported that they experienced less stress and had a greater sense of wellbeing, with no fall in academic performance, under a two grade pass/fail system. However there were variations in findings, with one report noting that the feelings of wellbeing diminished by the fourth semester, suggesting these changes may not be sustained over time.[38]

From 2009 the Saint Louis University School of Medicine made changes to the curriculum to promote mental wellbeing in its students. Initiatives included:

- Grading for pre-clinical courses changed from a 5 tier system to a pass/fail system;
- Class hours in the first 2 years of the curriculum were reduced nearly 10%;
- More longitudinal electives were introduced, breaking up long courses into smaller sections;
- Learning communities of students and faculty staff were created; and
- A mindfulness and resilience course was added as part of the curricula.

After these initiatives were introduced, researchers found students had significantly lower levels of stress, depression symptoms and anxiety symptoms than previous cohorts of students.[39]

Allowing that these studies only looked at medical students and there may have been biases in how they were conducted, it does seem that students have lower stress levels when working to a pass/fail grading system in comparison with other grading systems.

[36] Dahlgren, L. O., A. Fejes, M. Abrandt-Dahlgren and N. Trowald (2009). "Grading systems, features of assessment and students' approaches to learning." Teaching in Higher Education **14**(2): 185-194.
[37] Reed, D. A., T. D. Shanafelt, D. W. Satele, D. V. Power, A. Eacker, W. Harper, C. Moutier, S. Durning, F. S. Massie, M. R. Thomas, J. A. Sloan and L. N. Dyrbye (2011). "Relationship of pass/fail grading and curriculum structure with well-being among preclinical medical students: A multi-institutional study." Academic Medicine **86**(11): 1367-1373.
[38] Bloodgood, R. A., J. G. Short, J. M. Jackson and J. R. Martindale (2009). "A change to pass/fail grading in the first two years at one medical school results in improved psychological well-being." Ibid. **84**(5): 655-662.
[39] Slavin, S. J., D. L. Schindler and J. T. Chibnall (2014). "Medical student mental health 3.0: improving student wellness through curricular changes." Ibid. **89**(4): 573-577.

There is also some evidence linking a change in teaching practice to improved mental wellbeing of students. A 2006 program in Scotland switched their course from a traditional teacher/student arrangement, to a problem-based curriculum, where students had to manage their own learning as they solved a set problem.[40] After 25 weeks, the students reported fewer academic, clinical and personal problems, however reported a greater level of absenteeism. Results were similar during a follow up of the students. Ultimately the students' stress levels were reduced, but overall course performance did not improve.

While there is some promising research indicating how academic policies and practices may impact on student mental wellbeing, more research has to be undertaken to test and scale up these theories.

[40] Jones, M. C. and D. W. Johnston (2006). "Is the introduction of a student-centred, problem-based curriculum associated with improvements in student nurse well-being and performance? An observational study of effect." International Journal of Nursing Studies **43**(8): 941-952.

6) Life skills and physical activity programs

As part of this review we found a number of studies looking at the utilisation of 'life skills' programs that were optional for students (as opposed to mandatory and embedded in curricula). 'Life skills' include coping strategies, social skills and problem solving for individuals. These skills may also include suicide prevention skills and training.[41] These studies have looked at whether acquiring and improving such skills can help people better manage stress and improve mental wellbeing.

We also came across some studies that utilised physical activity and exercise to promote student and staff mental health. There is growing evidence that physical activity has a number of positive benefits for mental wellbeing. However, there are challenges associated with universities scaling up and extending these programs to all students.

In a Japanese university, students attended classes over 11 weeks, designed to promote mental wellbeing through greater self-determination and self-control.[42] The topics included: social relations, self-esteem and conflict resolution. Compared to a control group that did not do the classes, the students reported a significant increase in self-efficacy and improved interpersonal relationships.

Another paper looked at a program that involved three meetings over three weeks aimed at building resilience in undergraduates. After the program the students showed improved self-control and greater optimism, with fewer indications of depression.[43]

Though these two studies were looking at pilot programs and the sample size was small, it does seem that group strategies can be effective in giving students life skills than can help improve their ability to handle stress and improve mental wellbeing.

Exercise and physical activity are other activities or skills that are recommended for most people wanting to improve overall health, including mental wellbeing. A number of studies have looked at the value of exercise in improving mental wellbeing for university staff[44] and students.

One study looked at a program aimed at helping university student participants improve their physical health with a focus on reducing stress.[45] After 12 weeks of gym sessions and group discussions about wellbeing and the value of exercise, participants reported improved overall health and greater confidence in managing stress. Similarly, a 3 month Tai Chi course involving 30 college students was found to give the students improved mental wellbeing outcomes.[46]

Given the increasing evidence that physical activity levels can impact mental wellbeing, more research is needed.

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[41] Indelicate, N. A., A. Mirsu-Paun and W. D. Griffin (2011). "Outcomes of a suicide prevention gatekeeper training on a university campus." Journal of College Student Development **52**(3): 350-361.
[42] Ando, M. (2011). "An intervention program focused on self-understanding and interpersonal interactions to prevent psychosocial distress among Japanese university students." Journal of Adolescence **34**(5): 929-940.
[43] Gerson, M. W. and N. Fernandez (2013). "PATH: A program to build resilience and thriving in undergraduates." Journal of Applied Social Psychology **43**(11): 2169-2184.
[44] Dreyer, L., S. Dreyer and D. Rankin (2012). "Effects of a 10-Week High-Intensity Exercise Intervention on College Staff with Psychological Burnout and Multiple Risk Factors." ICHPER SD Journal of Research **7**(1): 27-33.
[45] Ince, M. L. (2008). "Use of a social cognitive theory-based physical-activity intervention on health-promoting behaviors of university students." Perceptual and Motor Skills **107**(3): 833-836.
[46] Wang, Y. T. (2008). "Tai Chi exercise and the improvement of mental and physical health among college students." Medicine & Sport Science **52**: 135-145.

7) eHealth technology

The literature base is growing for eHealth technologies such as mobile phone apps, computer games and web-based tools, particularly in the area of mental health. While these types of interventions are technically individual-based, they offer accessibility, scalability and cost-effectiveness for reaching young adults, particularly university students. They can also be personalised to each user even when offered to the whole population or group.

This is evidenced by the results of a recent systematic-review and meta-analysis of web-based and computer-delivered interventions to improve depression, anxiety and well-being of university students.[47] The authors concluded that eHealth interventions are more effective in improving students' mental health outcomes, particularly when they are compared with inactive controls (i.e. not receiving any type of intervention), and that there were no differences when compared with other types of active controls.

In addition, our review resulted in three studies that evaluated the impact of eHealth technology on university students.

ePREP is a program designed to improve relationship quality and individual mental health outcomes.[48] It was found that university student participants showed a decrease in anxiety, psychological aggression and physical assault. However there were no improvements in depression, negotiation, constructive communication and relationship satisfaction.

Another group of researchers assessed a game-based program which taught students coping and communication skills, cognitive restructuring and anger management, while providing information about stress and depression.[49] It also had a social element since players could comment on each other's progress and gift game tools. Despite a high drop-out rate, some improvement was seen in mental health literacy and confidence about academic study.

One interactive computer program led student participants to think about stressful situations that might come up in their everyday lives.[50] Through this, it was found that participants improved their ability to manage stress. The results suggest that an interactive format of engaging with students is more effective than just supplying information about managing stress.

eHealth technology offers the potential to be an accessible, scalable and cost-effective method of reaching university students to address and promote mental wellbeing. However, further research, development and investment in this technology is required, particularly by universities.

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[47] Davies, E. B., R. Morriss and C. Glazebrook (2014). "Computer-delivered and web-based interventions to improve depression, anxiety, and psychological well-being of university students: A systematic review and meta-analysis." Journal of medical Internet research **16**(5).

[48] Braithwaite, S. R. and F. D. Fincham (2009). "A randomized clinical trial of a computer based preventive intervention: Replication and extension of ePREP." Journal of Family Psychology **23**(1): 32-38.

[49] Li, T. M. H., M. Chau, P. W. C. Wong, E. S. Y. Lai and P. S. F. Yip (2013). "Evaluation of a Web-Based Social Network Electronic Game in Enhancing Mental Health Literacy for Young People." Journal of medical Internet research **15**(5).

[50] Jin, S.-A. (2010). "The effects of incorporating a virtual agent in a computer-aided test designed for stress management education: The mediating role of enjoyment." Computers in Human Behavior **26**(3): 443-451.

8) Alcohol, Tobacco and Other Drugs

There are some promising indications that universities can have a real impact in this area. However the research mostly concentrates on alcohol and tobacco; there is a lack of studies and evidence on other drugs.

Most studies in this area focus on ways to reduce 'binge drinking' (episodic short term overconsumption of alcohol) among college and university students. Overall we found that:

- Education about alcohol and risky consumption levels can increase student knowledge, but have little impact on the drinking behaviours of students.

- There is also contradictory evidence related to the effectiveness of social marketing strategies to reduce the harms associated with alcohol use.[51] It seems that these strategies increase knowledge, but an impact on behaviour is not evident or at least very small.[52]

- Web-based interventions (which allow for personalised feedback) seem to be effective in the short-term reduction of risky or harmful drinking behaviours in students.

- There is contradictory evidence related to 'dry' (alcohol-free) campuses.[53] While this approach may prevent some drinking, it may not have an impact on binge drinking and heavy drinking practices, indicating that the heavier, more at risk drinkers are not targeted and reached.[54]

- There is some promising evidence that community coalition strategies reduced the number of binge drinking episodes and their adverse consequences on university campuses.[55]

In regards to tobacco, the research indicates that people smoke less in smoke-free universities.[56] This is positive for second-hand smoke exposure. However, it is unclear whether this means that people therefore smoke less overall (ie. There is a reduction in the number of smokers), or whether people go elsewhere to smoke.[57]

[51] DeJong, W., S. K. Schneider, L. G. Towvim, M. J. Murphy, E. E. Doerr, N. R. Simonsen, K. E. Mason and R. A. Scribner (2009). "A Multisite Randomized Trial of Social Norms Marketing Campaigns to Reduce College Student Drinking: A Replication Failure." Substance Abuse **30**(2): 127-140.
[52] Seo, D.-C., D. Owens, R. Gassman and C. Kingori (2013). "Effects of a 2.5-year campus-wide intervention to reduce college drinking." Health Education Journal **72**(6): 673-683.
[53] Voas, R. B., M. Johnson, R. J. Turrisi, D. Taylor, C. R. Honts and L. Nelsen (2008). "Bringing alcohol on campus to raise money: impact on student drinking and drinking problems." Addiction **103**(6): 940-950.
[54] Walter, G. and J. Kowalczyk (2012). "The effectiveness of alcohol policies in 4-year public universities." Journal of Community Health: The Publication for Health Promotion and Disease Prevention **37**(2): 520-528.
[55] Wolfson, M., H. Champion, T. P. McCoy, S. D. Rhodes, E. H. Ip, J. N. Blocker, B. A. Martin, K. G. Wagoner, M. C. O'Brien, E. L. Sutfin, A. Mitra and R. H. DuRant (2012). "Impact of a randomized campus/community trial to prevent high-risk drinking among college students." Alcoholism: Clinical and Experimental Research **36**(10): 1767-1778.
[56] Seo, D. C., J. T. Macy, M. R. Torabi and S. E. Middlestadt (2011). "The effect of a smoke-free campus policy on college students' smoking behaviors and attitudes." Preventive Medicine **53**(4-5): 347-352.
[57] Joseph, G. L. L., M. R. Leah and O. G. Adam (2013). "Cigarette butts near building entrances: what is the impact of smoke-free college campus policies?" Tobacco Control **22**(2): 107-112.

Limitations

This brief and the corresponding review had a number of limitations.

While there is some good evidence supporting strategies to promote mental wellbeing in students, most studies have not been rigorously designed, monitored and evaluated, limiting their validity and generalizability to other populations and settings.

Difficulty in determining strictly population-based approaches versus individual-level approaches means we may have inadvertently excluded some studies while including a number of strategies that ordinarily would not be considered 'population-based' in a public health sense.

We have only reviewed published scientific literature, though acknowledging that there may be very useful information to be found in non-scientific documents (what's called 'grey literature'), especially in terms of strategies that focus on using policy changes as tools for promoting mental wellbeing.

While 61 of the 99 papers reviewed were focused on alcohol, tobacco and other drugs, we acknowledge that the greatest influence on these outcomes are often beyond the control of individual universities. For example, changes in the cost and availability of alcohol may be pre-determined by state or federal government laws. We have therefore not included studies looking at these issues.

A large amount of data has been retrieved for this review in a relatively short time frame. This has led us to focus on a general assessment of the information, rather than a systematic analysis of the qualities of each study.

However, despite the limitations we have outlined, this report is a comprehensive review of how population-based or settings-based approaches in universities can promote the mental wellbeing of students and staff. Overall this review indicates the large gaps in knowledge around population and settings-based approaches to promoting mental health in universities.

Final conclusions

There are four general conclusions derived from this review. The most effective strategies according to the evidence considered in this report have a number of aspects in common. They tend to be:

1) Informed by evidence and generating evidence

There is a lack of evidence on the effectiveness of population-based interventions for the promotion of mental health and wellbeing within university settings. This is particularly the case relating to university staff mental health. The number of studies targeting the mental wellbeing of university staff is scarce (5% of total papers). This does not mean there is no evidence related to the promotion of mental health and wellbeing within workplace settings, but that the published literature has not been conducted within specific workplace environments such as universities.

There is a need to systematically monitor and measure the physical and mental wellbeing of the whole university community in order to see changes and measure impact that our strategies may have over the short and long term.

2) Sustainable, integrated and multidimensional

Population-based, primary prevention initiatives should be combined with individual strategies that build personal skills and increase knowledge. These initiatives must be sustained over time and measure for impact, while also being integrated into the everyday environment of the university.

Educating and informing staff and students about mental health at an individual level can be useful to reduce stigma and improve knowledge, however it may not necessarily change outcomes or behaviour. In comparison, changing the environment of a university, whether that is the academic environment of curricula or the physical environment of a classroom, seems to be more effective at supporting improved mental health outcomes and behaviours for both staff and students. This applied not only to the studies with mental health outcomes but also for studies looking at creating smoke-free campuses.

3) Curricula-based

Where possible, initiatives that are curricula-based and included as part of a student's education and training are most effective at improving outcomes and promoting mental health, as these require a low level of agency by the students to receive the intervention.

4) Embedded within university policies and practices

Policies and plans must be embedded, implemented and communicated to the whole population. Creating a policy without explaining it and ensuring supporting measures are in place may result in ineffective implementation and impact.

Acknowledgements

This policy brief was drafted in 2015 by the primary author of the systematic review, Dr Ana Fernandez, and completed in April 2016 by Ms Elly Howse, Senior Project Officer, Healthy Sydney University.

The authors acknowledge the members of the Mental Wellbeing working group of Healthy Sydney University for their assistance in preparing the brief.

The related documents accompanying this brief can be found at the Healthy Sydney University website http://www.sydney.edu.au/healthy-sydney-university.

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Bibliography

Adams, J., O. Mytton, M. White and P. Monsivais (2016). "Why Are Some Population Interventions for Diet and Obesity More Equitable and Effective Than Others? The Role of Individual Agency." PLoS medicine **13**(4): e1001990.

Ando, M. (2011). "An intervention program focused on self-understanding and interpersonal interactions to prevent psychosocial distress among Japanese university students." Journal of Adolescence **34**(5): 929-940.

Australian Institute of Health and Welfare (2016). Australian Burden of Disease Study: Impact and causes of illness and death in Australia 2011. Australian Burden of Disease Study. Canberra, Australian Institute of Health and Welfare.

Becker, C. M., H. Johnson, K. Vail-Smith, C. Maahs-Fladung, D. Tavasso, B. Elmore and C. Blumell (2008). "Making Health Happen on Campus: A Review of a Required General Education Health Course." Journal of General Education **57**(2): 67-74.

Bergen-Cico, D., K. Possemato and S. Cheon (2013). "Examining the Efficacy of a Brief Mindfulness-Based Stress Reduction (Brief MBSR) Program on Psychological Health." Journal of American College Health **61**(6): 348-360.

Bloodgood, R. A., J. G. Short, J. M. Jackson and J. R. Martindale (2009). "A change to pass/fail grading in the first two years at one medical school results in improved psychological well-being." Academic Medicine **84**(5): 655-662.

Braithwaite, S. R. and F. D. Fincham (2009). "A randomized clinical trial of a computer based preventive intervention: Replication and extension of ePREP." Journal of Family Psychology **23**(1): 32-38.

Bughi, S. A., J. Sumcad and S. Bughu (2006). "Effect of brief behavioral intervention program in managing stress in medical students from two Southern California universities." Medical Education Online **11**: 1-8.

Conley, C. S., J. A. Durlak and D. A. Dickson (2013). "An evaluative review of outcome research on universal mental health promotion and prevention programs for higher education students." Journal of American College Health **61**(5): 286-301.

Cvetkovski, S., N. J. Reavley and A. F. Jorm (2012). "The prevalence and correlates of psychological distress in Australian tertiary students compared to their community peers." Australian and New Zealand Journal of Psychiatry **46**(5): 457-467.

Dahlgren, L. O., A. Fejes, M. Abrandt-Dahlgren and N. Trowald (2009). "Grading systems, features of assessment and students' approaches to learning." Teaching in Higher Education **14**(2): 185-194.

Davies, E. B., R. Morriss and C. Glazebrook (2014). "Computer-delivered and web-based interventions to improve depression, anxiety, and psychological well-being of

university students: A systematic review and meta-analysis." Journal of medical Internet research **16**(5).

de Vibe, M., I. Solhaug, R. Tyssen, O. Friborg, J. H. Rosenvinge, T. Sorlie and A. Bjorndal (2013). "Mindfulness training for stress management: a randomised controlled study of medical and psychology students." BMC Medical Education **13**.

DeJong, W., S. K. Schneider, L. G. Towvim, M. J. Murphy, E. E. Doerr, N. R. Simonsen, K. E. Mason and R. A. Scribner (2009). "A Multisite Randomized Trial of Social Norms Marketing Campaigns to Reduce College Student Drinking: A Replication Failure." Substance Abuse **30**(2): 127-140.

Dobkin, P. L. and T. A. Hutchinson (2013). "Teaching mindfulness in medical school: Where are we now and where are we going?" Medical Education **47**(8): 768-779.

Dreyer, L., S. Dreyer and D. Rankin (2012). "Effects of a 10-Week High-Intensity Exercise Intervention on College Staff with Psychological Burnout and Multiple Risk Factors." ICHPER SD Journal of Research **7**(1): 27-33.

Fernandez, A., E. Howse, M. Rubio-Valera, K. Thorncraft, J. Noone, X. Luu, B. Veness, M. Leech, G. Llewellyn and L. Salvador-Carulla (2016). "Setting-based interventions to promote mental health at the university: a systematic review." International Journal of Public Health: 1-11.

Friedan, T. R. (2010). "A Framework for Public Health Action: The Health Impact Pyramid." American Journal of Public Health **100**(4): 590-595.

Friedman, B., N. G. Freier, P. H. Kahn, P. Lin and R. Sodeman (2008). "Office window of the future? - Field-based analyses of a new use of a large display." International Journal of Human-Computer Studies **66**(6): 452-465.

Gerson, M. W. and N. Fernandez (2013). "PATH: A program to build resilience and thriving in undergraduates." Journal of Applied Social Psychology **43**(11): 2169-2184.

Grawitch, M. J., S. Trares and J. M. Kohler (2007). "Healthy workplace practices and employee outcomes." International Journal of Stress Management **14**(3): 275-293.

Harvey, S., S. Joyce, L. Tan, A. Johnson, H. Nguyen, M. Modini and M. Groth (2014). Developing a mentally healthy workplace: a review of the literature, The Black Dog Institute, University of New South Wales.

Hassed, C., V. S. Sierpina and M. J. Kreitzer (2008). "The Health Enhancement Program at Monash University Medical School." Explore: The Journal of Science and Healing **4**(6): 394-397.

Ince, M. L. (2008). "Use of a social cognitive theory-based physical-activity intervention on health-promoting behaviors of university students." Perceptual and Motor Skills **107**(3): 833-836.

Indelicate, N. A., A. Mirsu-Paun and W. D. Griffin (2011). "Outcomes of a suicide prevention gatekeeper training on a university campus." Journal of College Student Development **52**(3): 350-361.

Jin, S.-A. (2010). "The effects of incorporating a virtual agent in a computer-aided test designed for stress management education: The mediating role of enjoyment." Computers in Human Behavior **26**(3): 443-451.

Joffe, P. (2008). "An empirically supported program to prevent suicide in a college student population." Suicide & Life-Threatening Behavior **38**(1): 87-103.

Jones, M. C. and D. W. Johnston (2006). "Is the introduction of a student-centred, problem-based curriculum associated with improvements in student nurse well-being and performance? An observational study of effect." International Journal of Nursing Studies **43**(8): 941-952.

Joseph, G. L. L., M. R. Leah and O. G. Adam (2013). "Cigarette butts near building entrances: what is the impact of smoke-free college campus policies?" Tobacco Control **22**(2): 107-112.

Kessler, R. C., P. Berglund, O. Demler, R. Jin, K. R. Merikangas and E. E. Walters (2005). "LIfetime prevalence and age-of-onset distributions of dsm-iv disorders in the national comorbidity survey replication." Archives of General Psychiatry **62**(6): 593-602.

Klainberg, M., B. Ewing and M. Ryan (2010). "Reducing stress on a college campus." Journal of the New York State Nurses Association **41**(2): 4-7; quiz 18-20.

Larcombe, W., S. Finch, R. Sore, C. M. Murray, S. Kentish, R. A. Mulder, P. Lee-Stecum, C. Baik, O. Tokatlidis and D. A. Williams (2016). "Prevalence and socio-demographic correlates of psychological distress among students at an Australian university." Studies in Higher Education **41**(6): 1074-1091.

Lau, S. and F. Yang (2009). "Introducing Healing Gardens into a Compact University Campus: Design Natural Space to Create Healthy and Sustainable Campuses." Landscape Research **34**(1): 55-81.

Lederman, L. C., L. P. Stewart and T. L. Russ (2007). "Addressing College Drinking through Curriculum Infusion: A Study of the Use of Experience-Based Learning in the Communication Classroom." Communication Education **56**(4): 476-494.

Li, T. M. H., M. Chau, P. W. C. Wong, E. S. Y. Lai and P. S. F. Yip (2013). "Evaluation of a Web-Based Social Network Electronic Game in Enhancing Mental Health Literacy for Young People." Journal of medical Internet research **15**(5).

Merritt, R. K., J. R. Price, J. Mollison and J. R. Geddes (2007). "A cluster randomized controlled trial to assess the effectiveness of an intervention to educate students about depression." Psychological Medicine **37**(3): 363-372.

Mitchell, S. L., S. A. Darrow, M. Haggerty, T. Neill, A. Carvalho and C. Uschold (2012). "Curriculum infusion as college student mental health promotion strategy." Journal of College Student Psychotherapy **26**(1): 22-38.

Olding, M. and A. Yip (2014). Policy Approaches to Post-Secondary Student Mental Health. OCAD University & Ryerson University Campus Mental Health Partnership Project. Toronto, Canada.

Pignata, S. and A. H. Winefield (2013). "Stress-reduction interventions in an australian university: A case study." Stress and Health((Pignata S.; Winefield A.H., anthony.winefield@unisa.edu.au) Work and Stress Research Group, Centre for Applied Psychological Research University of South Australia Adelaide, South Australia Australia).

Reavley, N. J., T. V. McCann, S. Cvetkovski and A. F. Jorm (2014). "A multifaceted intervention to improve mental health literacy in employees of a multi-campus university: A cluster randomised trial." Journal of Public Mental Health **13**(1): 25-39.

Reed, D. A., T. D. Shanafelt, D. W. Satele, D. V. Power, A. Eacker, W. Harper, C. Moutier, S. Durning, F. S. Massie, M. R. Thomas, J. A. Sloan and L. N. Dyrbye (2011). "Relationship of pass/fail grading and curriculum structure with well-being among preclinical medical students: A multi-institutional study." Academic Medicine **86**(11): 1367-1373.

Riley, J. B. and M. McWilliams (2012). Curriculum infusion: Educating the whole student and creating campus change-Georgetown University (Washington DC). Transforming undergraduate education: Theory that compels and practices that succeed. Lanham, MD, Rowman & Littlefield; US**:** 319-323.

Seo, D.-C., D. Owens, R. Gassman and C. Kingori (2013). "Effects of a 2.5-year campus-wide intervention to reduce college drinking." Health Education Journal **72**(6): 673-683.

Seo, D. C., J. T. Macy, M. R. Torabi and S. E. Middlestadt (2011). "The effect of a smoke-free campus policy on college students' smoking behaviors and attitudes." Preventive Medicine **53**(4-5): 347-352.

Slavin, S. J., D. L. Schindler and J. T. Chibnall (2014). "Medical student mental health 3.0: improving student wellness through curricular changes." Academic Medicine **89**(4): 573-577.

Stallman, H. M. (2010). "Psychological distress in university students: A comparison with general population data." Australian Psychologist **45**(4): 249-257.

Tsouros, A., G. Dowding, J. Thompson and M. Dooris (1998). "Health Promoting Universities: Concept, experience and framework for action."

University of British Columbia (2015). Okanagan Charter: An International Charter for Health Promoting Universities and Colleges. Vancouver, Canada, University of British Columbia.

Veness, B. (2016). The wicked problem of university student mental health. Sydney, Australia.

Voas, R. B., M. Johnson, R. J. Turrisi, D. Taylor, C. R. Honts and L. Nelsen (2008). "Bringing alcohol on campus to raise money: impact on student drinking and drinking problems." Addiction **103**(6): 940-950.

Walter, G. and J. Kowalczyk (2012). "The effectiveness of alcohol policies in 4-year public universities." Journal of Community Health: The Publication for Health Promotion and Disease Prevention **37**(2): 520-528.

Wang, Y. T. (2008). "Tai Chi exercise and the improvement of mental and physical health among college students." Medicine & Sport Science **52**: 135-145.

Wolfson, M., H. Champion, T. P. McCoy, S. D. Rhodes, E. H. Ip, J. N. Blocker, B. A. Martin, K. G. Wagoner, M. C. O'Brien, E. L. Sutfin, A. Mitra and R. H. DuRant (2012). "Impact of a randomized campus/community trial to prevent high-risk drinking among college students." Alcoholism: Clinical and Experimental Research **36**(10): 1767-1778.

World Health Organization (2013). Mental health action plan 2013-2020. Geneva, Switzerland.

World Health Organization. (2016). "Mental health: strengthening our response." from http://www.who.int/mediacentre/factsheets/fs220/en/.

Yamaguchi, S., S. I. Wu, M. Biswas, M. Yate, Y. Aoki, E. A. Barley and G. Thornicroft (2013). "Effects of short-term interventions to reduce mental health-related stigma in university or college students: A systematic review." Journal of Nervous and Mental Disease **201**(6): 490-503.