Royal Commission into Victoria's Mental Health System

# WITNESS STATEMENT OF PROFESSOR MARIO ALVAREZ-JIMENEZ

I, Professor Mario Alvarez-Jimenez Ph.D, D.Clin.Psy, MA Research, BA (Hons), Director at Orygen Digital of 35 Poplar Road Parkville in the state of Victoria, say as follows:

1 I am authorised by Orygen to make this statement on its behalf.

2 I make this statement on the basis of my own knowledge, save where otherwise stated. Where I make statements based on information provided by others, I believe such information to be true.

## BACKGROUND

### *Qualifications and experience*

3 I have the following qualifications:

(a) Doctor of Psychology, the University of Cantabria, Department of Psychiatry and Medicine, Spain (2005-2009);

(b) Masters in Research Methodology: Design and Statistics in Health Sciences, University Autonomous of Barcelona, Spain (2006-2009);

(c) Post-graduate Diploma in Statistics in Health Sciences, Autonomous University of Barcelona, Spain (2005-2009);

(d) Certificate of Proficiency Researcher, the University of Cantabria, Spain (2004-2008);

(e) Certificate of Clinical Psychology Specialist from Spanish Public Health and Education Ministries, Spain (2001-2004); and

(f) Graduated in Psychology, Pontifical University of Salamanca, Spain (1995-1999).

4 I am a Professor of Digital Mental Health at Orygen and the Centre for Youth Mental Health (**CYMH**), Faculty of Medicine, Dentistry and Health Sciences, The University of Melbourne.

5 I am also the Director of Orygen Digital at Orygen.

*Please note that the information presented in this witness statement responds to matters requested by the Royal Commission.*

6 I am an Australian Health Practitioner Regulatory Agency (**AHPRA**) registered clinical psychologist. Since 2014, I have also been a clinical psychologist at headspace Glenroy (operated by Orygen).

7 Attached to this statement and marked 'MAJ-1' is a copy of my Curriculum Vitae.

***Current role and responsibilities***

8 Orygen Digital (formerly, eOrygen) is the digital division of Orygen that is in charge of developing the digital technologies to integrate with and enhance youth mental health services. We started in 2010 with a small team, which has grown over 10 years to 46 people. By 2021 the Orygen digital team will include over 70 researchers, clinicians and professionals. Orygen Digital is currently undertaking over 30 different research projects in partnership with a number of universities in Australia and overseas.

9 Orygen Digital's mission since its commencement has been to integrate evidence-based, engaging, digital interventions with youth mental health services. Our mission is to make all youth mental health services across Australia digitally-enhanced within five years. We are world leaders in developing digital interventions specifically designed to integrate with and address the limitations of youth mental health services. We are also leaders in developing social media-based interventions integrating clinician, vocational and peer support with highly engaging evidence-based therapies for young people and their families. Building on this leadership, Orygen Digital has recently received support from the Victorian Government ($6M) and the Telstra Foundation ($1M) to digitally enhance youth mental health services across Victoria for the next 14 months.

10 As the Director of Orygen Digital and Professor of Digital Youth Mental Health my role is to lead a multi-disciplinary team to design, develop, evaluate and disseminate digital mental health interventions that integrate with clinical services. My team combines social and ethical technology, with advanced and evidence-based psychological models and Artificial Intelligence (**AI**) to develop new interventions that address the key gaps and outcomes in youth mental health treatment and to integrate with youth mental health services. Put differently, my job is to transform youth mental health services through digital technology.

**IMPACT OF THE DIGITAL REVOLUTION**

***The effect of the existence of digital channels and platforms on young people's expectations of service delivery***

11 In my view existing digital technology has affected young people's expectations of service. Young people have come to expect that technology will be integrated with services as a whole. They expect intuitive, interactive software interfaces that provide

the opportunity to engage with other people including both professionals, clinicians, peer supporters and peers.

12 Take education as an example, which has embraced and taken advantage of the technological revolution; young people expect immediate support and they expect that face to face support is integrated with digital support. Our research shows that young people are ready and waiting for this to happen in mental health services.

13 Recent research has also shown that many young people, around 80%, would like to receive support from mental health professionals via social media and that 70-80% would like to be approached by professionals via social media if they experience symptoms.[1]

14 Having said that, research also shows that the majority of young people still have a preference for face to face care, and they want technology to enhance current services as opposed to replacing the supports that already exist. So there is still an expectation and demand that they will be able to see therapists in person if they wish to and that technology will enhance the whole experience.[2]

15 Young people also acknowledge, and are accepting of, different avenues and multi-channel or multimodal services to receive help. They are very understanding of services that offer some aspects that are not relevant to their needs because they may be relevant to others. They know that we will not be able to have a one size fits all approach.

16 Finally, more and more young people expect to have safe places where they can talk to other young people with the same experience, and access peer support in a safe way; in other words, that the channels that they use to communicate with one another and the world are used by clinical services as well.

17 From our experience they also want their families to be able to access integrated digital and face to face support as well and are accepting of this.

[1] Birnbaum, M. L., Rizvi, A. F., Confino, J., Correll, C. U. & Kane, J. M. 2017. Role of social media and the Internet in pathways to care for adolescents and young adults with psychotic disorders and non-psychotic mood disorders. *Early Interv Psychiatry,* 11**,** 290-295

[2] Valentine, L., Pryor, I., McEnery C, O'Sullivan Bell, I., Bendall, S. & Alvarez-Jimenez, M. In press "A Game-Changer" End Users' Perspectives on the Design and Delivery of a Blended Model of Care in First-Episode Psychosis Treatment. JMIR mental health; Bradford S, Rickwood D. Adolescent's preferred modes of delivery for mental health services. Child Adolesc Ment Health 2012 Oct 11;19(1):39-45.

***Expectations of different cohorts and communities***

18 I do not think there is a lot of evidence that expectations differ between different cohorts or communities.

19 For example, I do not think that the evidence supports the idea that young people with mild to moderate mental health conditions, rather than those with more complex mental health conditions, are more prone to only seek online digital support or be fully satisfied with it. To my knowledge, young people have the same views about accessing face to face support and integrated digital support regardless of the severity of their condition.

20 That said, it is critical that the expectations, needs, pain and goals of different groups are carefully considered when designing and integrating digital mental health solutions. For example, it is essential that when we develop digital solutions for specific cohorts and communities such as Aboriginal and Torres Strait Islander young people and LGBTQIA+, that the design of these digital solutions is user-led and centred, both from the perspective of the technological development but also in terms of running these services.

21 There is evidence that more young women seek online support, for example from eheadspace, but in general women are more likely to seek help compared with males.[3]

***Impact of the digital revolution on the mental health of young Victorians and the nature of those impacts***

22 The existence of more and more online services such as eheadspace has made psychological support more accessible and has probably offered support to young people who would not have been otherwise able to access mental health support. That said, research at a national level shows that the vast majority of young people accessing face to face services do not access additional digital support.

23 From a broader perspective, online social media has definitely influenced young people's mental health as it has deeply transformed the way they interact with each other and receive information so that most young people have an online 'persona' or 'self' in addition to a real world persona.

24 I am unaware of specific data on the impact of the digital revolution for young Victorians. However, there is no reason to think that the impact of technology for young Victorians will be very different to the impact that technology has for other young people in similar Western countries. Research shows that online social media can have positive effects -

[3] Rickwood, D., Webb, M., Kennedy, V. & Telford, N. 2016. Who Are the Young People Choosing Web-based Mental Health Support? Findings From the Implementation of Australia's National Web-based Youth Mental Health Service, eheadspace. *JMIR Ment Health,* 3**,** e40.

it can improve wellbeing, reduce depression, provide opportunities for socialisation in times of crisis and foster leadership and self-expression.

25 At the same time, social media can have negative effects. It can significantly increase the opportunities for bullying through 'cyberbullying', for example. Approximately one in four young people experience cyberbullying, which is often suffered in silence and strongly associated with depression. One in five young people go on social media just to make sure that no-one is saying 'mean things' about them. There is also research showing that online social media has led to the externalisation of personal worth where the number of likes and comments has become the most direct indication of self-worth. This has created yet another situation where the rich become richer and the poor become poorer, and where the most vulnerable pay the price. There is research showing that those with low social emotional wellbeing, for example, are more likely to experience cyberbullying, to feel bad about themselves, and to feel excluded when using online social media.[4]

26 There is also consistent research showing that Instagram and Snapchat, which are the most popular social media platforms for young people, are also the most detrimental for their mental health. For example, 7 in 10 young people report that using Instagram makes them feel worse about their body image and recent studies show higher usage of online social media is associated with higher depression, anxiety, self-harm and suicidal ideation amongst young people. Different explanations have been put forward for this. It has been proposed that in addition to cyberbullying, toxic online environments conducive to online contagion and increased information about self-harm, extensive social media usage may displace and disrupt the time spent in in-person social interactions and interfere with sleep time and quality.[5]

**ADVANCING THE DIGITAL AGENDA**

***Conditions and factors driving the adoption of digital innovations in general health settings***

27 Some areas of general health are more advanced in their adoption of digital technologies. Overall, other areas of health experienced an application of digital

[4] Common sense media: Teens Reveal Their Experiences. 2018. Social Media, Social Life. https://www.commonsensemedia.org/research/social-media-social-life-2018

[5] Hamm, M. P., Newton, A. S., Chisholm, A., Shulhan, J., Milne, A., Sundar, P., Ennis, H., Scott, S. D. & Hartling, L. 2015. Prevalence and Effect of Cyberbullying on Children and Young People: A Scoping Review of Social Media Studies. *JAMA Pediatr,* 169**,** 770-7; Underwood, M. & Faris, R. 2015. Being thirteen: Social media and the hidden world of young adolescents' peer culture. Cable News Network (CNN); iGen: Why Today's Super-Connected Kids Are Growing Up Less Rebellious, More Tolerant, Less Happy--and Completely Unprepared for Adulthood--and What That Means for the Rest of Us; Royal Society for Public Health (RSPH). #Status on mind: social media and young people's mental health and wellbeing; https://apo.org.au/sites/default/files/resource-files/2017-05/apo-nid92461.pdf

technologies earlier than mental health. There could be a few reasons for this. Firstly, general health simply includes a greater number of areas than mental health, and there are more researchers working in those areas. Also, other health areas have traditionally received more funding than mental health, allowing greater exploration of the possible integration of digital technologies into health care.

28 Secondly, certain applications of digital technologies to general health are in a sense more direct or straightforward than in mental health. For example, a wearable device to monitor heart functioning does just that: monitors heart function. To use such wearables to provide information about mental health requires a longer route, requiring research into how information provided by wearables on physical indicators can then be translated into inferences about behaviour and mental health. In general, an understanding of psychological phenomena can be more complicated than certain physical phenomena. For example, success in using machine learning to interpret radiological scans has proven to be more successful than using machine learning to successfully extract precise insights from neuroimaging or predicting depression using mobile sensing.

29 Telemedicine, also known as telehealth, is probably one area where mental health was involved early. An example of this is the pioneering work of Professor Peter Yellowless in telemedicine. However, it is really important to distinguish telemedicine from digital mental health applications. Telemedicine is simply providing traditional one-to-one support via technology mediums (e.g., video-conference, online chat or phone) and therefore has many of the limitations of traditional face-to-face models of care in terms of accessibility and continuity of care. Digital mental health applications fully harness the power of digital technologies (online social media, mobile technologies, wearable devices, mobile applications, etc.) and can provide integrated, real time 24/7 support.

30 Furthermore, the development of mental health apps and certain other technologies such as chatbots are other areas where mental health has been at the forefront. The key issue here is the need to improve engagement, which continues to be low with high dropout rates from these technologies (particularly when they are fully automated), and the division and break between these developments and clinical services.

***Conditions and factors impacting the adoption and advancement of digital innovations by mental health services***

31 Digital mental health research has increased considerably over the last decade and is now at a stage where it has momentum. Advancement requires more research and more funding.

32 We can distinguish between two types of digital innovations:

(a) analytical tools to aid diagnosis; and

(b) treatment tools.

33 Regarding the former, an emerging broad idea is that an individual's data, for example mobile phone usage, can be used by or analysed with AI or data science, providing mental health insights to inform clinicians and detect risk in real time. These tools hold a lot of promise with the potential to intervene in real time when people need support, but they need more time, resources and research to fully realise this promise.

34 Regarding treatment tools, there have been over 15 years of research showing that online interventions, particularly those which include human support, are effective, and in some cases just as much as face to face interventions. Mobile technology and the overall advancement of software development have contributed to this development.

35 Another key factor is the huge prevalence of mental ill-health and the gap between the need and the support that we can provide. Digital technology has become an ideal candidate to address this gap. Approximately 57% of people in high-income countries and 85% of people in low- and middle-income countries have no access to mental health care.[6] There has been an explosion in the number of mobile apps due to this gap between the need for care and what mental health services can offer people. Commercial companies have picked up on this and stepped into that gap. However, around 94% of people stop using mental health apps after only 14 days and most people will not find existing mental health technology appropriate to their needs.[7] Another key consideration is that, while mental health apps are flooding the consumer market, very few studies have examined their effectiveness[8] and many apps do not follow evidence-based guidelines and principles.[9] For example, a recent study found that of apps focused on psychosocial wellness and stress management, only 1% involved therapist support, less than 2% were designed to supplement in-person

[6] Saxena S, Funk M, Chisholm D. Comprehensive mental health action plan 2013–2020. *EMHJ-Eastern Mediterranean Health Journal* 2015;21(7):461-463.

[7] Baumel A, Muench F, Edan S, Kane JM. Objective User Engagement With Mental Health Apps: Systematic Search and Panel-Based Usage Analysis. *Journal of medical Internet research* 2019; **21**(9): e14567.

[8] Leigh S, Flatt S. App-based psychological interventions: friend or foe? *Evidence-based mental health* 2015; **18**(4): 97-9.

[9] Nicholas J, Larsen ME, Proudfoot J, Christensen H. Mobile apps for bipolar disorder: a systematic review of features and content quality. *Journal of medical Internet research* 2015; **17**(8).

treatment and only 2% had any research publications (with most of these being a single feasibility or efficacy study).[10]

36 Catastrophes such as the bushfires and the outbreak of COVID-19 have dramatically exposed not only the limitations of current mental health services and their complete reliance on face to face (in-person) care but also the global failure in integrating digital technologies into routine practice. This has catalysed an unprecedented demand for digital mental health solutions that is likely to remain in the longer term. There is really an urgent need for digital technology that is fully integrated into existing mental health services and treatments which have no such technologies implemented. This is the key aspect that we are addressing with our research and innovation; interventions that address the digital mental health services gap.

37 Telemedicine will not be the answer because of its full reliance on one-to-one contact. It is unable to bring about innovation and better treatments that address the limitations of current mental health services such as wait times, poor continuity of care, lack of relapse prevention support, lack of real time support at times of need, or even low to moderate treatment effects for many people with mental ill-health.

***Conditions and structures needed to accelerate the adoption of digital technologies in mental health***

38 We need a different model for development, research and funding to accelerate the adoption of digital technologies in mental health. The development, research and optimisation of digital technologies needs to take place in the real-world environments in which they are meant to improve outcomes.

39 At the moment most of the research findings come from population-based studies recruiting a very small proportion of highly motivated participants that are not representative of the reality of clinical services. When these interventions are subsequently tested in clinical services they fail to deliver positive results. Alternatively, research findings come from slow, expensive trials in clinical services where the interventions are obsolete by the time the trials are finished.

40 By contrast, we need to fully integrate technologies and digital interventions into services and evaluate, optimise and implement them simultaneously with large sample sizes against specific key performance indicators. This means that we need a different funding model where clinical services or governments fund this development beyond research grants. We also need a new research paradigm, and ethical procedures, that

[10] Lau N, O'Daffer A, Colt S, et al. Science or Snake Oil: Systematic Search of iPhone and Android Mobile Apps for Psychosocial Wellness and Stress Management. *JMIR mHealth and uHealth* 2020.

are congruent with the fast pace of technology and deliver meaningful and generalisable findings in real world clinical contexts.

41 To achieve this, we need to develop digital interventions that consider from the outset the limitations, complexities and needs of clinical services and develop not only the technology but also service protocols and implementation blueprints that ensure successful delivery.

***The most effective ways of including young people with lived experience of mental illness in shaping the digital agenda for mental health***

42 It is critical to utilise user-centred design procedures, rather than only relying on co-design, and to fully understand users' needs, goals, pain points and what is important to them so that we can design attractive, novel and innovative interventions. User-centred design about not taking any shortcuts and getting to know and understand what young people really want, what works for them, their pain points as well as what delights them. This deep understanding requires extensive and continuous research (both quantitative and qualitative) and cannot be achieved through using only co-design methodologies.

43 Co-design is important, but we need to use it in effective ways, not as the only tool. Co-design is really helpful in the context of user-centred design. In other words, using co-design without knowing deeply the issues we need to address, and how to delight young people, will not deliver innovative, attractive and engaging platforms, because in general people do not know whether they will like something until the use it 'in the wild'.

44 Young people need to also be involved in the delivery of online interventions by including peer support as a core component of service delivery models, so we ensure models of support are relevant to their needs.

45 It is also critical to test all assumptions in environments that resemble how the technology will be utilised. For example, if we have an assumption that technology X will improve or address problem Y; we need to ensure that this is the case via early validations and experiments.

46 Finally, with the explosion of AI, mobile sensing and other developments, we need to ensure that young people are involved across all stages of development to make sure that the way these technologies will be used is consistent with their expectations and needs.

**EMERGING TRENDS AND OPPORTUNITIES IN MENTAL HEALTH**

***The opportunities and challenges for a mental health system in a digital world***

47 There are currently significant challenges in the mental health system in terms of:

(a) sufficient access for young people to evidence-based care (75% may not be accepted to specialist services due to lack of resources);

(b) waitlists (90% of headspace services identify wait lists as a major issue);

(c) low engagement (40% of young people attend only one or two sessions of treatment/care);

(d) poor continuity of care (18% of young people are discharged too soon and we do not provide relapse prevention support);

(e) the number of young people that do not respond to treatment; and

(f) the therapeutic effects of our interventions are low to moderate in size.

48 The key positive opportunities are to expand the immediacy, continuity, attractiveness, and potency/intensity of evidence-based mental health care. A model of digitally enhanced support can enhance access, and also dramatically improve the engaging power and continuity of our interventions, treatment intensity, personalisation and clinical and social potency of our interventions.

49 By delivering integrated online care we can respond to the ruminations or worries of young people in real time and provide more potent solutions to their problems. In this sense, digital technologies are not just about plugging gaps, but also improving upon the current interventions (e.g., by increasing their potency and treatment effects). Integrated care can improve relapse prevention and support by preventing young people from coming back into system, because they are staying well, resulting in a reduction in the overall burden on the health system.

50 The key challenges at the moment for young people is that they are experiencing a dissociated world of face to face versus online support. They are bombarded by potential digital solutions, with thousands of mobile applications claiming to improve mental health. Only a very small proportion, less than 2%, have any research publications (most being feasibility studies[11]), many apps do not follow evidence-based

[11] Lau, N., et al., *Science or Snake Oil: Systematic Search of iPhone and Android Mobile Apps for Psychosocial Wellness and Stress Management.* JMIR Mhealth Uhealth, 2020; Leigh, S. and S. Flatt, *App-based psychological interventions: friend or foe?* Evidence-based mental health, 2015. **18**(4): p. 97-99.

guidelines and principles[12] and some of them are even harmful, making it almost impossible for young people to navigate this maze of options. Additionally, as I mentioned before, 94% of users stop using mental health apps after only 14 days of use.[13] On the other hand, when young people access face to face support, they do not receive any integrated digital support,[14] so support is often limited to a few infrequent sessions with very limited access to safe, stigma free places to talk to other young people and find support from others.

51 This is not what young people want. As opposed to a struggle between digital interventions and face-to-face services, our digital solutions need to be designed within youth mental health services and include innovative research methodologies that allow a proactive, timely translation into clinical service provision. Young people demand a one-stop mental health solution that seamlessly integrates digital interventions with face to face services. In our own research, young people put forward this model as 'a game changer' in global youth mental health treatment and innovation. This is very different from an approach to digital mental health developments designed to replace clinical care with apps for example. I do not think this is the answer to our problems and it can marginalise mental health care and resources even further. We can indeed revolutionise mental health care through technology; the opportunity to do this is unprecedented. We need, however, to avoid the temptation to take shortcuts and do the 'apparently' easy thing of simply developing universally accessible stand-alone apps. There are thousands of these apps in the market and yet young people are asking us to bring our mental health services to the 21st century through integrated digital interventions.

***The use of digital technologies***

52 Digital technologies are increasing the access to information and evidence-based support and treatment for young people. There are more and more evidence-based interventions in the market, many of which are free to use and there are services such as eheadspace and others increasing access to telemedicine support. We know that these interventions, particularly when they integrate human support, can be as effective as face to face care. The issue is that despite 15 years of research and over 100 trials showing that digital interventions work, particularly those with human support, they are

[12] Nicholas, J., et al., *Mobile apps for bipolar disorder: a systematic review of features and content quality.* Journal of medical Internet research, 2015. **17**(8).

[13] Baumel A, Muench F, Edan S, Kane JM. Objective User Engagement With Mental Health Apps: Systematic Search and Panel-Based Usage Analysis. *Journal of medical Internet research* 2019; **21**(9): e14567.

[14] Mohr, D. C., Lyon, A. R., Lattie, E. G., Reddy, M. & Schueller, S. M. 2017. Accelerating digital mental health research from early design and creation to successful implementation and sustainment. *Journal of medical Internet research,* 19**,** e153; Mohr, D. C., Weingardt, K. R., Reddy, M. & Schueller, S. M. 2017. Three problems with current digital mental health research... and three things we can do about them. *Psychiatric services,* 68**,** 427-429.

not integrated with mental health services. So, despite their potential, digital interventions have not yet fulfilled their promise to transform mental health care. This is the next frontier in the field.

***The potential impact of emerging technologies***

53 Emerging technologies will increase the reach, intensity, personalisation and immediacy of mental health care. Ubiquitous mobile technology also affords an unprecedented opportunity to capture time- and location-sensitive data and to help young people and clinicians track moods, behaviour and symptoms and identify meaningful patterns in real time. Using these technologies, mental health systems will become much more proactive and personalised, rather than reactive and 'late-intervention'.

54 We will move to proactive early intervention that engages treatment targets in real time and in a personalised way, increasing treatment effects. Rather than waiting for someone to become unwell, digital technology, for example by using wearable technologies, mobile sensing, or real time assessments, will be able to detect risk (e.g., suicide) or mental health deterioration and respond in a timely and personalised manner. Preliminary research indicates that the use of data generated passively by mobile devices — for example typing speed or vocabulary choices – could be used to detect mood fluctuations, tailor interventions, detect early signs of relapse and enable just-in-time interventions, which can be a potentially life-saving use of technology.

***The interaction between emerging technologies and complement face to face or traditional service delivery***

55 Digital technology can remove waitlists within services by offering immediate support to those seeking help while they wait to be allocated to an appropriate mental health clinician. For approximately 30% of people, the use of digital technology will be enough, reducing the waitlist time for others. Overall, digital technology can provide immediate support while awaiting more expert help.

56 Once people access treatment, digital technology will dramatically enhance the continuity, attractiveness and intensity of face to face interventions through fully blended models of care. Combining digital and face to face interventions will create synergies, where the whole is more than the sum of its parts, and people receive integrated, personalised 24/7 digital and face to face support. This will increase treatment potency and the low effect sizes that we see at the moment. Once people respond to treatment, they will be able to continue to access digital support to stay well for as long as they need it, which will address the current issue of a lack of relapse prevention support from mental health services.

***Examples of the use of digital technologies in mental health service delivery***

57 I can provide two examples of the innovative use of digital technologies in mental health delivery in our group; an early one and a recent innovation, both of which have clear clinical implications.

**HORYZONS innovation**

58 At Orygen we have led the design, evaluation and provision of specialist early intervention services for young people with psychosis over the past 30 years. These models were originated at Orygen, in Melbourne in the 90s and have been adopted world-wide across North America, Europe and Asia. We have now 20 years of evidence from randomised controlled trials conducted across countries and mental health systems demonstrating that these services improve psychotic symptoms, reduce relapse rates, foster patient satisfaction and result in tangible economic benefits. However, early intervention services for psychosis typically have treatment resources for 2 years, and several studies indicate that the benefits of early intervention that we see at the end of 2 years may not persist at 3 years post-discharge. Another important issue is that even after receiving specialised mental health services, functional and vocational recovery lags behind symptomatic remission. Many young people with first episode psychosis experience significant social functioning deficits including social isolation and unemployment.

59 So, we decided to develop a digital intervention that could be offered to young people with psychosis at the point of discharge from specialised services which was maintained beyond that timeframe as a means to sustain the hard-won clinical and social gains of these services via ongoing digital support. At that point we developed a new model of online social therapy that we called Moderated Online Social Therapy (**MOST**).

60 In its initial formulation, MOST merged peer-to-peer social networking, tailored therapeutic interventions, expert and peer-moderation, and new models of psychological therapy (strengths and mindfulness-based interventions) targeting social functioning. MOST was applied to a digital intervention entitled HORYZONS designed to enhance functioning and maintain clinical gains from specialist early psychosis services.

61 Originally funded by NHMRC and subsequently funded by the Victorian Government's Victorian Mental Illness Research Fund (**MIRF**) we carried out a 5-year randomised controlled trial where 170 young people with psychosis were randomised to either treatment as usual or treatment as usual plus HORYZONS for 18 months.

Target audience

62 HORYZONS targets young people with psychosis nearing discharge from a specialist first episode psychosis service.

Service delivery

63 Clinicians, vocational specialists and peer workers within the HORYZONS online platform deliver the services.

Outcomes

64 We recently completed the clinical trial and we are finalising all analyses. We found that approximately 50-60% of young people used HORYZONS over 18 months, which compares really well with the high short-term attrition rates that we see in the majority of online interventions. We measured outcomes every 6 months over 18 months via validated questionnaires as well as interviews.

65 Overall, we found that:

(a) young people using HORYZONS were more likely to secure employment over the 18-month compared with those in the treatment as usual group;

(b) young people in the HORYZONS group were less likely to attend emergency services compared with those in the control group over the 18-month follow-up; and

(c) young people in HORYZONS were less likely to be admitted to hospital, (particularly over the last 6 months of the study, when the risk for relapse starts to increase) compared with those in the treatment as usual group.

66 HORYZONS was our first large study and was powered by the first version of MOST. Since then different iterations of MOST have been customised to address mental health conditions across the severity spectrum and at all phases of treatment. We recently launched the fourth version of MOST (see paragraphs 68 to 77 below).

67 No serious adverse events or inappropriate use were detected during the study and virtually all participants reported feeling safe.

**MOST+**

68 A more recent innovation by our group was to develop a multi-modal online intervention for help-seeking young people (what we called **MOST+**). eheadspace now provides telemedicine support to young people seeking mental health support. While this

increases the availability of therapist support, it is not necessarily scalable because of its reliance on one to one human support, and it may not be flexible enough to cater for the needs and preferences of different young people.

69 So, in partnership with eheadspace and headspace national, building on MOST, we designed a multi-modal intervention that combined:

(a) real time chat with clinicians on demand;

(b) interactive, evidence-based therapy including behavioural experiments and therapeutic tasks for young people to complete;

(c) a safe and supportive social network incorporating moderated problem solving and support groups for young people where they could nominate issues and get help from others in addressing these; and

(d) support from peer workers via a social network platform.

70 In this way we could provide flexible, integrated, multimodal support for young people, within which they could do therapy in their own time with the support of therapists, talk to other young people, get support and learn from peer workers and other young people, help others, or request one on one support from a clinician. The idea was to cater for more young people, and to provide more intensive support while making the service more scalable.

Target audience

71 MOST+ targets help-seeking young people across Australia, mostly with depression and anxiety.

Service delivery

72 The service is delivered by clinicians and peer workers within the MOST+ online platform.

Outcomes

73 We did a pilot study with 157 young people seeking help from eheadspace. The pilot study found that the vast majority of young people experienced the intervention as easy to use, relevant, positive and helpful. This was measured via validated questionnaires before and after using the system as well as qualitative interviews with young people:

(a) 98% reported a positive experience using MOST+;

(b) 86% considered it helpful;

(c) 82% reported that using MOST+ helped them feel better;

(d) 86% felt more socially connected using it; and

(e) 92% would recommend it to others.

74 There were statistically significant improvements in eight of 11 secondary outcomes assessed including psychological distress, perceived stress, psychological wellbeing, depression, loneliness, social support, autonomy and self-competence. There were also significant correlations between indicators of system usage, perceived helpfulness as well as a number of secondary outcome variables.

75 Significantly, 40% of young people did not request online chats, which indicated that offering multimodal support increases the scalability and reach of these platforms.

76 It is noted that this was a pilot study from which conclusions regarding effectiveness cannot be drawn, but the novelty of the intervention, the fact that it was integrated within an existing service (a demonstration of the clinical validity of the testing environment), and the promising results make it an appealing intervention. The effectiveness will need to be established via controlled trials.

77 No serious adverse events or inappropriate use were detected during the study and 97% of participants reported feeling safe.

***Design principles and ethical considerations for the development of digital interventions***

78 In terms of the design of digital interventions, it is important to use user-centred design principles and co-design methodologies as previously noted. This means understanding the pain points, needs, goals and preferences of key stakeholders including young people, clinicians, families. This should also involve understanding the needs, constraints and limitations of clinical services.

79 All too often digital mental health interventions try to translate traditional therapy into online formats without consideration of engagement and how these technologies complement mental health services. The inevitable result is minimal treatment innovation, high attrition rates and lack of integration with services. Critically we need to develop these interventions considering the constraints, limitations, and needs of the environments where they will be deployed.

80 From the ethics standpoint, it is essential to ensure that well-designed safety protocols are in place to ensure the wellbeing of young people using these interventions and also to understand how safety procedures fit within existing clinical services.

81 From the persuasive design perspective, there should be a careful consideration of what kind of persuasive techniques are used, for what purpose and whether it is acceptable, ethical and humane to use those techniques from the perspective of improving outcomes.

82 From a social aspect, we need to fully understand how to harness human support to foster good outcomes while minimising risks and unintended consequences. Those risks may include feeling social pressure to help others, negative contagions effects, social comparison, social pressure and ranking.

***The limitations and challenges of digital technology***

83 It is important to ensure that digital technology is human. This is achieved by ensuring human support is a key element of the service delivery system. This is not only important because research shows that human support is a key ingredient increasing the engagement, attractiveness and effectiveness of these interventions but also because that is what people want and demand. It is important that technology becomes a pathway into evidence-based, human supported care as opposed to merely being a gateway to support.

84 Innovation in how we deliver human support is also required. Creating a collaborative relationship and therapeutic alliance is critical. It is possible that the biggest improvements in the effectiveness of these interventions will come from better and improved ways of delivering the human support as opposed to new features or technological advances alone.

**BENEFITS OF DIGITAL MENTAL HEALTH SERVICES FOR YOUNG PEOPLE**

85 Digital support should be a pathway towards effective treatment, not a barrier to it. Content should be trusted, clear, informative, evidence-based, engaging and empowering so that young people understand that they are not alone in their struggles. This should use real case examples and stories, comics, videos in first person from peers, or even virtual reality (**VR**) experiences where young people can see exactly what it is like to access mental health services in an engaging and informative way.

86 We need a mental health system that solves the problems of people as opposed to people having to navigate a complex mental health system; a no wrong door approach. You should be able to go to an official trusted online system and from there this should lead you to the appropriate treatment rather than you having to work out what the best treatment is.

87 Having said that, it is important that people are in the driver's seat and that through technology they can also understand the pros and cons of different alternatives and use

shared, informed decision making. This shared decision making can then also be used in face to face therapy. Technology and digital tools can help with this by providing simple, interactive, clear accurate information.

***Access to services***

88 If digital technologies become integrated with mental health services, waitlist periods can effectively be removed by providing access to multimodal support as soon as people seek help from these services.

89 Our estimates are that approximately 30% of young people for example may not need face to face support after they access high quality, multi-modal, human-enabled digital support. This would also mean that for those young people that need or want to see face to face therapists the waitlist becomes shorter through the freeing up resources.

90 The same logic applies to blended models of care as well as relapse prevention interventions once people have responded to treatment. In fact, Ron Kessler said that we put an enormous amount of resources in getting people well, but we hardly put any attention and resources towards keeping people well, with enormous losses and costs.

***Care pathways, treatment and supports***

91 One of the most exciting aspects of technology is that it can enhance and even transform face to face services as we know them. For example, it can provide continuity of care and support 24/7 in between therapy sessions, but it can also bring therapy into the real world by providing support when and where people need it. Importantly it can increase therapeutic intensity and personalisation and engage key therapeutic targets such as rumination or insomnia in real time increasing the small therapeutic effects that we see in current interventions.

92 In fact, real time targeted interventions based on ecologically valid data is one of the biggest hopes to increase the treatment effects of current interventions.

***The quality of services provided in the community***

93 The quality can be increased through more intensive, measure driven, personalised, engaging and proactive treatment that constantly improves with innovation taking place at a rate that it is not currently being seen. We need to move to an outcomes-driven system including outcomes that are important for services but more importantly for consumers.

***Measurement and feedback loops***

94 By using technology in between sessions, therapists will be able to get real time, ecologically valid data and identify meaningful patterns that inform therapeutic interventions. That data can also be used to boost interventions, such as cognitive therapy, by using real time data not only to question unhelpful beliefs or negative spirals that hold people back but also to identify positive patterns in a way that can empower people to better manage their mental health.

95 In time, we will be able to use mobile sensing to identify risks in real time and be able to provide help in pre-emptive ways. This will transform the mental health system from a reactive one to a proactive system that identifies needs and intervenes before it is too late, preventing relapse and suicide for example. We have moved from late intervention into early intervention, now we need to move from reactive models of care to proactive models of care.

96 Finally, if we make the mental health system digitally enhanced and measure driven, taking advantage of large sample sizes, we will be able to measure the impact of interventions in a clinically valid way at an unprecedented rate. This will enable a move to fast research translation models as opposed to the current situation where it takes 17 years to move research innovation into clinical practice and even then 85% of innovations never reach those who need them.

97 The large-scale deployment of digitally enhanced clinical services would enable, for the first time, rapid, well-powered, 'low-cost' randomised controlled evaluations testing the effectiveness of the different components of the intervention (e.g., dismantling trials), as well as successive iterations of the service. The results and innovations of these trials could be rapidly assimilated into the mainstream services. This industry-led methodology, known as agile, iterative, A/B testing, is a fundamental strategy adopted by leading technological companies to rapidly and continually improve their products against measurable key performance indicators (**KPIs**). It has not, however, been implemented at scale in mental health settings to date. We need to make mental health services digitally enhanced and then transform the way we do research so that our mental health services evolve as rapidly as the technologies that we use every day.

***Using digital solutions to improve mental health treatment and services for young people***

98 Digital solutions that combine evidence-based, attractive, therapeutic content with human support (clinician, vocational and also potentially peer support) and that are fully integrated with current models of care can improve treatment and care services for young people.

99 We have evidence that these interventions can be helpful for help-seeking young people, as blended models of care integrating face to face and online support as well as relapse prevention support; so across all stages of treatment. They can also be suitable for both mild to moderate and complex and severe mental health conditions.

***Determining whether to use digital technology as a core method of care or as an enhancement to other forms of care***

100 I think it is important to look at the evidence but also at the preferences of people. That said, digital technology can be used as a core method of therapy for help seeking people with mild to moderate mental health conditions and also for relapse prevention support for both mild to moderate as well as more severe mental health conditions. Technology is appropriate as an enhancement when this is the preference of people seeking help and also when people are receiving face to face interventions regardless of their diagnosis to increase the intensity, personalisation, continuity and potency of clinical care.

***Potential challenges in the use of digitally enabled mental health services***

101 The key challenge will be to ensure that the system is integrated, easy to use, and safe and relevant (as opposed to a system that does not respond to their needs). It is critical to make sure that technology is an enhancement of care, making what we have in terms of service delivery and translational research and innovation much better, much more immediate and potent, and much more accessible. We should be developing enhancing and innovative technology that brings mental health services into the 21st century as opposed to 'replacing technology'.

102 It is critical that digital services do not become a gatekeeper for face to face interventions; they should enhance human support, making it easier to get the support they need and want, not replace it or make it harder to access. At the moment people with mental ill-health are in a situation where there is a total disconnect between face to face and online and mobile mental health support. In other words, today, technology has failed to bridge the gap between young people and mental health services. This is a challenge for people with mental ill-health as it can be very complex to navigate. The key here is to move from this situation to a situation of integration.

103 We also need to make sure that the quality, accessibility, and attractiveness of the technology is what people have come to expect from technological innovation so that we create digital technology that is on par with the latest technological advancements.

***Treatment outcomes of digital mental health care generate and 'traditional' treatment options***

104 Technology based interventions can deliver the same outcomes as face to face interventions when human support is provided along-side the digital support. The key issue is whether the effects that we see in some online interventions translate into actual clinical services. There is recent evidence showing that this may not be the case. This may be because many of these interventions are tested in population-based studies including a small number of highly motivated users recruited from a very large potential pool of participants. In other words, the potential users who take up these interventions may be highly motivated users that are not representative of the people we see in clinical services.

105 This is the next frontier — to ensure that the interventions we design and deliver also work in the context of clinical services, with findings that are generalisable. Interventions need to be designed for and tested within real-world clinical environments.

***Factors encouraging or discouraging the use of digital technology to access or use mental health services***

106 A key issue in the use of digital technologies is that many apps do not provide human/clinician support, which is a key driver of the effectiveness of face to face and online interventions. This lack of support is associated with very high attrition rates. Many apps also do not feel appropriate or relevant to people's needs, hence the findings that so many people stop using them after only a couple of weeks (94% of people discontinue use of apps after only two weeks).[15]

107 Young people will also not use mental health technology if they perceive that the technology is a barrier to accessing mental health services. For example, an online intervention that acts as a gatekeeper to determine who can access a mental health service is unlikely to be a successful intervention.

108 Another factor is the lack of integration with clinical services; which possibly increases the lack of trust in digital support. If we want technologies that improve access to mental health services, integration with mental health services is required. For example, a service could offer face to face treatment and in between sessions offer access to 24-hour online support that is integrated and fed back to the clinician to see what does or does not help a young person feel better. That integration would increase both the therapeutic intensity and the effect of both face to face and digital interventions.

[15] Baumel A, Muench F, Edan S, Kane JM. Objective User Engagement With Mental Health Apps: Systematic Search and Panel-Based Usage Analysis. *Journal of medical Internet research* 2019; **21**(9): e14567.

109 Young people are exposed to literally thousands of apps with no way of knowing what is good, what is not, and how to choose what may be helpful. We need regulation in this environment and accreditation processes so that ethical, engaging, respectful and evidence-based technologies are endorsed and people do not need to work that out for themselves. These technologies also need to be attractive and on par with what they have come to expect from technology quality and innovation.

***The role of digital technologies in supporting families and carers of young people***

110 There are many issues that families face when supporting young people with mental illness and there is strong evidence support for the effectiveness of family-based interventions, including digital interventions.

111 However, research shows the majority do not access those interventions. Families are often left to their own devices, and experience stress, lack of information, social isolation and burden, physical health issues and financial hardship. They feel that the mental health system is almost impossible to navigate and many times they have been exposed to traumatic situations such as involuntary hospital admissions of the people for whom they care.

112 Technology can provide clear, evidence-based information about disorders, how to support and communicate with their loved one, how to look after themselves, but also provide them with forums where they can connect with one another, and learn from others as well as connect with clinicians. Our team, led by my colleague Professor John Gleeson has developed and evaluated a range of advanced digital interventions for families powered by MOST. These interventions combine:

(a) clear information about the mental health condition of their loved one;

(b) interactive evidence-based interventions to reduce their levels of stress, burden, depression and anxiety but also to improve communication, family dynamics and wellbeing; and

(c) access to clinicians, peer supporters and peer to peer online social networking.

113 We recently completed two clinical trials with relatives of young people with psychosis. Our pilot studies with the relatives of young people with depression, anxiety and borderline personality disorders show that these interventions are highly acceptable, engaging, safe and also promising in terms of reducing levels of stress for carers (even when this is measured through cortisol levels).

***Cost effectiveness of system-wide digital interventions compared to 'traditional' service delivery methods***

114 Evidence of the cost effectiveness of blended treatments are difficult to quantify due to the limited number of studies and variation across different interventions. Additionally, estimating the costs of new technologies is complex given significant frontend costs during development, after which technologies should theoretically run with relatively small costs over long periods of time. However, no such evaluations of long-term cost benefits compared to standard care models have been conducted to our knowledge. Also, technologies are constantly changing and becoming cheaper with new advances, making cost estimations quickly outdated.

115 Overall, there is inconsistent evidence on the cost benefits, with some studies demonstrating reduced costs,[16] some showing equivalent costs and others showing that blended treatments are more costly than standard ones.[17]

116 A potential reason for lack of cost savings in some studies is due to the inefficient way in which technologies are implemented within healthcare systems. When technologies are not adopted appropriately, either due to poor integration within care pathways, lack of training and resources to support their use, lack of appropriate implementation blueprints, or they are not designed appropriately for mental health services, they are unlikely to be used efficiently to maximise clinical and economic benefits.

117 Hence, we are now seeing more focus in digital mental health research on ways to implement technologies efficiently, including training programs on the use of mental health technologies for mental health workers and consumers, and the development of integrated, fit-for-purpose technologies designed for seamless integration with existing infrastructure.

***Impact of digital interventions on the prioritisation of treatments***

118 In general, digital interventions have not as yet enabled the reprioritisation and direction of the most expensive and intensive interventions to those young people in greatest need. However, there are multiple ways that this might be achieved. For example, the

[16] Hedman E, Andersson E, Ljótsson B, Andersson G, Rück C, Lindefors N. Cost-effectiveness of Internet-based cognitive behavior therapy vs. cognitive behavioral group therapy for social anxiety disorder: results from a randomized controlled trial. *Behaviour research and therapy* 2011; **49**(11): 729-36; Hollinghurst S, Peters TJ, Kaur S, Wiles N, Lewisand G, Kessler D. Cost-effectiveness of therapist-delivered online cognitive–behavioural therapy for depression: randomised controlled trial. *The British Journal of Psychiatry* 2010; **197**(4): 297-304.

[17] Kenter RM, van de Ven PM, Cuijpers P, et al. Costs and effects of Internet cognitive behavioral treatment blended with face-to-face treatment: results from a naturalistic study. *Internet Interventions* 2015; **2**(1): 77-83.

MOST+ model that was tested in the context of the eheadspace service can be used by young people whilst on the waitlist and throughout treatment.

119 Another good example is SPARX (Merry et al., 2012), an online CBT-based therapy in the format of a game that helps young people with depression to develop emotional resilience by teaching them how to apply learnings from the game to real-life situations. SPARX has also been offered to young people on the wait list for mental health services, providing immediate access to emotional support.

120 However, there are several limitations to current digital health technologies which have limited their productivity. Namely:

(a) most of these solutions are piecemeal solutions that address one aspect or issue rather than system wide solutions;

(b) there is a focus on mild to moderate conditions only and not on severe conditions;

(c) there is a focus on access but not on treatment continuity, intensity and relapse prevention;

(d) there is a focus on symptoms but not on vocational recovery and social connection which are key for young people;

(e) there is often a lack of focus on families;

(f) there is overall poor integration with existing systems, lack of fit for purpose interventions, lack of training and resources for workers and lack of consideration to the needs and complexities of clinical services, which limits adoption;

(g) there is a lack of productive partnerships between research and industry to ensure technologies are commercially ready and are supported by evidence;

(h) user uptake is low and engagement is not maintained over time because technologies are not user friendly, lack incentives and are unsupported by alternative health approaches (e.g. prescribed by a doctor or psychologist);

(i) security and privacy of health information online is a matter of ongoing concern; and

(j) some technologies require mass adoption to be effective, with small user bases limiting the effectiveness of the aim. For example, social media technologies require a critical mass of users to generate content and interactions, and AI and

machine learning algorithms require large data sets to identify patterns and trends.

121 We need a system-wide solution, specifically designed to address the issues of mental health services and integrated with mental health services from the beginning across all phases of treatment and for all mental health diagnoses, focused on both clinical and social, vocational and functional outcomes.

***Strengths and limitations of system-wide approaches to digital interventions***

**Consumer experience**

122 Available data suggests people are ready and willing to adopt technologies for their mental health, with the vast majority of people owning smartphones or having access to digital technology in their daily life. User satisfaction and acceptability of digital mental health technologies are largely very positive, though usage tends to drop over time.

**Clinical outcomes**

123 Evidence suggests that mainstream technologies (e.g. smartphone apps, online programs) can improve clinical outcomes across a range of mental health conditions. We have sufficient evidence demonstrating these technologies are feasible to use and acceptable to people with mental ill-health, and are now starting to see a culmination of evidence for efficacy from large scale randomised clinical trials.

124 There is also emerging evidence to support the clinical benefits of more novel technologies, such as VR, smart watches and AI. However, effect sizes are generally small to moderate, and technologies which are supported by a human are more effective than those used independently. This may be due to the issue of ongoing engagement, where independent use of technologies drops exponentially over time, limiting the 'dosage' of treatment. There is also a need to focus on social and vocational outcomes as well.

125 A major issue is that the effects that we see in population-based trials may not necessarily translate into clinical services. There is a lack of generalisation of outcomes as large-scale implementation trials of existing evidence-based online interventions have failed; in these implementation studies most people stopped using them and there was no evidence of their effectiveness in clinical contexts.

**Workforce experiences**

126 Certainly, there is potential for technology to reduce the burden on mental health care systems which may improve the quality of care and the chances of burnout amongst professionals. However I do not know of any direct evaluations of this domain.

**Workforce retention**

127 Similar to the above, technologies can play a supportive role to reduce demand on services and the delivery of interventions to increase clinical benefits, potentially therefore promoting a better workplace experience which may reduce burnout and staff turnover. However, again, I do not know of any direct evaluations of this domain.

***Potential consequences of system-wide digital approaches***

128 The ethics considerations of digital mental health technologies is an area of concern that needs to be carefully addressed. Data security, privacy, managing risk and other clinical procedures surrounding provision of services online, and safety, are important considerations. However, in our work we have demonstrated that with good safety protocols these interventions are extremely safe. Issues related to poor implementation and lack of consideration of workforce needs and issues, low rates of engagement over time, slow pace of development to dissemination, and lack of ongoing funding for technologies and sustainability produced in through research grants, are also important aspects.

129 Also, emerging data shows that some of these interventions may lead to more negative outcomes, as some studies have shown that ongoing monitoring of symptoms may lead to increased distress unless people are informed of the relationship between what they do and their feelings in an empowering way.

***Effectiveness of digital interventions***

**Impact of digital services for young people with lower intensity needs on workforce capacity to provide more intensive service interventions to people with high intensity needs**

130 We have actually done detailed modelling of what the workforce impact of digital services could look like in the context of young mental health services. For example, if we provide integrated, multimodal digital solutions at the point of help seeking, particularly when young people are waiting to be seen by clinicians, we estimate that approximately 30% of young people will no longer need face to face interventions for that episode of care.

131 Once young people access treatment we can provide integrated, blended digital and face to face support increasing treatment continuity and intensity and we estimate that approximately 25% of young people will require at least one less session of face to face treatment while receiving higher treatment intensity.

132 Finally, we can provide online relapse prevention support to young people once they no longer have access to face to face intervention. Approximately 33% will have fewer relapses or relapses of lesser intensity. This will save treatment resources, freeing up workforce capacity which can be redirected to servicing those with greater needs.

133 In our modelling, offering integrated blended face to face and digital support through our MOST+ application for young people across all stages of treatment including both clinical and vocational support could save $134M per year in young people using the headspace network (from reduced health expenditure, fewer hospital admissions, improved vocational outcomes) providing around $1130 in net benefit per young person. The implementation of this service would cost approximately $333 per young person for 6 months of continuous use which is less than the $350 cost per session in the headspace model**.**

**The role of digital technology in early intervention services**

134 Technology can indeed enhance services at all levels, from help-seeking through to blended models of care through to relapse prevention interventions, closing the entire cycle of mental health care and support. In other words we can develop evidence based tools for young people, families and clinicians to enhance the accessibility, potency, cost effectiveness, and long-term impact of youth mental health services.

135 Importantly, technology can provide not only clinical support but also vocational support and social support reducing loneliness, improving functioning and addressing some of the key needs and priorities for support identified by young people.

***The role of digital technology in supporting integrated care across health, mental health, AOD services and other service systems***

136 They key element in supporting integrated care is to develop technologies that can talk to each other so that we offer people a ‘no wrong door’ or ‘one-stop shop’ system that is easy to navigate. Clinical and therapeutic approaches and interventions should be available to providers regardless of the nature of care, preventing people from having to tell their stories again and again.

137 However, there should be provisions for people to be able to control the kind of information that is shared across different elements of the health care system so that care is enhanced and not limited. For example there is research that shows that people with mental ill-health are likely to receive poorer clinical care from physical health services, and this is part of the reason they die earlier compared with the population at large. It is critical that as we move towards integrating all aspects of the health system for consumers, provisions are put in place to prevent this from happening in a digitally enhanced system.

**Orygen Digital**

***Digital interventions offered***

138 At Orygen Digital we develop interventions integrating persuasive, human and ethical technologies with the latest evidence-based psychological models and computational technology such as machine learning and AI to develop new interventions that address the key gaps and outcomes in youth mental health. These gaps include, for example, poor access, lack of relapse prevention support, poor engagement with interventions and continuity of care and limited impact on social and vocational recovery. Online interventions are designed to be integrated with youth mental health services.

139 As I mentioned earlier, the Orygen Digital program began as a way of offering online relapse prevention and bringing about long-term recovery. The mental health system spends enormous resources on getting people well and the majority of people will enter remission with care. However mental health services do not have the resources to manage relapse prevention and 80% of young people with severe disorders will relapse, with enormous losses and costs. At Orygen Digital we wanted to engage young people in effective digital interventions for 18 months or longer as a means to bring about long-term recovery.

140 Because of that, MOST, described at paragraphs 59 to 67, has been designed and iteratively refined by a large multidisciplinary team of practicing clinical psychologists, designers, novelists specialising in young adult fiction, comic artists and software engineers, in partnership with young people, families, clinicians, clinical services and leading technology industry partners to make sure the content is engaging and meaningful. . MOST is now a highly flexible and constantly evolving model that has been customised to help young people at all stages of treatment (from help-seeking to relapse prevention including also blended face to face and digital support) and across diagnostic and severity spectrums. We just released the fourth version of MOST after 20 months of redevelopment based on 9 years of research data and feedback, and over $18M in research and development.

141 MOST is mobile phone-first in its design but it can also be used through a computer or iPad/tablet. The intervention offers young people continuous access to evidence-based therapy and clinical support, from any Internet-enabled device. All included therapy has been adapted and enhanced based on a decade of youth feedback and usage data, to ensure that every component captures young people’s imaginations and feels uniquely relevant to their daily life. This therapy is embedded within a supportive online community of other young people working on their mental health, designed to shift the treatment experience from one of isolation to one of shared mission.

142 More specifically, MOST includes:

(a) personalised, highly engaging evidence-based online treatment programs guided by clinicians and vocational workers targeting key clinical, vocational and social outcomes;

(b) targeted coping strategies to provide real-time, real-world support at the moment it is needed;

(c) safe and empowering social networking with peers;

(d) tailored, real time and asynchronous human support from clinicians, vocational specialist and peer workers; and

(e) powerful tools to enable seamless human and digital support (e.g. personalising content, managing safety and clinical care coordination).

143 It is a multi-modal support program which offers the full range of interventions in a single application.

***Results of the digital interventions***

144 We have recently completed two large clinical trials (with an additional four ongoing clinical trials, two of them NHMRC-funded) as well as nine completed and six ongoing pilot studies across more than 40 youth mental services from Australia, USA, Canada and Europe.

145 Results from these trials demonstrate that MOST is:

(a) safe, with no incidents and adverse events over nine years of testing;

(b) highly engaging over sustained periods of time — with 60% of young people with psychosis being engaged over 18 months or longer[18] and approximately 70-80% of young people with depression, anxiety, social anxiety and suicidal ideation engaged for three months in shorter-term studies.[19]

[18] Alvarez-Jimenez M, Bendall S, Koval P, et al. HORYZONS trial: a randomised controlled trial of a moderated online social therapy to maintain treatment effects from first-episode psychosis services. Submitted.

[19] Alvarez-Jimenez M, Bendall S, Lederman R, et al. On the HORYZON: moderated online social therapy for long-term recovery in first episode psychosis. *Schizophr Res* 2013; **143**(1): 143-9; Alvarez-Jimenez M, Gleeson J, Bendall S, et al. Enhancing social functioning in young people at Ultra High Risk (UHR) for psychosis: A pilot study of a novel strengths and mindfulness-based online social therapy. *Schizophrenia research* 2018; **202**: 369-77; McEnery C, Lim MH, Knowles A, et al. Social anxiety in young people with first-episode psychosis: Pilot study of the EMBRACE moderated online social intervention. *Early intervention in psychiatry*

(c) appealing for young people and clinicians. For example, 95% of young people would recommend it to others, 90% considered it helpful, 85% to 95% felt more socially connected using it, while 100% of clinicians considered it helpful for young people;[20]

(d) effective in improving vocational recovery and reducing hospital admissions and visits to emergency services;[21] and

(e) highly promising in improving things such as depression, anxiety, social anxiety, psychological distress, social functioning, social support, loneliness, and wellbeing.[22]

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2019; Rice S, Gleeson J, Davey C, et al. Moderated online social therapy for depression relapse prevention in young people: pilot study of a 'next generation'online intervention. *Early intervention in psychiatry* 2018; **12**(4): 613-25; Ludwig KA, Browne JW, Nagendra A, et al. Horyzons USA: A moderated online social intervention for first episode psychosis. *Early intervention in psychiatry* 2020; Santesteban-Echarri O, Rice S, Wadley G, et al. A next-generation social media-based relapse prevention intervention for youth depression: qualitative data on user experience outcomes for social networking, safety, and clinical benefit. *Internet Interventions* 2017; **9**: 65-73; Bailey E, Alvarez-Jimenez M, Robinson J, et al. An enhanced social networking intervention for young people with active suicidal ideation: safety, feasibility and acceptability outcomes. *International Journal of Environmental Research and Public Health (IJERPH)* in 17 (7), 2435.

[20] Alvarez-Jimenez M, Bendall S, Lederman R, et al. On the HORYZON: moderated online social therapy for long-term recovery in first episode psychosis. *Schizophr Res* 2013; **143**(1): 143-9; Alvarez-Jimenez M, Gleeson J, Bendall S, et al. Enhancing social functioning in young people at Ultra High Risk (UHR) for psychosis: A pilot study of a novel strengths and mindfulness-based online social therapy. *Schizophrenia research* 2018; **202**: 369-77; McEnery C, Lim MH, Knowles A, et al. Social anxiety in young people with first-episode psychosis: Pilot study of the EMBRACE moderated online social intervention. *Early intervention in psychiatry* 2019; Rice S, Gleeson J, Davey C, et al. Moderated online social therapy for depression relapse prevention in young people: pilot study of a 'next generation'online intervention. *Early intervention in psychiatry* 2018; **12**(4): 613-25; Ludwig KA, Browne JW, Nagendra A, et al. Horyzons USA: A moderated online social intervention for first episode psychosis. *Early intervention in psychiatry* 2020; Santesteban-Echarri O, Rice S, Wadley G, et al. A next-generation social media-based relapse prevention intervention for youth depression: qualitative data on user experience outcomes for social networking, safety, and clinical benefit. *Internet Interventions* 2017; **9**: 65-73; Bailey E, Alvarez-Jimenez M, Robinson J, et al. An enhanced social networking intervention for young people with active suicidal ideation: safety, feasibility and acceptability outcomes. . *International Journal of Environmental Research and Public Health (IJERPH)* in 17 (7), 2435; Rice S, O'Bree B, Wilson M, et al. Leveraging the social network for treatment of social anxiety: Pilot study of a youth-specific digital intervention with a focus on engagement of young men. *Internet Interventions* 2020: 100323.

[21] Alvarez-Jimenez M, Bendall S, Koval P, et al. HORYZONS trial: a randomised controlled trial of a moderated online social therapy to maintain treatment effects from first-episode psychosis services. Submitted.

[22] Alvarez-Jimenez M, Bendall S, Lederman R, et al. On the HORYZON: moderated online social therapy for long-term recovery in first episode psychosis. *Schizophr Res* 2013; **143**(1): 143-9; Alvarez-Jimenez M, Gleeson J, Bendall S, et al. Enhancing social functioning in young people at Ultra High Risk (UHR) for psychosis: A pilot study of a novel strengths and mindfulness-based online social therapy. *Schizophrenia research* 2018; **202**: 369-77; McEnery C, Lim MH, Knowles A, et al. Social anxiety in young people with first-episode psychosis: Pilot study of the EMBRACE moderated online social intervention. *Early intervention in psychiatry*

### *(f) Use of digital technology to trial and validate digital interventions and services*

146 We develop our interventions utilising user-centred design that considers the needs, goals, preferences of young people and families and also considers the needs, constraints, and complexities of youth mental health services. In our team we include novel combinations of multi-disciplinary expertise to achieve this.

147 We test them 'in the wild'. That is, in clinical services with young people with mild to moderate but also complex and severe mental health conditions, and their families, across all stages of treatment, employing clinicians from these services, and implementing them in the routine provision of these services including peer supporters from these services as well.

148 We design interventions that offer integrated, seamless human and digital support and test the acceptability, safety and engagement of these interventions via pilot studies and their effectiveness via randomised clinical trials.

149 We are now working on simultaneous development, implementation and evaluation of these interventions on the ground, so we create a new generation of digitally enhanced accessible, attractive, effective and constantly evolving youth mental health services against key markers of success. As noted earlier, large scale implementation of digitally enhanced mental health services can create a new model for rapid innovation and translational research that brings about continuous, clinically valid and generalisable improvements into mental health care. We want to achieve this to bridge the research translation gap as well as the digital versus mental health service divide. We have now received support from the Victorian Government and the Telstra Foundation to roll-out MOST and digitally enhance Youth Mental Health Services for the next 14 months. This is an unprecedented opportunity to not only transform youth mental health care delivery but also current innovation and research models. We have the unique opportunity to be more agile, nimble, effective and responsive to the needs of young people and clinicians

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2019; Rice S, Gleeson J, Davey C, et al. Moderated online social therapy for depression relapse prevention in young people: pilot study of a 'next generation'online intervention. *Early intervention in psychiatry* 2018; **12**(4): 613-25; Ludwig KA, Browne JW, Nagendra A, et al. Horyzons USA: A moderated online social intervention for first episode psychosis. *Early intervention in psychiatry* 2020; Santesteban-Echarri O, Rice S, Wadley G, et al. A next-generation social media-based relapse prevention intervention for youth depression: qualitative data on user experience outcomes for social networking, safety, and clinical benefit. *Internet Interventions* 2017; **9**: 65-73; Bailey E, Alvarez-Jimenez M, Robinson J, et al. An enhanced social networking intervention for young people with active suicidal ideation: safety, feasibility and acceptability outcomes. . *International Journal of Environmental Research and Public Health (IJERPH)* 17 (7), 2435; Rice S, O'Bree B, Wilson M, et al. Leveraging the social network for treatment of social anxiety: Pilot study of a youth-specific digital intervention with a focus on engagement of young men. *Internet Interventions* 2020: 100323.

and to constantly iterate and improve youth mental health services over time against important clinical, social, satisfaction and cost-effectiveness KPIs.

***The effect of digital interventions on service delivery for young people***

150 We know from our qualitative research that being part of these studies has had transformative impacts on many young people.[23] This qualitative research shows that young people using multimodal services:

(a) feel supported;

(b) see that they are part of a community and are not alone; they feel more socially connected;

(c) feel empowered and more in control of their mental health;

(d) feel normalised,

(e) can take perspective through and reflecting on their own progress and what works for them and seeing others talking about their lives and experiences;

(f) feel they could be themselves without judgement;

(g) have access to clinical and evidence-based content in between sessions; and

(h) feel that the interventions were relevant to them and that the therapy content is really helpful.

151 Indeed, some people have referred to these interventions as life-changing.

152 In two of our recent studies young people said that integrating digital technology into clinical services would be a game changer for youth mental health care; young people are ready and waiting for us to take that step.

***The effect of digital interventions on service delivery for mental health workers***

153 For many clinicians integrated digital and face to face support is empowering and they feel that the interventions, designed for, and in partnership with, young people are relevant to their needs. For example in our trial with eheadspace we found that 100% of clinicians considered the platform MOST+ to be relevant, helpful, easy to use and would recommend it to young people.

[23] See, eg, Valentine L, McEnery C, O'Sullivan S, Gleeson J, Bendall S, Alvarez-Jimenez M. Young People's Experience of a Long-Term Social Media-Based Intervention for First-Episode Psychosis: Qualitative Analysis. *Journal of medical Internet research* 2020.

154 In our focus groups clinicians state that they like the fact that they have multiple and relevant resources at their fingertips, peer workers are delivering support and young people can connect with each other. Clinicians also reported that they also really like the fact that young people can access support in between sessions and the clinicians can see progress and uptake in between sessions.

155 In a new study of blended digital and face to face support, we asked for volunteers to try the digital platform; almost all Orygen clinicians have volunteered to be part of the study.

***Challenges in using digital technology to provide services***

156 The key challenge in using digital technology for service provision is to integrate technology into the way clinical services work, for example in terms of after-hours care, or in terms of duty of care and the reporting procedures.

157 In developing MOST+ to address these challenges we worked very closely with services to develop safety procedures that met the needs of our studies and fit within the current structure of clinical services so that it was very clear who did what and when. It is important for clinicians to become part of the design process from inception and for their feedback to be integrated into the digital solutions straight away.

158 Another challenge is to ensure that this is not seen as an add-on to the work of already very busy clinicians. One way to do that is to really understand what their pain points are, so that we could design technologies that also respond to clinicians' needs and goals as well as those of young people. It was also really important for clinicians to see what young people think of and how they benefit from these interventions by augmenting the accessibility of clinical care. Once they saw this and young people became advocates for this support, the interest from clinicians increased significantly as well.

159 All that being said, what is happening now in the context of the COVID-19 outbreak is extraordinary from the perspective of digital enhancement of youth mental health services. What two decades of research have not been able to achieve - the integration between technology and mental health services - could be now accomplished within a few months. There is an unprecedented global demand and need for digital mental interventions integrated with services that are likely to persist over the long-term. This need will transform the attitudes of clinicians and services towards digital mental health support.

***Overcoming the challenges experienced by young people using digital interventions***

160 The key challenge in developing digital interventions is that what works for one young person may not be what works for another young person, and what motivates one young person also differs from another young person. For example, for some young people using online social networking is transformative whereas for others it is something that creates anxiety.

161 It is critical to really understand the full experience of young people, understand the limitations of these technologies, and use these technologies so that we can provide solutions that are relevant to their needs. For example, after interviewing many young people in depth we changed our social networks to ensure that rules of engagement were clear and to ensure that they had total control over what they see and do at all times. This included reducing the pressure on young people to actively participate by posting comments.

***Challenges in the delivery of digital interventions and services***

162 They key challenge for the Orygen Digital workforce in delivering digital interventions is ensuring that they take full advantage of the digital intervention as opposed to simply using their traditional way of working in a digital channel or using just some parts of the intervention. In other words, the workforce need to know how to take full advantage of the digital intervention to enhance its overall therapeutic potential and even transform their roles.

163 Knowing the features of the intervention is also a challenge that gets in the way of clinicians being able to take full advantage of that intervention.

164 To do this we have made the systems more and more intuitive and also ensured that we had online training programs, refreshers and supervision that reflected the potential of the technology with real world cases and testimonials. We kept on meeting with clinicians to understand what their needs were and what the pain points were and addressed them.

165 We are including technology-driven fidelity procedures as well, and online manuals and training that are adaptive and relevant to clinicians' needs. As I mentioned, the need for these technologies in the current state of crisis will transform the willingness and readiness to integrate these technologies in clinical practice for good.

**ENABLING DIGITAL MENTAL HEALTH CARE IN VICTORIA**

***Driving a digital agenda in mental health in Victoria***

166 It is important to determine what the role of technology will be in mental health in Victoria. Technology should be designed to enhance the current models of care, to make them more accessible, potent, cost effective, and to improve their long-term impact and benefits.

167 We already have a fantastic youth mental health service network, which has been replicated around the world, so we can build on it to bring about the next iteration of digitally enhanced youth mental health services. This will not only address the current urgent need created by the COVID-19 outbreak but also the limitations of the first iteration of youth mental health services in terms of access and continuity of care.

168 Once a policy of this kind is set, then the design of interventions will need to consider the needs, constraints and limitations of mental health services, as opposed to designing interventions by either commercial companies or universities, working outside clinical services and without considering their complexities and needs. So we need to have a unified approach and goal and then incentivise digital technologies and interventions that address the gaps in clinical services, the needs of consumers and deliver real clinical benefits on the ground, that also generalise the people we service in our clinical services.

169 I also think that the KPIs of digital interventions should include:

(a) technology based KPIs (such as safety, penetration rate, sustained engagement, satisfaction, perceived benefit);

(b) clinical KPIs (reducing symptoms, preventing relapse and hospital admissions);

(c) social KPIs (improving vocational recovery and reducing loneliness for example); and

(d) cost-effectiveness in comparison to current models of care;

so that we focus on technologies that improve outcomes but also that are engaging, safe, and perceived as useful and helpful by users.

***Structures and mechanisms to support the take-up, diffusion and scaling of digital mental health interventions in Victoria***

170 It is important that technologies are developed utilising user-centred design, carefully considering the needs, pain points, and goals of key stake holders including not only

end users, such as those with mental ill-health and their families, but also the needs of services and clinicians. This will increase engagement and take-up by users and services alike by developing interventions that address the real needs of end users and clinical services; so interventions should be designed considering as well the service protocols and full implementation blueprints for successful delivery.

171 Other processes that we will need to put in place will be proper training systems in partnership with key organisations (for example, universities, the Australian Psychological Society, and AHPRA) so we have a coordinated system of training and scaling-up in line with the demands and evolution of a new way of delivering care in the digital era.

172 We will need to think about Medicare and the Medicare Benefits Scheme (**MBS**) and ensure that digital interventions can be paid through these mechanisms, to be able to remunerate clinicians, vocational workers and peer workers. We have seen a recent example now with telemedicine being included as a billable item in MBS but we need to keep on reforming these systems and funding models to enable digital models of care beyond simply tele-psychiatry, which is an extension of face to face care via phone or video and therefore has limited room for innovation, scalability and providing continuous and personalised support.

173 We also need a mechanism and accreditation system for interventions in terms of quality, safety and effects, but this accreditation needs to be context specific. In other words, it is not appropriate, for example, based on the evidence we have at the moment to say that because an intervention worked in a specific context (e.g. population-based recruitment) it will work in a clinical setting.

174 Finally, we need to consider the need for ongoing research and development, and the resourcing needed for ongoing training and implementation. If this is not considered, implementation will continue to fail and technologies will become rapidly outdated.

***Systems and processes required to ensure the mental health system is adaptive and responsive to changes in digital technologies and consumer preferences***

175 An absolute key element here is to think about how we do research in digital technology. At the moment we do research in two ways; as mentioned before we either do population-based studies recruiting a small pool of highly motivated users with results that do not generalise to the clinical reality of mental health services, or clinical effectiveness trials conducted in clinical services that are very costly and slow due to slow recruitment into these studies. Therefore, by the time we finish those interventions the technology lacks currency or is simply obsolete and there is not a clear pathway to clinical integration.

176 A new way of thinking about this is to instead make the system digitally enhanced, and then take advantage of large numbers and technology, and use methodologies such as a constant iterative A/B testing but in this case against KPIs that improve the lives of those with mental ill-health. If we do this we will be able to conduct really rapid testing and trials, with results that are clinically valid and generalisable and then move the new evidence, innovation and findings of these interventions into the overall system at a really rapid pace. This would, in effect, create a new system that learns and adapts in real time, thus bridging the research translation gap and the online/face to face divide.

177 To do this we need new processes from the research and ethical stand point that enable us to improve processes and services in fast and safe ways and are responsive to the needs and preferences of users and new technological innovations. Ethics committees will need to be sensitive and have specific procedures to enable the rapid advancement of technology and large-scale efforts of improvement of technology and services. We need to be able to use these methodologies in an ethical and safe way, but also in a rapid way so that the mental health system does not lag behind what the potential of technology and interventions offer.

178 We also need funding models that enable this ongoing innovation and service improvement. Technologies that are developed and tested through research funds will need to be adopted and funded by clinical services and governments to ensure the sustainability of these interventions.

***Developing an evidence base to advance digital interventions***

179 For us to be able to deliver interventions with real world clinical benefits we need to develop interventions for, and test these interventions in the context of, clinical services. These interventions need to be tested in the environment where they are supposed to help people.

**Further research required**

180 There have been more than 15 years of research and over 100 trials showing that online interventions work. However, despite this evidence and enthusiasm, there is currently a remarkable research translation gap with very few examples, if any, of successful integration of these technologies into clinical services. There is a clear need for innovation and research into digital interventions that enhance clinical services and also into the mechanisms that influence take-up, adoption, long-term engagement and effectiveness of these interventions in clinical services.

**Processes and mechanisms to disseminate findings and provide guidance to consumers and providers**

181 An accreditation framework is needed to create a way for both consumers and providers to see what works for whom and in what context. It needs to include clear informative, easy to understand and accurate information on how these interventions work, for whom and also what users need to do for these interventions to improve their outcomes.

182 As I mentioned before we also need an easy to find, integrated portal that consumers and providers can use to find real time updates on these interventions.

**Ensuring the efficacy of emerging digital interventions**

183 We need to ensure that these interventions are tested and evolved in the context where they need to deliver outcomes. We need to ensure that the clinical benefits of these interventions are generalisable but also that we learn what works for whom and in what context.

184 If we come up with a fast ecologically valid way of developing, testing and optimising these interventions in the wild, using rigorous methodologies, but at the same time taking advantage of the rapid evolution of technology as well as large numbers, we will break the current research-translation divide. This will create a mental health system that evolves at a rapid rate and constantly optimises interventions that keep on improving outcomes in the real world of clinical services.

**WORKFORCE CAPABILITY BUILDING AND READINESS**

***Improving the adoption and implementation of digital technologies and services by the mental health workforce***

185 To assist the mental health workforce to take up and implement digital technologies and services, a number of key considerations need to be taken into account including:

(a) education on digital mental health practices;

(b) implementation support and funding;

(c) business development; and

(d) stakeholder collaboration.

186 Mental health services should be assisted to consider the best ways in which they might leverage digital technology within their organisation. This includes being provided with adequate redesign support to:

(a) consider how digital technology could help improve outcomes, reduce cost and address the key needs of services; and

(b) consider how digital technology could help support their service users in terms of their wider recovery (e.g., online psychoeducation, relapse prevention monitoring, crisis planning, informational supports for carers and loved ones).

187 Funding support will also be needed to educate, train and remunerate the workforce.

**Factors encouraging or discouraging healthcare professionals from using digital technology in service provision**

188 Factors that could encourage healthcare professionals to use digital technology in service provision include providing education to them on the ways in which digital technology will facilitate improved access to healthcare to mental health care services and help to deliver services in ways that are convenient for them.

189 Healthcare professionals may also require evidence showing the value of digital technologies before investing in a change to their current means of practice. Healthcare providers who are, or perceive themselves to be, competent in the use of reliable digital health technologies, and work in an environment in which digital technologies can be used effectively (i.e., high quality reliable technologies and internet connection), are more likely to adopt digital technologies within their existing service model.

190 Technologies that alleviate their pain points and reduce workload while improving outcomes that are very much liked and loved by consumers will be more popular amongst practitioners. We have seen a dramatic change in the attitudes towards technology in the context of the COVID-19 outbreak which illustrates that when the perceived need and benefit of digital technologies are clear, the workforce adopts these technologies. We can learn from this to really illustrate the benefits of these technologies for consumers and clinicians alike. I think this new attitude towards technology will persist in the long-term.

191 On the other hand, factors that could discourage healthcare professionals from using digital technology in service provision include:

(a) employee pushback;

(b) lack of a clear organisational-wide implementation strategy;

(c) irrelevant or unhelpful implementation and service procedures;

(d) lack of expertise to lead organisational digital transformation;

(e) lack of leadership in digital transformation;

(f) inflexible organisational settings;

(g) lack of education or confidence from healthcare professionals to use the technology in a competent useful manner;

(h) funding; and

(i) interventions that fail to consider their needs.

**Capabilities and skills required**

192 Capabilities and skills required by mental health professionals include digital literacy which means becoming equipped to determine whether a particular digital health offering is appropriate, efficacious, safe and ethically justifiable for the given population.

193 Mental health professionals also require a keen understanding of how to use the technology itself and assistance in determining for whom it is suitable and when it should be delivered. Namely, at what point in the mental health journey encompassing help-seeking, face-to-face support, through to long term relapse prevention and recovery technology can be useful and integrated in treatment.

**Assisting individual professionals or workforce groups adapt their practice to incorporate digital technology**

194 At Orygen Digital we have conducted a number of projects illustrating how digital technology can be used to redesign the delivery of mental health services. Our technology-based interventions have been designed to be integrated with, and to significantly enhance, the effectiveness of youth mental health services at all stages of mental health support. This includes help seeking, integrated face to face and online support, and long-term recovery and relapse prevention.

195 Prior to conducting a trial, we work to match potential solutions to meet the needs of the specific clinical service and gain an understanding of how technology can meet these needs.

196 An example of this in action is our recent Affinity trial, the first trial to assess how best to integrate traditional face-to-face and online mental health services in young people experiencing suicidal ideation. Over the course of 12 weeks, young people aged 18 to

24 who experienced thoughts about and contemplating suicide were recruited from the Mood Clinic at Orygen Specialist services.

197 To implement this integrated service effectively, clinicians within the Mood Clinic were supported via educational training sessions covering:

(a) ethical identification of suitable participants;

(b) use of digital platform and its features;

(c) information on data and clinical safety/privacy; and

(d) assistance in rolling out the technological platform within an existing service (i.e., resources, technology, funding).

***The impact of increased digital opportunities on 'traditional' workforce roles and identity***

198 Healthcare providers will have the ability to access information easily, on the move and 24/7 if required. This means that mental health care services have the potential to operate flexibly outside of normal parameters, offering support to those individuals in hard to access areas and facing other barriers to accessing mental health services; for example, the current situation with COVID-19 and the recent bushfires.

199 A digitally enhanced style of engagement may also result (in some cases) in a shift in power away from clinicians toward the consumer and consequently, a shift away from the traditional hierarchical healthcare power dynamic towards a direct focus on the service user's needs and preferences.

200 But also technology will empower clinicians to exercise their roles in different ways and to impact on the consumers' lives in a much more effective way. There will be synergies between face to face and digital support where the whole is better than the sum of its parts, for example by increasing therapeutic alliance, engagement, treatment intensity and personalisation.

***The impact of increased digital opportunities on the quality of therapeutic connection/alliance between consumer and clinicians***

201 Increasing digital opportunities can positively impact upon the potential therapeutic alliance by enhancing and extending the capabilities and efficacy of traditional mental health care services.

202 For example, clinicians will have the ability to remotely guide personalised interventions and provide appropriately stepped collaborative care as and when needed. With digital technologies augmenting traditional mental health services, therapists will be able to

provide real-time, evidence-based and personalised mental health support when the person needs it most. This will potentially strengthen the bond between clinicians and their clients. This is the situation where face to face and digital support create synergies where the whole is more than the sum of its parts. In one of our recent studies, young people reported that blended digital/face to face support would increase overall therapeutic engagement as well as the therapeutic alliance.[24]

203 In contrast to this, basic standalone digital offerings or shortcuts also have the potential to mirror undesirable qualities in therapists including poor responsiveness, inability to repair therapeutic ruptures, difficulty in providing timely and personalised feedback, thereby negatively impacting upon the potential therapeutic alliance. Likewise, therapists recommending apps without full knowledge of the tools or integrating these within the therapy process is likely to be an ineffective way of bringing technology into clinical practice.

***Examples from other jurisdictions***

204 Lessons from digital adoption and implementation in other jurisdictions or sectors that the commission should investigate include key examples from Australia, the United States and the United Kingdom, all of which have engaged in work relating to making better use of digital technology in the mental health sector.

205 Key examples from an Australian context include:

(a) the team at Orygen Digital who create engaging, effective, evidence and technology-based interventions for young people and their families, and integrate with and enhance youth mental health services,

(b) eheadspace, a confidential clinical telemedicine service where young people can web chat, email or speak on the phone with a qualified youth mental health professional;

(c) ReachOut, who deliver e-mental health services for young people with mild mental health conditions;

(d) the Black Dog Institute, who have deployed programs such as myCompass to expand access to support by providing scalable stand-alone solutions; and

(e) Beyond Blue, who operate support services for more than 150,000 people every year via telephone, email and web chat.

[24] Valentine L, Pryor I, McEnery C, et al. "A Game-Changer" End Users' Perspectives on the Design and Delivery of a Blended Model of Care in First-Episode Psychosis Treatment. Submitted.

206 Examples from the USA include the Beth Israel Deaconess Medical Center and Harvard University, USA who are engaged in work relating to digital phenotyping (or mobile sensing) that has the potential to improve outcomes for service users and the operational efficiency of mental health services. Specifically, ubiquitous mobile technology affords an opportunity to capture time- and location-sensitive data and to help consumers and clinicians track moods, behaviour and symptoms and identify meaningful patterns in real time. Preliminary research indicates that the use of data generated passively by mobile devices (mobile sensing) – such as typing speed or vocabulary choices – could be used to detect mood fluctuations, tailor interventions, detect early signs of relapse and even enable just-in-time interventions.[25]

207 The UK's National Health System (**NHS**) Long Term Plan published on 7 January 2019 also sets out the critical priorities that will support digital transformation and provide a change in the way that the traditional NHS provides mental health care for its citizens.[26]

**COVID-19**

***The emerging changes in mental health service delivery as a consequence of COVID-19?***

208 In my opinion we have already seen a keen interest and dramatic change in the attitudes of clinical services, clinicians and regulators alike towards the potential to use technology to deliver mental health care. The immediate effect has been the adoption of telemedicine as a mainstream tool to deliver one to one therapy via video conferencing. However, COVID-19 has brought to light both the total reliance of mental health services on face to face and one to one mental health care, as well as a current lack of technological innovation and interventions fully integrated into mental health care delivery. I think everyone is realising now that the integration of digital technology into clinical services will be a core component of the new generation of mental health services; clinicians, clinical services and regulators will make a concerted effort to facilitate that.

209 Paradoxically, COVID-19 has encouraged key stakeholders to do what consumers in general and young people in particular are calling for: providing digitally enabled mental health services, as opposed to using technology to replace current offerings or in a way that is not integrated with clinical care.

[25] Huckvale K, Venkatesh S, Christensen H. Toward clinical digital phenotyping: a timely opportunity to consider purpose, quality, and safety. *NPJ digital medicine* 2019; **2**: 88.

[26] https://www.longtermplan.nhs.uk/wp-content/uploads/2019/08/nhs-long-term-plan-version-1.2.pdf

***Longer term impact on service delivery***

210 I do think that these changes will have long-term consequences and result in a wave of innovation and integration of digital technology into clinical care that we haven't seen over the past 15 years of research. In my opinion, the realisation that technology has not been properly integrated into clinical services and the first-hand experience of what technology can do for consumers and clinical services will result in new intervention models that will benefit both consumers and carers. Telemedicine is just the first step towards this, but fully enabled digital mental health care, which offers 24/7 integrated, evidence-based, real-time, as well as peer, clinician and vocational support, for example, has the potential to transform mental health care. These models will increase the potency, immediacy, intensity, social impact and personalisation of mental health treatment while being scalable and reaching those who are not able to access face to face support. Once these new digital service models are implemented at scale, we will be able to bring about innovative models of rapid innovation, research and implementation that bypass the current research-translation divide.

***Available data on which population cohorts use digital technology to access mental health services***

211 To the best of my knowledge there is little data at the moment to show who is accessing digital mental health support due to the COVID-19 social distancing measures. We are now conducting several studies and surveys to answer this question. Overall, there is also limited data in terms of which cohort of the population use digital technology to access mental health services.

212 The Australian Bureau of Statistics found that in 2016-2017:[27]

(a) 86% of households had access to the internet. For households with children aged under 15 years, 97% had access to the internet compared with 82% of households without children under 15.

(b) Households located in major cities were more likely to have internet access at home (88%) than those in remote or very remote parts of Australia (77%).

(c) People aged 15 to 17 years were the highest proportion of internet users (98%) compared with the older age group (65 years and over) which had the lowest proportion of internet users (55%).

[27] Santesteban-Echarri O, Rice S, Wadley G, et al. A next-generation social media-based relapse prevention intervention for youth depression: qualitative data on user experience outcomes for social networking, safety, and clinical benefit. *Internet Interventions* 2017; **9**: 65-73.

(d) The proportion of internet users accessing the internet for health services or health research has increased from 22% of internet users in 2014-15 to 46% in 2016-17.

213 There is data on the usage of the following digital mental health resources:[28]

(a) eheadspace (young people aged 12 to 25; web-chat counselling service) — between 2015–2016, 24,000 young Australians accessed eheadspace and had over 50,000 occasions of service;

(b) Beyond Blue (general population of all ages; Communication and education on depression and anxiety) — accessed by 2.5 million unique users per annum;

(c) ReachOut (general population of all ages; online self-help resources, online forum, communication and education) — accessed by 1.5 million unique users per annum;

(d) e-hub at the Australian National University (general population, all ages; online therapy programs) — accessed by 828,000 unique users per annum;

(e) Black Dog Institute (information, education, psycho-education focused on depression, bipolar disorder and anxiety disorders) — accessed by 1.25 million unique users per annum;

(f) Mindhealthconnect (information, online programmes, self-help) — accessed by 100,000 users per annum) provides an online portal to mental health services;

(g) Kids Helpline — 18,952 counselling contacts per month, on average (15,460 via phone; 1,978 via email; 1,514 via web); and

(h) Lifeline — average 60,000+ calls per month via phone, Online Crisis Support Chat: average 2,500 contacts per month.

214 However, these offerings are not integrated with clinical services and are limited to broadly targeted digital programs and resources that are not necessarily tailored to individual needs. Popular smartphone apps include Smiling Mind, which is used by over 4 million people. However, research evidence into these apps is lacking. In addition, we need quality data on the level of severity of the mental health conditions users are presenting with as well as the impact of these offerings on clinical and social outcomes. In my opinion, raw numbers of usage do not demonstrate the engaging capacity of an

[28] Bailey E, Alvarez-Jimenez M, Robinson J, et al. An enhanced social networking intervention for young people with active suicidal ideation: safety, feasibility and acceptability outcomes. *International Journal of Environmental Research and Public Health (IJERPH)* in 17 (7), 2435.

application (its ability to engage users in continuous and effective support) and or the impact of the service on those using it.

215 A 2008 headspace National Youth and Parent Community Survey showed that 21% of 12 to 17 year olds and 34% of 18 to 25 year olds reported that they had specifically searched the internet for information to help themselves. However, there is also consistent research that young people have a strong preference for digital support integrated with clinical services.

***Access to digital mental health services by people with severe mental illness from poorer socio economic circumstances***

216 I am unaware of specific research looking at whether those with severe mental ill-health and poorer social economic circumstances receive digital mental health support.

217 We do know that access to technologies is more limited for those living in rural, regional and remote communities, children and young people with a disability and children and young people with low English literacy levels, as well as those with less financial means.[15] For this reason, it is likely that these populations access less digital mental health support.

218 On the other hand, there is also some evidence that:

(a) Indigenous young people use social media more than non-Indigenous young people;

(b) young Australian men experiencing psychological distress were significantly more likely to seek mental health information through the internet, with 95 per cent reporting they were satisfied with information they received;[29] and

(c) young people use social networking sites for social support around mental health topics, including suicide and self-harm.

219 All this data highlights the potential of technology to reach minority groups and those suffering from severe mental health conditions.

***Addressing access in a future mental health system***

220 The future mental health system needs to:

(a) be accessible, easy to navigate and culturally and gender sensitive;

[29] Rice S, O'Bree B, Wilson M, et al. Leveraging the social network for treatment of social anxiety: Pilot study of a youth-specific digital intervention with a focus on engagement of young men. *Internet Interventions* 2020: 100323.

(b) accommodate for low English literacy levels and all levels of education;

(c) account for disabilities;

(d) be stigma-free and culturally appropriate;

(e) be free of charge for those with less financial means; and

(f) develop digital interventions that are appropriately targeted, including across the diagnostic and severity spectrum (as opposed to focusing only on mild to moderate, high prevalence mental health conditions).

221 There is evidence that digital mental health support is just as effective in those with severe mental health conditions compared with those with mild and moderate conditions and also that those with severe mental health conditions have positive attitudes towards digital mental health care.[30] However, the majority of current online offerings and interventions target the latter groups. To address this gap, we need to make a concerted effort to include people from poorer economic circumstances and with complex mental health conditions in the development, evaluation and delivery of these interventions. We must also develop clear and ambitious guidelines and principles for integrated digital mental health care. This will ensure that we do not replicate in the new models of care the disadvantages that we currently see in relation to face to face care.

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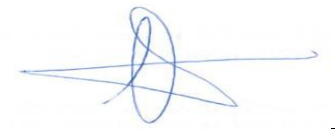

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*date* 10 Jun. 2020

[30] Alvarez-Jimenez, M., Alcazar-Corcoles, M. A., Gonzalez-Blanch, C., Bendall, S., McGorry, P. D. & Gleeson, J. F. 2014. Online, social media and mobile technologies for psychosis treatment: a systematic review on novel user-led interventions. *Schizophr Res,* 156**,** 96-106; Bucci, S., Barrowclough, C., Ainsworth, J., Machin, M., Morris, R., Berry, K., Emsley, R., Lewis, S., Edge, D., Buchan, I. & Haddock, G. 2018. Actissist: Proof-of-Concept Trial of a Theory-Driven Digital Intervention for Psychosis. *Schizophrenia Bulletin,* 44**,** 1070-1080.

Royal Commission into
Victoria's Mental Health System

# ATTACHMENT MAJ-1

This is the attachment marked 'MAJ-1' referred to in the witness statement of Professor Mario Alvarez-Jimenez dated 10th June 2020.

Professor Mario Alvarez-Jimenez Ph.D, D.Clin.Psy, MAResearch, BA (Hons)

## Academic Qualifications

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|---|---|
| 2005-2009 | **PhD**. University of Cantabria, Department of Psychiatry and Medicine, Spain |
| 2006-2009 | **Masters in Research Methodology**: Design and Statistics in Health Sciences, University Autonomous of Barcelona, Spain |
| 2005-2009 | **Post-graduate Diploma in Statistics in Health Sciences**, University Autonomous of Barcelona, Spain |
| 2004-2008 | **Certificate of Proficiency Researcher.** The University of Cantabria, Spain |
| 2001-2004 | **Certificate of Clinical Psychology Specialist** from Spanish Public Health & Education Ministries |
| 1995-1999 | **Graduated in Psychology**, University Pontifical of Salamanca, Spain |

## Current and Past Appointments

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|---|---|
| 2019 | **Promoted to full Professor.** Orygen, The National Centre of Excellence in Youth Mental Health, Centre for Youth Mental Health (CYMH), Faculty of Medicine, Sciences and Health Sciences, The University of Melbourne |
| 2017-present | **Director of Orygen Digital,** Orygen, The National Centre of Excellence in Youth Mental Health, CYMH, Faculty of Medicine, Sciences and Health Sciences, The University of Melbourne |
| 2017-2019 | **Member of Executive Board,** Orygen, The National Centre of Excellence in Youth Mental Health |
| 2015-2018 | **Associate Professor,** Orygen, The National Centre of Excellence in Youth Mental Health, Centre for Youth Mental Health (CYMH), Faculty of Medicine, Sciences and Health Sciences, The University of Melbourne |
| 2016-2019 | **National Health and Medical Research Council (NHMRC)** Career Development Fellow |
| 2014-present | **Clinical Psychologist,** headspace (Orygen) |
| 2014-2017 | **Head of eHealth**, Orygen, The National Centre of Excellence in Youth Mental Health |
| 2013-2015 | **CR Roper Fellow**, CYMH, Faculty of Medicine, Dentistry and Health Sciences, The University of Melbourne |
| 2010-2012 | **Senior Research Fellow**, Orygen, CYMH, Faculty of Medicine, Dentistry and Health Sciences, The University of Melbourne |
| 2005-2009 | **'Lopez-Albo International Fellow -PhD fellowship'**. University Hospital Marques de Valdecilla & Marques de Valdecilla Public Foundation–Research Institute (FMV-IFIMAV). |
| 2004-2005 | **Clinical Psychologist.** Cantabria's Mental Health Services (Spain). |
| 2001-2004 | **Three years Internship in Clinical Psychology (P.I.R. program)**. University Hospital 'Marques de Valdecilla', Spanish Public Health Ministry. Candidates to enter the P.I.R. program are required to sit an annual national competitive examination where an average of 100 applicants are selected from more than 2500 |

## Awards, Prizes & Fellowships

- In 2019, I attained an **Investigator Grant (EL2)** funded by NHMRC ($1,237,910). The success rate for this national competitive fellowship is 9%. I was ranked in the top 1% of all applicants Australia-wide.

- In 2015, I was awarded the **Research Excellence Award by NHMRC.** This highly prestigious award is granted to the **Top Ranked applicant Australia-Wide** in the Career Development Fellowship Scheme-Clinical including all medical specialities.
- In 2014, I attained a **Career Development Fellowship** funded by NHMRC ($411,768). The success rate for this national competitive fellowship is <15%.
- In 2014, I was awarded the 2014 **SMHR Rising Star Award**. This award is in recognition of early to mid-career mental health researchers whose work is making significant impact on the national and international scene, reflecting scientific excellence and public health impact.
- In 2013, I was awarded the **Young Investigator Award for Excellence in Research** by the Australasian Schizophrenia Conference (ASC) in recognition of emerging talent and innovative research in schizophrenia treatment.
- In 2012, I was the recipient of the **CR Roper Fellowship** ($500,000), a highly competitive 3-year fellowship in the field of bio-medical and health research awarded by the Faculty of Medicine, Dentistry and Health Sciences at the University of Melbourne. The success rate for this fellowship is <5%.
- I was awarded the ***International Early Psychosis Association (IEPA) Young Investigator Award*** in 2012. This international award is granted every 2 years to an up and coming researcher in the rapidly expanding field of early psychosis.
- My PhD (2009) was granted ***Summa Cum Laude*** (highest possible academic qualification).
- In 2005, following completion of my clinical doctorate, I was awarded the ***Lopez-Albo International Fellowship*** ($250,000), a 4-year fellowship funded by Marques de Valdecilla Public Foundation and Research Institute (FMV-IFIMAV). This grant scheme was established to support promising young researchers to be trained in leading international research centres (i.e., Orygen). This fellowship enabled me to complete 2.5 years of my PhD research at Orygen.
- During my clinical training I also attained a number of awards, including an ***Esteban Martino International Placement Award***, a 6-month international fellowship, and was given an overall grade of ***outstanding performance***. Prior to this I completed a Bachelor of Science (Degree with Honours) in Psychology in 1999 with a grade of ***high distinction***.

## Conferences & Engagement Activities

*Plenary, Keynote and Invited Presentations at National and International Conferences*

1. Digital technologies to transform youth mental health care delivery. NEA-BPD/Orygen conference. ***Invited speaker.*** Melbourne, 30th-31st January, 2020
2. Digital technology and positive psychology in promoting social recovery in youth mental health. 6th World Congress on Positive Psychology; ***Invited speaker*** Melbourne, 18-21st July, 2019
3. Innovations in e-youth mental health. ***Keynote speaker.*** Rising to the Challenge: Creating Mental Health Services for Young People with Complex Needs, Early Psychosis National Program Conference, Melbourne, Australia, 19–20th, March 2019
4. Can new technologies solve old problems in youth mental health? IEPA Early Intervention in Youth Mental Health; ***Keynote speaker,*** Boston, 7-10th October, 2018
5. Technology-based Interventions and Long-term Recovery in Early Psychosis. Bergen early psychosis symposium; ***Keynote speaker,*** Bergen, Norway, 28-29th May, 2018
6. Online interventions and mental health services. World Psychiatric Association's Thematic Congress, ***Keynote speaker,*** 25-28th February 2018, Melbourne
7. IAYMH International Association for Youth Mental Health; ***Keynote speaker,*** Dublin, 24-26th September, 2017
8. Online Family Interventions in First Episode Psychosis. ACU Health Research Symposium; ***Invited speaker***, Melbourne, 1st December, 2016

9. Online and technological innovations in youth mental health treatment. ***Keynote speaker***. Chonnam National University Hospital International Symposium, Seoul, South Korea 27th May, 2016
10. Social media, Internet and peer support: extending the benefits of early intervention services. ***Keynote speaker***. Early Intervention for Psychosis Conference, Wellington 23rd November, 2015
11. On the cutting edge: novel online intervention and positive psychology for long-term recovery in early psychosis. ***Keynote speaker***. Australian Schizophrenia Conference, Melbourne, 25th September 2015.
12. Acting on a dream: Towards long-term recovery in first episode psychosis; opportunities and challenges in the context of novel social-media technologies. ***Keynote speaker***. Canadian Academy of Child and Adolescent Psychiatry annual meeting, Quebec, 6th October, 2015
13. Thinking big: Online Social Media and Mobile Technologies for Long Term functional Recovery in First Episode Psychosis. ***Keynote speaker***. 7th Conference of the International Society for Research on Internet Interventions (ISRII), Valencia, 23-25 October 2014
14. Thinking outside the box: Online Social Media, Evidence-based Interventions and Long-term Social Recovery in Youth Mental Health. ***Keynote speaker***. XIV Conference of the National Association of Clinical Psychology (ANPIR), Seville, 5-7 June 2014
15. Online Social Media and Positive Psychology for Long Term Recovery in Early Psychosis. ***Keynote speaker.*** Fourth Australian Positive Psychology and Well-being Conference, Melbourne, 7-9 February 2014
16. The HORYZONS project: 21st Technologies to meet 21st Century Challenges in Early Intervention for Psychosis. ***Invited speaker.*** II International Association for Youth Mental Health (IAYMH) Conference, Brighton, 1st October 2013
17. The Horyzons Study. ***Keynote speaker.*** Early Psychosis Forum: To the Borders of Psychosis, Sydney, 16th September 2013
18. Looking for answers: Lifestyle interventions to improve the physical health of young people suffering from psychosis. ***Invited speaker***. iphYs International Satellite Meeting, IEPA, San Francisco, 10th October 2012
19. Lifestyle interventions in First-Episode Psychosis. ***Keynote speaker***. *Keeping the Body in Mind Forum,* Early Psychosis Programme, The Bondi Centre, Sydney, 15th November 2011

*Symposiums and Oral Presentations at National and International Conferences*

1. Alvarez-Jimenez M, et al. The Horyzons trial: a Randomised Controlled Trial of a Moderated Online Social Therapy to Maintain Treatment Effects from First Episode Psychosis Services. ***Invited speaker-Symposium.*** International Society for Research on Internet Interventions (ISRII), Auckland, New Zealand, 13–15th February 2019
2. Alvarez-Jimenez M, et al. Moderated Online Social Therapy for carers of young people recovering from first-episode psychosis: The Altitudes randomised controlled trial. ***Invited speaker-Symposium.*** International Society for Research on Internet Interventions (ISRII), Auckland, New Zealand, 13–15th February 2019
3. Alvarez-Jimenez M, et al. Enhancing Social Functioning and Long-term recovery in Young People with First Episode Psychosis (FEP) and Young People at Ultra High Risk (UHR) for Psychosis: a Novel Online Social Therapy Approach. ***Invited speaker-Symposium.*** 6th Biennial Shizophrenia International Research Society, Florence, 4th–8th April 2018
4. Alvarez-Jimenez M, et al. Online interventions to improve social functioning and recovery in First Episode Psychosis. ***Invited speaker-Symposium.*** Royal Australian and New Zealand College of Psychiatrists' Annual 2017 Congress Adelaide, 30th April – 4th May 2017

5. **Alvarez-Jimenez M,** et al. Generation Next: Online Social Media Interventions to promote social connectedness and support in youth mental health. ***Invited speaker-Symposium.*** Society for Mental Health Research Conference, Sydney, 7-9th December 2016
6. **Alvarez-Jimenez M,** et al. The Momentum project: A Novel Online Social Media, Strengths-based intervention to Improve Functional Recovery in Ultra High Risk (UHR) Patients. ***Oral presentation.*** 10th International Conference on Early Psychosis, IEPA, 19-22 October 2016, Milan, Italy.
7. **Alvarez-Jimenez M,** et al. Moderated Online Social Therapy in Youth Mental Health: Seizing The Opportunity, ***Oral presentation.*** Computing and Mental Health Workshop, CHI Conference, San Jose, California, USA 7th May 2016
8. **Alvarez-Jimenez M,** et al. Moderated online social therapy for depression relapse prevention: Outcomes from the Latitudes 12- week pilot study. ***Oral presentation.*** 3rd International Youth Mental Health Conference, Montreal, 10th October 2015
9. **Alvarez-Jimenez M,** et al. The Meridian Project: Moderated Online Social Therapy for Supporters of Young People Suffering from Depression and Anxiety. ***Oral presentation.*** 3rd International Youth Mental Health Conference, Montreal, 10th October 2015
10. **Alvarez-Jimenez M,** et al. Functional recovery trajectories in first episode psychosis. ***Invited speaker-Symposium.*** Society for Mental Health Research Conference, Adelaide, 3-5th December 2014
11. **Alvarez-Jimenez M,** et al. We are here for the long haul: Novel Online Social Media and Positive Psychology Interventions to Enhance Long-term Recovery in First Episode Psychosis. ***Oral presentation.*** 9th International Conference on Early Psychosis, IEPA, Tokio, 17-19th November 2014
12. **Alvarez-Jimenez M,** et al. Novel Social Media Technologies to Enhance Social Recovery in Early Psychosis: The Horyzons project. ***Oral presentation.*** 2013 Australian Society for Psychiatry Research (ASPR) Conference, Melbourne, 4-6th December 2013
13. **Alvarez-Jimenez M,** et al. Beyond Early Intervention: Moderated Online Social Therapy for Long-term Functional Recovery in First Episode Psychosis (FEP). ***Invited speaker-Symposium.*** ASC, Melbourne, 14th May 2013
14. **Alvarez-Jimenez M,** et al. On the HORYZON: Moderated Online Social Therapy for Long-term Recovery in FEP. ***Oral presentation.*** 8th International Conference on Early Psychosis, IEPA, San Francisco, 11-13th October 2012
15. **Alvarez-Jimenez M,** et al. Risk Factors for Relapse in FEP: a Systematic Review and Meta-analysis. ***Oral presentation.*** 8th International Conference on Early Psychosis, IEPA, San Francisco, 11-13th October 2012
16. **Alvarez-Jimenez M,** et al. The Horyzons Study: Online Recovery for Youth Onset Psychosis. ***Invited speaker-Symposium.*** 7th International Conference on Early Psychosis, IEPA, Amsterdam, 29th November-1st December 2010
17. **Alvarez-Jimenez M,** et al. Tackling the physical consequences of psychosis and its treatment: non-pharmacological interventions to prevent weight gain in FEP. ***Invited speaker-Symposium.*** 7th International Conference on Early Psychosis, IEPA, Amsterdam, 29th November-1st December 2010
18. **Alvarez-Jimenez M,** et al. Preventing the second episode: A RCT of relapse prevention therapy versus specialized treatment for remitted FEP patients. ***Invited speaker-Symposium.*** 2ND European Conference in Schizophrenia Research, European Psychiatric Association, Berlin 21-23rd September 2009
19. **Alvarez-Jimenez M,** et al. Prevention of antipsychotic-induced weight gain in drug-naïve FEP patients. ***Oral presentation.*** 15th International Society for Psychological Treatment in Schizophrenia (ISPS), Madrid, Spain, 14th Jun 2006

20. Alvarez–Jimenez M, et al. Early Intervention for Weight Gain in FEP. ***Oral presentation.*** 10th International Congress on Schizophrenia Research, Schizophrenia International Research Society, Savannah, EEUU, 2-6th April 2005

*Invited National and International Clinical Rounds and Workshops*

1. A vision for transforming youth mental health and research. ***Invited speaker***. Douglas Mental Health Research Institute, McGill University, 17th September 2019
2. Online technology and youth mental health treatment: a way forward. ***Invited speaker***. Institute of Psychiatry, Psychology & Neuroscience (IoPPN) at King's College, London, 4th June 2018
3. eOrygen: bringing about long-term recovery in youth mental health. ***Invited speaker***. NORMANT and TIPS Programs, Oslo, 30th May 2018
4. Workshop on managing online social media-based interventions in early psychosis. ***Keynote speaker***. Bergen early psychosis symposium; Bergen, Norway, 28-29th May, 2018
5. Workshop on moderation and clinical management of online social media platforms in first episode psychosis. ***Invited speaker***. McGill University, Montreal, Canada 29th April, 2016
6. Workshop on moderation and clinical management of online social media platforms in first episode psychosis. ***Invited speaker***. University of North Carolina (UNC), Chapel Hill, North Carolina, USA, 4th May, 2016
7. Online social media interventions for families in youth mental health. ***Invited speaker.*** Clinical Grand Rounds for the Chonnam National University Hospital Seoul, South Korea 26th May, 2016
8. Moderated Online Social Therapy in youth mental health: A stepping stone into the future of relapse prevention and long-term recovery. ***Invited speaker***. Clinical Grand Rounds for the Department of Psychiatry of the Montreal Children's Hospital (McGill University Health Centre Superhospital), Montreal, 8th October, 2015.
9. Online and mobile-based interventions in first episode psychosis: bridging the gap. ***Invited speaker***. Psychosocial Research Axis Grand Rounds of the Jewish General Hospital (Division of Research of the Department of Psychiatry), Montreal, 7th October, 2015.
10. The achievable dream: social media and strength-based interventions in first episode psychosis; towards long-term recovery. ***Invited speaker.*** Amsterdam Medical Centre, The University of Amsterdam, 15th October 2015
11. Social media and online interventions in youth mental health: a trans-diagnostic perspective. ***Invited speaker.*** VU University Amsterdam, 16th October 2015.
12. Novel social media and mobile technologies and youth mental health: opportunities and challenges. ***Invited Rex J Lipman Fellow.*** Rex J Lipman Fellow Program 2015, Adelaide, 5th August 2015.
13. Workshop on new psychological approaches for psychotic symptoms in early psychosis. ***Invited speaker***. University Autonomous of Madrid (No. 1 ranked University in Spain), Madrid 20st December 2013
14. Workshop on novel psychological interventions for persistent psychotic symptoms in psychosis. ***Invited speaker***. University Autonomous of Madrid, Madrid 21st December 2012.
15. Workshop on psychosocial interventions for weight gain management in FEP. ***Invited speaker.*** The Psychology Entry Level Seminar Program. Northwestern Mental Health Program, Melbourne, 29th July 2010
16. Workshop on psychological interventions for the prevention of weight gain in FEP. Seminar for psychiatry and clinical psychology interns. ***Invited speaker***. University Hospital 'Virgen del Camino', Pamplona, Spain, 7th January 2010

17. Workshop on effective interventions for relapse prevention and functional recovery in FEP. Seminar for psychiatry and clinical psychology interns. ***Invited speaker***. University Hospital 'Virgen del Camino', Pamplona, Spain, 21st January 2010
18. Workshop on psychological treatment for relapse prevention in FEP. ***Invited speaker***. 9th Conference of the National Association of Clinical Psychology (ANPIR), Santander, Spain, 11th Jun 2009
19. Relapse prevention and functional recovery in FEP: new horizons and challenges, ***Invited speaker***. University Hospital "Marqués de Valdecilla", Santander, Spain 15th May 2009
20. Relapse prevention and functional recovery in psychosis and schizophrenia-related disorders. ***Invited speaker***. Navarra Public Health Services, Pamplona, Spain, 25-26th September 2008
21. Workshop on psychological interventions in schizophrenia spectrum disorders. ***Invited speaker***. State Government of Navarra, Official training program for public clinical psychologists, Pamplona Spain, 18-20th September 2007
22. Workshop on cognitive-behavioural therapy for panic disorder. ***Invited speaker***. National Open University, Santander, Spain, 15th-16th March 2006

*Invited Lectures, Seminars, Webinars and knowledge transfer activities*

1. Transforming youth mental health services through digital technology. The MOST Project. ***Invited Webinar.*** DigiHealth and youth mental health service delivery, University of New South Wells, 20th of May 2020
2. The leadership challenges for Early Career Researchers (ECRs) that no one ever talks about. ***Invited speaker.*** Special course for ECRs on leadership skills, University of Melbourne, 20th of July 2018
3. Transforming youth mental health through digital technology. ***Invited public lecture***. iGen symposium. Melbourne Neuroscience Institute, University of Melbourne, 19th July, 2018
4. e-Mental health for young people – an integrated approach. ***Invited seminar.*** Department of health, Canberra, 2nd August, 2017
5. Virtual Reality and Augmented Reality in neuro-rehabilitation. ***Invited public lecture***. Melbourne Neuroscience Institute, University of Melbourne, 5th April, 2017
6. The Use of Internet in the Treatment of Psychosis. ***Invited lecturer*** (Webinar). Centre for Continuing Education, University of Sydney, 15th July, 2016
7. Online interventions for families of young people with depression and anxiety. ***Invited presenter.*** Service Innovation Projects Showcase. Headspace National Annual Meeting, Melbourne 3rd March 2015
8. Novel interventions to promote long-term relapse prevention and functional recovery in early psychosis. ***Invited lecturer.*** Monash 3rd year DPsych (Clinical) program, Melbourne, 25th September, 2014
9. Online social media and positive psychology for long-term recovery in youth mental health. ***Invited lecturer.*** North Western Mental Health, Royal Melbourne Hospital, Melbourne 25th August 2014
10. It is the journey what matters, not the destination: reflections on making it as an independent researcher. ***Invited lecturer.*** Monash Clinical Imaging Neuroscience, Melbourne 14th July 2014
11. Positive psychology and long-term functional recovery in early psychosis. ***Invited lecturer.*** St Vincent's Hospital, Department of Psychiatry, Melbourne 4th April 2014
12. Online interventions in youth mental health: a showcase of recent innovations. ***Invited presenter.*** Headspace national annual meeting; Melbourne, 14th May 2013
13. I never thought I'd get this far: reflexions on becoming a young independent researcher. ***Invited lecturer.*** Australian Catholic University, lecture for postgraduate students, Melbourne, 2nd May 2013

14. Psychological Interventions for young people with psychosis. ***Invited lecturer.*** University of Melbourne, Department of Psychiatry, lecture for medical students, Melbourne, 14th March 2013
15. Novel psychosocial interventions to promote long-term functional recovery in FEP. ***Invited lecturer.*** University of Melbourne, Department of Psychiatry, lecture for medical students, Melbourne, 31th Jan 2013
16. Online Interventions for Young People suffering from mental disorders. ***Invited lecturer***. University Autonomous of Madrid. Madrid 21st December 2012.
17. Novel interventions to improve long-term functional recovery in FEP. ***Invited lecturer.*** University of Melbourne, Department of Psychiatry, lecture for medical students, Melbourne, 24th October 2012
18. Internet technologies to improve long-term outcomes in FEP. ***Invited lecturer.*** University of Melbourne, Department of Psychiatry, lecture for medical students, Melbourne, 13td September 2012
19. Novel interventions to promote psychosocial recovery in FEP. ***Invited lecturer.*** University of Melbourne, Department of Psychology, lecture for postgraduate students, Melbourne, 23rd August 2012
20. On the HORYZONS: pilot results and beyond. ***Invited lecturer.*** University of Melbourne, Department of Psychiatry, lecture for medical students, Melbourne, 2nd August 2012
21. Online interventions for First-Episode Psychosis: a sneak peek into the future. ***Invited lecturer.*** University of Melbourne, Department of Psychiatry, lecture for medical students, Melbourne, 31st May 2012
22. From Episode II to Horyzons: Online Interventions for FEP Patients. ***Invited speaker.*** Barwon Psychiatric Research, The University of Melbourne and The Geelong Clinic, 8th November 2011
23. An Online Therapy for FEP. ***Invited speaker.*** IDG Seminar Program, Department of Computing and Information Systems, The University of Melbourne; 6th September 2011
24. An online therapy for FEP. Reflections and future directions. ***Invited lecturer***. University of Melbourne, Department of Computing and Information Systems, Melbourne, 11th March 2011

## Academic Leadership Roles

- **Director, Orygen Digital**, Orygen, The National Centre of Excellence in Youth Mental Health (2017-Current)
- **Member of Executive Group,** Orygen, The National Centre of Excellence in Youth Mental Health (2017-Current)
- Member of the Advisory Board of the **IMMERSE consortium,** a EU Horizon 2020 project on the implementation of mHealth in psychiatry
- **Head, E-Health,** Orygen, The National Centre of Excellence in Youth Mental Health (2014-2017)
- Member of the **Academic Advisory Board, Centre for Positive Psychology**, The University of Melbourne (2015-current)
- Member of the **Scientific Advisory Committee, Australian Coalition to End Loneliness (ACEL)**
- **Education Committee Co-Chair**, Schizophrenia International Research Society (SIRS) (2016-current)
- **Member of the Technology and Wellbeing Roundtable (TWRT)** network which integrates the major Australian organisations working on ehealth initiatives to improve mental health
- Senior researcher at CYMH and Orygen, with direct responsibility for the overall planning of the future clinical research strategy in the area of early psychosis (2010-current)
- Member of the Human Ethics Advisory Group and Research Review Committee at Orygen, CYMH, University of Melbourne (2013-2017)

- Member of the **senior group Early Psychosis Research Agenda (EPRA)** at Orygen (2010-current)
- Member of the **executive group and scientific committee** of the Spanish National Association of Clinical Psychology (ANPIR) (2010-Current).

## Major Academic Leadership Engagement

- Expert testimony on the **Victorian Royal Commission on Mental Health**, 28th of April 2020
- Presentation to the Australian **Productivity Commission** on Mental Health, 23rd January 2020
- Presentation to the **National Mental Health Commission**, 20th February 2020

## Contributions to Peer Review

- Reviewer and panel member in the 2020 NHMRC Investigator Grant Review Panel.
- Reviewer and participation in the faculty of medicine fellowships review panel (University of Melbourne) in 2019.
- Participation in the Australian National Health and Medical Research Council (NHMRC) Grant review panel (project grants) in 2017.
- I review over 10 articles per year for leading academic journals including, The New England Journal of Medicine, British Medical Journal, JAMA Psychiatry, The American Journal of Psychiatry, The Lancet Psychiatry, The British Journal of Psychiatry, Schizophrenia Bulletin, Schizophrenia Research, Acta Psychiatrica Scandinavica, Australian and New Zealand Journal of Psychiatry, The Journal of Clinical Psychiatry, Behavioural Research and Therapy, Psychiatry Research, European Psychiatry, Psychological Medicine, Schizophrenia Research and Treatment, BMC Psychiatry, Psychiatric Services and Social Psychiatry and Psychiatric Epidemiology.
- I have regularly acted as an assessor for the NHMRC, the UK Medical Research Council, the Spanish National Clinical Psychology Association, The Romanian Research Council as well as major philanthropic organizations from Canada (i.e., Graham Boeckh Foundation)

## Scientific Discipline Experience

- Registered clinical psychologist by the Australian Health Practitioner Regulation Agency (2013-Current)
- Registered clinical psychologist by the Spanish National Health System (2005-Current).
- Member of the IEPA (2010-Current), The Society for Mental Health Research (2011-Current) and the International Association for Youth Mental Health (IAYMH) (2013-Current).

*Conference Organisation*

- ***Member of the scientific committee*** of 12th International Conference on Early Psychosis, IEPA, 2020, Brazil
- ***Member of the scientific committee*** of the World Psychiatric Association's Thematic Congress**,** 25-28th February 2018, Melbourne
- ***Chair of 2 Symposium and 2 Oral sessions*** at the World Psychiatric Association's Thematic Congress**,** 25-28th February 2018, Melbourne
- ***Chair*** of an Oral Presentations Session at the 10th International Conference on Early Psychosis, IEPA, 19-22nd October 2016, Milan, Italy.
- ***Co-convener*** of the 2015 Australian Schizophrenia Conference, Melbourne, 23-25th September 2015
- ***Member of the scientific committee*** of the 2015 Australian Schizophrenia Conference, Melbourne, 23-25 September 2015

- *Chair* of 3 plenary sessions at the Australasian Schizophrenia Conference, Melbourne, 23-25th September 2015
- *Member of the scientific committee* of the 12th ANPIR Conference, Seville, Spain, 5-7th Jun 2014
- *Co-convener* of the 2013 ASPR Conference, Melbourne, 4-6 December 2013
- *Member of the scientific committee* of the 2013 ASPR Conference, Melbourne, 4-6 December 2013
- *Chair* of plenary and ordinary sessions at of the 2013 ASPR Conference, Melbourne, 4-6 December 2013
- *Chair* of plenary session at the Australasian Schizophrenia Conference, Melbourne, 14th May 2013
- *Co-convener* at the 9th ANPIR Conference, Santander, Spain, 11-13th Jun 2009
- *Member of the scientific committee* at the 9th ANPIR Conference, Santander, Spain, 11-13th Jun 2009
- *Chair* of 2 plenary sessions at the 9th ANPIR Conference, Santander, Spain, 12th Jun 2009

PUBLICATIONS

*Journal articles* (*Referred Journals)

*Accepted for publication or published online ahead of print*

1. Allott K, Steele P, Boyer F, Winter A, Bryce S, **Alvarez-Jimenez M,** Phillips L. Cognitive strengths-based assessment and intervention in first-episode psychosis: A complementary approach to addressing functional recovery? *Clinical Psychology Review*. Involvement: 15%; co-author on the in the paper.* [Date of acceptance: 22/05/2020]
2. Bell IH, Nicholas J, **Alvarez-Jimenez M,** Thompson A, Valmaggia L. Virtual reality as a clinical tool in mental health research and practice. *Dialogues Clin Neurosci*. Involvement: 15%; co-author on the in the paper.* [Date of acceptance: 22/05/2020]
3. Valentine L, McEnery C, Bell I, O'Sullivan S, Bendall S, **Alvarez-Jimenez M**. Our Online Life is Integrated with Our Physical Life": End Users' Perspectives on the Design and Delivery of a Blended Model of Care in First-Episode Psychosis Treatment. *JMIR Mental Health*. Involvement: 30%; lead investigator on the study and senior author in the paper.* [Date of acceptance: 08/05/2020]
4. Rice S, O'Bree B, Wilson M, McEnery C, Lim MH, Hamilton M, Gleeson J, Bendall B, D'Alfonso S, Russon P, Valentine L Cagliarini D, **Alvarez-Jimenez M**. Development of a graphic medicine-enabled social media-based intervention for youth social anxiety. *Clinical Psychologist.* Involvement: 30%; lead investigator on the study and senior author in the paper.* [Date of acceptance: 06/04/2020]
5. Bevan Jones R, Stallard P, Shameem S, Rice S, Werner-Seidler A, Stasiak K, Kahn J, Simmons T Simpson SA, **Alvarez-Jimenez M**, Rice F, Evans R, Merry S. Practitioner review: Co-design of digital mental health technologies with children and young people. *Journal of Child Psychology and Psychiatry.* IF=6.5. Involvement: 10%; co-author in the paper.* [Date of acceptance: 10/04/2020]
6. Valentine L, McEnery C, O'Sullivan S, Bendall S, **Alvarez-Jimenez M.** A qualitative analysis of young people's experience of a long-term social media-based intervention for first-episode psychosis. *Journal of Medical and Internet Research.* IF=4.9. Involvement: 30%; lead investigator on the study and senior author in the paper.* [Date of acceptance: 22/02/2020]
7. Nelson B, Torregrossa L, Thompson A, Sass L, Park S, Hartmann JA, McGorry PD, **Alvarez-Jimenez M.** Improving treatments for psychotic disorders: Beyond cognitive behaviour therapy for psychosis. Psychosis. Involvement: 15%; senior author in the paper.* [Date of acceptance: 11/03/2020]
8. Peach N, **Alvarez-Jimenez M**, Cropper SJ, Sun P, Halpin E, O'Connell J, Bendall S. Trauma and the content of hallucinations and post-traumatic intrusions in first episode psychosis. *Psychology and Psychotherapy: Theory, Research and Practice.* Involvement: 15%; senior author in the paper.* [Date of acceptance: 22/02/2020]
9. Ferrari M, McIlwaine S, Reynolds J, Archie S, Boydell K, Lal S, Shah JL, Henderson J, **Alvarez-Jimenez M**, Andersson N, Boruff J, Kristian R, LIyer SN. Gaming my Way to Recovery: Protocol for a Scoping Review about Digital Game Interventions for Youth Mental Health Services. *JMIR Research Protocols*. Involvement: 5%; co-author in the paper.* [Date of acceptance: 05/02/2020]
10. Ludwig KA, Browne JA, Nagendra A, Gleeson JF, D'Alsonso S, Penn DL, **Alvarez-Jimenez M**. Horyzons USA: A Moderated Online Social Intervention for First Episode Psychosis. *Early Intervention in Psychiatry* [Date of acceptance 03/02/2020]. IF=2.4. Psychiatry journal ranking=70$^{th}$. Involvement: 20%; senior investigator on the study.*
11. McEnery C, Lim HM, Knowles A, Rice R, Gleeson J, Howell S, Russon P, Miles C, D'Alfonso S, **Alvarez-Jimenez M**. Social Anxiety in Young People With First-Episode Psychosis: Pilot Study of the EMBRACE Moderated Online Social Intervention. *Early Intervention in Psychiatry* [Date of acceptance 15/12/2019]. IF=2.4. Psychiatry journal ranking=70$^{th}$. Involvement: 20%; senior investigator on the study.*

*Published*

12. Bailey E, Mühlmann C, Rice S, Nedeljkovic M, **Alvarez-Jimenez M**, Sander L, Calear AL, Batterham PJ, Robinson J. Ethical issues and practical barriers in internet-based suicide prevention research: A review

and investigator survey. *BMC Medical Ethics 2020 May 13;21(1):37* Involvement: 10%; investigator on the study.*

13. Rice S, O'Bree B, Wilson M, McEnery C, Lim M, Hamilton M, Gleeson J, Bendall S, D'Alfonso S, Russon P, Valentine L, Cagliarini D, Howell S, Miles C, Pearson M, Nicholls L, Garland N, Mullen E, McGorry PD, Alvarez-Jimenez M. Leveraging the social network for treatment of social anxiety: Pilot study of a youth-specific digital intervention with a focus on engagement of young men. *Internet Interventions May 8;20:100323* Involvement: 30%; lead investigator on the study and senior author in the paper.*
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*Reports & International declarations*

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