

I wish to thank the Honourable Justice Barker for designing and guiding this great series of public lectures, and for inviting me to talk on the subject of mental health – a topic of concern for many individuals and families in our community and a major issue in public health and care provision.

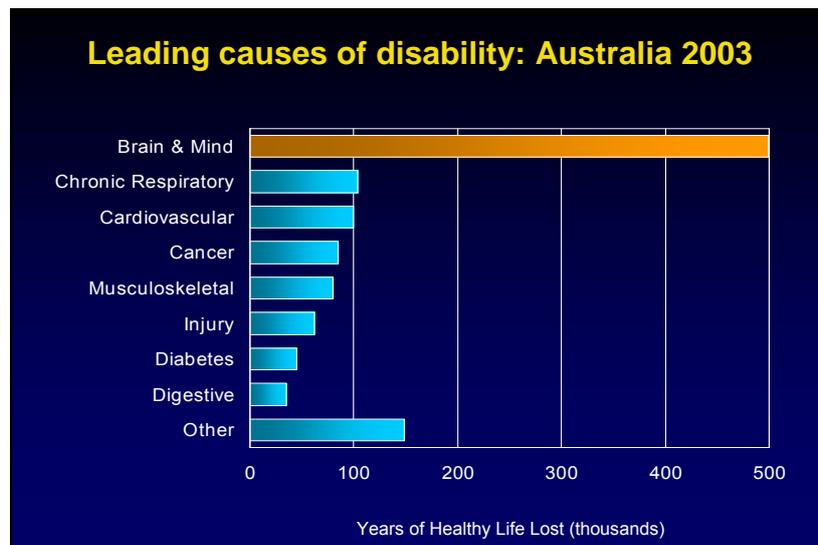
**My opening statement is a paraphrase of an old saying: mental health is too important to be left only to psychiatrists, psychologists and other mental health professionals.** What is mental health? The preamble to the Constitution of the World Health Organization, adopted in 1949 declares that “health is not just the absence of disease, but a state of complete physical, mental and social wellbeing”. The founding fathers of that great body had obviously agreed on a sort of a Platonic ideal that should guide humankind towards a noble goal, though realising that it could never be fully attained. By implication, mental health is not just the absence of mental illness, but the ability to lead a harmonious and satisfying life. I do not know how many of us here would subscribe to this definition – hopefully most of us. However, as a practicing psychiatrist and researcher, I am less concerned about abstract definitions and much more about the people I see and know who would not aspire to such lofty ideals. In my talk today I will try to do three things. First, give you an idea of the extent of mental ill-health in our population and the nature of mental illness. Secondly, based on research we have conducted in Western Australia, give you a realistic picture of the problems our fellow citizens afflicted with mental disorders are experiencing. And thirdly, venture some guesses as to what may be in store for us in the next 12 years leading up to the iconic Year 2020 – and also beyond.

**The leading causes of disability: world**  
(Source: WHO / Harvard School of Public Health, 1996)

	% of total
1 Unipolar major depression	10.7
2 Iron deficiency anaemia	4.7
3 Falls	4.6
4 Alcohol use	3.3
5 Chronic obstructive lung disease	3.1
6 Bipolar disorder	3.0
7 Congenital anomalies	2.9
8 Osteoarthritis	2.8
9 Schizophrenia	2.6
10 Obsessive-compulsive disorders	2.2

A landmark study, published jointly by the World Health Organization and the Harvard School of Public Health in 1996, laid down a new standard for estimating the impact of diseases and ill-health on populations, by combining statistics on premature deaths and disability into a single unit of measurement of the “burden of disease”, called Disability-Adjusted Life Years (DALYs). One DALY equals one lost year of healthy life. One of the surprising findings of that study was that several mental or behavioural disorders, including depression, alcohol abuse, bipolar disorder and schizophrenia were among the top ten causes of disability, accounting by 1996 for almost 11% of the global burden of disease. Moreover, the projections based on prevalent trends indicated that by the year 2020, the share of psychiatric disorders was likely to increase to nearly 20%, with depression becoming #1 in the world’s developed economies. What can explain the high impact of mental disorders on the total health cost of societies? In contrast to conditions associated with high rates of premature death, such as acute myocardial infarction, various cancers, malaria or HIV / AIDS, the majority of mental disorders have an onset early in life, tend to become chronic or to recur, and often cause long-term impairments and disability.

Slide 3



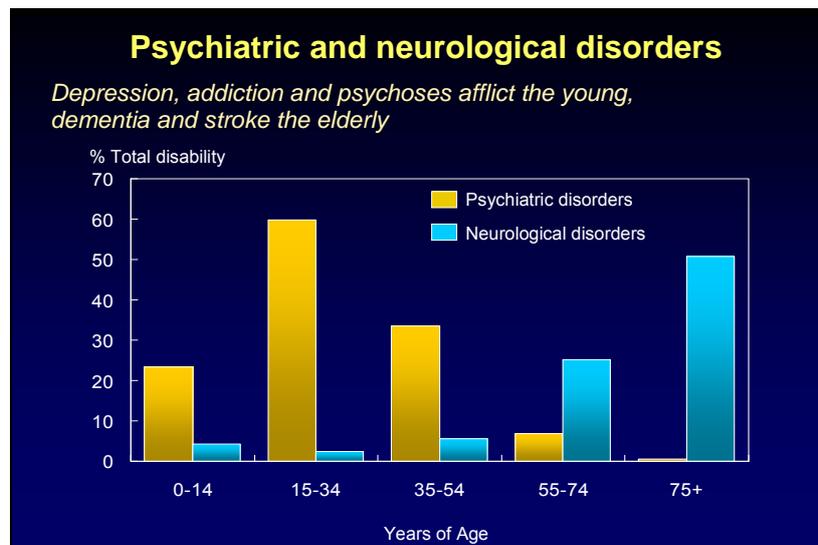
A similar study in Australia, using the same method of estimating the burden of disease as the WHO / Harvard study, was first conducted in 1996 and then repeated in 2003. The study concluded that mental disorders (24%) and neurological disorders (19%), presented on this diagram as “brain and mind disorders”, stand out as by far the outstanding causes of non-fatal burden of disability in Australia. By the year 2023, these two groups of conditions are likely to increase their share in the prevalence of disability from 42% to 43%.

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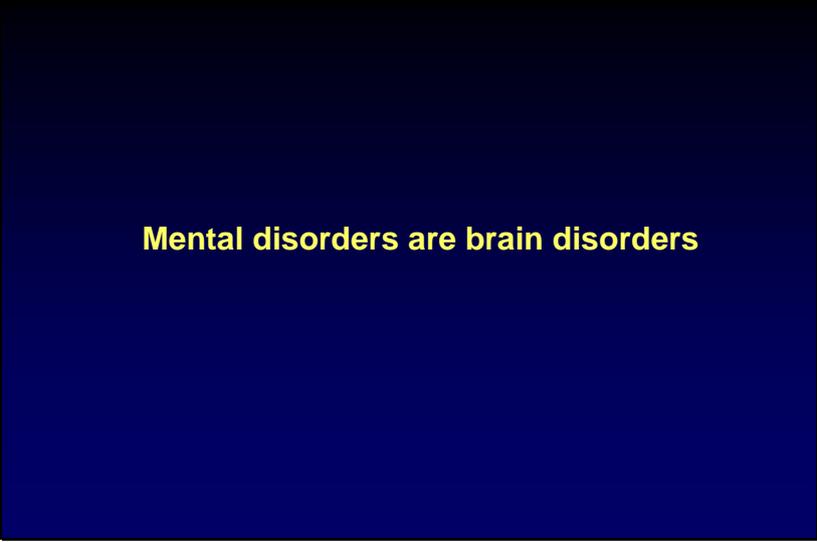
In any one year, over **3 million** Australians experience one or more episodes of major brain or mind disorder

This means that in any one year 3 million Australians (both adult and children) experience at least one episode of some kind of mental or neurological disorder. In indigenous Australians, this burden of disease and disability is disproportionately more severe. The impact is enormous: besides the direct effects of illness, the consequences include unemployment, social isolation, dependency, violence and suicide.



When we plot the incidence of various disorders on the axis of age, a revealing pattern emerges, showing that at no stage of the life cycle we are entirely immune against the afflictions of brain and mind. Disorders with onset in childhood and adolescence, such as autism, attention deficit and hyperactivity disorder (ADHD), drug-induced psychotic episodes, depression and schizophrenia dominate in early life, while in the elderly, dementia and neurological diseases such as stroke are most prevalent. While hardly any disorder is exclusively associated with gender, men and women exhibit different profiles of vulnerability. Men are much more likely than women to become dependent on alcohol or drugs, to commit suicide, to suffer from self-inflicted injuries, or stroke in advanced age, while women have higher rates of anxiety and depression, as well as dementia in old age. There are no substantial gender differences in the lifetime risk of schizophrenia or bipolar disorder.

Slide 6



**Mental disorders are brain disorders**

The rapid advances in neuroscience and neurobiology during the last two decades have probably produced more basic knowledge about how our brains work than it had been possible to do during the preceding 100 years. The mind is not a disembodied entity – it is the brain in action. Mental disorders are disorders of the brain's structural organisation and functioning.



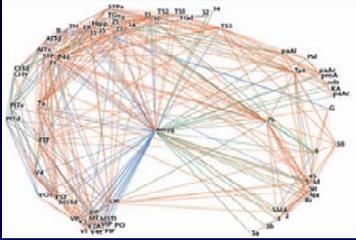
### Overview of mental disorders

- **Developmental disorders** (autism, ADHD, specific reading disability, intellectual disability)
- **Emotional disorders** (depression, anxiety disorders, obsessive-compulsive disorder, post-traumatic stress disorder)
- **Psychoses** (schizophrenia, bipolar disorder, delusional disorder, drug-induced psychoses)
- **Personality disorders** (paranoid, schizoid, borderline, antisocial, avoidant, dependent personalities)
- **Addictions or substance use disorders** (harmful use, dependence, withdrawal states)
- **Organic (neurodegenerative) brain disorders** (Alzheimer's disease, Huntington's disease, Parkinson's disease, other dementias)

When talking about mental health and mental disorders, it is important to keep in mind that we are referring to a very large variety of conditions that have their onset at different stages of the life cycle and involve a variety of causes, of which many are still poorly understood. Some of the common mental disorders, such as depression, anxiety disorders or personality disorders, may be merely the extreme of the same genetic and environmental factors that create the normal variation of human minds and brains. Other disorders, such as schizophrenia or autism involve a qualitative deviation from normal mental development or functioning. For example, people suffering from schizophrenia experience a distorted perception and interpretation of reality, involving delusions and hallucinations, disorders of logical thinking, and withdrawal from social interaction. Children affected by autism fail to acquire fully developed spoken language, normal non-verbal communication and social or emotional reciprocity with peers or adults, and tend to be absorbed in stereotyped or restricted interests and patterns of behaviour. Neurodegenerative disorders, such as Alzheimer's disease and other dementias involve progressive loss of memory, abstract thought and problem-solving skills, leading to inability to cope with complex (or later on even with simple environments) and ultimately to a complete dependence on around the clock monitoring and care. Different as they are, all "disorders of the mind" are also disorders of the brain. Treatments are at present available for most of the disorders on this slide, and they range from antidepressant and antipsychotic drugs to psychological therapies such as cognitive-behavioural therapy which is highly effective in the common emotional disorders.

### Brain complexity

- 100 billion brain cells (neurons)
- Each neuron communicates with ~10,000 other neurons via junctions called synapses
- ~ 500 trillion synaptic connections in the adult brain
- The estimated processing capacity of the human brain is 100 trillion operations per second (the processing capacity of a desktop computer is about 25 billion operations per second)



(Pessoa, 2008)



(Ansari, 2008)

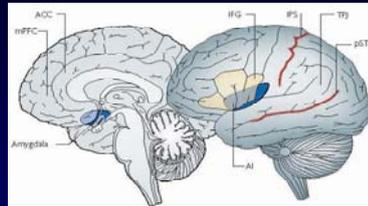
**Quantitative analysis of brain connectivity reveals a remarkable capacity for integration of cognitive and emotional information**

To understand what goes wrong in mental disorders, it is important to understand the normal brain first. The complexity of the brain is such that if we do not understand its normal development and function, we will fail to disentangle the extra complexity added by disease, or to design interventions to correct it.

The human brain is an amazing biological machine which has no counterpart in the known universe. The estimated number of nerve cells within the brain is about 100 billion. Each nerve cell, or neuron, connects on average to 10,000 other nerve cells via junctions called synapses. During fetal and early childhood development, nerve connections grow at the rate of 100 million per day, to reach a capacity of about 500 trillion synaptic connections in the adult brain, all processing incoming information from the environment and from one's own body.

## Early brain development

Neurodevelopment during pregnancy and infancy is the first critical period for future brain functioning. It contains the seeds of "prosocial" behaviour, as well as of mental and physical problems that become manifest in adult life.

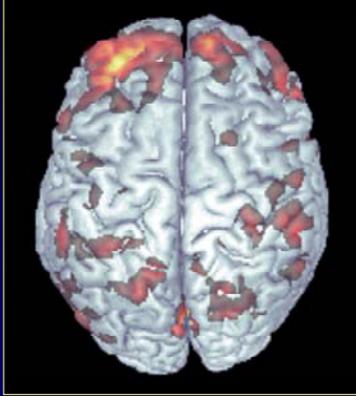


(Blakemore, 2008)

Regions of the "social brain" are involved in social cognition: observing and recognising other individuals, understanding their emotions, intentions and beliefs

Brain development in fetal life and infancy is programmed by a large number of genes (70 per cent of the 23,000 genes in our genome are expressed in the brain). However, appropriate stimulation from the environment is absolutely crucial for the successful execution of the genetic program that has been honed during half a billion years of human evolution. Actively exploring the physical and social environment, and discovering predictable patterns in the world around us amounts to what Harvard psychiatrist Leon Eisenberg called "the social construction of the human brain", a developmental process that lays the foundation for healthy mental life. Both "nature" and "nurture" are essential ingredients of the processes of growth and self-construction of each individual brain. However, the enormous complexity of the brain makes it vulnerable to risk factors which are now becoming better understood through neuroscience research. Fetal development is a critical period that contains the seeds of many physical and mental health problems in adult life, including high blood pressure, obesity, diabetes, as well as behavioural and psychiatric disorders. Faulty nutrition during pregnancy, maternal smoking, abuse of alcohol and street drugs, as well as stress may compromise fetal growth and result in a very low birthweight baby, vulnerable to birth complications that restrict the supply of oxygen to the brain. A chaotic rearing environment during infancy and early childhood is likely to impair learning and the acquisition of basic social skills, such as trust, self-esteem and empathy. Physical, including sexual, abuse during childhood has lasting traumatic effects on the brain that undermine the development of a healthy personality.

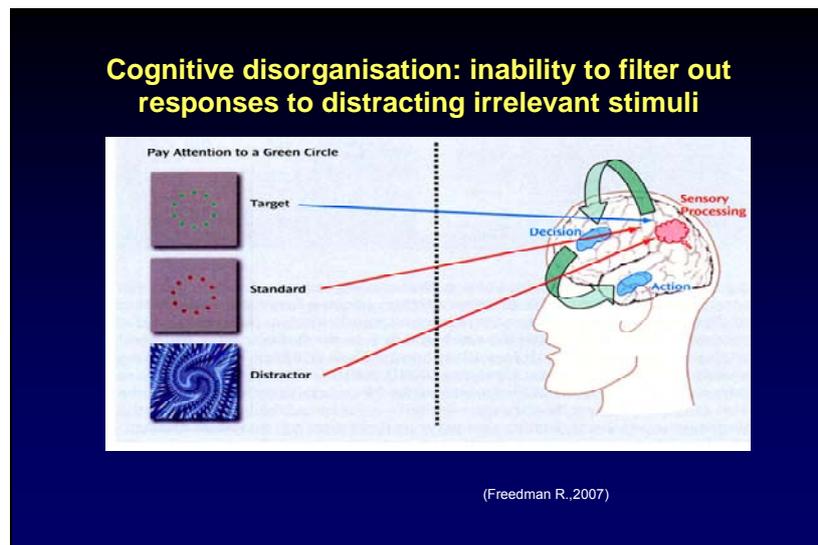
**The adolescent brain and risk of schizophrenia**



Early developmental lesion makes the adolescent brain vulnerable to accelerated loss of brain cells and aberrant connections between them. Drug abuse and stress augment these effects.

*Pantelis et al (2002; 2005)*

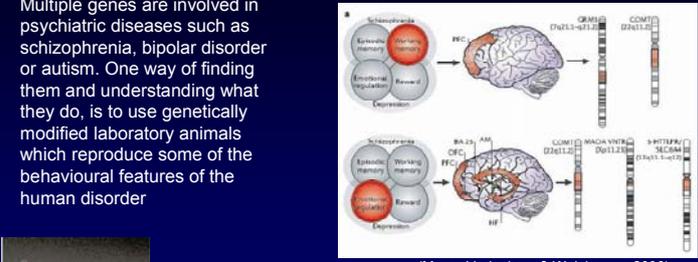
Adolescence is another critical period, characterised by social change, heightened self-consciousness, increased importance of peer relationships and an improved understanding of others. In addition to changes in hormone levels and changes in the social environment, there are significant neuroanatomical changes in parts of the brain – especially in the so-called “social brain” - that are likely to affect cognition and behaviour. An important change in the adolescent brain is a process called **synaptic pruning**: a genetically programmed elimination of redundant synapses (junctions between communicating brain cells) which have not been incorporated in functional neuronal circuits. This results in a consolidation of brain mechanisms that regulate cognition and behaviour. However, adolescence is not only a period of cognitive improvement – it is also a period of increased rates of mental illness, drug abuse and antisocial or risky behaviour. **Schizophrenia** is a disorder which typically begins in late adolescence but is likely to be preceded by subtle abnormalities in brain development since childhood. Synaptic pruning gone too far may be a key factor, resulting in a significant loss of neurons in brain areas regulating social cognition and goal-directed behaviour, as shown here by an Australian magnetic resonance imaging (MRI) study conducted by Professor Chris Pantelis. Additional environmental risks associated with drug abuse - especially cannabis and amphetamines – may trigger the onset of schizophrenia symptoms in young people genetically predisposed to the disease.



Neuropsychological tests combined with recording of the brain's electrical responses to visual or auditory stimuli allow us to probe selectively information processing by the brain. To be processed, a stimulus must first pass through a kind of a filter in the brain, called "sensory gate", which lets in stimuli that are novel or relevant and blocks distracting or irrelevant stimuli. This filtering process is entirely automatic and we are not consciously aware of the busy work our brain is doing. However, the efficiency of the sensory gate can be altered or impaired by emotional states, by drugs such as nicotine, alcohol, amphetamines, as well as by the subtle developmental brain abnormalities that predispose to mental disorder, such as schizophrenia. Such compromised gating may result in poor signal-to-noise ratio in the encoding of information in memory, or in massive amounts of irrelevant information flooding the processing capacity of the brain, giving rise to psychotic symptoms such as disordered thinking and misinterpretations of reality.

**Psychosis: from cognition to the brain, then to genes**

Multiple genes are involved in psychiatric diseases such as schizophrenia, bipolar disorder or autism. One way of finding them and understanding what they do, is to use genetically modified laboratory animals which reproduce some of the behavioural features of the human disorder



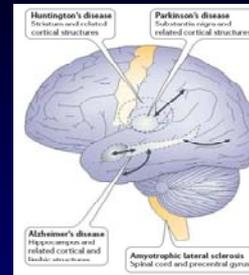
(Meyer-Lindenberg & Weinberger, 2006)

Cognitive dysfunction underlying the symptoms of schizophrenia can be mapped onto brain areas likely to be regulated by specific genes

Genes are major contributors to the majority of psychiatric disorders, but their specific effects and the mechanisms through which they cause disease are difficult to disentangle. The difficulty is partly due to the fact that most mental disorders are associated with multiple genes. Each gene in isolation may contribute only a minor portion of the risk, yet collectively multiple genes explain between 30 and 90% of the risk for various mental illnesses. In the case of schizophrenia, genetics accounts for about 50% of the risk – the rest is attributable to environmental factors. Knowing which genes, or networks of genes, are involved will facilitate our understanding of the molecular pathways that underlie the symptoms and guide researchers towards the development of more effective treatments. One way of doing genetic analysis of diseases such as schizophrenia, bipolar disorder or autism, is to collect DNA from large cohorts of patients and healthy individuals as controls. The entire genome is then saturated with a very large number of small DNA probes serving as markers for genes, and probabilities are calculated that any such markers are statistically associated with the disease. Another approach is a kind of “reverse engineering”, starting with measurements of specific cognitive dysfunction occurring in patients, but not in controls, and mapping such dysfunction to brain areas where it is likely to originate. Since the genetic regulation of many brain functions is becoming better understood by neuroscience – largely due to animal models - hypotheses about likely genes can be formulated and tested. Research into the genetics of schizophrenia by our group in Western Australia is proceeding along both of these paths.

## Age-related neurodegenerative disorders

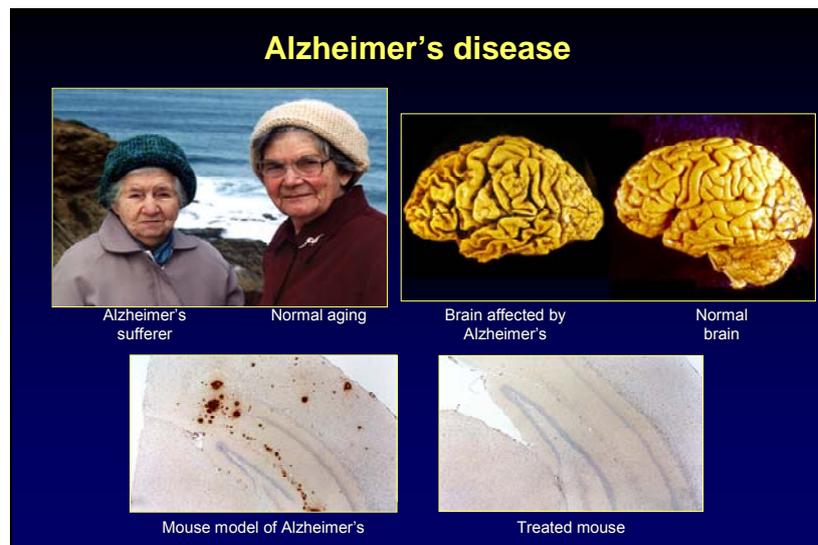
Different diseases affect different areas of the adult brain. Each starts in specific regions and later affects other regions. Whether a person develops a neurodegenerative disorder during aging is determined by genetic and environmental factors that counteract or facilitate fundamental mechanisms of brain aging.



(Mattson & Magnus, 2006)

The rising number of people suffering from dementia represents one of the most serious challenges to health care systems today and in the years to come. Alzheimer's disease (AD) is a degenerative brain disorder that leads to decline in memory and other intellectual functions, changes in personality and behavioural disturbances. In the late stages of AD, patients become increasingly dependent, needing constant supervision and care. Other forms of dementia, such as Huntington's disease, Parkinsonian dementia, and dementia associated with arteriosclerotic brain disease, are less common but no less devastating. Although dementia may affect adults of all ages, its incidence rises sharply with age, to reach a prevalence of 6 to 7% of the population above 65 years of age. It is estimated that unless means of effective prevention and treatment are discovered and implemented within the next decade or so, 750,000 Australians (about 80,000 of them in Western Australia) will be affected by dementia by the year 2050.

There has been significant progress in identifying and understanding the role of several key genes that underlie the risk of AD, and the development of genetic tests to detect such risk are under study. AD has a very long preclinical phase. In addition to genetics, neuropsychological tests of memory functions can predict risk of AD more than a decade before clinical diagnosis. However such tests will be of little use, and may raise ethical problems, unless effective treatment and prevention measures are available. Importantly, there is now good evidence from large population cohort studies that education, lifetime learning and maintaining an active mental life, as well as physical fitness, may reduce the risk of dementia or delay its onset, due to the building up of a greater "neuronal reserve" by sustained brain activity.



Of these two sisters in their eighties, the one of the left has Alzheimer's disease (AD). If we were to look at the brain of someone with Alzheimer's we would find that the brain is shrunken and filled with abnormal deposits of a protein called beta amyloid which damages nerve cells.

Pioneering work by an Australian scientist, Professor Colin Masters, and his collaborators overseas has contributed to the unravelling of the biochemical pathways involved in the deposition of this abnormal protein. Although there is still some controversy, most scientists working on AD now believe that this abnormal protein causes the disease.

Professor Masters' group has gone on to develop a novel drug that prevents the deposits in a mouse model of Alzheimer's and also stops the mice developing the behavioural and memory deficits typical of the disease. Another potential AD drug is being developed in Western Australia at Professor Ralph Martins' laboratory. Many groups around the world are also working on ways to block the deposition, or enhance the dissolution, of the abnormal protein. Clinical trials of these new compounds are already in progress, and it is not a risky prediction to say that major breakthroughs in the treatment and, possibly, the prevention of Alzheimer's disease are likely to occur within the next decade.



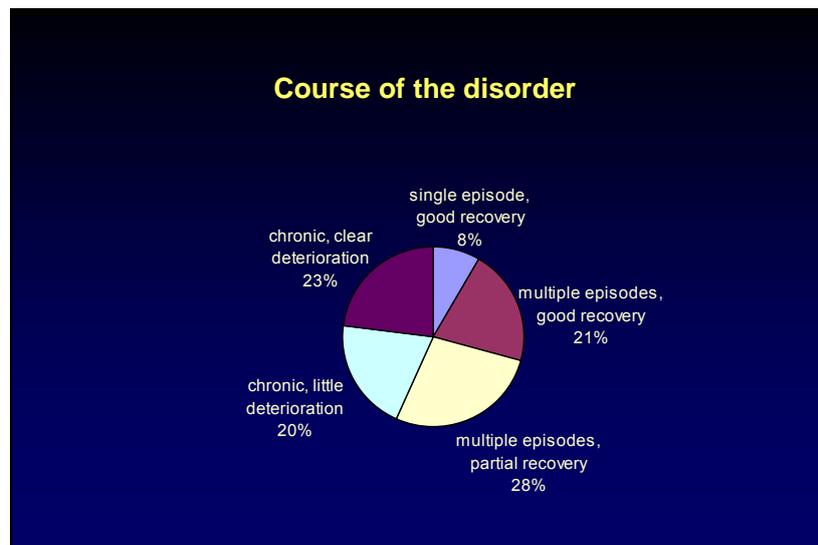
**Australians living with mental illness:  
national survey findings**

My research group at The University of Western Australia, together with research groups in ACT, Queensland and Victoria, conducted in the late 1990s a representative survey of people suffering from severe mental illnesses, such as schizophrenia and bipolar disorder. We screened some 5000 individuals at mental health services and conducted detailed, face-to-face interviews with over 1000 of them. The study focused not only on the symptoms these people were experiencing, but also on their social and economic situation and needs.

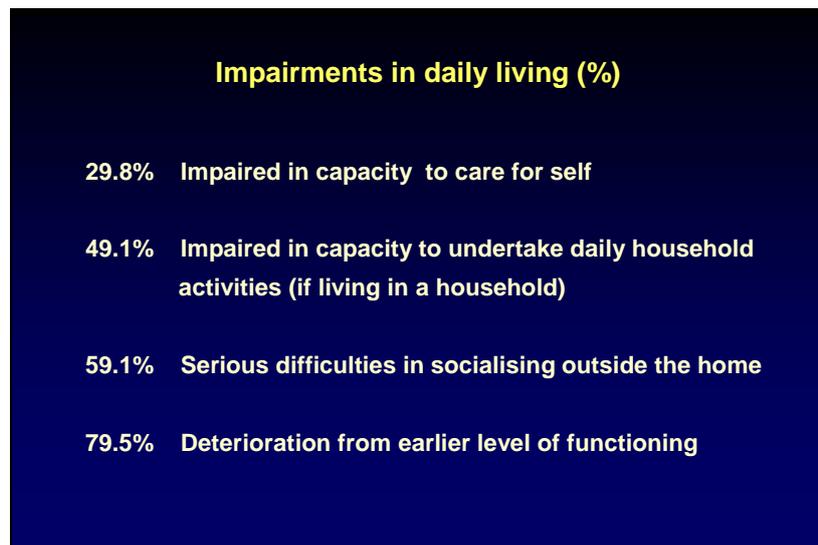
**Prevalence of psychotic disorders**

- **Point prevalence (1 month) - contact with any treatment service**
  - 4 - 7 per 1000 adults (mean: 3.6 per 1000)
  - Males: 4 - 7 per 1000
  - Females: 3 - 6 per 1000
  
  - Mainstream services: 3 - 5 per 1000
  - GPs/private psychiatrists: 1 - 2 per 1000
- **Period prevalence (1 year) - contact with mainstream services only**  
(range across the four catchment areas)
  - 3 - 6 per 1000 adults

We found that, at any given point in time, between 4 and 7 per every 1000 adult Australians were affected by psychotic disorders, such as schizophrenia or bipolar disorder. The majority of them were being treated within the public sector of the mental health services – mainly at community mental health clinics or at psychiatric units in general hospitals.



This pie chart summarises data on the course of psychotic disorders over time. A minority (8%) of the people affected by schizophrenia or bipolar disorders are lucky enough to experience a single episode of illness, followed by recovery and a return to their previous level of functioning. At the other extreme, 43% have a continuous illness with a severe or less severe deterioration of adaptive social skills, as compared to their pre-illness level of functioning. Another 49% experience recurrent episodes of psychosis, from which some recover reasonably well, while others never attain their previous level of functioning. This latter group, the largest of the three, exemplifies what has been labelled the “revolving door syndrome”, i.e. people who are in and out of hospital several times in any year, without attaining a lasting remission of symptoms and having only brief intervals of partial and fragile recovery.



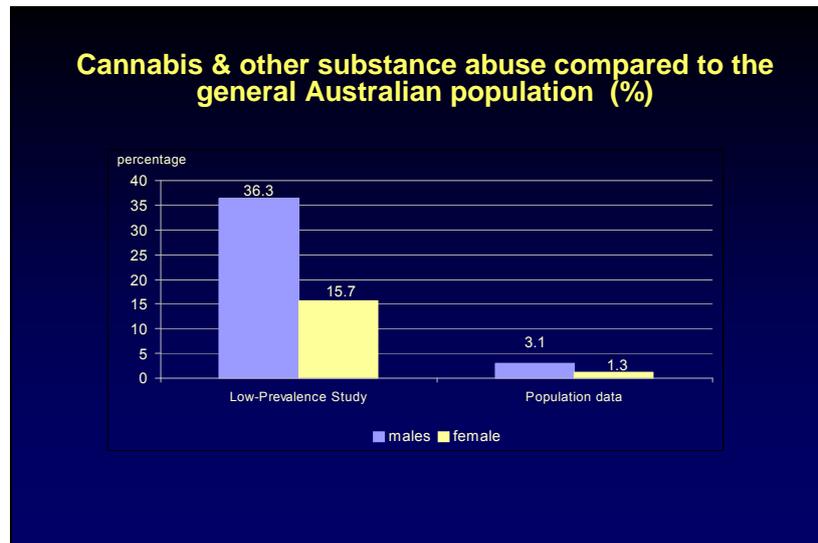
With a few exceptions, people affected by psychosis describe daily difficulties in self care, including maintaining personal hygiene, care for one's own appearance and efforts to keep physically fit or to maintain an interest in the world around – keeping up with the news, sports, or having a hobby. Dysfunction in daily family or household activities, such as cooking, shopping, cleaning, sharing meals and other tasks involving interaction with other persons was rated as present in close to 50% of the interviewed participants. Dysfunction in socialising outside the home, such as going out with friends or participating in any group activities in contrast to spending time alone, was present in 60% of the respondents.

<b>Employment (%)</b>	
<b>No regular occupation</b>	
At time of interview	72.0%
In past year	58.3%
<b>Sources of income</b>	
Wages from employer	15.5%
Pension, social security	85.2%
Disability pension	69.3%

Another area of role impairment is employment. The vast majority (72% of the people interviewed) were in employable age but had no regular employment and depended on social security or disability pension.



Perhaps the most striking finding of the survey was the extent of social isolation of people with severe mental disorders. One-third of the people interviewed were living alone, in single-person households. Only 15% were living in a family home or in a home they owned, while 31% were in rented accommodation and 33% were living in hostels or institutions. No less than 77% of men and 50% of women were single and 21 % were either divorced, separated or widowed. Only 16% were married or living with a partner. Only 65% reported having had a face-to-face contact with relatives over the past year, and 39% were unable to name a “best friend” with whom they could share thoughts and feelings.



There were high levels of street drug use, such as cannabis, amphetamines, LSD and heroin (36% of men and 16% of women), compared to population data on drug use in the general Australian population.

<b>Other 'lifestyle' variables (%)</b>	
<b>Personal safety:</b>	
■ Feeling unsafe in present locality (past month)	15.3
■ Unmet need for police or legal assistance	13.2
■ Victim of violence (past year)	17.6
■ Arrested (past year)	10.2
■ Deliberate overdose, self-harm (past year)	16.5

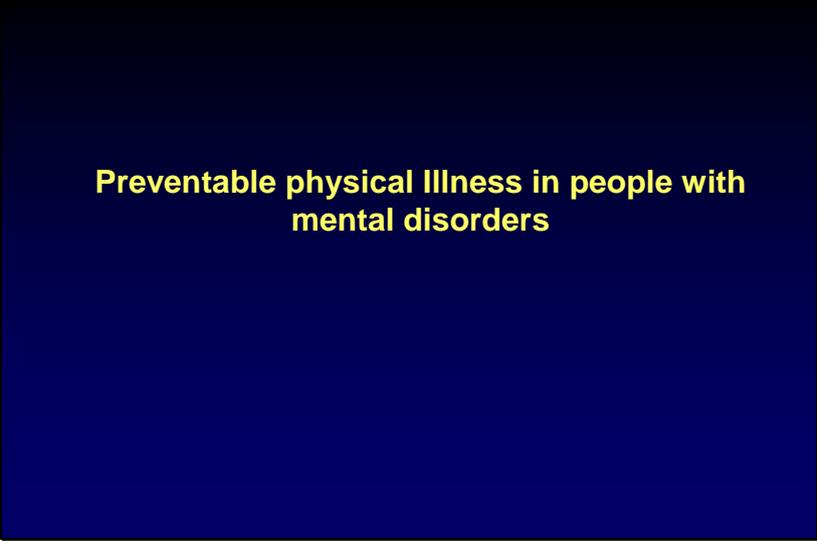
Some additional measures of subjectively experienced quality of life are quite revealing. For example, 15% were feeling unsafe in the locality where they were living, and 18% reported being physically assaulted (including 7% of sexual assault) during the past year. A total of 10% had been arrested at least once during the previous 12 months, the charges being mainly for non-violent offences, such as trespassing or disturbing public order. 17% reported one or more incidents of deliberate self-harm or drug overdose in the past year.

### The Social Breakdown Syndrome (E. Gruenberg, 1972)

The deficits caused by the disorder become amplified by environmental factors, resulting in “a socially determined reaction pattern” that includes:

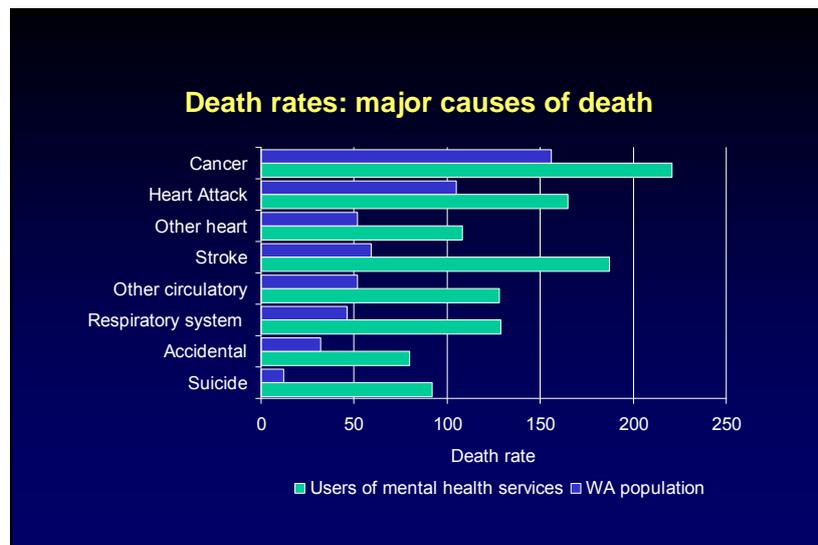
- Loss of social support and peer network
- Loss of meaningful goals and role fulfillment
- Disuse of acquired skills and knowledge
- Downgrading one's attitudes and expectations

The overall picture emerging from these distressing facts about the precarious situation in which the majority of people with severe mental disorder find themselves is best summarised by the concept of a **social breakdown syndrome**, proposed by the American psychiatrist Ernest Gruenberg some 40 years ago. According to Gruenberg, the symptoms and cognitive deficits that are intrinsic to severe mental illness are not the direct cause of the social handicaps they experience. Rather, it is a “socially determined reaction pattern” consequent on those symptoms and impairments that leads to alienation, isolation and segregation. Schizophrenia and other psychotic disorders usually have their onset in late adolescence or early adulthood. While social withdrawal and difficulties in participatory interaction with others are part of the disease itself, the consequences that follow almost automatically are unintended negative responses of the social environment. A young person developing psychotic illness suddenly or gradually loses contact with his or her peers. Previously acquired skills and knowledge are no longer exercised or useful; there is no prospect of achieving meaningful goals or roles in life. In the course of time, expectations and attitudes become downgraded and only delusions and autistic fantasies fill the void. This is what we, as psychiatrists, often fail to appreciate, being overly concerned with control of the conspicuous symptoms of disease while ignoring the existential predicament of our patients.



**Preventable physical illness in people with  
mental disorders**

Let me now turn another page describing the predicament of people with mental disorders: the problems they face regarding their physical health and survival. In a study that linked people with mental disorders in Western Australia to a database on their physical morbidity and mortality, we found a striking excess of deaths from various causes among patients as compared to the general population.

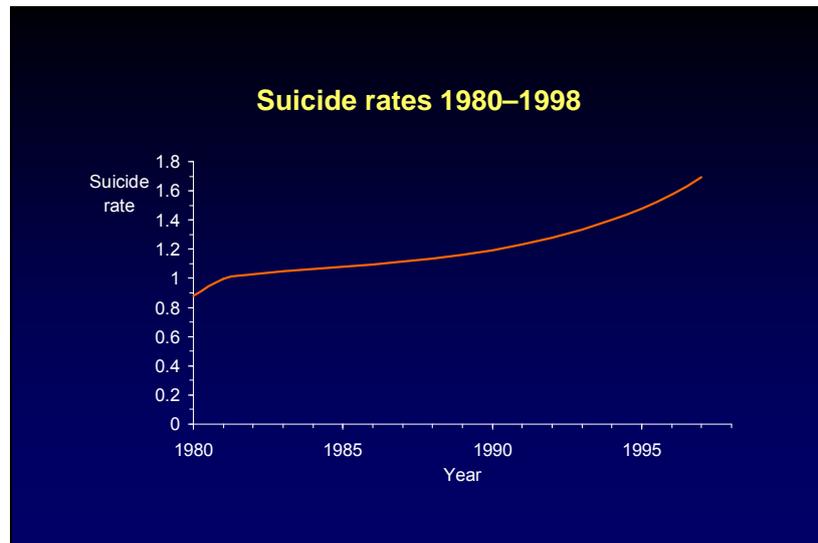


This chart shows that people with mental disorders are significantly more likely to die as a result of heart diseases, stroke, cancer, accidents and suicide than people without psychiatric disorders.

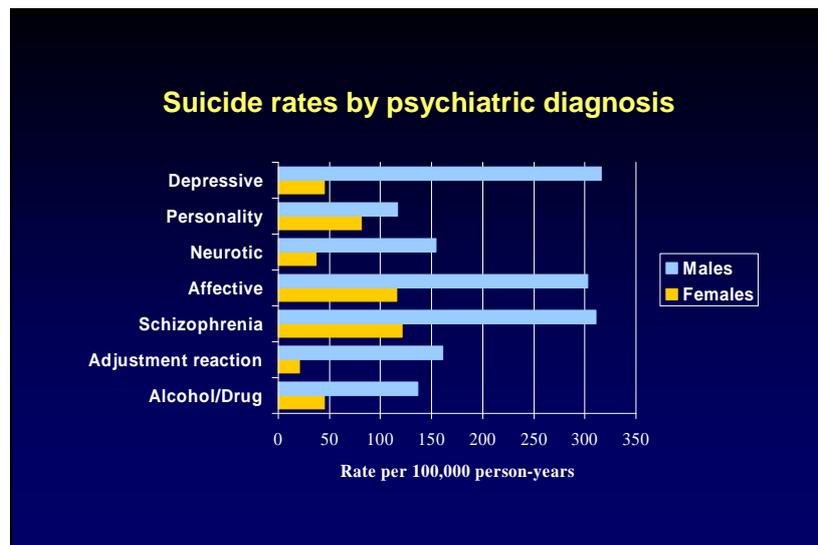


The suicide rate among people with mental disorders is quite excessive relative to suicide in the general population.

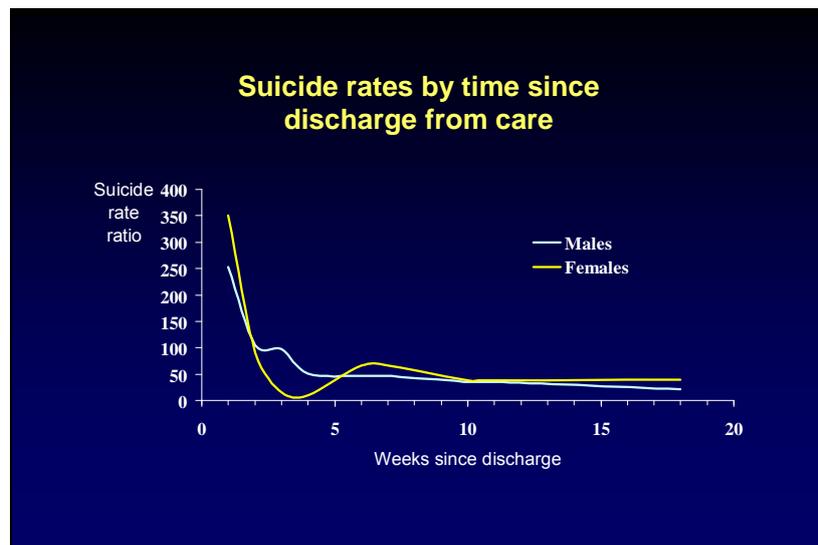
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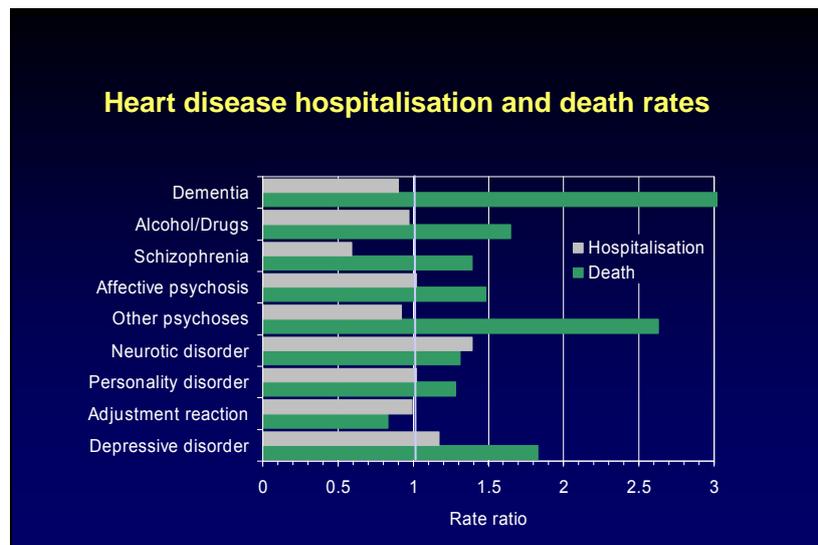
Moreover, our analysis demonstrated that suicide rates among psychiatric patients have been increasing steadily in the period between 1980 and 1998.



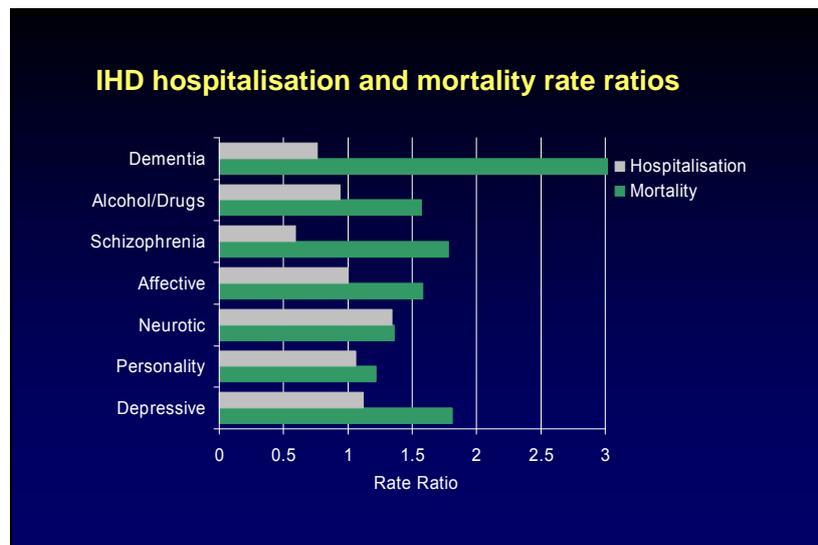
As one could expect, the suicide rates are highest among people with depressive disorders, schizophrenia and bipolar disorder – much higher in men as compared with women.



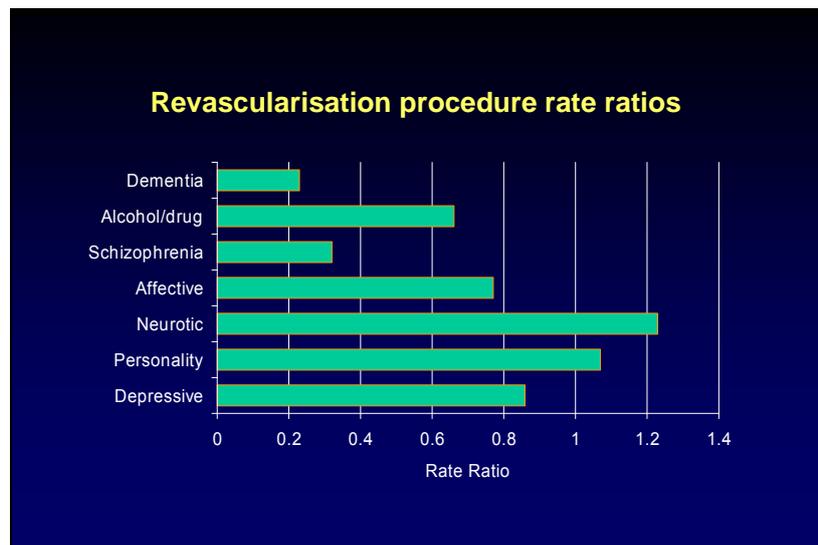
An unexpected finding was that the largest proportion of suicides occurred within a short interval of a month or less after discharge from hospital or other forms of care. This is an extremely important finding because it indicates two things: that patients with depressive disorders tend to be discharged from hospital too early, before their condition has been reasonably stabilised, and that there is a gap between hospital discharge and the uptake of such high-risk patients into the care of community mental health services.



Although suicide is a dramatic, but relatively rare outcome, in the long run the killer number one of people with mental disorders is heart disease. In this chart, the vertical line marked 1 indicates the rates of hospital admissions and cardiac deaths in the general population. Generally, psychiatric patients do not differ much from the non-psychiatric population as regards admission to hospital with heart disease. However, psychiatric patients are 1.5 to 3 times more likely to die of heart disease at some time, everything else being equal.



Ischaemic heart disease and myocardial infarction are the most prominent causes of premature cardiac death among psychiatric patients. In particular, patients with schizophrenia are significantly less likely to be admitted to hospital for such acute conditions, and their death rate is excessive.



Why this is so is illustrated on this chart, showing the likelihood of potentially life saving interventions, such as revascularisation (bypass) surgery. Again, the vertical line marked 1 denotes the average frequency of such surgical interventions in the general population of Western Australia. While some subgroups of psychiatric patients, e.g. those suffering from anxiety or personality disorders do not differ from the general population in their access to this intervention, patients with schizophrenia are three times less likely to receive such treatment. We do not know in any detail why this is so. The possibility that schizophrenia patients may be less able to communicate the distressing symptoms of a heart attack is ruled out by the fact that even when we restrict the comparison to those schizophrenia patients only who do get admitted to hospital and are diagnosed, the very low rate of bypass surgery remains. Are they deemed to be unsuitable for surgery because of persisting psychotic symptoms? Or are they considered to be a lesser priority on busy waiting lists? Are they not eligible for elective surgery because the great majority of such patients do not have private health insurance? We do not know and further studies are necessary to answer this critical question.

**Satisfaction with agencies accessed  
(% using; % feeling needs were met)**

	<i>using</i>	<i>needs met</i>
■ NGOs (St Vincent de Paul, Salvation Army)	25.8	88.5
■ Govt dept: Social Security	68.5	87.0
■ Churches	36.7	85.8
■ Mental health self-help organisations	17.3	72.9
■ Govt dept: Housing	24.5	70.8
■ Govt dept: Legal aid services	14.9	62.3
■ Local council	11.9	59.8
■ Govt dept: Employment Service	25.4	57.4
■ Govt dept: Community services	8.8	47.7
■ Ethnic services	5.8	36.8
■ Family Court counsellors	4.7	15.2

Overall, 47% of the people with severe mental disorders interviewed in our survey reported a need for specific services that they were unable to access. It is interesting to see how they rated the various services available in the Western Australian community. This table presents the percentages of people with severe mental disorders who had accessed specific services and their evaluation of the extent to which their perceived needs had been met. As it could be expected, the social security services of the Government department were those most regularly used and commanded a high level of need satisfaction. Surprisingly, it was non-governmental or charity organisations, as well as churches, that elicited the highest user satisfaction. In contrast, the family court services were the least popular and at the bottom of appreciation.

Slide 34



**2008 to 2020: possible scenarios**

Let me now turn to some emerging trends that are likely to influence or determine the state of population mental health and the provision of services during the next 12 years.

## 2008 to 2020: possible scenarios

### A. Problems and unmet needs today

- Low rate of workforce participation among people with mental disorders (29% compared to 49% of people with physical disability)
- Low recruitment to rehabilitation programs
- Low utilisation of drug and alcohol treatment programs
- Large deficit in specialist care within the public sector
- Discontinuities in mental health services provision
- Lack of a transparent system of monitoring treatment outcomes
- Overemphasis on pharmacological treatments, under emphasis on psychological and behavioural therapies

First, what are the main problems and unmet needs we are facing today, and are they likely to be resolved, or on the contrary, become aggravated in the next decade? Although Australia was among leaders in the mental health care reform, which meant a transition from predominantly institutional or hospital care to a community based model of mental health care delivery, de-institutionalisation did not result in a significant reduction of psychosocial impairment and disability among people with severe mental disorders. The low rate of workforce participation (29% of people with mental illness compared to 49% of people with physical disability) is a telling indicator of the problem. In our study, to which I referred earlier, we found a very low level of utilisation (less than 20%) of available rehabilitation services and programs. A similarly low utilisation rate was found for the existing specialised drug- and alcohol treatment programs for people with mental disorders. In Western Australia we have a chronic problem of deficit in specialist care within the public sector. For example, out of a total of 210 Fellows of the Royal Australian and New Zealand College of Psychiatrists (these are doctors who have completed their postgraduate specialist training), only 85 – according to the data available to me – are employed full-time or part-time in the public sector.

Another pressing problem is the lack of continuity of service provision between the different components of the mental health care system. It is a typical experience for a person with mental disorder to see different doctors, nurses or social workers at every transition from, say, hospital admission to a community mental health clinic, or from one community service to another community service. We often see an alarming rate of changes in diagnoses or changes in treatment over time – arising not out of medical or psychological need but out of a lack of an effective treatment and outcome monitoring information system. Among other things, these discontinuities lead to an over-emphasis on pharmacological treatments and under-emphasis on psychological treatments. Both are, however, essential and complementary to one another in shaping treatment response and helping towards recovery.

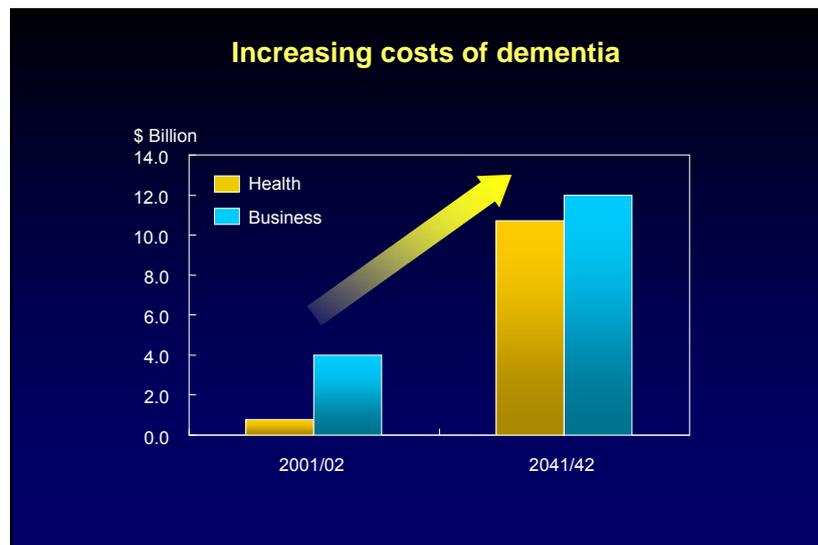
**2008 to 2020: possible scenarios**

**B. Challenges on the way to 2020**

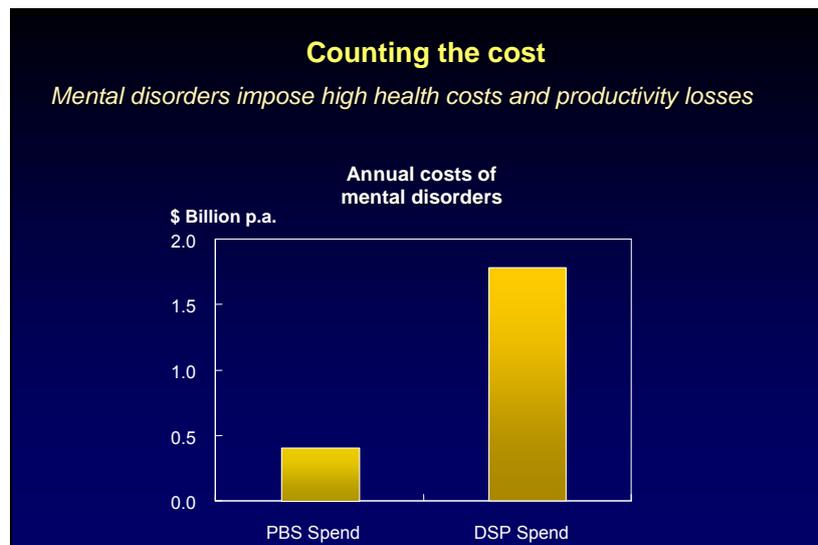
- No major change in the incidence of mental disorders is likely, but their prevalence will increase
- Aging population → increase in rates of Alzheimer's disease
- Increase of younger age groups → increase in rates of psychosis and substance use disorders
- Increasing costs of services and treatments
- Further shortfalls in specialists and skilled mental health professionals
- Adverse effects of social and environmental change (increased family breakdown, decreasing participation in community activities)
- Trend towards a "law and order" rather than a clinical care approach

Hickie et al., 2005

There is no reason to expect any major change in the **incidence** of mental disorders in the coming decade (incidence means the number of people who have the first onset of a disorder during any given year, divided by the total number of general population within the same age range). In contrast, the **prevalence** of mental disorders, i.e. the number of people who have a present disorder at a given point in time, regardless of when the disorder first began, is likely to increase. This increase will be driven mainly by two factors: the aging of the Western Australian population, with a corresponding increase in the total number of people over the age of 65; and a similar likely increase in the younger age groups, below 35 years of age. The average life expectancy of WA males is now 79.1 years; that of females 83.8 years – almost 10 extra years have been added to the life expectancy of the average Western Australian during the past three decades. However, both age groups – the elderly and the young – are at risk for disorders, such as Alzheimer's (the elderly) and depression, psychosis and substance-related disorders (the young). Moreover, on the basis of current trends we can expect further, and worsening, shortfalls in specialists and skilled mental health professionals. As pointed out by Professor Ian Hickie and colleagues (Medical Journal of Australia, April 18, 2005), increased family breakdown, decreasing participation in other community-based structures, and increased exposure to illicit drugs is likely to affect and increasing number of young people in our population. Together with an increasing reliance on a "law and order", rather than a clinical care approach to mental illness (compared to the rest of Australia, WA has the highest rate of involuntary admissions to psychiatric wards or hospitals), these trends indicate significant **challenges** ahead for social and health policies.



This diagram illustrates the projected increase, over 20 years, in the costs of dementia, i.e. costs to the health services (treatment and disability support) and indirect costs to the economy. Although there are only 160,000 new cases p.a., dementia accounts for over 50% of all residents in aged care facilities and 2.5% of total health costs. The costs to “business”, i.e. lost productivity, as well as the effect on families and carers, exceed manifold the direct health costs. And most worryingly, the situation is predicted to get worse: if the Intergenerational report is correct, the health costs plus indirect costs will exceed \$20 billion p.a. Clearly this is unsustainable.



The health costs of mental disorders are already very high nationally, with over \$2 billion per annum in pharmaceutical benefits (PBS) costs plus disability support pensions (DSP).



What this slide illustrates is that small, incremental improvements in disease management are not the answer. They could actually increase the cost burden, as shown by Professor Gavin Andrews in Sydney.

Early intervention is required to either prevent the disease from occurring, or at least to allow people to continue productive lives, regardless of any residual symptoms. Currently, only 14% of psychiatric disorders are treatable with currently available methods. If we were to apply evidence-based medicine (removing treatments that are known not to work and using only treatments whose outcomes have been extensively tested and documented), the effectiveness of treatment could be improved by 6% (to 20%). By focusing on cost-effective treatments only among all treatments that are known to work, the benefits could be further increased by 13% (to 33%). However, even given unlimited funds to support use of all available knowledge, we could only gain another 12% (total of 45%) and the majority of disorders cannot be averted by primary prevention. The compelling conclusion is that more investment in research is necessary.

Although Australian neuroscience, neurobiology and psychiatry have made seminal contributions to the study of brain and mental disorders (for example, the therapeutic and preventive effect of lithium in bipolar disorder was discovered by Dr John Cade, an Australian), mental health research remains grossly underfunded in comparison with other common diseases like cancer, cardiovascular disease, or asthma. It is time for community advocacy to promote appropriate funding for strong, scientifically sound and innovative research, as well as for the training of a critical mass of young researchers.

## 2008 to 2020: possible scenarios

### C. Opportunities on the way to 2020

- New generation of drugs based on a better understanding of the pathophysiology and genetics of brain diseases
- Pharmacogenetics and personalised psychological medicine
- Effective treatments for Alzheimer's disease (drugs, vaccines, stem cells?)
- Significant advances in non-invasive brain imaging
- Better diagnostic tools: early detection of brain abnormalities in pre-clinical psychotic illness
- Nanotechnologies for targeted drug delivery
- Smart imaging probes

My crystal-ball gazing into the future would be unfinished business unless I mention some tantalising R&D innovations that are already on the horizon, though their full effects may not become tangible before 2020. First, a new generation of antipsychotic, antidepressant and mood-stabilising drugs is already in a preliminary testing stage, and some of these new drugs have gone on to clinical trials. However, probably the major developments within the next 10-15 years will be driven by pharmacogenetics – the study of individual genetic make-ups that explain why the same drug helps greatly person A but is totally ineffective for person B. Much of this variation in drug effectiveness is due to variations in individual genetic profiles, and the discoveries of pharmacogenetics will help us to choose the drug that matches the specific person – leading to what is being termed “personalised medicine”. Another innovation is likely to come from nanotechnology: designing structures the size of a molecule, to which a therapeutic drug molecule can be tagged, and using them as delivery vehicles transporting the drug directly and precisely to the brain structure or brain cells where the drug is most effective. There will be considerable improvements in tests – genetic or neurobiological – that can identify early on the risk or predisposition to a disease and thus trigger interventions that could counter the risk. Of all the major brain and mind disorders, perhaps Alzheimer's disease will be the first whose genetics and neurobiology is likely to be unravelled within the next decade to an extent allowing the development of effective drug treatments, vaccines, or tools enabling prevention or delaying its onset.

- Eliminating Alzheimer's disease by 2042 would save Australia-wide over **\$20 billion p.a.** in health and indirect costs
- If the onset of disease was delayed by five years, the direct and indirect health savings would be **\$5 billion p.a.**
- If the incidence of schizophrenia was reduced by 25%, we would save **\$500 million p.a.**

Simply delaying the onset of Alzheimer's disease, or these diseases, or reducing the incidence of chronic schizophrenia by early diagnosis and treatment by 25% could save a lot of suffering and reduce significantly the costs that society bears. Similarly, reducing the incidence of schizophrenia by 25% will save the Australian community some \$500 million p.a.

But some of the novel technologies may raise difficult ethical or legal issues. Let me mention just a few.

## 2008 to 2020: possible scenarios

### D. Difficult ethical and legal issues

- Predictive DNA testing
- Cognitive enhancer drugs
- “Brain fingerprinting” and the privacy of personal thought
- Brain-based prediction of risk of violent offending
- “Neuroscience of moral judgement” and criminal responsibility
- The “psychiatrisation” of everyday life may serve to legitimise the marginalisation of people who do not fit (Summerfield & Veale, 2008)

This is a list of likely novel approaches to using neuroscience to putative practical goals – some of them social, others controversial or likely antisocial. Limited time prohibits me from much discussion, but I will comment briefly on those that touch upon community interests and values, such as the hypothetical possibility that we might be able to stem violence with the assistance of neuroscience and genetics. In an era of social fear and “zero tolerance of risk”, it may be tempting to invoke neuroscience in political or legal decisions about the management of people deemed to be at risk of committing violent acts (rather than having actually committed such acts). For example, the UK government persists in pushing new laws towards **preventive detention** of individuals thought to exhibit “dangerous or severe personality disorder” (DSPD). In a different context, the law may ask questions whether a brain abnormality is a necessary condition for determining diminished or absent culpability. The evidence that happens to be invoked in court is usually derived from functional neuroimaging (fMRI) studies, or from behavioural genetics. While neuroimaging studies have indeed reported associations between patterns of brain activation in response to provoking stimuli and a history of violent behaviour, this is at best a statistical association and not one of cause and effect. Such studies have not been replicated by others and none have been shown to have a predictive value. Similarly, findings of an association between a polymorphism in a gene and antisocial behaviour tell us nothing about cause and effect, or about the future risk of violent offending in a particular individual. Fundamentally, there is a conceptual mismatch between the framework of justice, operating with legal definitions and criteria in the individual case, and the framework of neuroscience or genetics, operating with statistical probabilities based on large groups of individuals but telling us hardly anything about any individual member of the group.

## 2020 and beyond: possible scenarios

### Need for longer-range perspective

- Mental health is a major societal responsibility requiring broad, forward-looking social and health policies, public information and education
- Prevention and treatment of mental illness is not only a matter of new technologies
- Need for targeted support to fundamental preventive factors: healthy parenting, responsible child rearing and stimulating schooling
- Combating the stigma associated with mental illness
- Equity in access to early detection of problems and minimisation of risk

On my last, concluding slide, I wish to highlight the need for a longer-range perspective on matters of mental health and mental illness. The year 2020 is not far away. We must project our vision beyond that iconic benchmark, into a future world that will be inhabited by our children, grandchildren and young people yet unborn. Barring incremental risks of disastrous effects of climate change on the kind of society we know today, what social environments can we envisage that could affect, negatively or positively, the mental health of future generations?

One hypothesis is that the current “information age”, with its universal and overwhelming transmission of information through the visual channel and at a high speed, will have an impact on a brain that has evolved biologically in a very different environment. To what extent this would translate into brain disorders is difficult to determine. Whether the family, as it is today, will remain the basic habitat for the “social construction of the brain” is an open question. But these are just two the many “unknowns” that enlightened future-oriented health and social policies must face. Mental health must be recognised as a major societal responsibility calling for a broad political vision, public information, education and community involvement. Prevention and treatment of mental disorders is not just a matter of new technologies, but of fostering and sustaining a social and physical environment supporting healthy brain and mind development. Responsible parenting should remain an essential part of it, as will be good schools, elimination of poverty, combating the stigma associated with mental illness, and ensuring equitable access to effective treatment and prevention interventions for all people – young and old – who might need them.

On this ending note, I wish to thank you for your attention.