2019 Submission - Royal Commission into Victoria's Mental Health System

Organisation Name
N/A

Name
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What are your suggestions to improve the Victorian communitys understanding of mental illness and reduce stigma and discrimination?
"Now strong evidence that the major neglected factor in the causation and severity of mental disorders is developmental trauma. 20% of the population have had significant trauma and yet, while services are trying to provide trauma sensitive services, they are not actually treating the changes trauma has caused in the brain. There is not enough room to make the case in this questionnaire, so I will attach a paper on developmental trauma and a proposal for a developmental trauma treatment service (fully costed and on the shelf ready for implementation). "

What is already working well and what can be done better to prevent mental illness and to support people to get early treatment and support?
"Current funding methodologies and service designs do not enable the comprehensive set of service components required to effectively treat developmental trauma in children, youth and adults (see treatment service proposal) "

What is already working well and what can be done better to prevent suicide?
"Three quarters of those that achieve suicide have histories of significant developmental trauma that had not been treated. Current suicide prevention programs usually do not effectively treat the trauma, which may be why suicide rates in young people have been going up instead of coming down despite increasing investments."

What makes it hard for people to experience good mental health and what can be done to improve this? This may include how people find, access and experience mental health treatment and support and how services link with each other.
Detecting those with developmental trauma/complex PTSD and providing appropriate therapy (e.g. EEG guided neurofeedback) makes people much more functional and effective in getting on with life and evolutionary driven tasks.

What are the drivers behind some communities in Victoria experiencing poorer mental health outcomes and what needs to be done to address this?
"The Commonwealth funding methodology favours the wealthy over the poor. The highest amount of Medicare rebates per head of population for mental health items is in the wealthiest areas of Melbourne and the lowest amounts in the poorest areas, but the poorest areas with more public housing are the most needy areas. The Commonwealth raises 82% of taxes and the States only 18%, yet the states are meant to be the service providers and need over 40% of the tax base to do so, so they are always at the mercy of the Commonwealth for the grants to the states. The states have been withdrawing from providing community based care due to the inadequate funding of hospitals, hoping the Commonwealth with provide for the missing middle via the PHNs. COAG commissioned a National Mental Health Service Planning Framework (NMHSPF) and

invest over $2.5m in a modelling spreadsheet, including costings, that showed in 2013 dollars the over $2 billion was required to be invested to bring community based services up to an evidence based adequate level of services. However the model has been kept secret from the public and commentators like myself, though I have all the background information from working for the NSW Mental Health Commission at the time. "

What are the needs of family members and carers and what can be done better to support them?
N/A

What can be done to attract, retain and better support the mental health workforce, including peer support workers?
N/A

What are the opportunities in the Victorian community for people living with mental illness to improve their social and economic participation, and what needs to be done to realise these opportunities?
N/A

Thinking about what Victorias mental health system should ideally look like, tell us what areas and reform ideas you would like the Royal Commission to prioritise for change?
"Ensure the release of the NMHSPF for give the public an understanding of what should be provided. Make sure that the funding is made transparent and accountable, as there has been rife diversion of mental health funding to physical health services around Australia. Putting funding through not for profit NGO contracts can reduce risk. Organise a dialogue on the role of developmental trauma on the whole range of mental health conditions and how to effectively treat the brain changes brought about by the trauma as part of comprehensive treatment. Prof Derrick Silove, who has been involved in trauma work with refugees, has said that if we can effectively treat the effects of trauma it would be the greatest public health initiative of all time. I think we are at the tipping point to achieve this (see my paper). "

What can be done now to prepare for changes to Victorias mental health system and support improvements to last?
"You get exactly what you pay for and you cannot achieve high quality with fee for service private practice systems (see funding methodology paper). There needs to be a clear service design and funding methodology publically available and clear means to ensure accountability. The Western Australian Mental Health Commission has been the most successful in Australia because we convinced them to hold the whole mental health budget and commission services, both in the public and NGO sectors. They stopped the diversion of mental health money through having the power to reduce funding to the hospitals that tried to do so. They also had the freedom to consult widely and support innovation. "

Is there anything else you would like to share with the Royal Commission?
The attached papers contain additional information.

A Tipping Point for Developmental Trauma Treatment?

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Abstract

There has been a progressive appreciation of the importance of epigenetics, and in particular, developmental trauma, in mental disorder assessment and treatment. Now the underlying plastic brain structural and functional responses are becoming clearer, but treatment options have not been very effective in calming the fear-driven brain. Evidence is increasing that quantitative electroencephalography (qEEG) guided neurofeedback is of major benefit within comprehensive treatment programs, but such programs for the general public do not exist.

Key Words: developmental trauma/ complex PTSD/ epigenetics/ psychosis/ schizophrenia/ neurofeedback/ qEEG/

Paper

Having been involved with the NSW Service for the Treatment And Rehabilitation of Torture and Trauma Survivors (STARTTS) for over 30 years, I have watched the development of improved understanding of, and therapies for, every type of trauma found in refugees (Gurr 2001). It was not until I became the Clinical Director of the headspace Youth Early Psychosis Program (hYEPP) – ages 12-25, in Western Sydney, that I saw many young people with developmental trauma, walking through the doors of primary care headspace centres, or referred for assessment for first episode psychosis, or ultra high risk of developing psychosis. Their histories, leading to self-harming, depression, suicidal ideation, anxiety, post traumatic stress disorder (PTSD), eating disorders, substance abuse, dissociation and personality disorders, revealed the range of childhood traumas experienced (neglect, poverty, emotional abuse, violent abuse, sexual abuse, domestic violence, vicarious trauma etc.). As primary care headspace does not have the capacity to deal with complex issues and the hYEPP is a specialist psychosis program, where to refer these highly needy young people?

The Adverse Childhood Experiences (ACE) studies (Centers for Disease Control & Prevention, USA) concluded that child maltreatment was the most costly public health issue in the United States, calculating that the overall costs exceeded those of cancer or heart disease, and that eradicating child abuse in America would reduce the overall rate of depression by more than half, alcoholism by two-thirds, and suicide, serious drug abuse, and domestic violence by three quarters. It would also have a significantly positive effect on workplace performance, and vastly decrease the need for incarceration. Around 17% have 4 or more types of trauma with very significant effects on mental and physical health, and if 6 or more, life expectancy is reduced by 20 years.

Pinto Pereira et al (2017) used the data from 8,076 in the 1958 British birth cohort study, collected at age 16, with measures of employment, financial stability and social class at age 23 up to age 50. 21% had experienced one type of maltreatment, 10% two types, 16% some form of neglect, 10% psychological abuse and 1% sexual abuse. The odds ratio for long term sickness increased from 1.0 for no maltreatment to 1.76 for one type and up to 2.69 for two or more types. Exposure to sexual or non-sexual abuse was linked to the need for income support (OR 1.75). Neglect was associated with being unemployed, or not having education or training (OR 1.43), mediated by cognition and mental health. However, adolescent cognitive skills did not mediate when children were subjected

to sexual or non-sexual abuse, for unclear reasons. It could be argued that their brains are dysregulated so that cognitive processes will not restore function.

30 years of STARTTS offering training to clinicians, has not led to real growth in treating services. I speculate that it is because treatment has been difficult, as common treatments to calm dysregulated brains have provided limited benefits. Many do not fully respond to cognitive exposure therapy, dialectic behaviour therapy (DBT), eye movement desensitization and reprocessing (EMDR), operant conditioning such as using heart rate variability, and talking therapies. Those that do better have single or limited trauma events (e.g. PTSD is only a subset of responses to trauma). Most importantly I think there is avoidance of vicarious trauma from hearing trauma stories.

We need a developmentally appropriate trauma diagnosis (D'Andrea et al 2012). Children exposed to interpersonal victimisation often meet criteria for psychiatric disorders other than PTSD. A wide range of symptoms is common in victimised children and adolescents, related to genetic predisposition. For example the genetic risk for schizophrenia is 32% and epigenetics 68%. Symptoms include affect and behaviour dysregulation, disturbances of consciousness and cognition, alterations in attribution and schema, and interpersonal impairment. Currently multiple comorbid diagnoses, based on symptom clusters, are necessary, but not necessarily accurate, leading to both under-treatment and over-treatment, with a failure to actually treat the trauma.

Teicher & Samson (2016) have provided a very important review of plastic brain changes resulting from developmental trauma, which are evolutionary protective mechanisms to enable survival in a toxic environment, until the capacity to produce the next generation at puberty. The brain then switches from growth to pruning for efficiency, and behavioural programming switches to competing with peers for the best mate and resources for raising children. The previously protective changes cease to be helpful and may be harmful. Psychopathology may emerge due to the mismatch between the world the brain was modified to survive in and the world it finds itself in during subsequent developmental stages.

Ongoing research by Teicher's group has shown that the timing of stressors is important. The adolescent tasks of competing with peers, creates vulnerability to new plastic changes from bullying around 13-14 years. Then sexual abuse in girls becomes a major factor around 15 years. Teicher has more papers (including Schalinski & Teicher 2015, Schalinski et al 2017) and in the pipeline from their increasing library of functional magnetic resonance imaging (fMRI) and the use of the Maltreatment and Abuse Chronology of Exposure (MACE) assessment tool (Teicher & Parigger 2015). The major lesson is that the traumatised brain sees the world differently, reacts differently and the lack of recognition of this, and controlling for it, severely confounds most diagnostic and treatment research, based on symptom clusters, the basis for DSM-5.

A systematic review of developmental trauma subtypes and their association with onset and severity of psychiatric disorders in adulthood (Carr et al 2013) showed physical abuse, sexual abuse and unspecified neglect with mood disorders and anxiety disorders; emotional abuse with personality disorders and schizophrenia; and physical neglect with personality disorders. Sub-types in childhood and adolescence can predict the development of psychopathology in adults – they trigger, aggravate, maintain and increase the recurrence of psychiatric disorders. Emotional, physical and sexual abuse types of trauma generally lead to high anxiety and over-arousal on the qEEG, while neglect leads to under-arousal. Some episodes of trauma can lead to dissociative shut-down.

Being the victim of childhood abuse has been found to have a dose response relationship with psychosis, with experiencing mild, moderate and sever abuse being associated with 2,11 and 48

times, respectively, the likelihood of having "pathology level" psychosis, compared with no childhood trauma (Janssen et al, 2004). Conus et al (2010) in an audit study of 658 first episode psychosis patients, at what was the Early Psychosis Prevention and Intervention Centre (EPPIC) in Melbourne, found that 83% had at least one type of stressful event (separation of parents 42.1%; physical abuse 26.0%; death or loss of close other 21.1%; migration 18.5%; problems with partner 17.5%; sexual abuse 16.0%) and 34% had either or both physical and sexual abuse. Unfortunately the files had not recorded emotional abuse or neglect, which would have significantly increased the rates for multiple types of trauma. A systematic review of the association with the severity of hallucinations and delusions in psychotic disorders (Bailey et al 2018) showed significant dose related correlation, but not correlation with the severity of negative symptoms. Severity of childhood neglect was correlated with negative symptoms.

Symptom clusters, as the base for DSM-5, do not predict causation or treatment response. An example is Attention Deficit Hyperactivity Disorder (ADHD), where there is good evidence of developmental trauma as a strong factor in causation, and qEEG showing that there are 5 types of ADHD that will not be evident from symptoms alone (Kropotov 2016). Analysis of the qEEG and event related potentials (ERP) allows differentiation of brain functions that can lead to similar symptoms, through comparison with normative qEEG databases. Analysis of the person's qEEG enables personalised treatment (Kropotov 2016, Gunkelman 2014). The qEEG can be recorded pre and post treatment, to show abnormality returning to normal functioning.

The emerging application of qEEG assessment and qEEG guided operant conditioning neurofeedback (Sitaram et al 2017) could drive major changes in diagnostic categories and treatments, that utilise the developing brain's plasticity in correcting dysregulation. This includes improving the speed of communication where there has been excessive pruning in adolescence (Whitford et al, 2011), improving cognition, and the ability of the cortex to more effectively inhibit and fine tune emotions and behaviours. It is probable that the main cause of cognitive decline with psychosis is due to developmental trauma effects, well before the symptoms of psychosis emerge (Bora & Murray 2014), and possibly able to be improved by neurofeedback (Surmeli 2016). There is evidence that the operant conditioning by neurofeedback produces statistically significant upregulation of functional connectivity in the salience network (Ros et al 2010 & 2013).

The key studies that have applied neurofeedback to chronic conditions did not control for developmental trauma, except for chronic PTSD (Van Der Kolk et al 2016, Askovic et al 2017, Askovic & Gould 2009, Askovic et al in press). In spite of this, there have been good results for qEEG guided neurofeedback for chronic schizophrenia (Surmeli 2011, Bolea 2010, Nan et al 2017), Obsessive Compulsive Disorder (Surmeli 2011), Intellectual Disability (Surmeli 2016) and ADHD – many papers), where there was not a good response to treatment as usual.

For example, Surmeli (2011) treated 51 patients with chronic schizophrenia with neurofeedback. They had Positive And Negative Symptoms of Schizophrenia (PANSS) scores within the range 76-156, mean110.24 (SD 21.62). 47 out of 48 final participants showed clinical improvement, as the mean PANSS score decreased to 19.56 (SD 26.78) which was statistically significant, along with improvements in Minnesota Multiphasic Personality Inventory (MMPI) and Test Of Variables of Attention (TOVA) measurements. They were followed for around 2 years with the mean reduction in PANSS scores of 82%, where above 20% is considered good for antipsychotic medications (aripiprazole 30.1%, placebo 22.3% in adolescents – US FDA approval data). 19 ceased to meet criteria for schizophrenia, 27 no longer needed medication and the remaining 24 required about half their previous dosage and were more functional. However, as stated above, this study was confounded by not asking about developmental trauma or controlling for it, but because Surmeli

(and Bolea) was using qEEG guided neurofeedback, the qEEGs showed the signs of trauma, which were treated.

Now the confounding effects of developmental trauma are understood, for any mental health research that does not control for it, means that the outcomes are highly compromised. While there will be a placebo effect included (as with every psychiatric treatment – Hammond 2011), the long term follow-up rates in studies have shown that the improvements with neurofeedback have been permanent, unlike with medications and some brain stimulation techniques.

Mainstream psychiatry has been moulded by the state hospital systems, with their restricted training environments, and behaviour shaping by the pharmaceutical industry, towards a biological model of mental disorder (Read et al 2009). We have failed to find clear genetic causes and it is time we took on board the massive evidence for the role of epigenetics and social determinants of health. Psychiatrist have the important role in diagnosis, integrated to take account of all factors, bio-psycho-social, but we have failed to implement new knowledge. Psychiatry has basically ignored the effects of trauma on other diagnoses (Zammit et al 2018), so when 29 specialist mental health services actually screened for PTSD in adult patients, no matter what main diagnosis was given, around 30% scored positively, only 2.3% mentioned it in the case notes and no service actually treated the PTSD. As PTSD is only a subset of responses to trauma, many more were missed and probably not treated for emotional abuse, attachment disorders and neglect.

There is a strong connection between developmental trauma and persistent substance dependence in adults (Meier et al 2015). Around 70% of people with eating disorders have one or more types of developmental trauma at a significant level (Afifi et al 2017). Bryant et al (2018) showed that PTSD in refugees is associated with harsh parenting styles, leading to adverse effects on their children's mental health. There is plenty of evidence that developmental trauma can be passed on to the next generation, so treating the trauma is also a form of prevention. Early identification and treatment of those at risk before becoming parents, reducing poor choices and behaviours, domestic and social, could make a significant difference. This is why the 12-25 age group is so important for identification and treatment of developmental trauma.

Not systematically asking about child abuse in our diagnostic interviews is now ethically problematic. In spite of clinician concerns that to ask will open Pandora's Box, the opposite is true (Read et al 2007). People want to reveal their trauma, as it is often the core basis of their distress. The evidence is that we should ask as part of the initial assessment process, as the longer you put it off the less is revealed. What people detect is our reluctance to hear about their trauma, correctly interpreted as we are not emotionally strong enough to be helpful, to keep both parties safe and know how to effectively treat. Just as asking about suicide does not cause it, asking about trauma may be distressing, but it is a positive development in their recovery. The longer you leave it, the presentation is modified into one of our more acceptable diagnostic categories and treated as such, so the person learns to keep their trauma to themselves and despair about being truly helped.

Specialist services attempting to treat developmental trauma, whether for children, adolescents, youth or adults, have shown in their articles and books considerable consensus on what is needed to provide effective treatment (Courtois & Ford 2013, Ford & Courtois 2013, Hopper et al 2019, Briere & Lanktree 2012, Mendelson et al 2011, Blaustein & Kinniburgh 2010). There are four components – engagement and development of trust, regulation of emotions and other brain functions, dealing with the trauma with psychotherapies and then re-socialisation, as relationships are always affected.

There can be a hierarchy of care model, whereby simpler treatments, such as on-line education and therapy programs, will be enough to help some, but even then there can be a superficial appearance

of resilience that does not reverse the disturbance of brain functions and the effects on physical health. Developmental trauma always creates strong psychodynamic issues, such as disturbed attachment, and transferences (Herman 2015), while traumas experienced in adulthood may not. However, developmental trauma makes people vulnerable to more severe reactions to new stresses in adulthood. The Dunedin prospective cohort showed that severe maltreatment in the first decade of life leads to a significantly higher risk of PTSD when exposed to adult trauma by the age of 38, compared to no trauma, with 12.7% having a diagnosis of PTSD (Breslau et al 2014).

As much trauma occurs before the development of language, and there is evidence that language centres shut down when the brain moves resources to fight, flight or playing dead and dissociating, so language based therapies can be very slow to help. For most, particularly with youth, individual psychotherapy is required to provide re-parenting, with ancillary therapies, such as body work to connect to somatic memories (Van Der Kolk 2014). Brand et al (2017) did a systematic review of trauma focussed CBT interventions for people with psychosis, who also had a diagnosis of PTSD and across 25 studies found low effect sizes, poorly sustained when treatment ceased. Raio et al (2013) found that stress markedly impairs cognitive regulation of emotion and highlights critical limitations of CBT to control affective responses under stress.

The great challenge has been how to quickly re-regulate the brain, as it is clear that progress is slow until that has been achieved. Mindfulness, trauma sensitive yoga, sensory modulation, Capoeira, etc. have been tried with some success, but the real breakthrough has been neurofeedback for the most severe, who have not responded to other therapies. Sebern Fisher has been a pioneer, providing neurofeedback treatment to children and adolescents who were in institutional care, due to an inability to change their difficult behaviours (Fisher 2014). She was able to calm their fear-driven brains so that psychotherapy could work and the normal developmental roles be achieved. This is also the STARTTS experience with children and youth. Unfortunately, when the books listed above were published in the 2010-2013 period, it was before the benefits of neurofeedback were recognised. Even the latest book by Hopper et al (2019), while mentioning it, had not included it in their therapy. If qEEG guided neurofeedback could be applied as part of early intervention, the course of disorder and lived experience could be much better. The challenge now is to achieve investment in specialist treatment services with the critical mass and capacity to experiment and look for answers to the many questions, that require long term prospective studies. Rather than start with the mild to moderately affected by developmental trauma, weeding out many to meet narrow research requirements, we need to take on real world young people, the most severe with multiple problems, and welcome them. There is also a need for specialist perinatal/early childhood and adult (a large legacy group) programs.

Experience at STARTTS has shown that there are effective treatments in a hierarchy of care model. With refugees, engagement needs go beyond the individual to the whole family, ethnic group, religion, school and sports etc, to develop trust, security and a sense of identity in a new environment. They need group programs that enable re-socialisation in safe environments. This is also true with the traumatised youth we see at headspace.

Considering the personal, family and social pain and massive economic costs for those who have not responded to current treatments as usual, qEEG guided neurofeedback should be more extensively used in psychiatry practice. The risks are low if qEEG guidance is provided, as the brain finds its own solution, like earning to ride a bicycle. Once learned, it is not forgotten.

STARTTS has seen so many lives changed for the better and the savings to society have been huge. However, while fully controlled trials have yet to occur, which might take a very long time with

standard academic research funding and processes, we need to develop treatment skills and services that can provide for long term prospective studies. Research should be commissioned and this could be a role for the National Mental Health Commission.

The specialist pilot services must have critical mass to support a wide range of interlinked purposes: sufficient throughput for good statistical power in longitudinal prospective studies, diverse treatment skills and practices, training for internal and external clinicians, support for clinicians hearing trauma stories. A service design has been modelled and costed to achieve these goals (Gurr 2018).

It has been said that if we can effectively treat and prevent developmental trauma, it would be the greatest public heath initiative of all time.

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TAMHSS

Transforming Australian Mental Health Service Systems

Developmental Trauma Service Proposal 12-25 Age Group

August 2018

Developmental Trauma Service Proposal 12-25 Age Group

There is strongly emerging evidence that developmental trauma, otherwise known as Complex Post-Traumatic Stress Disorder, is very prevalent.

A national study in England in 2013 found that almost half the general population reported at least one adverse childhood event and over 8% reported four or more (Bellis et al, 2014b). Other studies consistently estimate around 12% or more have significant levels of childhood trauma. At least one in four children have experienced child abuse or neglect (including physical, emotional, and sexual) at some point in their lives, and one in seven children experienced abuse or neglect in the last year (USA Centers for Disease Control and Prevention).

Developmental trauma should not be conflated with PTSD, which is a sub-set of symptoms in a wider range of deleterious effects of developmental trauma, including depression and self-hatred, anxiety, dissociation and depersonalization, aggressive behaviour against self and others, problems with intimacy, and impairment in the capacity to experience pleasure, satisfaction and fun. Effects are “dose” related and cause much personal pain, chronic health disorders, early death and societal disturbance. There is a massive whole of life personal, social and economic cost to society, but this is not being effectively addressed.

Technology has enabled us to measure protective, evolutionary adaptive, plastic changes to the brain in traumatised children, which help their survival in childhood, but which become maladaptive in adolescence and adulthood. Technology is now helping us understand the functional effects of these changes and thus find ways of re-training the brain to function normally. Developments in psychotherapies are becoming more effective, especially after brain re-regulation.

With over 30 years of experience, treating thousands of traumatised refugees of all ages, the NSW Service for the Treatment and Rehabilitation of Torture and Trauma Survivors (STARTTS) is seeing very positive outcomes. For example, highly traumatised former child soldiers from Africa have been able to settle in class and complete their education with modern therapies. These learnings need to be implemented for the general population.

Why Now?

Over the last 5 years, testimony given to The Royal Commission into Institutional Responses to Child Sexual Abuse has brought to public attention the lifelong pain, suffering and disabilities created by child sexual abuse. While the issues dealt with have only been the tip of the iceberg of developmental trauma, it has created an expectation that governments will do something to provide compensation and to prevent future trauma.

However, financial compensation will not provide the treatment that trauma survivors desperately need, and the Royal Commission recommended significant investment in effective treatment, and this proposal would be a highly relevant implementation of highly promising treatment modalities, which would also benefit from further replication on an implementation science/cost benefit basis.

The progress in understanding brain development, plasticity and function over the last few of years is now leading to new insights into designing innovative treatments that include brain training for re-regulation and go beyond previously best practice psychotherapies.

With the clear evidence of need and the massive cost of not acting (see below), it is timely now to systematically invest in emerging effective treatments and prevention.

Why 12-25 age group?

Treating developmental trauma can be divided into four natural segments:

Becoming Parents

Developmental trauma can be passed from generation to generation. Parents who have been traumatised as children are much more likely to traumatise their own children. They can be identified at the time of pregnancy, delivery, or child infancy, and an active program to effectively treat (not just support) parents, would be a primary prevention for their children.

Infancy & Childhood

Preschool to end of primary school/puberty, developmental trauma could be identified by teachers trained to do so and families referred to a trauma treatment service. Traumatized parents, missed earlier in the child's life, could be also be identified by other services (mental health, alcohol and other drug services, police, child at risk services etc) and receive treatment for their own developmental trauma or later onset PTSD. Proactively seeking and treating these parents is important in limiting the damage to their children.

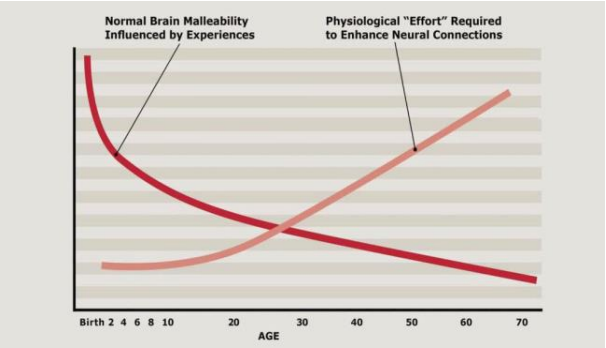
The children also need treatment, whether remaining with their parents or in out-of-home care. These services need particular child and family therapy skills, as the parents are still the main influence and carers for children, and attachment issues must be addressed.

Adolescence & youth (12 -25)

This is the period of maximum emergence of mental health disorders, as the brain prunes connections for efficiency, but exposes functional problems when the most demanding developmental changes are faced, from sexual maturity, peer social competition and the emergence of an independent self. Many studies consistently show childhood developmental trauma creates high vulnerability and adverse outcomes in this age group.

Thus it is a period of high risk, with high levels of stress, social experimentation that can fail, high anxiety, self-medication with illicit drugs and alcohol, depression, self-harming and suicide, and involvement in the criminal justice system.

Behaviours displaying distress become more visible and effective recognition and treatment will have a life-long benefit, as the brain is more easily re-regulated in this period. Treatment should in turn protect their children, and stop the transfer of trauma to the next generation. The return on investment will be very high in this age group.



Adults

Over the age of 25 there is a different mix of trauma experiences – still very many untreated for developmental trauma, but also additional traumas from single traumatic events or multiple events, such as PTSD in soldiers. There is clear evidence that it is not too late to apply brain training and new treatments.

All of these phases need expert specialist services to provide leadership to effectively treat the range of responses to trauma.

Types of Trauma

- Neglect - Parental absence both physical and emotional
- Emotional - Parental psychopathology, intoxication etc
- Violence, direct and vicarious (domestic, community, school, disaster, refugee etc)
- Sexual abuse - Incest, family associate, external perpetrator, opportunistic rape
- Accidental e.g. MVA's sport & recreation, war injury etc
- Single event versus multiple events versus developmental – 3 basic types that can overlap
- Vicarious

These types should not be conflated, as they each cause different changes in the brain and need different treatments. The same traumatic event can result in very different brain responses based on individual factors. Many have parental attachment disorders and/or dissociative responses that require longer term psychotherapies or somatic therapies.

Effects of Developmental Trauma

An important review of all the developmental trauma brain imaging studies, up until publishing in 2016 (Teicher & Samson), showed consistent evidence of brain changes compared to healthy controls, due to the different types of trauma. A lack of understanding of the effects of these changes has caused errors in diagnostic formulations based on symptoms alone, and failure to treat these evolution driven, adaptive changes, leads to poor outcomes with mainstream therapies.

For example, trauma could have occurred in a preverbal developmental phase e.g. infancy, before the person had words to express their experience, or the stress of the trauma can cause the language areas of the brain to shut down (not needed to fight or run away), so little language based memory is stored, and the person cannot give an articulate story about what happened. Psychological protective mechanisms, such as dissociation to block the conscious mind from feeling the trauma, can remain until actively assessed and treated.

Much of the memories of trauma are stored in the parts of the brain and body that defended against the trauma, which is why body based therapies can be important.

The brain controls our bodies, and trauma thus has effects on many physical health management systems, such as the autonomic nervous systems, hormones, bio-rhythms, sleep etc. There is now consistent evidence of the massive detrimental effects that developmental trauma (and later life trauma) has on our physical health. For example, Prof. Anthony Broe (NEURA) recently reported a strong correlation between early dementia and high scoring on the Childhood Trauma Questionnaire. Trauma causes accelerated ageing by shortening telomeres, which may be reversed by control and reduction in stress, regular exercise, anti-oxidant diet, meditation and yoga.

A large longitudinal prospective study, assiduously following up 1,037 consecutive births in Dunedin hospital for 45 years, has shown that, assessed at the age of 3, a segment with Low Socio-Economic Status, Child Maltreatment, Low IQ or Childhood Low Self Control, comprising 22% of the cohort, accounted for about 80% of social and economic costs by the age of 38. 12.7% had received a diagnosis of PTSD by age 38, and that would not include the other types of trauma responses.

36% of the cohort's injury insurance claims
66% of welfare benefits
40% of excess obese kilograms
77% of fatherless child-rearing
54% of cigarettes smoked
78% of prescription fills
57 % of hospital nights
81% of criminal convictions

The Centers for Disease Control and Prevention in the USA have a website dedicated to this issue, with a huge collection of scientific papers supporting the whole of life effects on all aspects of health.

Why Invest in Developmental Trauma Treatment?

Australian Pegusus Economics in 2012 estimated that, if the impacts of child abuse (sexual, emotional and physical) on an estimated 3.7 million adults are adequately addressed, the combined budget position of Federal, State and Territory Governments could be improved by a minimum of $6.8 billion annually. In the population of adult survivors of childhood trauma more broadly, i.e. a figure of 5 million adults, this estimate rises to $9.1 billion. On different, but plausible assumptions, the annual budgetary cost of unresolved childhood trauma could be as high as $24 billion.

Access Economics took a slightly different approach in 2007, and estimated that 177,000 children under the age of 18 were abused or neglected in Australia that year. This figure could be as high as 666,000 children and young people. Based on these numbers, the best estimate of the cost of child abuse incurred by the Australian community in 2007 was $10.7 billion, and as high as $30.1 billion.

They also estimated the lifetime cost of child abuse to children abused or neglected for the first time in 2007, which were between 130,237 children and as high as 490,000 children, finding the cost to be $13.7 billion, but could be as high as $38.7 billion, in 2007 dollars. USA cost estimates are consistent with these estimates. Globally we must find better solutions to reduce the personal, social and economic costs!

Effective investing in developmental trauma treatment could be the greatest single public health initiative of all time.

Targeting some initial investment at the 12- 25 age group will give the fastest results, as they are looking for solutions now, before maladaptive behaviours become embedded.

This proposal is consistent with the Phoenix Australia and Orygen policy document "Trauma and young people", operationalising its principles and suggested practices

Why a Specialist Service?

Experience at STARTTS has shown that training health disciplines through theory courses, over almost 30 years, has not been effective. There are team and individual fears of kindling vicarious trauma; a lack of thorough practical skills training and ongoing supportive and expert supervision; practice isolation of a sole skilled trauma practitioner among generically skilled staff; and the lack of service support for treating developmental trauma. It takes skilled consistent care for the individual and months to years of time. There are very few courageous clinicians actually treating developmental trauma!

The historical funding methodology, of fee-for- service private psychotherapy practice, with limited sessions, limited time per session, lack of support for training and ongoing supervision, is not evidence based and not effective, as stated in the Royal Commission report. A major study in the USA showed that it was impossible to achieve best quality and efficiency in mental health services with this fee-for-service method. Also, the services funded following the report are for adults, only targeting a small segment of those with developmental trauma. With many questions still needing to be answered, only properly structured, dedicated services, with motivated leadership, an evidence base, high intensity of care and an active response team culture, will bring optimally effective results.

A recently published meta-analysis (2018) of 25 studies, where the people attending specialist mental health services were screened for post-traumatic stress disorder, showed an average of 33% met criteria for PTSD (e.g. substance use 36%, psychotic 31%, affective 39%). However, only 2.5% of case notes mentioned the fact. If they had also screened for developmental trauma these figures would have been higher. This illustrates the lack of understanding about developmental trauma and how to treat it in mainstream specialist mental health services. A new specialist service needs to have capacity to treat co-occurring mental health disorders, either directly or through treatment partners.

The next generation of clinicians need an effective training environment and case-based learning with intensive supervision, and this will only happen in a specialist service set up to do so.

Currently a lot of money is being spent by state and federal governments on programs for disturbed youth, but they are piecemeal, focussing on small pieces of the jigsaw, such as suicide, other self- harming, substance abuse, criminal activity, homelessness, personality disorder, anxiety and depression etc, when the major underlying cause is developmental trauma. While these services try their best, they do not have the means or skills to effectively address the trauma.

This program would work in close collaboration with all the agencies working with young people, to provide the specialist treatment to their clients, while also supporting their staff to provide trauma informed care.

Recommended Evidence Based Interventions

There are 21 highly endorsed consensus clinical guidelines, that have been compiled from the extensive literature and set out in the 'The Last Frontier' – Practice Guidelines for Treatment of Complex Trauma and Trauma Informed Care and Service Delivery, published by the Blue Knot Foundation. These are also elaborated in the "Trauma and young people" policy document published by Orygen & Phoenix Australia.

It is acknowledged that there are many gaps in knowledge and the quality of evidence, but that is even more reason to create some specialist services that systematically address these issue, rather than wait for the haphazard academic process to fill the gaps. It is assumed that these guidelines will be implemented by services funded under this proposal. In summary, key components include:

- Assessment using validated tools and interviews
- Creation of a safe environment, engagement and therapeutic relationship
- Psychological education about trauma and its effects
- Brain regulation;
  - Repair plastic adaptive responses to childhood trauma, done in combination with individual psychotherapy (Neurofeedback, EMDR, Tapping, Heart rate variability etc.)
  - Group methods – e.g. Trauma Sensitive Yoga, Capoeira Angola, Mindfulness
- Talking therapies;
  - Attachment therapies – one to one (e.g. Conversational Model)
  - The many variations on Cognitive Behaviour Therapies, both individual and in groups
  - Other psychological frameworks (e.g. Narrative Therapy, Internal Family Systems)
- Family Therapies - where appropriate
- Other group therapies (e.g. psychodrama methods, self-defence classes)
- Somatic therapies (e.g. massage, sensory)
- Social connection groups
- Completion of adolescent and young adult developmental tasks
  - Complete education – Education Support Program
  - Obtain appropriate paid work – Individual Placement and Support program
  - Learn skills for appropriate intimacy - Strongest evolutionary driver to produce the next generation, so only feel complete with a sexual partner
  - Health lifestyle, diet and exercise

It is necessary that there is a wide selection of treatments available, due the wide variety of phases of development, individual needs and social environments. An efficient approach will be to develop a hierarchy of treatments, from the more generic to the more specific and individualised, but there will be the need for one to one case management and psychotherapy for all in this age group.

To provide the required range of services, there must be sufficient volume and critical mass for efficiency and sustainability.

Eligibility Criteria

Considering the high prevalence of developmental trauma, there will be a need to give priority to the more severely affected. Expert advice will be sought on screening, assessment and decision support tools. The number of people that canbe treated per year and the size of population that can be covered by this service design is hard to estimate at this time, but will become apparent with diligent data collection.

Service design

Components of Care

- Comprehensive assessment, diagnosis and formulation, including QEEG where possible
- Physical health assessment, treatment and monitoring
- Case Managers/psychotherapists with caseload no greater than 15- 20 per fte, with average weekly treatment ranging from 6 months to 2 years (with extension based on need), with unlimited treatment sessions (team supervised for appropriateness). Experience shows clients cease treatment when ready, as they are more interested in getting on with life, whereas set therapy time limits lead to anxietyabout separation from the therapy service andcan delay progress.
- Regular team case review meetings for support, risk management (higher suicide, violence, health risks), teaching, monitoring of client progress, client flow and demand management.
- Functional Recovery staff providing a hierarchy of therapies that improve brain regulation social connection, and psychological meaning, including:
  - Trauma sensitive Yoga
  - Bodywork (including massage, sensory and other somatic therapies)
  - Capoeira Angola (an enjoyable group activity requiring mindfulness and controlled social interaction, found useful for brain regulation at STARTTS), with music.
  - Art Therapy for those less able to verbalise
  - Drama Therapy; self-defence classes for those physically or sexually assaulted.
  - Healthy lifestyle – diet and exercise
- Access to alcohol and other drugs specialists, but treatment integrated with core psychotherapy, as it is so commonly a factor.
- Specialist staff providing education completion support and employment services.
- Encourage the development of communitiesof peer support, as the effects of developmental trauma can be long lasting and fluctuate with changing circumstances.

Delivery Vehicle Design

- Easy non-stigmatising access, such as co-located with primary care headspace sites. As with the headspace Youth Early Psychosis Program, this could add depth to the headspace model, and there can be better critical mass and efficiency for shared group programs and facilities. Could be across two headspace sites for ease ofaccess.
- Must be able to provide mobile outreach and home-based assessment and care.
- Extended hours of operation for convenient access.
- Specialist teams for fidelity to the model, staff support, training and supervision.
- Must have psychiatrists for strong diagnostic reliability/ fidelity & capability, due to high levels of overlapping disorders, from anxiety, depression, substance abuse, psychosis, neurological disorders, chronic pain and other somatic disorders and for comprehensive individual care planning andimplementation.
- Must include teaching and strong supervision capabilities, to include undergraduate and postgraduate students and workforce development.
- Designed and resourced to support external clinicians (psychiatrist, GPs, psychologists and other allied health) in surrounding areas and youth agencies, through continuing education and direct consultancy services for case-based learning and support.
- Must have team critical mass for sustainability, attraction of quality staff, efficiency in the use of specialists, and staff turnover management.
- Must include staff with lived experience.

- Must include staff from indigenous and culturally and linguistically diverse backgrounds for cultural inputs.
- Staff salaries and conditions must at least be equivalent to the relevant state LHD staff awards and staff contracts must be a minimum of 4 years to enable staffing stability and the development of expertise through case-based learning and supervision (like an intern arrangement, as expertise is rare). It takes a long time to get a specialist service such as this recruited, and to a steady state of functioning, with many systems to be developed.
- Active demand management and work flow processes – there will be a lot of demand based on the high prevalence of young people affected by developmental trauma and the need for sufficient time for therapies.
- Active awareness raising, community education, community engagement and advocacy.
- Must include the infrastructure and staffing to build in comprehensive data collection, evaluation and research, so that it is an inalienable function of the whole activity.

Staffing Structure

- Service Director with relevant dinical background
- Clinical Director Psychiatrist – full time – quality of care, evaluation/research, clinical risk
- Psychiatrist – full time – diagnosis and psychiatric treatments
- Senior Clinical Psychologists x 2 – training coordination/supervision/limited direct clinical
- Therapy Team Leaders x 2 – limited direct clinical20 psychotherapists (mixed disciplines, diverse backgrounds)
- Functional Recovery Team Leader – group work coordinator, other therapies coordinator.
- Functional Recovery Staff – 6 fte including education support specialist, employment specialist, exercise physiologist, dietician, physiotherapy/massage, Capoeira trainer, trauma sensitive yoga therapist, Art Therapist, therapy group leaders.
- Community Liaison/Education/engagement Officer
- Intake/Work-Flow Coordinator
- Intake clinicians/waiting list management x 2
- Data and Evaluation Coordinator
- Psychiatry Registrar – full time trainee
- General Practitioner – 0.4 fte for those at health risk and who will not attend an external GP
- Quantitative Electroencephalography (QEEG) Technician - full time
- Administration Manager – finance/logistics/ facilities etc
- Clerical support/Reception/data/evaluation support – 3 fte
- Space for visiting external research and evaluation project staff
- Contribution to organisational overheads – HR, payroll, IT support, etc.

Program Governance

Rapidly developing knowledge, so need to build in quality program governance to allow for rational informed changes to the program over time. We can base the program on best available evidence, but there are clear knowledge gaps and we need to let a variety of interventions be tried and tested. We need a national expert committee (academic researchers, service delivery management experience, consumers) to provide ongoing advice to the Commonwealth, PHNs and delivery contractors, wanting design changes based on emerging evidence.

Prospective Research and Evidence Development

Controlled research in this area is not easy, due to many variables, therapy processes take a long time and the whole of life rewards for investment will not be fully known for many years. The hypothesis is that benefits will be seen across a wide range of health, social services and employment outcomes. Thus there is a need for both quantitative and

qualitative research and evaluation, with long time lines that do not meet the usual criteria for various national research funding mechanisms and which also do not sit well with current academic performance demands. Funding should be included so that research and evaluation can be commissioned, so that several projects can be carried out at the service or across services.

- Long term funding and contracts to enable prospective studies.
  - Academic Connections, but not university controlled
  - Commissioned research to answer key questions
  - Action Research/implementation/ triangulation research methodologies.
- Research Network, with de-identified data sharing, to enable comparisons of different interventions and sufficient numbers for statistical power.
- Developing a national clinical database will be essential. Training and Development Roles

Having pilot services progressively funded in each state would enable cross fertilisation and the bases for extension across the community, through education and supervision of developing treatment clusters. This proposal is aimed at getting the program started with clinical action and evaluation, but teaching and supervision is also time consuming and further staff and funding would be needed.

Funding Model

Reality of funding sources – the Commonwealth Government is the obvious best source of funds for this program, due to the fiscal imbalance in the Australian federation (Commonwealth receives around 82% of taxes and the states only 18%, but the states need about 40% to provide public services). There are current funding risks in the states, with significant diversion of funds from community based mental health services to acute hospital care. However, this is not just a mental health program – it is aimed at investing to reduce expenditures, over the whole of government, over the whole of the survivor's life and the next generation.

Block funding initially – hybrid funding potential, but Medicare fee for service design would need considerable changes to match the natural history of effectively treating developmental trauma, especially attachment repair. Current experience with activity based funding for community based mental health services, shows only historical generic services (no evidence based models of care), are being costed as the basis for funding. This would not be a rational basis to fund this necessarily initial specialist model.

As a specialist program, there needs to be expertly designed commissioning contracts, and Primary Health Networks can only develop the commissioning skills with advice from the expert committee. Contracts need to be for a minimum of 4 years, and preferably 5 years, with guaranteed rollover if performing as expected, as the short term nature of recent mental health related contracts via PHNs have strongly inhibited implementation of complex clinical models of care (e.g. Early Psychosis Youth Service) The Commonwealth needs to change its funding methodology for this specialist clinical service, to factor in professional staff state-based remuneration and conditions variations, incremental payment scales and inflation, in order to meet the market to attract and keep staff. The current allocation of initial funds, with no increases to provide for these factors, leads to program instability and deterioration, due to loss of trained and experienced staff over time (not meeting the market for their desirable skills), loss of staff FTE, and loss of quality (if time per consumer rationed). There can be high turnover of junior staff, who join to get training and then leave for higher pay, so expertise does not accumulate and the quality of the interventions dissipated. Finding efficiencies in service delivery should be evidence based, rather than the Commonwealth progressive erosion method.

- Funding for equipment, such as QEEG and neurofeedback, to be included.
- Funding for training and supervision by external experts should be included.
- Vehicles will be required for home visiting and group transport.

Fifth National Mental Health and Suicide Prevention Plan

This proposal would make a significant contribution to the Plan, as developmental trauma is a major factor leading to suicide, Aboriginal and Torres Strait mental ill health, more severe mental illness and poor chronic physical health. It will improve system performance by integrating evaluation and research with service delivery and targeting research to answer important questions. At the time of implementation, consumer involvement in local co- design would be important.

National Alcohol and Other Drugs Strategies

As people with developmental trauma have very high rates of self-medication with tobacco, alcohol, cannabis, opioids, amphetamines and over the counter medications, effective treatment of the underlying causes should be taken into account in Due to the high levels of unhappiness and anxiety, they are often diagnosed with depression and prescribed antidepressant and sedative prescription medications, which are of marginal benefit. These simplistic and expensive attempts at symptom control are not curative, whereas brain re-regulation and targeted best practice psychotherapies can be curative and a lot cheaper over time.

Program Risks

Conflicting messages and unrealistic KPIs in contracts between layers of commissioning (Commonwealth Department – Primary Health Network – Non-government Organisation).

Funding and contract uncertainties, leading to staff anxiety and exit stampedes, followed by having to rebuild, when greater funding certainty is restored.

Commonwealth government expectations that quality staff will accept a discount in pay and conditions to work for an NGO (large differences in state markets – one size does not fit all).

Failure to sustain the program by death by a thousand cuts (e.g. no inflation adjustments).

Future Vision

If we are to follow the evidence, programs such as this need to be rolled out to cover the whole population, whether urban, regional or remote, with variations for language and cultural needs.

Initially it would be good to fund pilot services that can trial adaptations to fit particular communities across the nation. Highest demand is likely in the lowest socio-economic areas.

While many parents and families, of dependent adolescents and young adults living with developmental trauma, will be offered therapy in connection with the traumatic disorders of their offspring, this will not always be appropriate. This program is aimed at the youth age group, but the other age related segments, discussed above, also need targeted programs and funding. New models of care should be established for those needs, with expert advice and funded concurrently, or as an extension of funding over time. Technology may enable services for remote communities.

Conclusions

We have opened our eyes through the Royal Commission.

We have reached a tipping point in our understanding of the effects of developmental trauma on the brain and some techniques to provide effective care.

Now we need the courage to seriously invest in a journey to implement the knowledge we have, but to do so with open minds for innovation and systematic evaluation of choices.

In medicine it often takes 10-30 years to implement new evidence – what a national shame if we delay this opportunity to heal individuals and communities.

Decisions to invest should not be driven by the cost of the investment, but by the heavy cost of inaction, of not investing as soon as possible.

Act now and imagine how good you will feel if you help to bring this service to fruition!

Bring your support to the attention of decision makers NOW, politicians and senior public servants, across the many relevant government departments.

TAMHSS

Transforming Australian Mental Health Service Systems (TAMHSS) was formed in 2009 at the Perth TheMHS Conference

TAMHSS Network recognises the cultural diversity of the many Australian communities, and the importance of engaging them in awareness of their own mental health and prevention and early intervention of mental illness, related stigma and discrimination. We also recognise the many special needs for services to deal with complex disorders.

THE OBJECTIVES OF THE TAMHSS NETWORK ARE TO:

1. Provide a means for the Australian Community to become involved in the transformation of our mental health service systems.
2. Promote the rights of all consumers and families to receive services they need.
3. Promote a wide and consistent range of high quality mental health services across all age groups and throughout the country.
4. Promote interventions which are based on best practice as determined by both quantitative and qualitative evidence.
5. Promote a service delivery system that is integrated at every level including participation of all service sectors (public, private & NGO).
6. Promote the right of equity of access to all.
7. Promote a regional funding system and methodologies that provide adequate quality, control of both budget and expenditure, and transparent accountably, all of which should be independently monitored.
8. Promote recovery-oriented service systems which focus on the goals of social inclusion and citizenship.

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Neurofeedback for Psychosis

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***Abstract*:**

Psychosis causes major disease burden, individual, family, social and economic pain. Medications are of limited effectiveness and cause many unpleasant side effects. Technology is now allowing us to the examine the organ being treated, to better personalise therapies, including neurofeedback operant conditioning. The epigenetic effects of developmental trauma in the causation of psychosis are highly significant and responsive to quantitative electroencephalography (qEEG) guided neurofeedback, with very promising results. While there are many questions to be answered, it is time to implement this therapy more widely.

Key words: psychosis/schizophrenia/epigenetics/qEEG/neurofeedback/developmental trauma/burden of disease/recovery

Paper:

There is considerable evidence that childhood and adolescent trauma has major epigenetic effects in causing psychosis, including schizophrenia (review by Popovic et al 2019). In schizophrenia, about 8,300 single nucleotide polymorphisms have been estimated to contribute to a common genetic risk of only 32% (Ripke et al 2013), suggesting that in addition to genetic background, environmental factors may be the basis of pathophysiological processes (Manolio et al 2009). The review of neuroimaging by Teicher and Samson (2016) shows the plastic brain changes in response to childhood traumas (e.g. neglect, poverty, poor attachment, emotional abuse, and physical and sexual abuse) which are evolutionary protective mechanisms to enable survival in a toxic environment until puberty, to produce the next generation. The brain then switches from growth to pruning for efficiency, and to behavioural programming to competing with peers for the best mate and resources to support children. The previous protective changes cease to be helpful and may be harmful. Further traumas at sensitive stages of development, such as bullying at the ages of 13-14, when competing with peers is most important, can also cause brain dysregulation. Psychopathology may emerge, due to the mismatch between the world the brain was modified to survive in, and the world it finds itself in, during subsequent developmental stages. These changes may remain throughout life unless actively modified, and medication does not do it.

Psychiatry has had to rely on symptom clusters for diagnosis, as direct examination of the organ being treated was not possible. The profound effects of developmental trauma have not been recognised or controlled for in research, and this has led to highly confounded results, and unfortunately this often continues. Now technology is enabling better diagnosis, particularly through functional magnetic resonance imaging (fMRI) (Xiaoyan & Rongjun 2015) and quantitative electroencephalography (qEEG) (Kropotov 2016). While academics have access to very expensive fMRI machines, qEEG is cheap and quite effective.

The prospect of personalised treatment is now being realised for medication (Gunkelman 2014) and brain operant conditioning through neurofeedback (Sitaram et al 2017). While neurofeedback has long been used by psychologists for performance enhancement and ADHD treatment, it is now effectively used for the treatment of trauma in refugees (Askovic et al 2017 & in press), chronic Post Traumatic Stress Disorder (PTSD) (Van Der Kolk et al 2016) and schizophrenia.

Brand et al (2017) did a systemic review of trauma focussed cognitive behaviour therapy (CBT) interventions for people with psychosis, who also had a diagnosis of PTSD, and across 25 studies found low effect sizes, poorly sustained when treatment ceased. This should not be surprising, as PTSD that responds to exposure treatment usually follows discrete highly threatening events, rather than the more insidious emotional abuse, physical neglect and attachment failures in the developmental period, which many in the trials would also have experienced. Raio et al (2013) found that stress markedly impairs cognitive regulation of emotion and highlights critical limitations of this technique to control affective responses under stress. Re-regulation of the brain to reduce the effects of stress is needed at the start of treatment to enable more effective psychotherapy outcomes.

Developmental trauma has an effect on the severity of mental health disorders (Bailie et al 2018). A systematic review of the association with the severity of hallucinations and delusions in psychotic disorders showed significant dose related correlation with the severity of hallucinations and delusions, but not correlated with the severity of negative symptoms. Severity of childhood neglect was correlated with negative symptoms, which is logical, as there are very different protective brain changes, and failures of brain development, due to the lack of appropriate attachment and stimulation. There is evidence that the emotional, physical and sexual abuse types of trauma generally lead to high anxiety and over-arousal on the qEEG, while neglect leads to under-arousal. However some episodes of trauma can lead to dissociative shut-down (Schalinski & Teicher 2015). Thus neurofeedback protocols need to vary with guidance from the qEEG.

Gruzelier (2000) showed that people with schizophrenia can learn to self-regulate their brain activity with operant conditioning, such as neurofeedback. Treatment of schizophrenia using qEEG or rtfMRI guided neurofeedback, designed before the understanding of the evolutionary protective brain changes, showed significant benefits (Surmeli et al 2012, Bolea 2010, Schummer & von Stietz 2013, Orlov et al 2018, Nan et al 2017). The qEEG differences between those with developmental trauma and the normative database would have led to protocols directed at those differences, as well as the psychosis.

Surmeli (2012) treated 51 people with chronic schizophrenia with neurofeedback. They had Positive and Negative Schizophrenia Symptoms (PANSS) scores within the range 76-156, mean 110.24 (SD 21.62). 47 out of 48 final participants showed clinical improvement, as the mean PANSS score decreased to 19.56 (SD 26.78) which was statistically significant ($P< 0.01$), along with significant improvements in Minnesota Multiphasic Personality Inventory (MMPI) ($P< 0.01$). There were also improvements in the Test of Variables of Attention (TOVA) measurements for the 33, whose symptom levels allowed pre testing ($P< 0.01$). They were followed for around 2 years with the mean reduction in PANSS scores of 82%. Above 20% is considered good for antipsychotic medications (aripiprazole 28.6%, placebo 21.2% in adolescents – US FDA approval data). 19 ceased to meet criteria for schizophrenia, 27 did not need medication and the remaining 24 required about half their previous dosage and were more functional. The post qEEG changes were consistent with these results. In the Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE) study, the efficacy of the pharmacological treatment on the primary measure, staying in the study until completion, was only 26% (Kane, Janicak 2006). In this study, not only did all but 3 people adhere to the neurofeedback regimen (94%), but of those that needed medication, 68% of them adhered to their medication treatment when followed up to 2 years.

Bolea (2010) reported on his neurofeedback treatment of 70 people with severe chronic hospitalised schizophrenia, resistant to all other treatments, who responded very well and most were discharged to the community, with reduced medication. One recent trial of intensive neurofeedback over 4 days, for a person with chronic schizophrenia, with geographic difficulty to complete long term

training, produced an excellent result (Nan et al 2017). The follow up assessments have shown that the effects are sustained, unlike medication effects that cease with the medication.

It could be argued that the efficacy of the neurofeedback was due to reversing the effects of developmental trauma, and those with a stronger genetic risk remaining on medication, while functionally much improved. These results point to a significant reduction in the burden of disease and the cost of effective treatment, despite the intervention being initially intensive.

The headspace Youth Early Psychosis Program in Western Sydney is caring for young people 12-25 with either first episode psychosis or who are at ultra high risk of developing psychosis. Conus et al (2010) found that 83% of the young people with first episode psychosis, admitted to the Early Psychosis Prevention and Intervention Centre (EPPIC) in Melbourne, had been exposed to at least one stressful event and 34% to sexual or physical abuse. Our experience is that when we look for developmental trauma in the first episode group, two thirds appear to have had significant trauma and almost all of the ultra high risk group. Retrospective reports by people will often fail to retrieve memories of neglect and emotional abuse, which often occurred before the development of language, while parents are preoccupied with sedation from drugs and alcohol, their own symptoms of PTSD, depression, psychosis, physical illness, depravation, developmental disability and domestic discord (Murphy et al 2018). Thus the rates of developmental trauma are likely to be higher than reported, another reason to look at the qEEG.

As we see the limitations of medications with our young people and the apparent benefits of actually treating developmental trauma, the time has come to start using qEEG and neurofeedback in our services, to enable full uptake of the recovery approach to care. This would be consistent with the interventionist-causal paradigm method proposed by Brand et al (2017) to untangle the relationship between developmental trauma and psychosis. It is postulated that this will have a major beneficial effect across the ultra high risk and first episode psychosis spectrums, considering the dose related correlation of symptoms and trauma (Bailey et al 2018).

As 68% of causation of psychosis is epigenetic, and developmental trauma plastic changes affect physical health functions as much as mental functioning (Lanius et al 2010), I hypothesise that applying neurofeedback, based on qEEG signs of developmental trauma, will show significant benefits for mental and physical health, reducing personal, family, social and economic pain. It should be immensely cost effective by reducing the burden of disease and enabling greater functional recovery and social inclusion.

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