

MANITOBA LIBERAL CAUCUS REPORT

**ATTENTION!**

**ONLY POSITIVE  
ATTITUDES  
ALLOWED IN  
THIS AREA**

**OPTIMAL BRAIN HEALTH  
FOR ALL MANITOBANS**

**JON GERRARD, JUDY KLASSEN, CINDY LAMOUREUX**



**MANITOBA  
LIBERAL  
CAUCUS**

**Attention: Only Positive Attitudes Allowed in this Area**

**Optimum Brain Health for all Manitobans**

**Liberal Caucus Report 2016**

**Recommendations for changes to Public Policy in Manitoba**

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## **Preface:**

For the last several years Manitoba Liberals have been strong supporters of including some critical psychological services delivered by psychologists under medicare as we now do for services provided by doctors. Our approach received very strong support when we were campaigning door-to-door during the provincial election of 2016. Following the election, we decided to extend our approach to mental and brain health, by asking “What is needed to achieve optimum brain and mental health in Manitoba?” This report is the result.

Brain and Mental health are particularly important today. Our title “Attention: Only Positive Attitudes Allowed in This Area” is derived from a sign on a door at the Learning Disabilities Association of Manitoba. It exemplifies one of the fundamental aspects of how we need to approach those with brain and mental health issues – to keep things positive and to build on people’s strengths. Too often mental and brain health issues begin or are made worse when they are approached in a negative way. The result is often frustration, anger, lowered self-esteem and increased difficulty in addressing issues which arise. Richard Lavoie (2005) tells the shocking, awful, distressing story of a child with a learning disability who was ignored and rejected by her classmates, and at the end of the year put, by her classmates, in the wastebasket and told “You’re garbage... and that’s where garbage belongs.” In this report we start with the approach that all human beings have strengths and we need to build in a positive fashion on those strengths to help them achieve optimum brain health for themselves, and to do this we need to be positive.

We have read widely and consulted extensively in the preparation of this report. In this effort we have talked to more than 50 representatives of over 30 organizations, have met with more than 30 additional people individually who include a wide variety of health professionals and those who themselves or their families have needed brain health care, and read more than 15,000 pages of textbooks, books on brain health and scientific research papers. We thank all those who have helped us in the journey. We also recognize this is a vast field, that in some ways we have just touched the surface, and that in a project of this magnitude, there will be some mistakes. We apologize in advance and request that if you identify a shortcoming, you will email to Jon Gerrard at [jon.gerrard@leg.gov.mb.ca](mailto:jon.gerrard@leg.gov.mb.ca). Thank you.

Judy Klassen, MLA-Keewatinook and Interim Leader of the Manitoba Liberal Party  
Cindy Lamoureux, MLA-Burrows  
Jon Gerrard, MLA-River Heights

Manitoba Liberal Caucus

## **Acknowledgements:**

We thank all those who contributed to the development of this report including those who gave advice during our consultations, those who participated in our panel at our forum and those who attended the forum. Thanks are also due to the staff in my office and in our Manitoba Caucus office including particularly Chris Bishop who was a major help with the research and the preparation of this report, and to Mie Larsen, Shandi Strong, Johanna Wood and Craig Larkins.

It must be acknowledged that when we started this project, after the 2016 provincial election, we were uncertain whether we could complete it. Indeed, the project turned out to be much larger and more complex than was initially considered. It would not have been possible without the passion and commitment from our caucus staff and the many that provided help in one way or another. Thank you to all.

## **Summary:**

Nutrition and Exercise

Psychological services

Attachment

Learning disorders

Ending discrimination

A "my team" approach

Multimodal therapy

Addictions

Traumatic Brain Injury

Preventing depression and suicide

Addressing homelessness and unemployment

Changing the criminal justice system and child and family services

The world of brain health is seeing major, indeed monumental, developments. These can help dramatically improve the brain and mental health of Manitobans if we are ready to act.

We offer twelve cornerstones for a brain health action plan for Manitoba.

1) Advances in our knowledge of the impact of nutritional choices on brain health show a path forward. It is possible that if all Manitobans followed the dietary recommendations of Health Canada and the Dietitians of Manitoba with respect to the omega 3 fatty acids DHA and EPA we could see a decrease in depression in Manitoba of 50 to 70 percent. It would also lower early preterm births, decrease the number of very low birth weight infants, improve learning and brain development in children and reduce violence among adolescents and adults. Addressing vitamin D insufficiency and getting adequate sunlight and exercise can also improve brain health.

- 2) Psychological services are such a critical part of improving brain and mental health that we need to include certain psychological services under medicare as we do for physician's services. This cost-effective general public health measure will compliment nutritional and other initiatives. Mind improving psychological supports can help children and prevent and treat depression, eating disorders and other brain health conditions.
- 3) We now understand the critical importance of secure attachment by children to their caregiver(s) in their earliest years to the psychological well-being of children and adults and their ability to interact with others and participate well in our society. Measures to ensure the nature and the process of attachment are understood, including in our schools, represent a third cornerstone of improving brain health in our province.
- 4) Addressing learning disorders must be a provincial priority. Assessments for learning disorders need to be fully covered under medicare and sufficient resources added to ensure that wait lists are dramatically reduced so children can be assessed and helped promptly.
- 5) Addressing discrimination. Discrimination and the associated bullying that often accompanies bias and discrimination can have adverse effects on brain health of victims. Areas where substantial discrimination continues to exist, such as discrimination based on physical size or weight need to be addressed through recognition in the Manitoba's human rights code so that individuals faced with these challenges can have them addressed.
- 6) A "My Team" approach to supporting individuals with brain health challenges is essential. This team involves many health professionals working together. The team also involves families and community circles of support including peer support and the fostering of a cooperative approach. An easier and more effective navigation of the system is needed so people can get the help they need when they need it. Together these approaches need to be patient centered so that a person with a brain health concern can talk meaningfully about having "My team" working for him or her.
- 7) Multimodal therapy, which integrates a number of different treatments or approaches as part of one therapeutic plan, is now emerging as having the potential to reverse dementia and end the cataclysmic possibility of ever increasing numbers of people with this dreaded condition. Multimodal approaches also look likely to make a difference to better prevent and treat many brain conditions including multiple sclerosis, depression, anxiety and ADHD.
- 8) A timely, effective, rapid response capability to help those with addictions is an imperative. Preventing and more effectively treating addictions is a vital necessity if our province is not to be consumed by efforts which bounce from one addictive substance to another. Learning from positive progress in communities like Nelson House which have seen a dramatic reduction in addictions and in FASD can be helpful

9) Traumatic brain injury which occurs in car accidents, in physically violent acts or in repeated concussions represent serious events which can have long lasting, costly and crippling effects. Addressing this effectively through preventive measures and through improved therapy can help improve individuals' lives and save health care dollars at the same time. A solid plan in this respect is essential.

10) Advances in the prevention of depression and suicide which employ multimodal approaches including support from health professionals, from friends and community members, from peer support workers and which include addressing nutrition, life goals, physical and mental activities as well as education and employment opportunities can substantially reduce depression and suicide in our province. Having this plan in place is a must to reduce the tragedies our province has seen in recent years.

11) Ensuring that individuals with brain issues have homes is a vital component to the success of their therapy and to their well-being in life. It is a cost effective effort as it saves large amounts of money in health and justice costs. An effective plan to end homelessness is a cornerstone of a strategy for improving brain health in Manitoba.

12) Those with brain health issues often have interactions with child and family services and the criminal justice system. These are both areas where Manitoba needs improvement, and where critical improvements can make a big difference in the lives of affected individuals. Indeed effective improvement and plans in these two areas are vital to improving brain health and the lives of those with brain health issues as well as moving toward a safer society.

These measures have been looked at from a cost benefit analysis and will help the provincial government's bottom line as well as improving the brain health of all. Indeed, action in these areas will be important to the long run sustainability of our health care system.



## Introduction:

Optimizing brain health is one of the crucial challenges of our times. Depression is predicted to be the second leading cause of disability globally by 2030 (Detels R et al 2009). Of Manitobans age 10 and older, 23.3 percent have a mood or anxiety disorder and 5 percent have a substance abuse condition. As well 10.6 percent of Manitobans 55 years and older have dementia (Fransoo R et al 2013). In Canada, one third of disability claims are related to mental health problems and mental health illnesses but account for about 70 percent of the total disability claim costs (Sroujian 2003). The cost of suboptimal brain health to individuals and to our society is already staggering and if no action is taken the impact on individuals and families and the cost to society will continue to rise.

Convincing evidence now exists with regard to the beneficial effects of nutrition, particularly long chain omega 3 fatty acids and vitamin D, of exercise, and of psychotherapeutic approaches to improving brain health. With dementia, recent efforts which provide evidence that multimodal therapy can reverse dementia and allow people to return to work may usher in a new era in brain health (Bredensen 2014). If we can utilize the emerging potential for action in all brain health conditions, we could see the beginning of a revolution in the way we approach the optimization of brain health in Manitoba, and in the world. This report is focused on charting such a course.

It is dedicated to Judy Klassen's niece who tragically committed suicide, to Jon Gerrard's mother who suffered, periodically, from depression, to the many Manitobans with brain health conditions and to the many Manitoba families and friends who have been affected as a result. It is dedicated to Clara Hughes who has shown that it is possible to struggle with a mental illness and yet achieve great goals, and to have a balanced, "open heart, open mind", fulfilling life (Hughes 2015). A debt of gratitude is owed to Jon Gerrard's father who was involved in pioneering the diet to successfully treat phenylketonuria and showed that genetic conditions affecting the brain can be mitigated by diet.

The use of the word Brain Health in the title is deliberate. One day, when Jon Gerrard used the word mental illness to talk about a boy with Asperger's Syndrome, he was corrected by his mother. "This is not a mental illness, this is a neurodevelopmental disorder." The use of the term "brain health" is to be inclusive of all Manitobans, those with a mental illness, those with a traumatic brain injury, those with a neurodevelopmental disorder, those with intellectual disabilities and indeed all those who seek to have their brains working as well as they can.

This report includes material which has been the result of the work that each of us, (Judy Klassen, Cindy Lamoureux and Jon Gerrard) do every day as politicians in dealing with brain health issues in Manitoba. It also builds on Jon Gerrard's work and knowledge as a physician, a researcher and a scientist, on Judy Klassen's concerns with and experience in dealing with suicides and on Cindy Lamoureux's work with immigrants and with the Justice system in our province.

## **The Goals of Public Policy with regard to brain health:**

Public policy objectives for brain health should be far reaching and all encompassing. It is not enough to improve the functioning of individuals who have injured brains, or brains which provide a particular challenge to an individual. The health of our society depends on optimizing the brain health of all.

Governments do not have an inexhaustible supply of dollars in striving to improve brain health. Thus wise use of public money means looking carefully at how dollars are best spent. In this context, much research provides evidence of large benefits of strategic investments in brain and mental health. We have found many areas where large improvements can be made in the mental health of Manitobans and with a substantial pay off in the returns on the investments achieved. For examples a recent Conference Board of Canada report concludes that improving treatment of depression among employed Canadians could potentially boost Canada's economy by up to \$32.3 billion a year, while improved treatment of anxiety could boost the economy by up to \$17.3 billion a year" (Sutherland and Stonebridge 2016).

### **Goals for Brain Health in Manitoba**

- 1. A primary objective is to achieve optimum brain health for every Manitoban.**
- 2. A secondary objective is to recognize that every person's brain is unique and that optimizing health is different from person to person.**
- 3. A third objective is to ensure public dollars are spent wisely.**

The overall goal of this report is to make practical and doable recommendations with respect to the brain health of Manitobans. The report is not comprehensive, but uses examples to provide insights into how changes in public policy can have a significant impact to optimize the brain health of Manitobans. The report focuses on a general understanding of the factors associated with or causal to brain health conditions, and factors which are associated with a decreased incidence or a reduction in the incidence of the brain health conditions and/or diseases. This approach, similar to approaches which have been taken to reduce heart disease, is taken to identify, where possible public health measures which can influence the risk and preventative factors which are associated with or causal to increases or decreases in the incidence or prevalence of brain health well-being.

This report does not deal with the pharmacologic therapy of brain health issues, except as there may be public health issues related to the access or cost related to such pharmacologic therapy, and with the exception of where considerations of optimum nutrient (fatty acids, vitamins etc.) input and intake is involved. The optimum use of pharmacologic therapy is an important part of optimum brain

health. At the same time, supporting the integration of dietary, lifestyle and psychotherapeutic approaches has important implications for public health which go beyond pharmaceutical treatment.

**The report is divided into several sections.**

First is a section on overall brain health, some basic concepts of how the brain works, of how brain function can be improved in general terms, and of factors including chemicals and trauma which can cause damage to our brains.

Second is a general section on the impact of life experiences and human-human interactions on the brain.

Third is a section on the development of the brain, including critical developmental time frames which are important to optimum development.

Fourth is part 1 of an action plan for improving brain health dealing with general approaches.

Fifth is part 2 of the action plan for improving brain health dealing with specific circumstances and conditions.

Sixth is an overview of the status of human and infrastructure resources needed for optimizing brain health in Manitoba.

Seventh is an overview of funding for brain and mental health, and a cost assessment of both the actions proposed and of not taking the actions proposed.

Eighth is a consideration of whether Manitoba's population is more deficient in DHA/EPA than other provinces – and could this account for several areas of poor provincial performance?

Ninth is an overview of twelve key areas.

This is followed by our acknowledgements and a list of references. Appendices include a list of all recommendations, a list of people consulted in the development of the report and additional material related to the report.

# Section 1: Overall Brain Health

## General information about the brain

### Brain basics

In humans, our brain is about 2 percent of our body weight. It is however, highly active using 20-30 percent of the calories a person consumes, and receiving about 20% of a person's blood flow.

Some additional important facts about the human brain:

- 50% is dedicated to vision.
- 80% is water.
- Were the water to be removed, 60% of what is left, the solid weight of the brain, is fat.
- Of the fat, a high proportion is an unusual long chain omega 3 fatty acid called docosahexanoic acid (DHA). Indeed DHA makes up about fifty percent of the weight of neuronal cell membranes (Singh M, 2005). DHA appears to play an important structural role in nerve and brain function, and a deficit in DHA and/or EPA may contribute to mental illness.
- A much smaller proportion of the brain fat is made up of another unusual long chain omega 3 fatty acid called eicosapentanoic acid (EPA) which appears to play an important role in modulating nerve cell function in part as a precursor to a variety of highly active lipid molecules.
- Neurotransmitters, of which there are many, send messages from one brain cell to another and also play a vital role in brain function. These include examples like dopamine, serotonin, acetylcholine, gamma-amino-butyric acid (GABA), glutamate, aspartic acid and norepinephrine.
  - Acetylcholine is involved, as a neurotransmitter, with learning and memory.
  - Serotonin is involved with mood, and low serotonin activity can be associated with clinical depression.
  - Norepinephrine is involved in stressful situations and increased norepinephrine may be associated with anxiety.
- Knowledge of these neurotransmitters is important to brain function and changes in neurotransmitters may be a basis for certain mental illnesses. Production of neurotransmitters can be influenced by varied factors including diet.

# BRAIN ANATOMY

## The parietal lobes

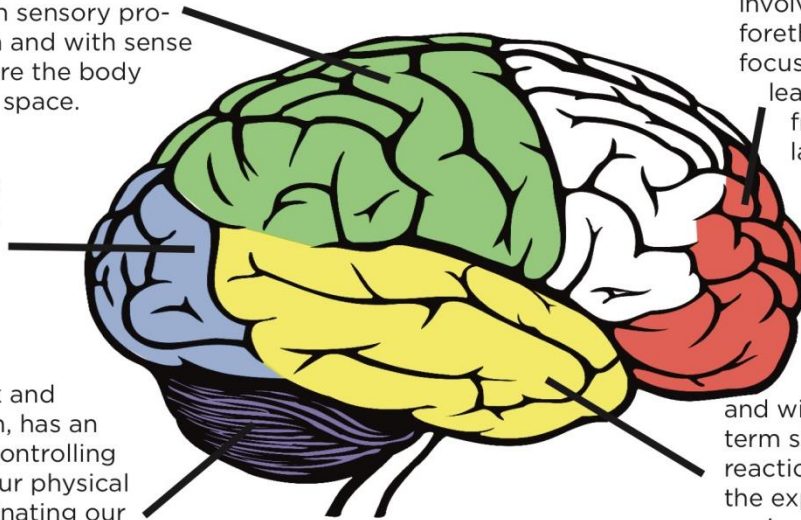
Are concerned with sensory processing, with touch and with sense of direction of where the body and its parts are in space.

## The occipital lobes

are concerned with vision and visual processing.

## The cerebellum,

located at the back and bottom of the brain, has an important role in controlling and coordinating our physical movements, coordinating our thoughts and in processing complex information. While representing only 10 percent of the brain's volume, the cerebellum contains 50 percent of the brain's neurons (nerve cells).

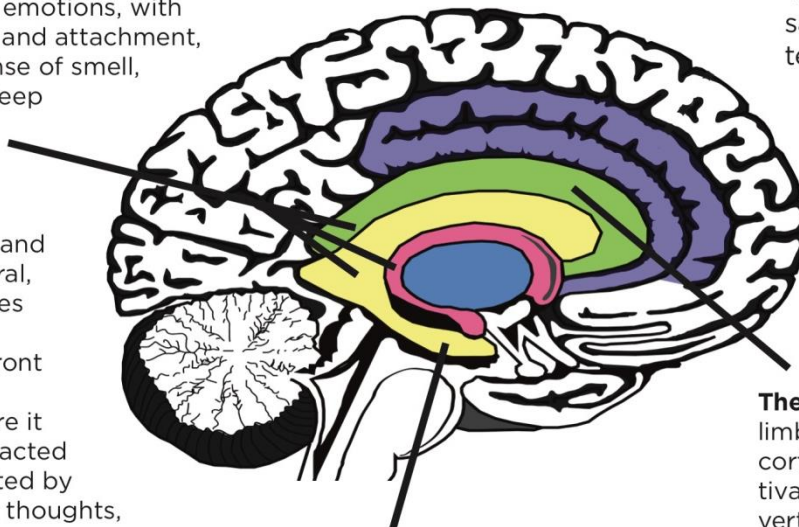


**The prefrontal cortex** (about 30 percent of a human brain), which is involved with planning, organization, forethought, judgment, empathy, focusing, the control of impulses and learning from mistakes. Part of the frontal lobe, the anterior cingulate gyrus, is involved with error detection and shifting attention.

## The temporal lobes

are involved in determining what things are, in learning, with auditory processing and with moving memories into long term storage, but also with emotional reactions, and responses including the expressing or control of a person's mood and/or temper. Lesions in the temporal lobe, for example, have been associated with aggressive, violent and suicidal behavior

**The limbic system**, located at the base of the brain, is the site where much of the information about ourselves and our surroundings first arrives in the brain. The limbic system is involved with emotions, with sexuality, with bonding and attachment, with processing our sense of smell, with moods and with sleep and appetite cycles. Information reaching the limbic system is tagged as emotionally charged (meaningful), and then sent to the temporal, parietal or occipital lobes for initial processing and from there to the front part of the brain - the Prefrontal cortex - where it can be considered and acted upon (driven or motivated by the basal ganglia), with thoughts, physical actions and movements



**The insula** receives messages from the body's internal organs like the gut.

**The basal ganglia**, near the limbic system under the cortex is involved with motivation and drive, and converting ideas into actions and responses.

**The hippocampus**, one part of the limbic system has an important role in converting initial short term memories into long term memories. Another part, the amygdala, is involved with emotions and sexuality.

Knowledge of these anatomical structures becomes important in understanding brain health and in understanding the impact of brain injury on a person. As an example of the importance of injury to the brain, a study of homeless people in Toronto found 58 percent of the men and 42 percent of the women had had a significant brain injury before becoming homeless (Hwang et al 2009).

### **Genetics and Epigenetics and the brain**

Many brain and mental health conditions have a significant inherited genetic component. Epigenetics, biochemical changes including methylation of DNA and modification of histones which bind to DNA, may also have an important role. Of interest, nutrition can modify and mitigate an individual's genetic and epigenetic circumstances as was first shown in the early 1950s for phenylketonuria. Each person has their own unique gene pattern, and though there are general nutritional needs for all, nutritional needs may vary depending on a person's genetic endowment (Walsh 2012).

### **The resilience, plasticity and fragility of the brain.**

Our brains are remarkable organs. There is substantial ability of the brain to do well in spite of adverse circumstance. It is resilient. There is a remarkable capacity of the brain to change and adapt and to find or develop new nerve pathways to recover from damage or toxic events. This is called the plasticity of the brain (Doidge 2015). The brain – a large soft organ which is mostly composed of water and fat – is, however, very susceptible to damage – both physical and chemical. It is fragile. We need to take care of our brains, and to do this we need to understand factors which promote brain health and factors which are a threat to brain health.

# Factors (other than human-human interactions) which can promote brain health:

## Chemistry, Nutrition and Brain Health

Adequate nutrition, in particular nutrition which provides the food which ensures the presence of the basic nutritional and chemical building blocks for optimum brain health, is vital.

Examples are docosahexanoic (DHA) and eicosapentanoic acid (EPA), two long chain omega 3 fatty acids which are found primarily in fish, seafood and algal oils. Diets which lack fish, seafood or algal oils and are not supplemented with DHA and EPA are associated with suboptimal brain function. As an example, inadequate DHA and EPA in a mother's diet during pregnancy is associated with slower brain and intellectual development of children compared to mothers receiving adequate DHA and EPA (Protzko et al 2013). Preterm and term infants need DHA and EPA for optimal growth, visual acuity and brain development (Clandinin et al 2005; Isaacs et al 2011; Birch et al 2000; Drover et al 2011; Willatts et al 2013; Jiao et al 2014, Birch 2010; Qawasmi et al 2013).

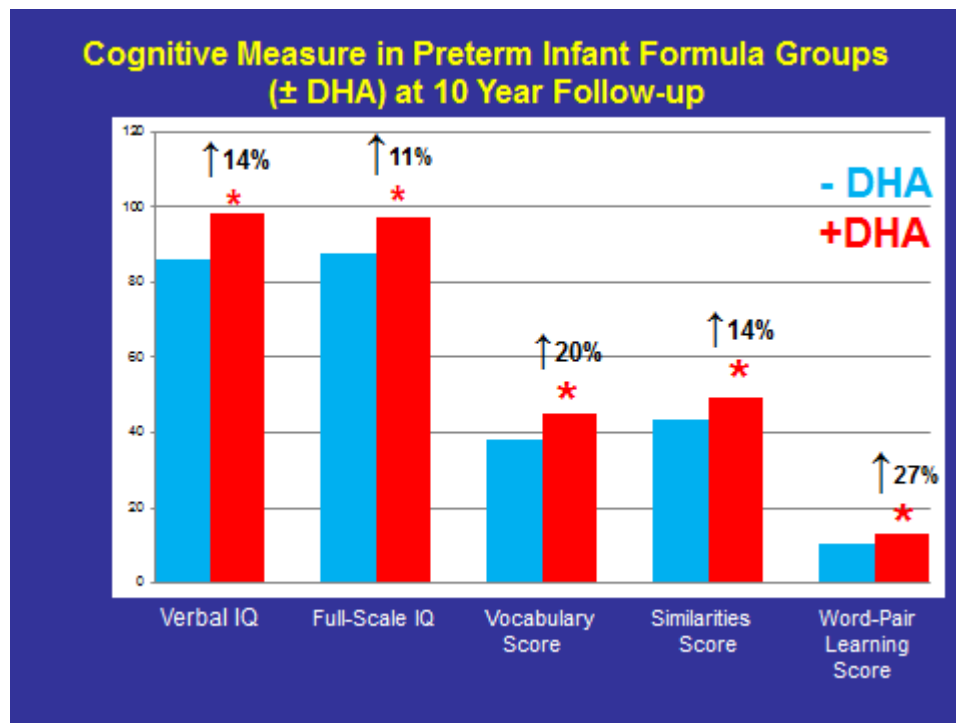


Figure 1: DHA in formula for preterm infants who were not breastfed and impact on cognitive performance at age 10. Data in figure from Isaacs et al 2011 for infants who were not breast fed. Figure courtesy of Dr. Bruce Holub.

It must be noted that many foods which are labeled as containing omega 3 fatty acids have the omega three fatty acid alpha-linolenic acid which is found in a variety of plants like flax. The human body is very poor at converting alpha-linolenic acid into DHA and EPA so needs DHA and EPA in the diet. Thus DHA and EPA are essential fatty acids for humans. The presence of alpha-linolenic acid is not sufficient. This does not take away from the fact that dietary alpha-linolenic acid has other

beneficial effects – on the heart and blood pressure for example. Of interest, the fact that humans require DHA and EPA in their diet and have only a limited ability to convert alpha linolenic acid to DHA and EPA is used as evidence to support the fact that a critical period of the evolution of the human brain may have occurred adjacent to a lake or an ocean where seafood containing EPA and DHA were plentiful (Sharpless 2013). A number of studies which will be detailed in the sections below show that supplementing individuals with DHA and EPA can improve cognitive function and reduce violence.

It should be noted that there are varied reasons that the long chain omega 3 fatty acids may be effective in improving brain health beyond those mentioned above. One of these is improved regulation of the immune system and the balance between cellular and humoral immunity, a balance that may also be impacted by other nutrients including vitamin A and Silica (Kaslow 2016).

Specific nutritional deficiencies are associated with decreased brain development and/or performance. This includes as examples deficiencies of thyroid hormone, vitamin B12, choline, zinc, iron and vitamin A (Coulston et al 2013, Nguyen and Thomas 2011; Olson and Mello 2010).

Nutrition may also have an impact on neurotransmitter production and thus influence brain health.

## **Exercise and the Brain**

Exercise has been shown to improve cognitive ability and the brain's executive functioning. (Amen DG 2015). Exercise has been shown to reduce depression, to slow or even reverse dementia associated with Alzheimer's Disease (Dunn et al 2001, 2005; Amen 2015).

Exercise has been shown to improve long term memory, reasoning, attention, problem solving and ability on fluid intelligence tasks which measure the ability of a person to improvise from previously learned experience to solve a new problem (Medina 2008). For children, after 12 weeks of jogging, cognitive performance improved significantly, to revert to pre-jogging levels when jogging ended (Medina 2008). "Physically fit children identify visual stimuli much faster than sedentary ones. They appear to concentrate better. Brain activation studies show that children who are fit allocate more cognitive resources to a task and do so for longer periods of time. ... Kids are less likely to be disruptive in terms of their classroom behavior when they're active. Kids feel better about themselves, have higher self-esteem, less depression, less anxiety" (Medina 2008).

For adults, who were sedentary, enrolling in an aerobic exercise program similarly improved mental ability. Aerobic exercise appears best, but strength and resistance training also is beneficial (Medina 2008)

Exercise benefits those at risk of dementia, with the lifetime risk of general dementia being cut in half, and for Alzheimer's disease the odds of getting Alzheimer's disease are reduced by more than 60



percent (Medina 2008). Exercise is a beneficial treatment for depression and for anxiety both immediately and over the long term (Medina 2008).

### **Sunlight, vitamin D and the Brain**

There is much evidence supporting the concept that sunlight and vitamin D are healthy for the brain. It has been known for many years that individuals who are particularly sensitive and dependent on sunlight have a condition called SAD – Seasonally Affective Disorder. A person with SAD becomes depressed for lack of sunlight and will respond by having their non-depressed state restored when exposed to sunlight, or to light which mimics sunlight. It is likely, though the evidence here is less clear, that these individuals are on one end of a bell curve in which people respond with healthier brains to sunlight, but to varying degrees. Certainly, for many people, exposure to sunlight has a positive effect on mood even if they are not depressed to begin with.

There is also evidence that adequate levels of vitamin D can be positive to brain health, and that low levels of vitamin D are associated with depression (Holick 2010) and Multiple Sclerosis (Jelinek 2016). Certainly, not all the effects of sunlight on mood are a result of the ability of sunlight to stimulate the body's vitamin D production. Sunlight has effects on other human responses, including as an example the body's production of melatonin, and the visual stimulus of light and the colours present with good light on the visual cortex. In a further example, exposure of the skin to sunlight can accelerate bilirubin metabolism and as a result protects infants who would otherwise have high bilirubin levels from the very negative effects of bilirubin on the brain.

The impact of light is a public health issue for a number of reasons, in part because it relates to the design of buildings and living spaces. As a politician JG has visited many people in their homes and apartments as part of his general routine and these visits are accelerated in the run-up to an election. He has noticed from time to time, individuals with brain health conditions living in basement suites where little sunlight can get in, and wonders if our housing and apartment building design could be improved in ways that would improve individual's health. Others also have these concerns. JG met a university president who talked of the need to ensure hospital rooms had as much access as possible to sunlight.

### **Activities in a natural environment.**

There is a growing body of evidence that engaging in activities in a natural environment can be positive to brain health. "natural spaces and built green spaces have mental health promoting effects, and lack of access to such spaces is likely detrimental to mental health in modern life" (Todman and Holliday 2015). The evidence is perhaps best in relation to children who have been labeled with the designation ADHD – Attention Deficit Hyperactivity Disorder. Children with ADHD who play regularly in green settings have milder symptoms than children with ADHD who play in built outdoor and

indoor settings (Taylor and Ming 2011; Luov 2005). Some, but not likely all of this, could relate to sunlight exposure from being outdoors.

## **Pets**

Having a pet has been shown to have a positive impact on the brain health of people (Headey and Grabka 2007; Cusack 2013).

## **Promoting a beneficial gut microbiome.**

Evidence has accumulated in recent years that the microbiome, the bacteria in the gut, are important to a person's health. The presence of healthy bacteria has been associated with improved brain function while the presence of unhealthy bacteria has been associated with poorer brain function. (Perlmutter and Loberg 2015).

# **Factors which can be deleterious or damaging to brain health**

## **Chemical Toxins and the Brain**

Phenylketonuria or PKU is a genetic condition in which high levels of one of the normally present and important amino acids, phenylalanine, can cause severe brain damage on a regular diet because these individuals are unable to adequately metabolize phenylalanine. For these individuals, a diet which is low in phenylalanine has been life and brain saving. Individuals with PKU who are identified at birth (as all are now with screening in Canada) would be severely impaired intellectually without a special diet. With a low phenylalanine diet, such individuals can live a normal, brain healthy life. This condition is mentioned as an example of a brain toxin, how its impact is selective on certain individuals because of their genetic makeup and the nature of the metabolizing enzymes in their bodies, and how the presence of the brain toxin can be addressed in these individuals.

## **FASD – Fetal Alcohol Spectrum Disorder**

FASD is the commonest current cause of impaired acquired brain function at birth. Alcohol is a brain toxin, and its impact is of particular concern as a toxin to the growing brain during fetal development. It is a major public health issue, because of the impact of FASD on affected children and adults and the impact of children and adults with FASD on our society and because of the very high cost to government and to society in general of the care of these children. These added costs for a child with FASD accrue to our health care system, our education system, our child welfare system and our justice system. It has been estimated, for Manitoba, that the costs to the provincial treasury are in the range of \$500 million to \$900 million each year, so addressing this issue and preventing FASD has the potential to save very large amounts of taxpayer's money (Gerrard and Lamoureux 2006).

## **Neurotoxins and possible brain toxins.**

A number of chemicals to which we are or may be exposed are potentially toxic to the brain. The nature and the amount of exposure and the individual person's ability to metabolize the chemical are important to whether the presence of the chemical is toxic. Brain toxic chemicals include certain pesticides, certain paints and/or the solvents used in applying the paints and microtoxins found in algae. An exhaustive list would be a very long one and is beyond the purview of this report.

## **Physical damage to the brain.**

The brain is fragile. Knowledge of the impact of physical damage to the brain is becoming much more widely appreciated with knowledge and appreciation of the impact of concussions. Head trauma comes in many forms however. Growing public concern about the impact of head trauma and the cost to our society as well as to the individual is resulting in wider use of bike helmets, and in better measures to prevent and to treat concussions.

In summary, it needs to be recognized that the brain is one of the most important organs we have, if not the most important organ. Specific attention is therefore needed to understand the nature of the brain and its health.

### **Recommendations**

- 4. It should be general public policy to promote a better understanding of the brain and its function.**
- 5. The provincial government should ensure that adequate knowledge of brain health and the general factors which either promote or adversely affect brain health is a formal part of the health curriculum in our K-12 primary and secondary school system.**
- 6. The provincial government should establish a Working Committee on Optimum Brain Health which has the ability to check facts and a) make general statements with regard to the brain and its function and b) make general proposals for improving the brain health of all Manitobans and c) making recommendations as to how to ensure this information is generally available to Manitobans. This working committee should provide its recommendations for improving brain health on a regular basis as the nature of the science and evidence in this area develops.**

## Section 2: Life experiences and human-human interactions and brain health

Brain health is a reflection of the chemical (including nutrition) and physical environment in which we live. Brain health also can change as a result of life experiences and human-human interactions. This section looks at life experiences which can promote the best possible brain health and at experiences which can provide a challenge to optimum brain health. We look here at brain health in two perspectives – where factors can affect a child’s intelligence and where factors can affect the likelihood a child will have a brain condition, like depression, which has a major impact on brain function.

### Experiences which can promote brain health:

a) **Achieving secure attachment:** As discussed in more detail below, life experiences which lead to attachment security can have a very positive impact on brain health.

a) **Learning:** Living a life of learning can help achieve optimum brain health. For example research results show that enrolling children in early educational interventions can increase a child’s IQ. A review of 16 randomized controlled clinical trials indicates the following: “These interventions involved more than pre schooling alone; rather, the interventions entailed extensive alterations to the child’s environment.” The findings specifically refer to economically disadvantaged children and showed that “an early education intervention raised his or her IQ by more than 4 points, and that including a centre-based education component raised her or her IQ by more than 7 IQ points” (Protzko et al 2013). It should be noted that schooling itself has been shown to both increase and to maintain intelligence (Ceci 1991).

b) **Sending children to preschool:** Analysis of 16 randomized controlled trials involving 7,370 children has shown that sending a low-income or disadvantaged child to preschool raises his or her IQ by as much as 7 points when a specific language development component is included (Protzko et al 2013). As the authors comment “Attending preschool provides lower SES [socio-economic status] children with the opportunity to engage with novel stimuli, to practice complex problem solving, to navigate social interactions, and to confront other cognitive challenges they do not face in their home environments.”

c) **Reading to children in an interactive manner.** In a meta-analysis of eight studies it has been shown that reading to a child under four years of age in an interactive manner raises the child’s IQ by over 6 points (Protzko et al 2013).

d) A combination of attention to positive cognitive learning program together with exercise, nutrition and other factors have been found to reverse dementia. [Bredensen 2014)

e) **Peer support workers** for those with brain health issues. A careful review of the impact of peer support workers has shown that using peer support workers who are able to share their lived experience helps to replace feelings of isolation and rejection with hope and personal empowerment, and as a result this benefits both those with brain health issues and the peer support workers. Specifically the use of peer support workers has been associated with improvements in physical and emotional health, in integration and social functioning, in stability in employment, education and training, in a reduction in drug and alcohol use among patients with co-occurring substance abuse problems and in clinician assessed global functioning. Employing peer support workers has also been found to reduce in-patient bed use and the costs associated with in-patient bed use (Trachtenberg et al 2013). In addition, employing peer support workers has been shown to help drive a positive recovery-focused approach within organizations.

## **Experiences which can negatively affect brain health**

a) **Major life stresses and ‘traumas’**. Major life stresses including divorce, death of a loved one, exposure to violence, etc. .... have been shown to be associated with negative effects on brain function (Medina 2008) Major stresses and traumas can also trigger Post-traumatic stress disorder (PTSD) which can have a serious negative impact on brain health.

b) **Weight Discrimination**. Bias and discrimination against those who are overweight, weight discrimination, has been shown to have adverse effects on brain health including an increased vulnerability to depression, lower self-esteem, lower self-acceptance, lower life satisfaction, greater psychological distress, and greater loneliness (Sutin and Terracciano 2013; Puhl and Heuer 2009). One result of this weight discrimination is that “Participants who experienced weight discrimination were approximately 2.5 times more likely to become obese at follow up, and participants who were obese at baseline were three times more likely to remain obese at follow up (Sutin and Terracciano 2013). Another finding has been that those who experience weight discrimination have been found to have an increased mortality risk of nearly 60 percent (Sutin et al. 2015).

c) **Poor or dysfunctional attachment** This is such a potentially important consideration that it is dealt with at length under brain development

d) **A Negative Mindset**. It has been suggested that Automatic Negative Thoughts are bad for healthy brain function and that this can be addressed by processes which challenge such thoughts (Amen DG 2015).

Understanding the factors in our lives which can positively and negatively affect our brain health is important. Knowing and understanding what these factors are and how individuals can modify their

lives to help the health of their brains is a significant part of what we need to know in order to look at how the public policy objective of optimizing the brain health of all our citizens can be achieved.

#### **Recommendation**

**7. The Working Committee on Optimum Brain Health should catalogue and disseminate knowledge of life experiences which can have positive impact on brain health, and those which can have negative impacts. This knowledge should be incorporated into the K-12 school health curriculum so that all children will have some knowledge of how to look after their brain.**

## Section 3: Brain development

“Brains are built over time and the foundation of brain architecture is constructed early in life.”

“Globally... about one-third of children under age 5 fail to meet their developmental potential as a result of poverty inadequate nutrition.” “Early experiences affect the nature and the quality of the brain’s developing architecture by determining which circuits are reinforced and which are pruned through lack of use.” “Skill begets skill as brains are built from the bottom up.” “Serve and return interactions shape brain architecture. When an infant or young child babbles, gestures or cries, and an adult responds appropriately with eye contact, words or a hug, neural connections are built and strengthened in the child’s brain that support the development of communication and social skills.” “Acquiring the building blocks of executive function and self-regulation is one of the most important and challenging tasks of early childhood” (Centre on the Developing Child, Harvard University 2016).

**1. Nutrition and Brain Development** – As already discussed supplementing the diet of pregnant women, breast-feeding women, and neonates with long-chain polyunsaturated fatty acids, specifically docosahexanoic acid and eicosapentanoic acid which are important for brain and nerve function, raises a child’s IQ by more than 3.5 points. (Protzko et al. 2013) )

**2. Sensitive time point or windows for critical area of brain development** – For certain brain activities, there is a critical developmental time point. For example, a child with strabismus can have a “lazy” eye which is not following objects as a result of the problems with the muscles controlling the eye’s movements. The condition can be surgically corrected, but the correction needs to take place early in life, or the window of opportunity to make the brain connections to allow optimum vision will be missed. Similarly, with a child with a hearing difficulty at birth, it is important to identify and address this quickly or the child will have greater difficulty developing hearing, language and speech because the critical, optimal time period for learning hearing, sounds and speech is missed. It is for this reason that Manitoba, along with many other jurisdictions, has universal newborn hearing screening. Other aspects of brain function have time sensitive windows. Attachment (see below) develops early, and it is very difficult to correct attachment problems after age 4.

**3. Attachment** – and variations in the development of attachment as they apply to brain health. Attachment theory has put forward the concept, now supported by much evidence, that if, when a child is young, caregivers are generally warm and interactive with the child, and can be counted on when needed and do not engage in “frightening” behaviours, a secure sense of attachment can develop to the caregiver(s)” (Fraley and Roisman 2015). As a result, “the child is likely to explore the world confidently, initiate warm and sociable interactions with others, and find security in the knowledge that a caregiver is available if needed” (Fraley and Roisman 2015). This is the picture of what is referred to as the development of “attachment security”.



In contrast, "if attachment figures are cold, rejecting, unpredictable, frightening or insensitive, the child learns that others cannot be counted on for support and comfort," and this child is likely to develop what is referred to as the development of "attachment insecurity". In this case the child may react "by excessively demanding attention and care (anxiety response) or by withdrawing from others" and/or striving to achieve "a high degree of self-sufficiency" (avoidance response) (Fraley and Roisman 2015).

i. Attachment security is associated with a greater emotional understanding, being more empathic towards others, being better able to take the perspective of other individuals and expressing less anger and hostility (Fraley and Roisman 2015). Individuals with attachment security have also been found to be better caregivers and care receivers, to suffer less depression and experience fewer negative emotions, and are more satisfied in their romantic relationships. As well, in their jobs, they have been found to be more satisfied as employees, healthier, more engaged in their work, higher performers on task related and non-task related jobs, less involved in deviant workplace behaviours, better team performers and team leaders, and more able to balance work and family issues (Paetzold 2015).

ii. Attachment insecurity is associated with greater anger, aggression and hostility and less empathy towards others (Fraley and Roisman 2015). Attachment insecurity is also associated with depression, generalized anxiety disorder, obsessive-compulsive disorder, substance abuse, posttraumatic stress disorder, eating disorders and suicide ideation (Ein-Dor and Doron 2015). Insecure attachment associated with anxiety is also significantly associated with some forms of chronic pain, with stroke, with heart attacks and with high blood pressure. Insecure attachment associated with avoidance is associated with an increased likelihood of having headaches, arthritis, back and neck problems and other chronic pain issues (Pietromonaco et al 2015). These lengthy lists provide evidence that the nature of attachment is very important in understanding brain health as well as aspects of overall health.

Attachment styles are a function not only of early childhood experiences, but also of subsequent close relationships and other life experiences (Paetzold 2015). Attachment styles may also be influenced by genetic factors which render individuals more susceptible to attachment insecurities as a result of exposure to adverse events in childhood (Ein-Dor and Doron 2015 ).

The really good news about the work on attachment is that it now appears that attachment styles are subject to change so that children can be protected and their lives enhanced as they grow up and age. This research is based on the understanding of the nature of the responsive parenting which leads to secure attachment.

The major elements of such parenting are:

1. nurturance, especially when a child is in distress,
2. contingent responsiveness in which a parent responds quickly to a child's behaviours when the child is not distressed,
3. delight by the parent in the child's positive behaviours,
4. The avoidance of any frightening behavior by the parent towards the child.

With this understanding a number of interventions with parents and children have been undertaken.

One of the most extensively studied interventions, and also one of the most effective to date is "Attachment and Behavioural Catch-Up" (ABC). ABC has been specifically designed for infants age 6 months to 24 months who have experienced early adversity. It is a 10 session intervention conducted in a family's home by a parent coach with parents and children present. The ABC intervention has been shown in randomized clinical trials to be effective in improving attachment, and several years after intervention completion, reducing child negative affect during a challenging activity and improving executive functioning (Dozier and Roben 2015)

Also very promising is the application of attachment theory to helping adults, specifically in helping adults with couples therapy. Not only is the evidence that healthy secure attachment in a child can lead to improved adult relationships, but the application of attachment theory and science have led to the development of emotionally focused therapy for couples experiencing distress in their relationship. As Johnson and coworkers put it "Attachment offers a systematic protocol for relationship repair that has already proven effective on many difference levels and is more and more broadly adopted by couple therapists across the globe. It also expands the scope of couple therapy as a modality. If couple therapy can help partners not only repair their relationships, but shift from basically insecure working models and affect regulation strategies to secure connection, this therapy modality can begin a cascade of change and individual growth, evoking all the positive effects associated with more secure loving bonds" (Johnson et al 2015) .

### **Recommendations**

**8. That attachment theory be part of the K-12 health and parenting curriculum**

**9. That the understanding of attachment theory, and the implementation of public health approaches which maximize the extent to which secure attachment develops be a central part of the plan to optimize brain health in Manitoba.**

## **Section 4: Action Plan with respect to improving the brain health of Manitobans**

An action plan to improve the brain health of Manitobans needs to be based on science and evidence. Where there is adequate current science and evidence, the plan should not hesitate to make bold recommendations. Where there is evidence combined with a substantive theoretical perspective which suggests the need for action, but there is insufficient amount or quality of evidence to implement change, then the plan should not be silent but should present the case for action and recommend that the action be in the form of provincial efforts to support or be involved with research. Such research may be in the form of observational research using existing provincial databases like that of the Manitoba Centre for Health Policy. It may be in the form of support for efforts which extend the basic knowledge we have, or it may be in the form of action research in which change is implemented in limited groups or limited geography in the context of testing whether the change is effective, understanding how the change can best be implemented and what will be its costs and benefits. Throughout the process of implementing the action plan, adequate attention must be paid to public awareness and public consultation.

### **Recommendations**

**10. The Government of Manitoba must implement an action plan based on science and evidence.**

**11. The Government of Manitoba must increase support for the research efforts needed to move our province forward and position Manitobans at the forefront of the understanding of the human brain and how we can best benefit Manitobans. We heard there is a particular need for the province to fund individuals in the transition period after their start in research and before they receive funding from the Canadian Institute for Health Research.**

**12. The Government of Manitoba, in moving forward with a brain health action plan must engage in a public awareness effort which helps all Manitobans to understand why this effort is so important and must, where needed, engage in public consultations as part of this process.**

# Part I: General Brain Health Measures

The Action Plan is presented in two parts.

Part I - deals with general brain health areas including

- 1) Nutrition,
- 2) Exercise,
- 3) Sunlight and Vitamin D,
- 4) Learning and related brain health enhancing activities,
- 5) The Provision of Psychological Services,
- 6) Bullying and brain health
- 7) Being overweight and brain health
- 8) The coordination of behavioural health services,
- 9) Circles of Care and Networks of support
- 10) Life goals, helping others, meditation and art as part of improving brain health,
- 11) Housing and homelessness
- 12) Employment.
- 13) Using trauma Informed approaches

## 1. Nutrition

Nutrition is clearly important to brain health. The nutritional requirements of the brain are important and in certain ways different from most of the rest of the body. There is now a very large body of evidence which looks at this relationship between nutrition and brain health and which supports the concept that through specific nutritional changes brain health can be improved.

### Recommendation

**13. The Government of Manitoba needs to make, through its Working Committee on Optimal Brain Health, formal nutritional recommendations for improving the brain health of Manitobans.**

In specific nutritional areas, there is a solid theoretical base and a substantive base of scientific evidence for taking action.

### DHA and EPA

Many Canadians and Americans do not get sufficient DHA and EPA in their diets (primarily from fish). The average daily intake for DHA for pregnant women in Canada has been measured at 80 mg/day (Denomme et al 2005). The estimated DHA plus EPA intake for adult Canadians is 130-150 mg/day. The recommendations of the Dietitians of Canada is for DHA plus EPA intake of 300 to 450 mg/day.

The recommendation of a National Institute of Health workshop is for a combined DHA and EPA intake of 650 mg/day, and of the American Heart Association of 900 mg/day (DHA-EPA omega-3 Institute 2016). Canadians have, on average, very low levels of DHA and EPA intake. This deficiency in DHA and EPA is confirmed in an analysis of red blood cells phospholipids in Canadians which shows that only 2.6 percent of Canadians had DHA plus EPA levels which were considered high enough to be at low risk of coronary heart disease (Langlois and Ratnayake 2015). A study in Canadian children aged 4 to 8 years old also found low intake of DHA and EPA, with only 12% having the presently recommended amount (Madden et al 2009). Analysis shows that in the United States, which has similar DHA and EPA consumption patterns to Canada, there are between 72,000 and 96,000 excess deaths each year due to low DHA and EPA consumption (Danaei et al 2009). It is with the background of low DHA and EPA in Canadians that the following work on DHA and EPA is considered.

**DHA and EPA in pregnant mothers and infants:** Primary among the areas of nutritional research where there is a solid base of evidence and theory is in our knowledge of DHA and EPA. In this case, there are a series of 8 randomized controlled clinical trials with a total of 844 participants which were reviewed using a carefully designed and sophisticated meta-analysis. The trials combined showed that supplementing either a pregnant mother or supplementing infant formula with DHA and EPA or a fish oil containing DHA and EPA raises a young child's IQ by more than 3.5 points (Protzko et al 2013).

Supplementing a pregnant mother with DHA and EPA has other beneficial effects as well. Such supplementation has been shown to decrease the number of prematurely born babies, to decrease the number of low birth weight babies, to decrease the number of babies needing to be admitted to intensive care units, and to decrease infant deaths. These findings are substantial (Mackrides et al 2010; Carlson et al. 2013) Combined the data show clear and adequate evidence for benefit from the supplementation of pregnant women with DHA and EPA and warrant a recommendation for supplementing pregnant women with DHA and EPA. The overall benefit and cost benefit of acting is substantial (Ahmed S et al. 2015). Since Manitoba has the highest infant mortality rate in Canada, this single action could have the benefit of improved infant mortality rates as well as fewer infants needing Neonatal Intensive Care Unit care and thus reducing costs and morbidity associated with prematurity.

#### **Recommendation**

**14. Strong consideration should be given to DHA and EPA supplementation for all women in Manitoba during pregnancy, beginning by week 20 of pregnancy in Manitoba. (A possible exception may be women with bleeding conditions where there is a theoretical possibility the DHA and EPA could worsen the condition).**

**DHA and children who are slow readers:** A randomized controlled trial of DHA in children who were 7 to 9 years of age and who were below the 20 percentile for reading showed that in these children, the reading ability improved significantly in those children who received DHA compared to those who did not (Richardson et al: 2012).

**Recommendation**

**15. The Manitoba Pediatric Society should be asked to make recommendations with regard to children who are in the lower 20 percentile in reading and who are aged 7 to 9 as to whether such children should routinely receive a DHA/EPA supplement. If so, the cost of the supplement should be covered under pharmacare.**

**DHA and EPA and reducing violent behavior:** Another area where convincing studies exist relates to the supplementation of prisoners where there is a possibility of violent behavior. Two studies, one from the United Kingdom and one from Holland have clearly shown that supplementation with DHA and EPA and vitamins can reduce violent actions in the prison setting. (Gesch B et al. 2002; Zaalberg et al 2010). In the British study, especially violent actions were reduced by 37 percent compared to 10 percent in the placebo group. In the Dutch study the comparable numbers were a 34 percent reduction in the supplemented group compared to 14 percent in the control group. These findings are consistent with other observations which link violence and violent crime to decreased consumption of fish and seafood (Hibbeln 2001), and a study showing supplementation of DHA and EPA can reduce aggression in children (Raine et al 2016).

**Recommendation**

**16. Individuals who are inmates in jails should receive diets containing sufficient fish and seafood or diets which are supplemented with DHA and EPA and vitamins to reduce violent activities in our jails.**

**The wider use of DHA and EPA to improve brain health:** Some physicians are going further, and are starting to ensure any individual with a concern over brain health is receiving adequate DHA and EPA either in the diet or as a supplement (Amen 2015). Higher DHA levels in cord and maternal blood at birth are associated with improved neurological status of children at age 5.5 years (Escolano-Margarit et al 2011). DHA and EPA may be important for cognitive development in infants and children and ensuring adequate DHA and EPA for all children should be given a priority. Eating fish (containing DHA and EPA) more frequently has been associated with better grades in school during adolescence (Kim et al 2010).

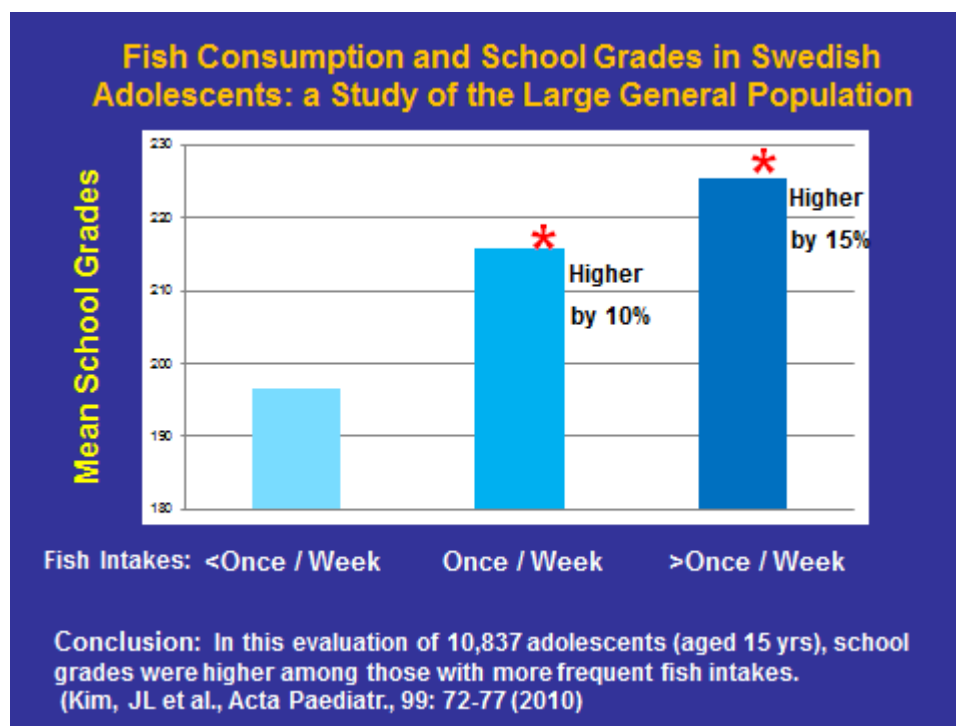


Figure 2: Fish Consumption and school grades in 15 year olds. This figure was provided courtesy of Dr. Bruce Holub.

There are dietary recommendations for DHA and EPA. In Canada, the Ministry of Health recommends adults in Canada have 1.1 to 1.6 mg/day of DHA, EPA and ALA (alpha-linoleic acid) (Health Canada 2016). The Dietitians of Canada (2016) recommend between 300 and 450 mg DHA and EPA per day. Noteworthy, trials in depression suggest that it should be at least 60% EPA (Sublette et al 2011). Based on these dietary recommendations, Manitoba should act. It is certainly the case that many, many Manitobans are getting far less than this.

### Recommendations

**17. Since DHA and EPA are important for brain health, Manitoba should reinforce existing recommendations from Health Canada and Dietitians of Canada with regard to DHA and EPA in the diet or in supplements, and the advice of the Working Group on Optimum Brain Health should be sought as to the best way to ensure as high a proportion as possible of Manitobans are meeting these daily requirements.**

**18. The Working Committee should be charged specifically with addressing on an urgent basis (in cooperation with existing organizations like the Manitoba Pediatric Society) issues such as a) Should it be recommended that all (or only those with inadequate dietary intake of fish) breast feeding women, and all children under the age of 5 years who are not being breast fed or receiving DHA and EPA in their formula be recommended to receive supplemental DHA and EPA, and if so that such supplements should be fully covered under pharmacare?**

**19. Provincial support for research to study the impact of diet on brain conditions should be enhanced. As an example, research is needed to establish the extent of fish and seafood consumption by Manitobans and the levels of DHA in Manitobans.**

**20. Given the importance of access to fish for communities, changes should be made to the Freshwater Fish Marketing Corporation to allow locally produced fish to be sold by fishermen to local groceries, local restaurants, and local institutions like hospitals and personal care homes in the home community of the fisherman in order to enable greater incorporation of fish into local diets. Together with this effort to market local fish, the DHA and EPA content of fish species in Manitoba should be listed on the Province of Manitoba web site.**

It is important that there be adequate infrastructure to support good nutrition throughout Manitoba, from our school system through support for dietitians. The Child Nutrition Council plays an important role in nutrition in Manitoba's schools. Its role needs to be continued, indeed expanded, to address brain health concerns. There exists currently a shortage of dietitians in Manitoba. The Manitoba government needs to evaluate this situation and act to ensure there are adequate numbers of dietitians in our province – particularly in areas where the percentage of people with brain health conditions and with diabetes is high.

#### **Recommendation**

**21. The province needs to sustain and enhance the role of the Child Nutrition Council in improving the diets of children in our primary and secondary schools.**

**22. The province should evaluate the number and distribution of dietitians in Manitoba and take measures to ensure there are adequate numbers of dietitians and that sufficient dietitians are present in areas of high need.**

## **2. Exercise**

Abundant evidence supports the fact that exercise is good for the brain (Dunn et al 2001, 2005). This applies in particular to aerobic exercise, but also to strengthening, resistance exercises. The effects are powerful and may, for example, reduce the risk of Alzheimer's disease by 60 percent. The impact of exercise may vary somewhat according to the type of exercise. For example, walking or running on rough terrain appears to be better for your brain than walking or running on smooth roads or sidewalks. This may be because the former requires the brain to be more engaged and more active during the exercise than the latter – because there are more challenges from the rough terrain in terms of balance, coordination etc.

Manitoba, as with other provinces promotes "healthy living" which includes exercise. But there are still many Manitobans who do not do sufficient exercise to keep their brains healthy. The reasons may be complex – lack of understanding of the importance of exercise, lack of motivation to exercise,



lack of available space or facility to exercise, the design of our communities which in general promotes a car culture rather than an active living (biking, walking, etc.) culture. The challenge in implementing an “exercise” culture is how to best achieve it and what steps will be most effective. To date, too little has been done to assess province-wide activity levels of Manitobans and to address areas where levels are low.

### **Recommendations**

**23. The provincial government needs to evaluate on an ongoing basis the activity levels of Manitobans and to do this by region and by community in order to provide a basis for an action plan to improve the level of physical activity province wide.**

**24. Exercise, because of its general benefit for brain and cardiovascular health should be promoted by health professionals and governments for its beneficial impact. The provincial government should make a public health recommendation for exercise for optimal brain health and for prevention of Alzheimer’s Disease, and task the Working Group for Optimum Brain Health to make recommendations for specific effective actions that the government, organizations or individuals should take.**

Some studies suggest exercise is not mentioned enough by physicians, not recorded enough and not assessed as a risk factor for various conditions, including brain conditions, enough. Should exercise be discussed with all patients? Should information on exercise as good for the brain be available in all doctors’ offices? Should exercise be part of what psychiatrists, psychologists and neurologists include as part of their overall health prescription for every brain health issue? Are there exceptions? Should some of the focus be on exercise activities like hand movements, leg movements, eye movements, lip movements and tongue movements for individuals with disabilities who are not able to exercise in more typical ways. Should there be adequate exercise facilities in personal care homes, and if so what types of exercise facilities?

### **Recommendation**

**25. The Manitoba College of Physicians and Surgeons should be asked to evaluate the extent to which physicians are talking to their patients and providing information about exercise, and should make recommendations for exercise to support optimum brain health.**

### 3. Sunlight and Vitamin D

There is very substantial evidence for a beneficial effect of sunlight and vitamin D on brain health. Part of this effect of sunlight is due to the impact of sunshine to increase vitamin D, but part is independent of vitamin D and is due to other factor(s) (Baarnhielm et al 2012) . A very strong relationship has been found between levels of vitamin D and Multiple Sclerosis and treatment with vitamin D has been shown to be effective in preventing Multiple Sclerosis and reducing the symptoms and the relapses in Multiple Sclerosis (Kampman et al 2008; Munger et al 2004; Ascherio et al 2010; Goldberg et al 1986; VanAmerongen et al 2004; Etemadifar and Janghorbani 2015; Jelinek 2016, ). Levels of vitamin D below 125 nmol/l are associated with depression (May et al 2010), and dietary supplementation with vitamin D has been found to reduce depression (Jorde et al 2008). Vitamin D supplementation in elderly populations has been shown in a meta-analysis of varied studies to reduce falls by more than 20 percent (Bischoff-Ferrari et al 2014). Varied additional evidence suggests that adequate vitamin D is essential for brain health (Garcion et al 2002).

Nevertheless, there are important questions which need to be asked. To what extent should physicians looking after patients with varied brain conditions be assessing patients to see if they have optimum vitamin D levels? Should sunlight and vitamin D be discussed with individuals with all brain conditions? Is there an intersection in the interests of those interested in public health and those interested in building design? What efforts are currently being made to look to see whether individuals with brain health issues are getting sufficient sunlight and vitamin D? Should assessment of exposure to sunlight and level of vitamin D be part of the full assessment of every individual with a brain health condition? Should vitamin D be prescribed for all individuals with brain health conditions who have suboptimal levels of vitamin D?

Questions like these are being asked in the medical literature and publicly. Chaudhuri (2005) makes the case for offering routine supplementation in pregnancy and childhood to prevent multiple sclerosis. An editorial (2010) in the Lancet Neurology makes the following comment:

*"because the risks seem to be low, is there already a case for widespread vitamin D supplementation? Scotland is one such region where the prevalence and incidence of MS, and other diseases related to vitamin D deficiency, are already so high that the benefits of supplementation are likely to outweigh any potential side-effects. During an upcoming summit in Scotland, hosted by MS Society Scotland and resulting from the Shine on Scotland campaign, researchers will present the case to Scottish government officials for vitamin D supplements to be made freely available for all young children and pregnant women. As vitamin D is an inexpensive supplement, the potential cost savings of such a programme are enormous, and in addition to MS, might have implications for numerous diseases linked to vitamin D deficiency. In Europe, if the predicted effects of raising serum vitamin D concentrations to 100 nmol/L are realized, the potential savings have been estimated to be €187 billion per year from the direct and indirect burden of disease, set against an expenditure of €10*

*billion on testing and public education. As well as the possible health benefits, such a supplementation programme might provide important research opportunities to understand the long-term effects of vitamin D.”*

Scotland, which like Manitoba has a very high incidence of multiple sclerosis, has already acted based on recommendations from their Scientific Advisory Commission on Nutrition. Scotland has suggested that everyone over the age of one in Scotland needs to consume daily supplemental vitamin D in order to protect bone and muscle health (editorial 2016). See also information on individual conditions in Section 5.

#### **Recommendation**

**26. The Working Committee on Optimum Brain Health needs to consider the evidence with respect to sunlight and vitamin D on brain health, particularly in relation to depression and multiple sclerosis, make a recommendation for where research is needed and where preventive treatment (for example to optimize vitamin D levels) can be incorporated into general practice, and whether Manitoba should follow Scotland in recommending all Manitobans over the age of one take vitamin D supplements. At a minimum those over age 50 should have supplementary vitamin D because of clear evidence it reduces falls in the elderly.**

#### **4. Learning and related brain health enhancing activities**

There is now a considerable body of knowledge which provides evidence for a significant effect of learning by children on brain health. There is also evidence that level of education and ongoing learning can be protective in terms of dementia. However, the knowledge with respect to the prevention and treatment of dementia needs to be expanded upon so that recommendations in regard to the latter can be more specific.

#### **Recommendations**

**27. Assessment of interactive reading with a child and assessment of preschool learning should be a normal part of the brain health history of every child, and addressing these issues when they are lacking should be part of the assessment of every child’s brain health and development by their physician. The Manitoba College of Physicians and Surgeons should be asked to evaluate the extent to which this is currently happening and whether measures to improve current physician practice are needed.**

**28. Assessment of the extent to which an adult is engaged in learning programs should be part of the brain health assessment of adults with respect to the prevention and treatment of dementia. The Manitoba College of Physicians and Surgeons should be asked to assess current practices and whether measures to improve current physician practice are needed.**

## 5. The Provision of Psychological services

Enhanced access to psychological services in Manitoba is badly needed to improve the brain health of Manitobans. Anderssen (2015) makes a very strong case for coverage of psychotherapy under medicare – indeed quoting Dr Elliot Goldner as saying “This is the biggest gap we have and the one that most needs to be fixed.” In part this is necessary to address the current long wait times as well as the poor access to psychological services for those who are unable to afford them. Liberals have advocated for including certain psychological services delivered by psychologists under medicare to improve brain health. This approach is being used elsewhere and has been studied extensively and been found to be effective and cost-effective (Hunsley 2002). Many psychological services now have a proven track record with controlled trials showing, for example, that cognitive behavioural therapy provided by psychologists is as effective as medication for depression in the short term and more effective in the long term. Liberals have advocated for the inclusion of psychological services for children, psychological services for depression, postpartum depression, post-traumatic stress disorder and those with suicidal ideation under medicare to begin with.

The issue of the scope of psychologists practice also needs to be addressed (Canadian Psychological Association 2016), so that psychologists can be practicing to the extent of their competence and be more fully included in health care.

There is also a need to hire more public sector psychologists. For example, there is wisdom in having a psychologist associated with the Health Science Centre Addictions Unit.

### Recommendations

**29. The Government of Manitoba should start including certain psychological services under medicare as with physicians’ services to make sure they are available to those who need them.**

**30. Manitoba needs to review with the Manitoba Psychological Society the scope of psychologists practice and make changes to allow psychologists to more fully participate in health care prevention and treatment, and have a greater role in certain critical areas such as the care of suicidal patients on discharge from a hospital or the Crisis Response Centre.**

## 6. Bullying and brain health

Bullying can be very negative in terms of brain health. “Bully victims are significantly more likely to be diagnosed with both generalized anxiety disorder and anti-social personality disorder. ... Another negative mental health outcome of bullying that causes great concern is suicidal behavior” (Kaplan C, Chard A: 2015). A survey in the United States has shown that 19.6 percent of children are involved in bullying, 13 percent as victims, 4 percent as perpetrators and 3 percent as both victims and perpetrators (Kaplan and Chard 2015). Progress has been made in Manitoba with legislation to address and reduce (hopefully eliminate) bullying in schools. To date there has not been objective

analysis of its impact. Reducing and/or eliminating bullying must continue to be a policy goal in Manitoba. It could be considered to put bullying under the human rights code, as at present it is only covered under the Human Rights Code when it can be shown to be related to one of the aspects which is covered such as race, ethnicity or gender. Indeed, in 2013 Manitoba Liberals brought forward an amendment to do this, but it was rejected by the then government.

### **Recommendations**

- 31. That an evaluation of the current extent of bullying in Manitoba be undertaken to assess the effectiveness of recent anti-bullying legislation, and whether changes are needed.**
- 32. Legislation should be passed to include bullying under Manitoba's Human Rights Code so that those who are adversely affected by bullying have can have their concerns considered.**

## **7. Being overweight and brain health.**

Dr. Moe Lerner has for more than 20 years called for addressing discrimination against those who are overweight. Sadly, as Brian Goldman (2014) exposes in his chapter "Harpooning the Whale", we have a major problem in health care with bias and discrimination against those who are overweight. For example, in one instance he mentions an obese "woman who had been driven from any and all benefits that modern medicine might offer her by the cold and denigrating judgment offered her by almost every modern medical practitioner she had met." Because discrimination is associated with an increased incidence of brain health conditions, particularly depression, it is important that measures be taken to end discrimination on the basis of weight. This does not lessen concerns that being overweight may not be good for your brain. Indeed, "there are dozens of studies... that report as your weight goes up the actual physical size and function of your brain go down" (Amen 2015). However, studies have shown that discrimination against those who are overweight is harmful to individuals and is associated with greater problems in reducing weight, not lesser ones. As Goldman (2014) puts it "people who experienced weight discrimination are more than twice as likely to remain obese as those who do not experience such prejudice." Therefore, discrimination makes the situation worse not better and it needs to end.

Others, besides those who are obese are from time to time discriminated against on the basis of their size or weight – for example individuals with eating disorders and individuals who are very short or very tall.

### **Recommendation**

- 33. Legislation be implemented to include discrimination on the basis of physical size or weight to be under Manitoba's Human Rights Code**

## **8. The coordination of behavioural health services - a “My Team” approach**

Implementing a more effective brain team approach to improving brain health to address the full range of brain health concerns from mental health illness, to addictions, to neurodevelopmental issues to brain injuries is needed. Manitoba can build on excellence in certain areas – as, for example, with surgery using the gamma knife. For optimum brain health for Manitobans we need close working relations among all behavioral health and neurologic health specialists in the province. The Group for the Advancement of Psychiatry has been a very strong advocate for improved teamwork – including not only behavioural health professionals, but also extended family members, circles of friends, mentors in the community and members of the justice system - to help bridge the divides which too often result in fragmented and poor care and support, and poor transitions (from hospital to the community, from a corrections facility to the community etc.). (Group for the Advancement of Psychiatry 2016). There has been some progress in this area in Manitoba, but there remains a lot of work to do to have seamless, patient centered care which truly involves and benefits from the knowledge and compassion of all. Patient centered approaches need to focus on making the change from care organized around health providers, to care organized around the patient so each patient can talk about “My health team”.

One approach to helping achieve better coordinated care, which will be important at least until real effective overall coordination is much better achieved, is to have system navigators who can help individuals deal with the current incredibly complex system. The Mood Disorders Association of Manitoba is working on an initiative in this regard which it hopes to have implemented in the near future. The Mood Disorders Association of Manitoba is to be congratulated in this respect as are organizations like the Brain Injury Association which try to provide a service which helps in this respect. It is to be noted that the Brain Injury Association recognizes that their clients have special needs in this area as many are deficient in short term memory. More is needed to address both the complexity of the system and the unique requirements of those with varied brain health issues.

Leaders with the Mood Disorders Association of Manitoba recommended that a “brain health dashboard” be developed which would essentially function as a single “dashboard” to allow a system navigator or a person with a brain health issue to navigate the system and to easily find all possible supports in Manitoba whether public or non-profit or private.

Anderssen has recommended putting a priority on the use of technology to deliver therapy into the homes of Canadians as an important solution.

### **Recommendations**

**34. The Working Committee on Optimum Brain Health make recommendations to the province on the optimum approach to create effective and optimal teamwork among all behavioural health professionals and those involved in the justice system and in other areas to support**

**optimum brain health for Manitobans. Included in these recommendations need to be measures to help clients of our health care system with brain health issues navigate the system, taking into account the fact that those with brain health conditions may have unique needs in this respect.**

**35. A brain health “Dashboard” be developed to allow individuals to efficiently find the wide variety of resources which are available in Manitoba.**

**36. The potential to use technology to delivery therapy into the homes of Manitobans be explored.**

## **9. Circles of care and networks of support**

Networks of support can and should include family, friends and community members. Circles of support are critically needed for those with brain health issues. These need to be supports which include those outside the professional behavioural health services because achieving the goals of the prevention and treatment of brain health conditions often depends, in the long run, on being able to transfer support from the behavioural professionals to a family and community based social network.

Currently in Manitoba, families feel ill equipped to help a child or a family member with a mental or brain condition. Families often feel left out and disempowered because of the current Manitoba system which tends to limit the involvement and help of families. Other provinces, notably British Columbia have a Mental Health Act which is more permissive for contacting and informing families and a change to the British Columbia model needs to be considered.

One of the most effective measures to help provide the circle of support is the use of peer support workers to help those with brain health issues (Trachtenberg et al 2013). Achieving effective programs using peer support workers needs an assurance of adequate training of peer support workers. In Canada, there already exists the Peer Support Accreditation and Certification (Canada) (PPACC) which provides accreditation and certification of peer support workers. PPACC emphasizes that there are two types of peer support worker – peer support for those with lived experience (those with mental or brain health issues) and peer support for families, where family includes those in a person’s circle of support. The latter could be very helpful in assisting families and helping family members to be more knowledgeable and more involved. There is not currently a national training program for peer support, or a provincial (Manitoba) training program. These are badly needed if we are to achieve the potential very significant benefits from enhanced peer support efforts.

## **Recommendations**

**37. The Working Committee on Optimum Brain Health make recommendations for the optimum approach achievable in Manitoba for creating effective networks of support to assist those with brain health issues. These recommendations need to include changes to the Mental Health Act to make it easier for health professionals to share information with family members and possibly with other members of the person's circle of support.**

**38. The Province of Manitoba ensure that all RHAs have programs which employ peer support workers for those with brain health issues.**

**39. The Province of Manitoba begin a training program for peer support workers who can be certified through PSACC.**

**40. The Province of Manitoba advocate with the federal government for a national training program for peer support workers with national funding.**

### **10. Life goals, helping others, meditation and art as parts of improving brain health.**

Amen (2015) has emphasized that having life goals, and in particular goals to help others, can have a substantial and sometimes profound effect on brain health. As a psychiatrist, he has a critical understanding of this area, but it is worth reiterating the evidence in this respect which shows that greater purpose in life predicts lower mortality across the lifespan of individuals (Hill and Turiano 2014).

Meditation and attention to relaxation has become an important part of therapy to improve brain health. Similarly, art therapy, as happens at the Artbeat Studio in Manitoba has been very helpful to many. Altruism and helping others can be an important part of therapy and of improving brain health.

### **11. Housing and homelessness**

It is no secret that a disproportionate number of people who are homeless in Manitoba have brain health issues. For example, in Toronto it was startling to find that 58 percent of the men and 42 percent of the women had had a significant brain injury before becoming homeless.

In Medicine Hat, they have developed a program to end homelessness and have been very successful in dramatically reducing the number of homeless people

Housing First was brought to Manitoba as part of a research study to evaluate its effectiveness. The study, in five major cities across Canada, demonstrated major benefits from employing an approach



addressing housing needs first to help those with significant brain health issues. The study demonstrated the effectiveness of this approach as well as its cost effectiveness, the ability to balance the cost of the program with savings in other areas of provincial funding. The plan, while it has continued in part, has not been extended province wide for all who need it.

When success is achieved in a research effort, the natural result should be the extension of the benefit to all who need it. It would not happen, except under very rare and temporary circumstances that when a new drug is tested, and the results found positive that the new drug would then only be used to treat those patients who were already treated and to neglect the effective treatment of those in the control arm. It would, put bluntly, be unethical and a breach of trust toward those who accepted being in the study and were randomized to the control arm. Without any hesitation, the benefits of the housing first intervention need now to be, as fast as possible, extended to those in the control arm and then as quickly as possible to all in Manitoba for whom the study has demonstrated a benefit and a cost benefit.

Landlords in Winnipeg have had issues with the Housing First program. The result is, that though the approach for Winnipeg needs to build upon the Housing First approach, it needs to use more effectively the approach in Medicine Hat which is built on a good cooperative relationship between the program and all landlords, whether private or public or non-profit sector.

### **Recommendation**

**41. Housing First be extended as expeditiously as possible to all Manitobans with serious brain health issues for whom benefit for housing first was shown in the national study. That the approach be one which works in partnership with private sector landlords as well as public sector and non-profit sector landlords as in Medicine Hat.**

## **12. Employment**

“Evaluation of various groups based on sex, age, race/ethnicity and educational level consistently found an association between unemployment status and poor mental health across many diverse population groups” (McGregor and Holden 2015). Sometimes the brain health issue comes first, sometimes it is in part a result of the unemployment, or is exacerbated by the unemployment. Nevertheless, it is clear that lack of employment has an adverse impact on brain health, and that an employment plan is needed for those with brain health challenges. This should include professional help with employment as employment for an individual with brain health issues can be a challenge. That being said, many individuals with brain health issues are extraordinarily creative and can be extraordinarily productive. Such individuals can be a major benefit for an employer, but at the same time, effectiveness in keeping an individual with a brain health issue employed is a challenge and can

be best achieved with several key ingredients a) professional help in finding work, b) an employer who has an understanding of the brain condition and is ready to provide some accommodation to the individual. This can be as simple as keeping an individual with brain health issues away from stressful, pressure cooked situations, or allowing time for appointments with health professionals. It can, in some instances be much more complicated, but can be achieved where the individual can be accommodated in working from home, and c) the development of a circle of support surrounding the employee – so that other employees have some understanding of the circumstances and are there to provide support and understanding to a person with a tendency to be depressed, to be anxious, to be bipolar or an individual with an addiction. d) Under some circumstances a work subsidy may prove critical in ensuring continued employment. The cost of such subsidy is still potentially less than the cost of social services support for the individual when he or she is not employed. The productivity and creativity of such individuals as part of the team can be exceptional if the right fit and circumstances for the workplace can be found. The Manitoba Supported Employment Network is to be congratulated for its efforts in this area. Often individuals with brain or mental health conditions are only able to work for short periods, or at best one or two days a week or sporadically. The current social assistance system is not designed to help these individuals because the province claws back 70 percent of earnings under many of these conditions resulting in a major disincentive to work, and much less benefit from work than for others.

#### **Recommendation**

**42. The Social Assistance system needs to be redesigned so that it is useful for those with brain and mental health conditions who work for short periods, or part time or sporadically, so that they do not have a very high (70%) marginal tax or claw back rate. The 70% claw back rate should be reduced to 50%.**

There is a particular place where individuals with lived experience with brain health issues can be very helpful to the improvement of brain health in our society, and this is the employment of peer support workers who themselves have lived experience and can talk of their successes, and of dealing with the challenges along the way. Employing peer support workers has been shown to have positive effects on the peer support worker as well as on the service users, and in inspiring the brain health “Team”. Manitoba should move as quickly as possible to develop and implement approaches for employing peer support workers in the brain and mental health fields. Individuals who are peer support workers need the appropriate training – and training programs should be accredited under Peer Support Accreditation and Certification (Canada).

#### **Recommendations**

**43. The Working Committee on Optimum Brain Health be tasked with making recommendations for optimum support for individuals with brain health issues with regard to finding and maintaining employment.**

**44. Manitoba should proceed expeditiously to implement a plan which includes employing a substantial number of peer support workers.**

### **13. Using Trauma informed approaches**

Individuals exposed to traumas whether abuse, removal from family and friends, or physical trauma as in a car accident or a war needs a “trauma informed” approach to helping them. For children, traumatic events are often referred to Adverse Events in Childhood (AEC). While the help in dealing with trauma can and should come from health professionals, it is important that there be wider knowledge in the general public. This is happening with better understanding of post-traumatic stress disorder, and hopefully such understanding will progress so that societal reactions in general are helpful in addition to the positive help from behavioural health professionals.

## **Part II: Measures for Specific Circumstances or for Specific Conditions**

The goal here is not to be exhaustive in terms of understanding altered states of the brain, but rather to use several specific common conditions and issues and a few less common ones to illustrate aspects of brain function which are important to the development of public policy. In Part II, we deal with specific circumstances and specific conditions. These include:

- 1) Brain Health and the Criminal Justice System,
- 2) Brain Health and the Child and Family Services System,
- 3) Fetal Alcohol Spectrum Disorder
- 4) Neurodevelopmental Disorders including Autism and Asperger's Syndrome
- 5) Learning Disabilities
- 6) Intellectual Disabilities
- 7) Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder
- 8) Eating Disorders
- 9) Anxiety
- 10) Depression
- 11) Suicide,
- 12) Schizophrenia
- 13) Traumatic Brain Injury and Concussion
- 14) Addictions
- 15) Epilepsy
- 16) Parkinson's disease
- 17) Multiple Sclerosis
- 18) Stroke
- 19) Dementia
- 20) Phenylketonuria

### **1. Brain health and the criminal justice system**

Central to improved help for those with brain and mental health issues is attention to the criminal justice system. Those with brain health issues, from learning disabilities to traumatic brain injury to depression and schizophrenia are disproportionately represented in the criminal justice system. It does not have to be this way. It must be said at the start that Manitoba has made progress with the implementation of a Mental Health Court in Manitoba in 2012. Cindy Lamoureux says, after touring

Manitoba’s correctional facilities and talking with those in charge. “It also needs to be said that correctional facilities in Manitoba are working with the idea of brain health rather than denying it and punishing those incarcerated further because of it. Many people who are incarcerated are now diagnosed with brain health issues such as schizophrenia, dipression, bi-polar and others at the time of being admitted. Corrections focuses on stabilization. Those who have been diagnosed are much less likely to be mistreated as difficult inmates who do not want to follow rules, but rather they are treated with sensitivity specific to their diagnosis. A holistic approach is encouraged rather than solely a correctional approach. Corrections also insist on time spent in the sun to achieve a certain balance of Vitamin D. They take food into account to ensure a person is receiving certain nutrients and they encourage studies, trades and sports.” Nevertheless there is more that can be done throughout our criminal justice system, particularly to have a system that more effectively prevents and treats mental health so that people are not incarcerated in the first place.

**Preventing the unnecessary Criminalization of individuals with brain health issues:**

Manitoba has an extraordinarily high rate of incarceration compared to other provinces (see figure below). It is possible that the reason for these staggering rates is our inability to prevent the criminalization and incarceration of those with brain and mental health issues.

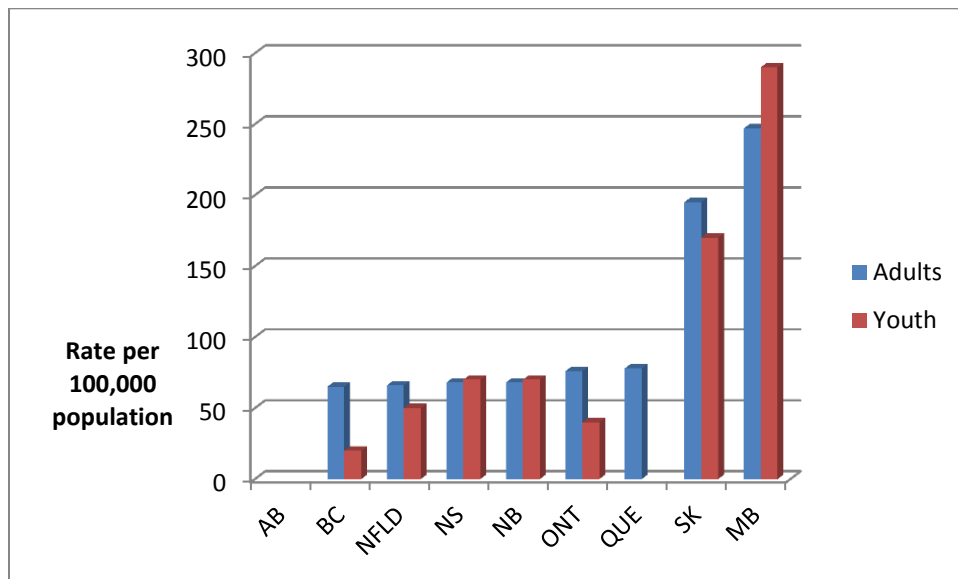


Figure 3: Incarceration rates for each province. Data from Statistics Canada

In a remarkable book, the Group for the Advancement of Psychiatry (2016) has put together a series of approaches which could help transform the ability of our behavioural health system so that it is more responsive to the needs of those with brain health issues and is better able to work in partnership with those involved with the criminal justice system. The book provides examples of situations which are often similar to what has and may still be happening in Manitoba. While there is far too much material in this book to include here, an example and a few comments are needed.

For example: "My son never stole, lied or hurt anyone. He was loud, disruptive and delusional, not a criminal. I was told the only way to get him help was to get him into the criminal justice system, so he could be contained. I had to press charges and he got arrested... he is now a "criminal".... I do not know the answer, BUT this is not it."

Very similar circumstances have occurred in Manitoba.

These points are made by the Group for the Advancement of Psychiatry in response to this story:

i) "An accessible, comprehensive, effective mental health system...is undoubtedly the most effective means of preventing the criminalization of people with mental illness. "

Addressing homelessness is a critical part of this because as Cindy Lamoureux comments "A lot of the crime happening in Manitoba is a result of poverty. It may be stealing for food, breaking and entering for shelter, or the real event of fighting for survival that often causes a homeless person to commit a crime... The Women's Correctional Facility in Headingly explained to me when I toured their facility that the female population is the fastest growing in prison and this is because of our economy. It is because women will often break the law for their families, whether it is to feed their children or put a roof over their heads."]

ii) "Arrest, incarceration, and criminalization are never acceptable substitutes for provision of appropriate treatment for individuals with behavioural health needs... "Diverting a mentally ill person to jail, to keep him or her out of the hospital, literally makes no sense."

iii) "The prevention of inappropriate criminalization of individuals with behavioural health conditions must be a system-wide quality improvement priority for every one of us.

iv) "Consider what can be done to make it more likely that an individual in a behavioural health crisis receives emergency treatment rather than being arrested. ..."Consider what can be done to identify individuals who have behavioural health needs that can respond to treatment and to connect those individuals to that treatment in lieu of pursuing incarceration and prosecution."

v) "When incarceration is required, quality behavioural health services must be provided."

From the perspective of the psychiatrist, the report says:

i) "Do I/we welcome people and families with mental illness and/or substance use issues with criminal justice involvement as priority clients for attention, inspiration and hope?"

ii) "Is it our mission to see every client at risk as a valuable human being who needs every effort on our part to stay out of jail?"

### **Recommendation**

**45. Every effort possible needs to be made to have a comprehensive, responsive and effective Justice System to address brain health issues so that wherever possible individuals with brain health issues are not criminalized.**

**Avoiding approaches which are insensitive and lack understanding of the challenges of individuals with brain health issues.**

"My son, now 23 years old, has a history of problems that have included learning disabilities, Attention Deficit Disorder, depression, substance abuse... The solution, slap fines on him that there is little chance he can pay, and when he does not pay throw him in jail. .. For the community, jail is expensive. Mentally ill people or those with substance abuse problems don't belong in jail. More importantly, it does not make the community any safer for the rest of us."

Whether it is slapping fines on those with brain health issues, or making bail conditions which individuals with brain health issues are unlikely, because of their condition, to fulfill, the justice system needs to be more understanding and more creative in achieving effective ways to divert such individuals from the criminal justice system to a behavioural health system which is responsive and effective.

Seventy percent of people in jail in Manitoba are not yet tried, not yet convicted or not yet sentenced. These delays relate in part to the inappropriate way in which individuals with brain health issues are handled by our court system, a number of which are documented in a lengthy report issued in 2014 (Canadian Civil Liberties Association and Education Trust 2014).

### **Recommendation**

**46. The issues raised in "Set up to Fail: Bail and the Revolving Door of Pre-Trial Detention" needs to be addressed urgently and changes made in Manitoba by the provincial government.**

**Ensuring public safety is addressed.**

Over the last two decades much has been learned about understanding violent behavior and providing greater public safety and more effective treatment approaches for those with the potential to show violent behavior.

-More rigorous and systematic and effective approaches are now available to identify individuals who may be violent. In general it has been found that expert opinion has tended to overestimate the potential violent tendencies for those with many types of mental illness, but to underestimate the violent tendencies of psychopaths who speak well and appear on the surface to be less likely to be violent. These approaches should be generally incorporated into the assessment of individuals with respect to their potential for violence (Harris et al: 2015)

-Improved diagnostic approaches, including SPECT and fMRI imaging are showing that lesions or alterations in the left temporal lobe need particular attention with respect to the potential for violent behavior, and that cysts which can be surgically removed or drained, and increased focal activity which can be treated are modalities which can be successful in reducing the potential for violence (Amen DG 2015).

-Improved understanding of brain biochemistry has demonstrated the importance of adequate nutritional and food supplement approaches with regard to violence prevention. Studies in England and in Holland have demonstrated a dramatic reduction in violence in individuals who are incarcerated who are taking supplemental DHA and EPA (Gesch et al. 2002).

### **Recommendation**

**47. Ensure systematic approaches are used to assess the potential for violent tendencies in individuals, that adequate diagnostic approaches are taken to be sure there is not underlying pathology which can be addressed, and that optimal approaches to brain health as well as to coordinating the activities of police and behavioural health professionals are taken to provide safety to Manitobans.**

### **Effective Partnerships and Achieving Effective Transitions**

It is important to ensure that partnerships of psychiatrists with family members and community friends of individuals with brain health issues, with individuals within the criminal justice system and between those caring for individuals in correctional institutions and in the community are occurring so that those with brain health issues can be best helped.

Too often, in Manitoba, those in the behavioural health system have not done as well as needed in partnering with family and community friends to enable optimum support. These points are made very strongly by the Group for the Advancement of Psychiatry. Specific comments include:

- Make transition planning a priority in your practice. [Cindy Lamoureux received specific comments and advice in relation to transitions. She said "Winnipeg Remand Centre suggested we have a better link between Corrections and Services. For example, Social Workers who follow up. We need more programs such as Winding River (except not only for addictions) that is offered at the men's facility at Headingley." She also says of the failure of some individuals to take medication after they are released "lack of medication could be due to having no Manitoba Health Card, or no Social Insurance Care...Stony Mountain assists all inmates who are being released in possessing both health cards and social insurance cards. Why not have this at all correctional facilities? Or catch it early at the Winnipeg Remand Centre? Furthermore I am convinced it would save money in the long run if homeless people could have assistance in creating this documentation."



- It takes a village to manage these patients
- “Prioritize working with families in your practice – recognize that a continuing partnership can make a difference between slow steps toward success and dramatic failure.”
- “Partner with families who have loved ones in the criminal justice system at every opportunity to work collaboratively (psychiatrist/treatment provider and family) to achieve the best possible outcome.”
- Teamwork with families can make all the difference.
- “How can the ‘right’ of mental health patients (who lack the ability to make good decisions for themselves) supersede the rights and safety and peace of mind for the families and communities of these patients?”
- “Today police departments serve as the de facto crisis system for most mental health systems... and police officers are first responders in most mental health crises occurring in our communities... yet until recently few law enforcement agencies had a systematic approach to addressing ‘mental disturbance’ calls. ”
- “Work as a collaborative partner with the judge and other criminal justice personnel for each patient who is involved in the court system to develop a successful plan of care that helps the judge to feel successful, helps the patient to be successful, protects public safety and minimizes incarceration.”
- Ensure wrap around services, supports and supportive family and friends are present at important transition times such as from hospital to community, from jail to community, and that emergency plans are in place to address crises at such times should they occur.

### **Reducing violence and criminality:**

Manitoba’s rates for our violent crime severity index are the highest in Canada (Stats Canada). Further, Manitoba’s rates for violence against women were double the national rate. This is a serious issue, and being a long standing systemic situation it needs a solution. One possible explanation, which has been overlooked, is that Manitoba’s population is relatively deficient in DHA and EPA (see Section 8 for more). It has been shown in careful studies that a deficiency in DHA and EPA is associated with increased violence and that supplementing individuals with DHA and EPA can reduce violence, and in an international study it was found that across many countries the amount of seafood consumption (seafood contains DHA and EPA) was inversely related to the murder rate in countries. Countries where more people were deficient in DHA also had a higher murder rate (Hibbel 2001) (for more see Section 3: Action Plan part 1, section on Nutrition). Regardless of whether the high rate of violence in Manitoba is linked to our diet, improved education in relation to empathy, family dynamics and ways of reducing family violence is needed in our schools. Some efforts are being made with programs like “The roots of empathy” which is being used in some Manitoba school divisions. But an

effective province-wide approach is needed which knits together the best of existing programs, and new ideas into a systematic effort.

**Recommendations - See 31-34**

**48. Research is needed to understand the potential relationship between those who commit violent acts and their intake of DHA and EPA.**

**49. There should be a focus on Transition planning including ensuring all those who are in a correctional institution are helped to ensure they have a Manitoba Health Card, a Social Insurance Card and have a transitional plan for housing.**

**50. A province-wide approach to preventing interpersonal violence through education in our schools should be implemented.**

There are many other areas discussed in this report which can help with prevention and/or treatment of brain conditions and/or the optimization of brain health which can be helpful in reducing the extent to which individuals with brain health issues need to come into contact with the Justice system. These would include a full implementation of Housing First (recommendation 44), and addressing attachment issues because “Insecure attachment can lead to conduct problems and socially deviant or criminal behavior” (Ein-Dor and Doron 2015). This finding arose from observations of Bowlby that “frustrating and painful experiences with parents, and/or early prolonged, or permanent separation from a mother, may result in an “affectionless” character marked by distrust and hostility towards parents and a pervasive lack of empathy and compassion towards others” (Ein-Dor and Doron 2015) (Recommendations 9 and 10).

One of the developments with potential in Manitoba to help those with brain and mental health issues and has the potential to avert problems which lead to the involvement of those with brain and mental health issues with the criminal justice system is a course in Mental Health First Aid which is being delivered by the St. John’s Ambulance. At the moment delivery into our school system is “hit and miss” rather than to all students province-wide. New Brunswick has realized the importance of taking this course to all students (usually grade 11) province wide and they do this at a cost of \$60,000. The benefits of teaching mental health first aid to all students in grade 11 are enormous. Together with this effort, the Manitoba College of Physicians and Surgeons should consider encouraging all family physicians and emergency room physicians to ask a few questions, or use a written questionnaire, to screen for brain and mental health issues on each patient visit.

**Recommendations**

**51. The course in Mental Health First Aid given by St. John’s Ambulance should receive provincial support so that this course, or an acceptable alternative (some school divisions will choose an alternative), can be taken by grade 11 students in Manitoba.**

**52. The Manitoba College of Physicians and Surgeons should assess the potential for family physicians and emergency rooms to use simple screening questions or questionnaire to assess the possibility of brain or mental health issues at each patient visit.**

**The big question: what proportion of violent and criminal behavior is related to life circumstances and what to biochemical abnormalities in the brain?**

Work with DHA and EPA suggests some aspects of violent behavior may be the result of brain chemistry. This may be the “tip of the iceberg.” Walsh (2012) has put forward the concept that there are other chemical imbalances which may contribute – for example he has found a combination of copper overload and zinc deficiency to contribute to behavioural problems. Walsh (2012) makes the point “The reality is that most children with terrible behavior were born with chemical imbalances that predispose them to this conduct.” He argues that “The best way to reduce crime and violence is to identify children with antisocial tendencies and to provide effective treatment before their lives are ruined.”

Walsh studied 207 patients aged 3 to 55 years (median age 11.5 years), with assaultive or destructive behaviors which had been resistant to standard pharmacologic treatment and/or psychotherapy. He looked for chemical imbalances, such as an elevated ratio of copper to zinc in the blood, and then used individualized biochemical therapy to address the abnormalities found. He found “A reduced frequency of assaults was reported by 92% of the compliant assaultive patients with 58 percent achieving elimination of the behaviour. A total of 88% of compliant destructive patients exhibited a reduced frequency of destructive incidents and 53% achieved elimination of the behavior.” Treatment was more effective for those under age 14, in part due to poorer compliance for older subjects. The results were highly significant ( $p < 0.001$ ) (Walsh et al 2004). The results are impressive, but as Walsh himself makes clear, double blind placebo controlled studies with long term follow up are needed before the work will be fully accepted (Walsh 2012).

## **2. Brain health and Child and Family Services**

Critical to improving brain health province-wide are changes to our Child and Family Services System. This is because children who have been in CFS are disproportionately children who have been exposed to stresses which can lead to mental health issues, are disproportionately children who have behavioural or other brain health issues and are disproportionately involved with our criminal justice system. That consideration of brain health is a major issue for children within the child and family services system there can be no doubt. As an example, the current Children’s Advocate has looked carefully at suicide which is occurring in Manitoba disproportionately in children who are or who have been in the care of Child and Family Services. Her incisive report has looked at the changing nature of suicides – with increasing number of girls and young women, and at the risk factors involved with

children who committed suicide – which included poor school attendance, criminal justice involvement, exposure to suicide, substance use (youth and parent), placement instability, self-harm, suicidal ideation, prior documented suicide attempts, a history of hospitalization and a history of physical abuse (Office of the Children’s Advocate Manitoba 2016).

Central to the role of Child and Family Services must be optimizing the brain health of children, for it is an essential part of what is in the best interests of the child.

Understanding the importance of attachment is vital as indeed the Children’s Advocate report recognized. Taking children away, by apprehending them at birth, often from a breast-feeding mother, must become a very rare event, instead of occurring often as it does now (approximately one child a day in Manitoba). Instead, as the Mothering Program at Mount Carmel Clinic has shown, mothers, even those in challenging circumstances, can be supported in raising their children well, and in doing so it is possible to build upon the natural bond of attachment of mother and child. It is possible that one of the reasons for higher suicide rates in children who are or have been in the care of Child and Family Services is that attachment insecurity is common in children in CFS care and attachment insecurity has been associated with suicide ideation (Ein-Dor and Doron 2015).

Even as there is trauma to a child in abuse or neglect, so there is also trauma when a child is removed from its home and its family through apprehension. Understanding the impact of this trauma in the life of a child is important. As people in New Zealand have found through mandating a family conference before removing a child, there is a better way to nurture a child in the bosom of its extended family. As people in western Australia, and at the Nisichawayasihk Cree Nation Family and Community Wellness Centre have found through their respective Signs of Safety and Circle of Care approaches, it is possible to treat families in difficulty with dignity and respect, and to listen to their stories and to work with them to find the best solution for each child and family, and in so doing dramatically reduce the number of children in care.

We have heard stories of children with identified developmental disorders being placed in the care of child and family services. It appears to us that such children are likely overrepresented among children in care. We were told of instances where parents with a child with a condition like autism was told that they had to come into care to receive services, and that the associated voluntary placement was too often a path to permanent placement rather than a pathway in which the child and family were helped together and stayed together. Improved support for children and families which is not dependent on a child being taken into care could likely obviate the need for children like these to be brought into the care of child and family services in the first place.

There are currently more than 10,000 children in the care of child and family services. The outcomes for these children in care taken as a group have not been good in Manitoba. Too many of these children end up not graduating from high school. Too many of these children end up with

attachment insecurity as they are moved often from one foster home to another. Too many of these children end up as juvenile delinquents, as missing and murdered women and men, and in our criminal justice system. If the government deems it is the best parent for more than 10,000 children in our province as is happening now, then it is up to the government to prove it can be the best parent. Right now the outcomes would argue that overall in our province the government is doing far worse, on average, for these children, than the outcomes are for the average of all the other children in our province!

Higher rates of juvenile delinquency and criminal activity by adolescents and adults who have been in the care of Child and Family Services may result from attachment insecurities. As Bowlby noted in the 1940s, “frustrating and painful experiences with parents, and/or early prolonged, or permanent separation from a mother, may result in an “affectionless” character marked by distrust and hostility towards parents and a pervasive lack of empathy and compassion towards others” (Ein-Dor and Doron 2015). Sadly, too many children in CFS care have a double whammy – both difficult experiences with parents and this is then followed by prolonged or permanent separation from their mother and/or father. Better parental education and better support for parents in understanding the nature of attachment and how attachment insecurities can arise could prevent this – and as so many reports over many years in Manitoba have recommended – much more prevention is needed – and with the understanding of the nature or attachment it is achievable.

Following the introduction of a more effective approach to helping families and children which reduced the number of children apprehended and taken into care and improved the support for families, there was a reduction in substance abuse disorders from 20.2 percent of the population of Nelson House to 11.6 percent of the population (Fransoo et al. 2013). This reduction in substance use is notable because it is consistent with the observation that substance use can become much worse when children are taken away as a response to the breakup of the family. The improved approach to CFS in Nelson House has also resulted in a reduction by about half in the crime committed in the community.

### **Recommendation**

**53. The Province make changes to Child and Family services based on best practices in Manitoba (the Nisichawayasihk Cree Nation Child and Family Services, Westman Child and Family Services based in Brandon, the Mothering Project at Mount Carmel Clinic and Family Group Conferencing delivered by Ma Mawi Wi Chi Itata Centre are examples) and elsewhere (Family Group Conferencing in New Zealand and Signs of Safety in Perth Australia are examples) so that families and children are better supported, so that more children develop secure attachment and so that fewer children need to be taken into the care of Child and Family Services.**

For children who are in CFS care, who have generally had more than their fair share of adverse Childhood Experiences, (Nakazawa 2015) there is a need to recognize that our brains are able, to an extent, to self-heal; they are capable of neuroplasticity. In this context a common finding in those who live long lives (centenarians) is that they all possess a strong characteristic of being emotionally resilient, and yet at the same time being emotionally sensitive to others (with what has been referred to as the sensitivity gene). It is also important to recognize that part of improving mental health is having life goals.

#### **Recommendation**

**54. Expose all children, but especially those in CFS care, to what it means to dream big so that they recover at a later point in life, and so that they will always carry this inner vision and thus strive for that vision. For our CFS children this exercise especially needs to be documented and continually to be a focal point of discussion for their assigned worker.**

The stress vulnerability model (Hazeldon 2016), as the name suggests has two main factors, the vulnerability, refers to our basic susceptibility to mental health disorders, i.e. "it runs in the family". Stress is anything that challenges a person, requiring some kind of adaptation. Researchers have now found that there is a stress vulnerability gene, and so without proper long term planning for the mental well-being of these individuals, we will always have members in our society who struggle with poor lifestyle choices in regards to addictions or who will struggle with a mental illness.

#### **Recommendation**

**55. For children taken into CFS care, there needs to be an assessment through engaging in simple activities to determine whether a child may be predisposed to the stress vulnerability gene and for such children train them to develop self-aware coping skills such as relaxation skills and social skills. Yoga in the classroom has been shown to dramatically reduce undesired behaviour. Again, for our CFS children this exercise especially needs to be documented and continually be a focal point of discussion for their assigned social worker.**

Your biography becomes your biology (Nakazawa 2015). The emotional trauma we suffer as children not only shapes our emotional lives as adults, but it also affects our physical health, longevity, and overall wellbeing. We must acknowledge the concept of memory reconsolidation, which states, as time goes by, our brains rewrite memories based on new experiences and new perceptions.

### **Recommendation**

**56. By knowing that our brains can reshape our memories by new experiences we need to begin supporting children in middle school to journalize positive stories from their life, the goal is to create “better” memories from which they will rely on in later years. Again, for our CFS children this exercise especially needs to be documented and continually be a focal point of discussion for their assigned social worker.**

Given the vital role that nutrition plays in brain health, and the critical importance of optimizing brain health in children in CFS care, there needs to be standards for nutrition in children in CFS care, there needs to be education of CFS workers and documentation by CFS workers of the nutrition of all children in CFS care.

### **Recommendation**

**57. The Working Committee on Optimum Brain Health should specifically set standards for nutrition for children in CFS care; every child entering CFS care should have a nutritional assessment and recommendations by a dietitian, funding for nutritional supplements needed should be covered under pharmacare or NIHB (Noninsured health benefits) and be made available in every health office or nursing station in every First Nation, and CFS workers should document the nutritional status of children in CFS care.**

### **3. Fetal Alcohol Spectrum Disorder (FASD).**

Fetal Alcohol Spectrum Disorder is of great concern in Manitoba. It is the most common cause of a preventable brain abnormality present at birth. It is estimated that one in a hundred births in Manitoba is a child with FASD, and yet even after many years of knowing this is an issue, we still do not have good incidence and prevalence figures for our province. The number of children diagnosed annually has not changed significantly over the last 20 years.

It is known that children in the care of child and family services have a higher than average prevalence of FASD. It is reported that 17 percent of children in the care of CFS have FASD.

The costs of FASD to individuals with this condition and to our society are large. The extra costs to the education system, the health care system, the child and family services system and to the justice system are large and were estimated to be between \$424 and \$924 million annually (Gerrard and Lamoureux 2006).

There have been some advances in knowledge over the last two decades. This would include:

- Evidence that children with FASD can learn and function at the grade level for their age if given a learning environment which is less stimulating and with dimmer lights so they can focus better on the learning task and not be distracted so easily.

- Evidence that children with FASD learn differently from other children, but can learn given optimal reinforcement and support
- Evidence that an early diagnosis of FASD is very helpful because it allows the child to receive the type of learning and support he or she needs, and because it allows caregivers and educators to know that the child has a neurological defect and is not therefore labeled as a “bad, terrible no good” child.
- Evidence that children with FASD who are diagnosed early on are protected from some of the bad outcomes of children who are not diagnosed early, in particular from engaging in delinquent and criminal activity.

While help for children with FASD has improved, there has been little progress in the prevention of FASD except at Nelson House at the Nisichawayasihk Cree Nation Family and Community Wellness Centre where there is a strong case for a substantial decrease in FASD in the community. This is backed by data from the Manitoba Centre for Health Policy showing a reduction in substance abuse in the NCN community.

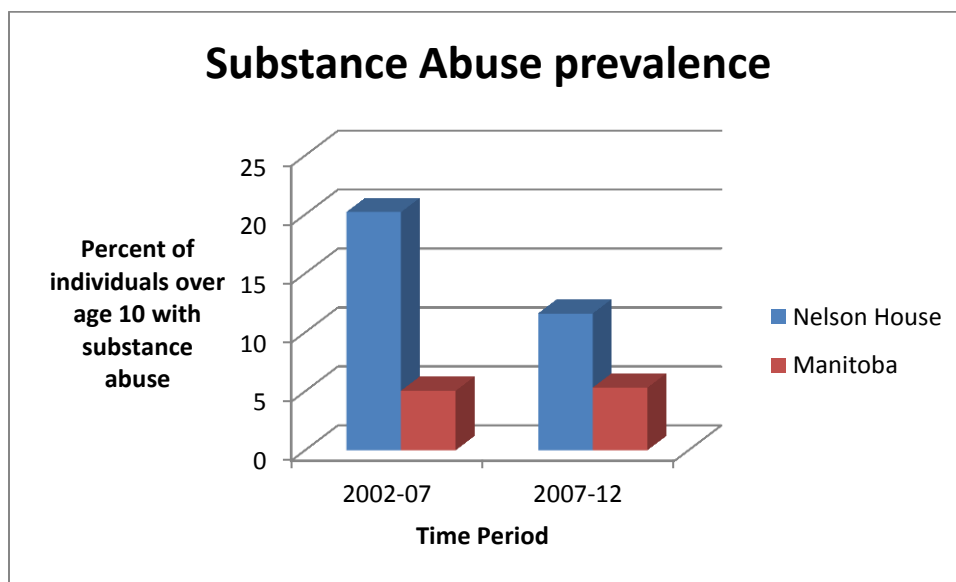


Figure 4: Data are from Fransoo et al 2013. There was a 43 percent decrease in substance abuse in Nelson House while in Manitoba as a whole there was a 5 percent increase.

The integrated approach used in Nelson House which brings together child and family services with public health, counseling services, FASD, early childhood learning and child care has been successful. A similar approach is needed elsewhere as part of an effective FASD reduction strategy. It is significant that the approach in Nelson House combined attention to addictions and to child and family services in order to be effective, perhaps because the origin of too many addictions can be traced to family issues and to the approach currently being taken elsewhere in Child and Family Services. It is possible that changes in Child and Family Services with respect to children and families, which result in better supporting families and reducing child apprehensions, may be very helpful in



decreasing addictions. Nelson House also uses a comprehensive approach to reducing FASD which is enabled by the various services provided from one centre.

Substantial evidence shows that various effects of alcohol on the fetus and the developing brain can be reversed by supplementation of pregnant mothers with various nutrients including vitamin A, folic acid, DHA, zinc and choline (Young et al 2014). These studies in animal models parallel emerging information from studies in humans and provide information which is consistent with the postulate that improved nutrition can decrease the incidence and/or the extent of brain damage in children with FASD, and perhaps help in their recovery.

We also heard of the need for more services for children and adults with FASD.

### **Recommendation**

**58. That there be a provincial addictions and FASD reduction strategy designed and implemented based on an understanding of the situation at Nelson House where there is substantive evidence for a reduction in addictions and in FASD.**

**59. That progress in understanding the nature of effective help and treatment for children and adults with FASD be formally put into that provincial plan to better help children and adults with FASD and to reduce the potential for children and adults with FASD to be involved with the criminal justice system.**

## **4. Neurodevelopmental conditions (including autism, Asperger Syndrome)**

Understanding neurodevelopmental conditions and the contribution of particular genetic changes to neurodevelopment is an important stepping stone in understanding brain function and how the brain responds to specific genetic changes. These conditions, often genetic or epigenetic, can provide a window on the impact of varied biochemical changes on the brain. Knowledge of these conditions, even though many are relatively rare, can help us understand how the brain works and can lead to help for these individuals as well as for those with other brain health situations. I will discuss one neurodevelopmental condition – Autism and the form of Autism Spectrum Disorder in which there is relatively and selectively preserved language and cognitive abilities – Asperger’s Syndrome.

**Autism:** Autism Spectrum Disorder (ASD) is “a complex neurodevelopmental disorder” with “deficits in emotional reciprocity and nonverbal communication” (Realmuto 2016). Autism is currently much more frequently diagnosed than it was several decades ago. The reasons for this are not clear. One theory is that autism is developing more often today because of our diet. There are also links between more than 100 genes and autism (Perlmutter 2015), and indeed chromosomal microarray testing may reveal changes in up to one quarter of those with ASD (Realmuto 2016). While there is a growing understanding of the nature of these links and the possibility for improved therapy based on

the genetic understanding of autism, to date this is an area of potential, but not yet with demonstrated improved therapies beyond behavioural modification approaches.

It has become clear that early therapy for autism using applied behavioural analysis (ABA) or other therapies can dramatically improve the outcome of children with autism. But for greatest effect, they need to be started as early as possible. "The techniques of applied behavioural analysis ... is sophisticated, specific, non-punitive and effective" (Realmuto 2016). ABA therapy is provided in Manitoba through St. Amant Centre, though the funding and resources are not sufficient with the result that there was, as of September 2016, a waiting list of 58 children. There has been a severe problem in recent years that the lack of resources has meant some children have aged out (are no longer eligible for the program) before they were ever able to get the ABA therapy they needed. This is unacceptable. There needs to be sufficient resources to provide therapy for all children with autism. In this instance, early therapy can make a difference which lasts a lifetime and treatment for all with autism must be supported. For some parents this may mean therapies other than ABA. Although, there are reports of benefit from a gluten-free, casein-free diet (Walsh 2012), a careful double blind study has not found an effect (Hyman 2016).

Evidence from the Thalidomide era, when some of the infants born were found to have autism when the thalidomide was taken between days 20 to 24 of gestation, suggests that there is a sensitive period during embryonic development when specific exposures may lead to autism (Stromland et al 1994). If true, then prevention of autism may depend on determining what critical exposures during this time can lead to autism and preventing them.

Smith-Lemli-Opitz syndrome (SLOS), a genetic condition with decreased cholesterol synthesis, has a very high incidence of autism spectrum disorder, with approximately 75 percent of children with this condition having autism (Sikora et al 2006). Approximately 20% of children with autism spectrum disorder who do not have SLOS have been found to have low cholesterol suggesting that alterations in cholesterol metabolism could contribute to other forms of autism (Tierney et al 2006).

### **Recommendation**

**60. The financial resources need to be provided by the Manitoba government to ensure every child with autism has access to therapy. Given the increase in the number of children diagnosed with autism in recent years, a yearly increase will be needed. For the immediate future, until the situation stabilizes, it will likely require an additional \$2 million per year for the next two to three years.**

**Asperger' Syndrome (AS):** This condition is a form of autism, in which the child has normal to high intelligence but has difficulties with social functioning. Children with Asperger Syndrome have an Autism Spectrum Disorder, but because they are currently treated differently in Manitoba because of their higher IQ, they are mentioned here separately. These children can do very well with the right

support and help. They also need understanding. They often have special abilities and can sometimes perform focused tasks with great proficiency, but lack the social skills to do well without some support. The provision of support is critical, as is a special understanding and support at their place of employment. There is often a difficulty because existing social services often are not always a fit for those with Asperger's Syndrome. This shows the need to adapt our social supports to individual conditions rather than trying to put in place social supports for everyone in the same way.

"Studies of AS [Asperger's Syndrome] frequently suggest that, for many individuals, improvement over time is sufficiently great that, as adults, they no longer qualify for or need this diagnosis... This transition may happen in as many as 20%, or so, of individuals." But, many will continue to need some social supports if they are to function well and to be employed (McPartland et al. 2014). In Manitoba, programs like the Manitoba Supported Employment Network can be helpful.

Although there are genetic components which contribute to autism, it is unlikely that purely genetic influences can account for the increase in autism in recent years. Changes in the environment including diet need to be investigated as contributors to autism and for their potential for prevention and therapy.

### **Recommendation**

**61. The Working Group on Optimal Brain Health should evaluate the evidence relating the cause of autism to diet and environmental influences and make recommendations for further research into prevention and treatment approaches that are evaluated based on the findings.**

## **5. Learning Disabilities**

Attention to improved approaches to learning disorders is a key to helping many who would otherwise struggle in school and struggle through life. For those who are helped, many become remarkably productive adults. However, too many individuals with learning disorders have difficulties in life and in work and end up in our criminal justice system because they did not get the help they needed early in life. One of the reasons for this is that children with learning disabilities often struggle with social relationships, and often because their condition affects the development of social skills as well as academic skills.

In Manitoba, the current system is based on an outdated view that people with learning disorders can wait. It does not make sense that a child begins the school year, is recognized as having a learning disorder but cannot get an assessment until the end of the school year and treatment or therapy then waits many months, even a year beyond that. Such a child loses a year of school, sometimes two years, occasionally three years before the learning disability is addressed. This situation needs to be urgently corrected so that we no longer have children who fall behind just because there are huge

wait times for assessments and therapy. It needs to be widely understood and recognized that a child needs to learn to read so that he or she can read to learn!!!

There are a variety of learning disabilities and a number of strategies used to help children based on their specific disability and their developmental level. For example, some children need a quieter environment, or even noise blockers to be able to focus on reading and learning.

The Learning Disabilities Association of Manitoba has for about 50 years functioned as the place to help Manitoba children and adults with learning disabilities. Fundamentally, we need a new era in Manitoba with quick access to assessment of children with learning disabilities and quick access to therapy, treatment and help. Covering assessment and therapy for children with learning disabilities under medicare is covered in recommendation 29 and can make a dramatic difference in reducing the wait times for children with learning disabilities and enable children to develop without having to lose one or two school years.

New evidence shows that children in the lowest twenty percent of readers at age 7-10 can benefit significantly from supplementation from DHA and EPA (Richardson et al 2012). Based on this clear evidence, it should be a standard practice in Manitoba for children with learning disabilities to have a dietary assessment and for physicians to be able to prescribe DHA/EPA supplements for such children with such supplements for such children being covered under pharmacare (see Recommendation 17).

Some children need to be in school classes geared to their developmental or learning level rather than their chronological age. This has been found to benefit children with learning disabilities. Children with learning disabilities have been found to benefit from a highly individualized learning environment where children are helped with learning social as well as academic skills. It is important to protect children with learning disabilities from social isolation, rejection and bullying which occur all too often. It should also be noted that "Learning disabled children tend to have poorly developed problem-solving skills and, as a result, they tend to resolve conflicts by using aggression rather than negotiation" (Lavoie 2005).

Sometimes in schools, parents are seen as the problem. Parents are partners in helping their children and they need to be included as part of the solution.

### **Recommendations**

**62. The province should work with the Learning Disabilities Association of Manitoba to enable a doubling in size of LDAM in Winnipeg, and its expansion to include satellite centres so that children all over Manitoba can receive services promptly when needed.**

**63. DHA/EPA supplements should be included under pharmacare when prescribed by a physician for a child with a delay in reading.**

## 6. Intellectual Disabilities

Individuals with intellectual disabilities in Manitoba have important supports in the Community Living Associations and through St. Amant Centre which provides much community living as well as care at St. Amant, and through organizations like SCE LifeWorks which works to help and support individuals with intellectual disabilities find employment. Much progress has been made in Manitoba in this area, but a number of issues remain to be addressed.

**Employment and income:** Increasingly with the help of organizations like SCE Lifeworks, individuals with intellectual disabilities are finding regular employment in regular jobs and earning regular income. Ongoing support, and not just support to find the job, is essential for many. It is time to move beyond the approach which claws back 70% of the earning of someone who is on social assistance and works part time and reduce this from 70% to 50% to provide a greater incentive and reward for work. It was also suggested to us that those with intellectual disabilities would be a good group to look at for the potential benefit for a guaranteed annual income.

There has been significant progress in the last two decades with children with intellectual disabilities going to school in their own community and living at home. The sense of belonging with family and friends in the community is very important and is positive. It is important to recognize that children with an intellectual disability can be panicked if they don't see their mother or father even for a very short time. There has also been a move away from a punishment approach to managing behavior, and toward looking instead at what brings a child or person joy, and using positive rewards for good behavior. This approach has had very positive results. In Manitoba today, there are about 6,000 adults with intellectual disabilities who are open to community living services. About 65 of these are in individualized funding through a Company of Friends/Innovative Life Options and this program has been found to work well.

Navigational help with the system is important for individuals with intellectual disabilities. Support for families is also important because there is often a lot of extra stress put on families who have a child with an intellectual disability.

Too many individuals with intellectual disability suffer from bullying because of their disability and/or from post-traumatic stress disorder as a result of abuse or institutionalization in the past. This needs to be better recognized with better support for counseling and psychotherapy.

People working in this area have told us that "Our great fear is that the system will be rationalized by increasing the number of people in group homes, from the current 3 to 4, to a higher number." The current situation provides a reasonable home-like environment. Increasing it to a higher number of individuals per home would be a mistake and if done will be associated with a poorer environment for those with intellectual disabilities.

The pay for those working and looking after those in the community is currently about \$13 an hour. This rate has made it difficult to retain workers, and the rate really needs to be raised to \$15 to \$16 per hour. This is important to maintain continuity for those with intellectual disabilities. It is also important to have continuing education for those working in group homes.

The Manitoba Developmental Centre has 167 people left currently. 50 to 60 of these people will probably need personal care homes in the foreseeable future, and planning for the future for people at this centre needs to occur. St. Amant Centre is increasingly providing community support and is moving from a developmental centre to a health facility.

Some individuals with intellectual disabilities fall under the Public Trustee. The Public Trustee's focus is on managing finances. There needs to be a case management approach. In some instances this is led by parents, but where the Public Trustee is involved there is a gap. This needs to be addressed.

There is a very important role, early in childhood, to ensure children with intellectual disabilities, including those with autism, have the best possible opportunity to lead productive lives and to contribute to our community. This area is covered more in the section on Autism.

### **Recommendations**

**64. Manitoba needs to focus efforts in areas like SCE Lifeworks which are working with individuals with intellectual disabilities to enable them to find and work in regular jobs earning regular wages. This effort is paying off in improved morale and improved self-esteem, and is highly cost effective.**

**65. Attention needs to be paid to post-traumatic stress disorder in those with intellectual disabilities as part of helping them achieve a healthy life.**

**66. There needs to be a recognition that the pay for those who work in the community with those who have intellectual disabilities, needs to move closer to the pay rates for those working in institutions.**

**67. An approach to prevention of intellectual disabilities, including autism associated with intellectual disability, is needed in a more comprehensive and more vigorous fashion. This will include investment in research and in planning, but can have great long term cost-benefit as we have fewer children with intellectual disabilities and those who do have an intellectual disability will have a better chance for a fuller life. Investments in research today, to prevent autism for example, could have a very positive long term health and cost benefit.**

## 7. Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder

Can we turn “problem children” into star performers?

There are numerous stories of children who are diagnosed with ADHD who have gone on to be significant achievers (Amen 2015). “Hyperactivity” in a child when it can be harnessed and focused can result in high achieving and productive adults. Another outcome for these children – juvenile delinquency and the criminal justice system is also too common. Our goal in Manitoba surely must be to do our best to ensure as many children as possible achieve their potential as contributors to our society rather than becoming outlaws.

Careful studies of ADHD now show a predominant component of ADHD is hereditary. If a parent has ADHD, the chance their child will have it is 57%. As well, meta-analysis of 79 twin and adoption studies shows that “the majority of variance in the traits of ADHD are a result of genetic factors (averaging 71-73% for ADHD inattention and hyperactive impulsive symptoms, respectively ranging from 55 to 98%” (Barkley 2015; Nikolas and Burt 2010). The latter not only argue for a hereditary component(s) of ADHD, but also supports that there are different genetic defects associated with different ADHD symptom complexes (inattentive compared to hyperactive types are an example). A caution is also needed here that because it is genetic does not mean it is not treatable. Many genetic conditions are now treatable – sometimes with dietary changes.

A recent study which showed that younger children in the same school year (with births in the first half of the year) were much more likely to be diagnosed as having ADHD, suggesting a developmental component such that when younger children are in the same situation as older children (as in the same school grade), younger children are more likely to be labeled as hyperactive or inattentive. Some of this could result from a difference between a diagnosis made by a general physician (more likely to be a result of developmental stage) and a specialist physician and stresses the importance of being certain the diagnosis is real and not just a reflection of the child’s developmental stage.

At the same time, there are clearly children with ADHD and this has been substantiated by imaging studies showing correlations with brain functional changes (Amen 2015). Furthermore the attempt to classify ADHD into subtypes including a) classic ADHD, b) Inattentive ADHD, c) Overfocused ADHD, d) Temporal Lobe ADHD, e) Limbic ADHD, f) Ring of Fire ADHD and g) Anxious ADHD may be promising of a better understanding of ADHD. This is particularly so when different subtypes can be shown to respond to different treatments (Amen 2015).

In looking at ADHD, we need to look at risk factors for ADHD. These include:

- Maternal cigarette smoking (Jensen 2015; Barkley RA 2015) “Among the strongest pregnancy factors associated with risk for ADHD are more chronic influences such as neurotoxins. Among

these, the greatest evidence exists for the role of maternal tobacco smoking." Increased risk 2.5 fold over non-smoking mothers.

- Maternal alcohol consumption (Barkley 2015). The increased risk is 2.5 fold over non-drinking mothers.
- Low birth weight (Barkley 2015) "the evidence for LBW [low birth weight] specifically seems quite convincing as a risk factor for ADHD. ... LBW was three times more common in children with ADHD than in control children, perhaps accounting for nearly 14% of all ADHD cases."
- Maternal iodine deficiency (Vermiglio F et al. 2004).
- Mercury exposure (Barkley 2015).
- Pesticide exposure (Barkley 2015).
- Low manganese (Barkley 2015).
- Streptococcal Infection (Barkley 2015)
- Tourette Syndrome (Perlmutter 2015)
- Traumatic Brain Injury (Barkley 2015)
- Having a C-section birth triples the risk of ADHD (Perlmutter 2015)

### **Factors which may be preventive for ADHD**

- Breastfeeding (Perlmutter 2015)
- Long chain omega 3 fatty acids - DHA and EPA given to children diagnosed with ADHD or with clinically significant ADHD symptoms resulted in significant improvement in symptoms in 10 double blind placebo controlled trials (Hurt and Arnold 2015). The clinical change was small but significant  $p < 0.0001$ . In further studies adding DHA and EPA to children who responded well to pharmaceutical therapy did not give further improvement, but providing DHA and EPA to children who were not responding well to pharmaceutical therapy did provide an improvement in symptoms (Hurt and Arnold 2015).
- Various additional dietary changes and/or supplements have been tried in children with ADHD. Supplemental therapy with ferrous iron may be beneficial where there is a documented iron deficiency. For a full review see (Hurt and Arnold 2015).

### **Concerns related to ADHD therapy**

Concerns that drugs used to treat ADHD like Ritalin, Adderall and Concerta may be capable of trapping adolescents in a cycle of habitual use and addiction (Jensen 2015).

Current outcomes for children with ADHD are not as good as they need to be:

- They achieve fewer educational goals beyond high school than their peers (Jensen 2015).
- They are less likely to be employed full time and have lower average household incomes than their peers (Jensen 2015).
- They are twice as likely to get arrested (Jensen 2015).



- They are 78 percent more likely to be addicted to cigarettes or cigars (Jensen 2015).
- They are three times as likely to be out of work (Jensen 2015).

### **Biochemical changes associated with ADHD**

The brains of children with ADHD have been found to have lower levels of the neurotransmitter GABA (Perlmutter 2015). Of interest GABA has been shown to be produced in substantial amounts by certain gut bacteria – strains of Lactobacillus and Bifidobacterium) and it has been suggested that the decrease in brain GABA may be a result of the nature of the “micro biome” in those with ADHD

### **Therapies for ADHD**

- Medications which affect biochemical pathways within the brain including drugs like Ritalin, Alderal and Concerta.
- Exposure to nature and green space: A single blind controlled trial found that children with ADHD who were walking in a park as opposed to a city setting had a response to ADHD as great as with pharmaceutical intervention (Faber et al: 2009).
- Although there is strong evidence for a genetic, inherited basis for ADHD, since it is possible to have an impact through diet on general brain health and since diet may influence the biochemical pathways in the brain (as initially demonstrated in the inherited condition phenylketonuria many years ago) diet may have a potential to help. There have been many assessments of the impact of diets.
- For example in addition to the use of long chain omega 3 fatty acids DHA and EPA, where a positive improvement (not a cure) has been demonstrated, many other diets have been tried. These include a) cutting carbohydrates and adding healthy fats (Perlmutter 2015), b) a restricted “elimination” diet (Pelsser et al. 2011) and c) the use of probiotics like Lactobacillus acidophilus has been found to be as effective as Ritalin in the treatment of ADHD (Harding et al. 2003).
- Exercise – Bader and Adesman 2015 have reviewed the evidence related to exercise and ADHD and they say the following: “A review of studies from the 1980s to 2010 found modest beneficial effects of exercise on ADHD symptoms and recommends it as a supplement to medication” (Berwid and Halperin 2012). Bader and Adesman add that studies since then continue to show “support for the improvement of both behavioural and neuropsychological functions in children with ADHD”

### **Additional Considerations**

ADHD and children in the care of Child and Family Services – Anecdotal evidence suggests that children in the care of child and family services are disproportionately diagnosed with ADHD, and that sometimes such children are given relatively high doses in order to keep them “under control”. A

careful look at children in child and family services who are diagnosed with ADHD is needed to ensure we are achieving the best outcomes for these children.

ADHD and adolescents and adults in the criminal justice system – Individuals with ADHD are often “conflict seekers” – that is as an example, children with ADHD may go out of their way to upset their parents, or other authority figures and may intentionally upset their pets. As a psychiatrist notes the answer to this conflict seeking is “When parents stop providing the negative stimulation (yelling, spanking, lecturing etc.) these children decrease the negative behavior. Whenever you feel like screaming at one of these kids, stop yourself and instead talk as softly as you can. At least in that way you’re helping to break their addiction to turmoil and lowering your own blood pressure” (Amen 2015). This perspective becomes very important, not just for parents, but for individuals within the justice system who are dealing with these individuals as children, adolescents or adults. How many situations of potentially serious conflict could be avoided by changing the approach to those with ADHD?

How many police departments even have the information on individuals they are dealing with that have ADHD, so that individual officers can make a decision on how to approach the individual? How many in the justice system know they have the potential, through their behavior, to lead a situation of potential conflict into a vicious, escalating, cycle or a virtual, de-escalating, one? We need to ask as well whether adolescents and adult in the criminal justice system are all getting optimum care, treatment and therapy for ADHD?

Better understanding of individuals with ADHD and how they can do best is needed. For example “While it is true that almost all of us perform better with praise, I’ve found that it is essential for people with ADD. When the boss encourages him to do better in a positive way, he becomes more productive. In parenting, teaching, supervising, or managing someone with ADD, it is much more effective to use praise and encouragement, rather than pressure. People with ADD do best in environments that are highly interesting or stimulating and relatively relaxed.” (Amen 2015).

The potential for reducing ADHD incidence through DHA/EPA, reducing maternal cigarette smoking and alcohol consumption and improving diets (decreasing iron and iodine deficiencies etc.) needs to be explored.

In summary, understanding and effectively preventing and treating ADHD must be a major public health concern. Children with this diagnosis are disproportionately likely to end up in the care of CFS or in the criminal justice system. Evidence has shown successful ways to achieve positive outcomes in many of these children. Do we need to be doing more? Attachment theory suggests attachment to a mentor might be beneficial, particularly for children in CFS care. Should this be looked at? It is now important that we implement, in Manitoba, the best possible practices so that these children who are often labeled “problem children” can achieve their full potential with many indeed becoming star

performers as adults. As increasingly supported by the evidence, multimodal therapy including attention to diet (especially DHA and EPA), exercise and exposure to green space are now on an increasingly solid evidence base.

### **Recommendations**

**68. The province should support efforts to look at and use multimodal approaches to the treatment of ADHD.**

**69. The Working Group on Optimizing Brain Health should look carefully at the issue of ADHD its diagnosis and treatment, children in the care of CFS and adolescents and adults in the criminal justice system to be sure we are doing everything we can be doing to change the outcomes for children with ADHD so that they can be fully contributing members of society with good opportunities for employment.**

**70. That the Working Group on Optimizing Brain Health be asked to make recommendations for how to help people work with individuals with ADHD so that they can perform at their best – emphasizing stimulating environments, the use of praise and how best to handle conflicts with individuals with ADHD – using quieter, soft, effective language rather than screaming as an example.**

## **8. Eating Disorders:**

Eating Disorders, the most common of which are Anorexia Nervosa (AN) and Bulimia Nervosa (BN), represent persistent disturbances of eating behavior and/or behavior intended to control weight which impairs social function (Crow and Eckert 2016). In Canada, the lifetime prevalence for AN is 0.9% in women and 0.3% in men and of BN is 1.5% in women and 0.5% in men. Treatment of AN “involves a combination of medical management, nutritional education and rehabilitation often using behavioural techniques,” and can be “remarkably resistant to a wide range of interventions” (Crow and Eckert 2016). For bulimia, “Cognitive behavior therapy either in a group setting or an individual format...has repeatedly been shown to be the most effective treatment for bulimia, even when compared to antidepressants” (Crow and Eckert 2016). However, “Although AN and BN are separate diagnostic disorders, there are no clear boundaries between the two conditions. Not only can the one develop from the other, but characteristics of both disorders are frequently present together in the same individual” (Crow and Eckert 2016).

Presentations to Canada’s House of Commons Status of Women Committee on Eating Disorders emphasized the fact that “The mortality rate for anorexia nervosa is 10% to 15% ... probably the most lethal psychiatric illness in terms of gross mortality rates” (Dr. Blake Woodside presentation). Because they are the most lethal of psychiatric disorders, eating disorders deserve special public attention.

Many of those with eating disorders also have co-occurring illnesses such as obsessive compulsive disorder, anxiety disorder, severe depression, early onset of osteoporosis, severe dental problems and drug addiction. They often engage in self harm, such as burning, cutting and even attempting or succeeding at suicide. Many service providers will not take a person into treatment until the drug addiction or eating disorder is cured first. Both are dangerous health issues and more programs need to be created that can treat concurrent illnesses at the same time.

## **Risk and protective factors for Eating Disorders**

### **Risk Factors:**

- i) **Individual factors:** These include female gender, early childhood eating and gastrointestinal problems, elevated weight and shape concerns especially thin body preoccupation, negative self-evaluation, involvement in athletic activity which emphasizes thinness, with ballet dancing or with modeling, perfectionism, obsessive-compulsiveness, neuroticism, harm avoidance, having traits associated with avoidant personality disorder and employing extreme weight loss behavior. Girls born prematurely are also more likely to have anorexia nervosa. Adverse events and stresses in childhood, including abuse, have been associated with eating disorders.
- ii) **Family factors:** Having a parent or a sibling with an eating disorder is associated with an increased likelihood of an eating disorder, as is critical comments by family and/or friends about eating, weight and shape.
- iii) **Socio-cultural factors:** These include living in a culture where there is social pressure to be thin, or where the cultural standards for feminine beauty are towards thinness,
- iv) **Psychiatric conditions:** Conditions associated with eating disorders include depression, anxiety disorders and obsessive-compulsive disorders.
- v) **Nutritional conditions:** Individuals with eating disorders have been found to have a high incidence of vitamin D deficiency and/or insufficiency, though this may be the result of the eating disorder and not a risk factor (Moses-Modan et al 2014).
- vi) **Genetic vulnerability.** It has been postulated that particular genetic factors may be associated with a susceptibility to eating disorders – including as examples genes for serotonin and opioid receptors.

### **Protective Factors:**

- i) **Individual factors:** These include high self-esteem, positive body image, critical processing of media images, emotional well-being, strong school achievement, being self-directed and assertive, having good social skills with success at performing multiple social roles and good problem solving and coping skills.
- ii) **Family factors:** These include belonging to a family that does not overemphasize weight and physical attractiveness and eating regular meals with the family.

iii) **Socio-cultural protective factors:** These include belonging to a less westernized culture that accepts a wide range of body sizes and shapes, involvement with a sport or industry where there is no emphasis on physical attractiveness or thinness, and peer or social support structures and relationships where weight and physical appearance are not of high concern (references in relation to risk and protective factors include: Crow and Eckert 2016; Jacobi et al 2004, Striegel et al 1997, McKnight Investigators 2003; Mayo Clinic Staff 2016; National Eating Disorders Collaboration 2016).

Publicly funded residential treatment facilities exist in some provinces to treat severely affected children and adults, but not in Manitoba. There does exist a private centre in Brandon (West Wind), but for many it is not affordable. There should be a public treatment facility in Manitoba as soon as possible.

Currently in Manitoba the Women's Health Clinic waiting time for treatment is 6 – 12 months. This is far too long. There needs to be improved funding and staffing to address the unacceptably long wait times.

Improved statistics and research and the reporting of such findings on eating disorders in Manitoba is needed along with an overall provincial plan for the treatment and management of these conditions which results in reduced waiting times. Implementation of the recommendation (number 29) to cover certain critical psychological services under medicare should help improve access to therapy and reduce waiting times. Individuals with eating disorders often have long hospitalizations. Improved prevention and treatment can potentially save significant health care dollars.

### **Recommendations**

**71. Manitoba develop a provincial plan for treatment of individuals with eating disorders in order to reduce wait times, to address areas including the need for professional development, research, improved statistics, prevention, awareness and the development of a publicly funded Manitoba residential treatment program.**

**72. Until the provincial plan is developed and a Manitoba residential treatment centre is in place, affected individuals needing access to residential treatment should have access to such treatment in other jurisdictions and the cost should be covered under medicare whether provided in Manitoba or in another province.**

## **9. Anxiety**

Anxiety disorders are those which are characterized by fear and apprehension, nervous thoughts and exaggerated worries about the future. Anxiety disorders afflict more than 40 million Americans."

(Perlmutter 2015). In Manitoba mood and anxiety disorders together have a prevalence of 23.3 percent in 2007-2012 (Fransoo et al 2013).

Anxiety disorders and depression are often related and it is common for an individual to suffer from both anxiety and depression. Indeed, in one classification of anxiety disorders, as well as pure anxiety there are individuals with mixed anxiety and depression, over focused anxiety and depression, temporal lobe anxiety and depression, cyclic anxiety and depression and unfocused anxiety and depression (Amen 2015). Anxiety disorders are often associated with high levels of activity in the basal ganglion (Amen 2015).

It needs to be said that not all anxiety is bad. A level of anxiety can be important in certain lines of work – for example those concerned with safety issues. Anxiety disorders are considered to be present when they interfere with normal day to day functioning.

### **Risk factors and protective factors for Anxiety Disorders**

#### **Risk factors and factors associated with increased anxiety disorders,**

- i) Medical and psychiatric conditions:** Tourette syndrome individuals – anxiety is found in 49 percent (Perlmutter 2015). Anxiety disorders are one of the most common side effects of birth control pills (Perlmutter 2015). Hypoglycemia is a major cause of anxiety disorders and includes the following symptoms: periods of feeling confused, dizzy, light-headed, irritable, anxious, panicky or shaky sweating or feeling faint” (Amen 2015). Polymorphisms of the receptor genes for oxytocin and arginine vasopressin have been found to be linked to anxiety disorders. (Ein-Dor and Doron 2015)
- ii) Nutritional conditions:** Diets low in magnesium are associated with increased anxiety disorders (Naidoo 2016).
- iii) Social conditions:** “Children who experience teasing, bullying, rejection, ridicule or humiliation may be more prone to social anxiety disorder. In addition, other negative events in life, such as family conflict or sexual abuse, may be associated with social anxiety disorder” (Mayo Clinic Staff 2016).
- iv) Individual behavioural characteristics:** Attachment insecurities are linked to generalized anxiety disorders (Eni-Dor and Doron 2015); “Infants classified as anxious-resistant were more likely than their secure counterparts to endorse anxiety disorders at age 17” (Eni-Dor and Doron 2015)” “Children who are shy, timid, withdrawn or restrained when facing new situations or people may be at greater risk” Mayo Clinic Staff 2016).
- v) Individual circumstances:** Anxiety disorders are more likely to develop in children and teens in hostile environments (Medina 2008) and in those exposed to trauma (Jensen 2105); “Facial disfigurement, stuttering, Parkinson's disease and other health conditions can increase feelings of self-consciousness and may trigger social anxiety disorder in some people.” (Mayo Clinic Staff 2016).
- vi) Biochemical factors:** Associated with anxiety are low levels of the brain hormone BDNF, higher levels of cortisol, an over-reactive stress response, increased permeability of the gut, higher levels of inflammation in the gut, higher levels of systemic inflammation (Perlmutter 2015).

**vi) Immediate triggers:** Certain situations and stresses can trigger anxiety. "Meeting new people, giving a speech in public or making an important work presentation may trigger social anxiety disorder symptoms for the first time. These symptoms usually have their roots in adolescence, however" (Mayo Clinic Staff 2016).

### **Factors associated with fewer anxiety disorders**

i) **Nutritional factors:** Naidoo 2016 comments: "In addition to healthy guidelines such as eating a balanced diet, drinking enough water to stay hydrated and limiting or avoiding alcohol and caffeine, there are many other dietary considerations that can help relieve anxiety. For example, complex carbohydrates are metabolized more slowly and therefore help maintain a more even blood sugar level, which creates a calmer feeling.

A diet rich in whole grains, vegetables, and fruits is a healthier option than eating a lot of simple carbohydrates found in processed foods. When you eat is also important. Don't skip meals. Doing so may result in drops in blood sugar that cause you to feel jittery, which may worsen underlying anxiety.

The gut-brain axis is also very important, since a large percentage (about 95%) of serotonin receptors are found in the lining of the gut." Human studies have shown that certain probiotics can alleviate anxiety by rebalancing the micro biome (University College Cork 2011). Treatment of individuals with probiotics containing Lactobacillus and Bifidobacterium show promise in reducing anxiety.

Naidoo 2016 comments "specific foods have been shown to reduce anxiety. In mice, diets low in magnesium was found to increase anxiety-related behaviors. Foods naturally rich in magnesium may therefore help a person to feel calmer. Examples include leafy greens such as spinach and Swiss chard. Other sources include legumes, nuts, seeds, and whole grains. Foods rich in zinc such as oysters, cashews, and liver, beef, and egg yolks have been linked to lowered anxiety. Other foods, including fatty fish like wild Alaskan salmon, contain omega-3 fatty acids. A study completed on medical students in 2011 was one of the first to show that omega-3s may help reduce anxiety.

A recent study in the journal Psychiatry Research suggested a link between probiotic foods and a lowering of social anxiety. Eating probiotic-rich foods such as pickles, sauerkraut, and kefir was linked with fewer symptoms.

Asparagus is known widely to be a healthy vegetable. Based on research, the Chinese government approved the use of an asparagus extract as a natural functional food and beverage ingredient due to its anti-anxiety properties. Foods rich in B vitamins such as avocado and almonds [are] "feel good" foods [which] spur the release of neurotransmitters such as serotonin and dopamine. They are a safe and easy first step in managing anxiety."

Amen (2015) adds "many supplements have antianxiety properties [including] magnesium (80 percent of the population is low in it), theanine from green tea, the calming amino acid GABA, ashwagandha, Relora, and valerian root. B vitamins, especially vitamin B6 in doses of 25 to 100 mg have also been found by some to be helpful. If you take B6 at these doses it is important to take a B complex

supplement as well. My patients have also found the scents from essential oils of chamomile and lavender to be calming.”

**ii) Exercise:** A growing body of evidence suggests that exercise can powerfully influence the course of anxiety disorders (Medina 2008)

**iii) Activities:** Meditation can be helpful to those with anxiety disorders (Amen 2015; Messaoudi et al 2014; National Inuit Suicide Prevention Strategy 2016;

### **Recommendation**

**73. The Working Committee on Optimal Brain Health should be tasked with providing recommendations to improve the understanding of links between attachment insecurities and anxiety disorders and making recommendations for a population health approach to reduce anxiety disorders in Manitoba.**

## **10. Depression**

Major depression is a severe illness which “is usually accompanied not only by tearfulness but also by changes in eating habits, or withdrawal from family life (Jensen 2015). It is a “deregulation of thought processes, including memory, language, quantitative reasoning, fluid intelligence and spatial perception” (Medina 2015). Post-partum Depression is a particularly concerning form of depression which occurs in the days and weeks after a mother has given birth to a child. It is a time when particular awareness is needed and where there is a possibility of systematic assessment of mothers and psychological help to prevent or treat the depression early on.

The combined prevalence of mood and anxiety disorders in Manitoba was 23.3-23.5 percent in the time period from 2002-2008 (Fransoo et al. 2013). Between 20 and 30 percent of adolescents report at least one major depressive episode (Jensen 2015). Depression is now the leading cause of disability worldwide, impacting more than 350 million people. By 2005, antidepressants were the #1 prescribed drug in the U.S. (Roethel 2012). “Depression is the most expensive medical illness on the planet and is one of the greatest killers of our time,” (Amen 2015). Depression is not only an illness itself, it is a risk factor for Alzheimer’s Disease, heart disease, cancer and obesity (Amen 2015). The World Health Organization (2008) has predicted that depression will be the most important disorder on the planet by 2030, in terms of disease burden.

There have been major advances in understanding, preventing and treating depression in the last two decades. Sadly, to date this has not translated into a decrease in depression. But implementation of current science and evidence could prevent much depression and treat it much more effectively. Recent reviews “have concluded that 22% to 38% of major depressive episodes could be prevented if currently existing depression prevention programs, such as Interpersonal Psychotherapy – Adolescent



Skills Training were implemented” (Young et al 2016). Dietary change and exercise can also be helpful in preventing depression.

Depression has multiple causes. Indeed, understanding the biochemical and social reasons for depression, can help in identifying the cause and in implementing a solution which addresses the cause. Depression due to vitamin B6 deficiency can be addressed by ensuring adequate vitamin B6. Depression due to seasonal affective disorder (SAD), due to lack of exposure to sunshine, can be addressed with light therapy. Attempts are being made to sub classify depression types. One classification of depression includes six types – a) pure depression, b) mixed anxiety and depression, c) over focused anxiety and depression, d) temporal lobe anxiety and depression, e) cyclic anxiety and depression and f) unfocused anxiety and depression (Amen 2015). Another classification divides depression into undermethylation, folate deficiency, copper overload, pyrrole disorder and toxic overload biotypes (Walsh 2012). Though there is not yet general agreement on subtypes of depression, these efforts are indicative of attempts to refine the nature of depression and to provide treatment specific to the type of depression.

A multifaceted and multimodal approach to depression, like that for dementia (below), may have the potential to achieve significant reductions in depression in Manitoba and to bring to pass more effective and longer lasting therapy for depression.

### **Risk factors for depression (and factors associated with depression) can be grouped into six categories**

**i) medical and psychiatric conditions:** Women with diabetes are nearly 30 percent more likely to develop depression (Pan et al 2010); twenty five percent of individuals with Tourette Syndrome have depression (Perlmutter 2015); depression has been linked to alcohol abuse in teens (Jensen and Nutt 2015 ); a major depression in adolescence increases the risk of an adult episode of depression (Jensen and Nutt 2015). Concussion is associated with an increased risk of depression: “studies have found 15 to 20 percent rates of depression in patients up to a full year after a concussion” (Jensen and Nutt 2015). “Being hospitalized because of an autoimmune disease increased the risk of being hospitalized for a mood disorder by 45 percent. Moreover, any history of being in the hospital for an infection increased the risk of getting diagnosed with a mood disorder later on by a whopping 62 percent. And for those who experienced an autoimmune disease and infection, their risk for a mood disorder more than doubled” (Perlmutter 2015); “Depression is associated with low levels of certain neurotransmitters, especially norepinephrine, dopamine and serotonin. In our experience, these deficits can cause increased activity in the Limbic System, which in turn causes many of the problems associated with depression” (Amen 2015); Brain derived neurotropic factor (BDNF) is decreased in depression (Perlmutter 2015 ); Depression has been attributed to a lack of GABA (gamma amino-butyric acid) and glutamate (Perlmutter 2015).

- i) **Nutritional conditions:** Low seafood consumption and low levels of DHA and EPA are associated with increased depression (Hibbeln 1998; Mamalakis et al 2002; Tanskanen et al 2001; Lin et al 2010). For post-partum depression, low seafood consumption and low levels of DHA in breast milk are associated with depression (Hibbeln 2002). Consumption of higher levels of sweets, and of fast food (hamburgers, sausages, pizza) and processed pastries (muffins, doughnuts, croissants) is associated with increased depression (Jeffery et al 2009; Sanchez-Villegas et al 2012). Low levels of vitamin D have been associated with depression (Holick 2011). Indeed, vitamin D levels below 125 nmol/L have been found to be associated with depression (May et al 2010). Low levels of B12 [vitamin B12] is a risk factor for depression (Perlmutter 2015); Zinc levels have found to be lower in those with major depression than in controls (Swardfager W et al 2013). Gluten sensitivity is associated with depression (Perlmutter 2015). Deficiency of vitamin B6 is associated with depression (University of Maryland Medical Centre 2016). The reason for depression in vitamin B6 deficiency is thought to be because vitamin B6 is an important cofactor in the last chemical step in serotonin synthesis (Walsh 2012). Dietary inadequacy for vitamin B6 has been found to be present in 7 percent of men, and 28 percent of women (Coulston et al 2008). Because of the nature of the chemical reactions influenced by vitamin B6, "moderate deficiency of Vitamin B6, reduces serotonin levels without affecting other neurotransmitters" (Coombs 2012). High levels of copper are associated with depression (Narang et al 1991; Casper and Malter 2016; National Institute of Diabetes and Digestive and Kidney Diseases 2016)
- ii) **Social conditions:** Food insecurity is a risk factor for depression. "Children living in food-insecure households are at increased risk for symptoms of depression and anxiety, hyperactivity and inattention and behavioural problems." (Whitaker et al 2006)
- iv) **individual behavioural characteristics:** Obesity is correlated with a 55 percent increased risk of depression, while depression is associated with a 58 percent increased risk of developing obesity (Luppine et al 2010); Attachment disorders have been associated with an increased risk of depression (Ein-Dor and Doron, 2015). For adolescents, both anxious-avoidant and anxious-resistant attachment styles have been found to be related to depression (Ein-Dor and Doron, 2015); in adults, attachment insecurities (anxiety and avoidance) predict subsequent increases in depression over time periods ranging from 1 month to 2 years" (Ein-Dor and Doron 2015). Insomnia can worsen depression (Jensen and Nutt 2015 ); Cigarette smoking and dependency may precipitate depression (Jensen and Nutt 2015 ). Some researchers have found a correlation between multitasking and symptoms of depression. (Jensen and Nutt 2015)
- v) **Individual circumstances** – "One of the most insidious effects of prolonged stress is that it pushes people into depression." (Medina 2008); "Children living in hostile environments are at greater risk for certain psychiatric disorders, such as depression." (Medina 2008)

**vi) Immediate triggers** – “Loss related to death of a significant other (e.g. parent or a spouse), however, may confer more profound consequences and increase the likelihood of developing depressive symptoms among both anxious and avoidant people” (Ein-Dor and Doron 2015). Becoming unemployed is associated with depression - It is of interest that in Manitoba following the closure of the Pine Falls mills with many people in the local community being laid off, there was an increase in the proportion of people in the community with depression from about 25 percent to 31 percent (from 2002/03-2006/07 to 2007/08-2011/12) (Fransoo et al 2013). Parent child conflicts can precipitate depression (Young et al 2016).

### **Factors associated with a decrease in depression**

**i) Nutrition:** Increased seafood consumption by country is associated with decreased depression (Hibbeln 1998) and post-partum depression (Hibbeln 2002). A meta-analysis of 15 trials has shown that consumption of fish oil containing high levels of EPA consumption reduces depression (Sublette 2011). One of these was a trial to prevent depression, and it showed that while 30 percent of individuals receiving interferon alpha became depressed, EPA therapy was associated with a two-thirds reduction of depression to only 10 percent (Su et al 2003). People who stick to a Mediterranean type diet have significantly lower rates of depression (Sanchez-Villegas et al 2009); Breastfeeding is associated with less depression later in life (Shoukat and Hale 2012); Probiotics - Human studies have shown that certain probiotics can alleviate depression by rebalancing the micro biome (University College Cork 2011). Cocoa, coffee and curcumin (turmeric) are listed as lowering the risk of depression (Perlmutter 2015). Two randomized controlled trials have shown that vitamin B6 can decrease depression in women who are premenstrual or are on oral contraceptives (Adams et al 1973; Doll et al 1989;) In the latter study, the impact was specific to women who had low levels of vitamin B6. No effect was found in men (Williams et al 2005). It may be important to supplement with a combination of standard vitamin B6 combined with pyridoxal-5'-phosphate to achieve beneficial results (Walsh 2012). Zinc supplementation has been found to reduce depression when used alone (Salati et al 2015) or together with Selective Serotonin Reuptake Inhibitors (Ranjbar et al 2013).

The relation between seafood consumption and depression needs more attention – as shown in the graphs below. What is striking is the extent to which depression and low seafood consumption are related. What is notable, is that if these graphs accurately characterize this relationship, it suggests that increasing seafood consumption in Canada has the possibility of substantially reducing depression. Indeed, if the graphs are accurate in portraying this relationship, and if increased seafood consumption does decrease depression as some studies are now showing, then it is not unreasonable to suggest that increased seafood consumption could possibly reduce depression by as much as 50 to 70 percent.

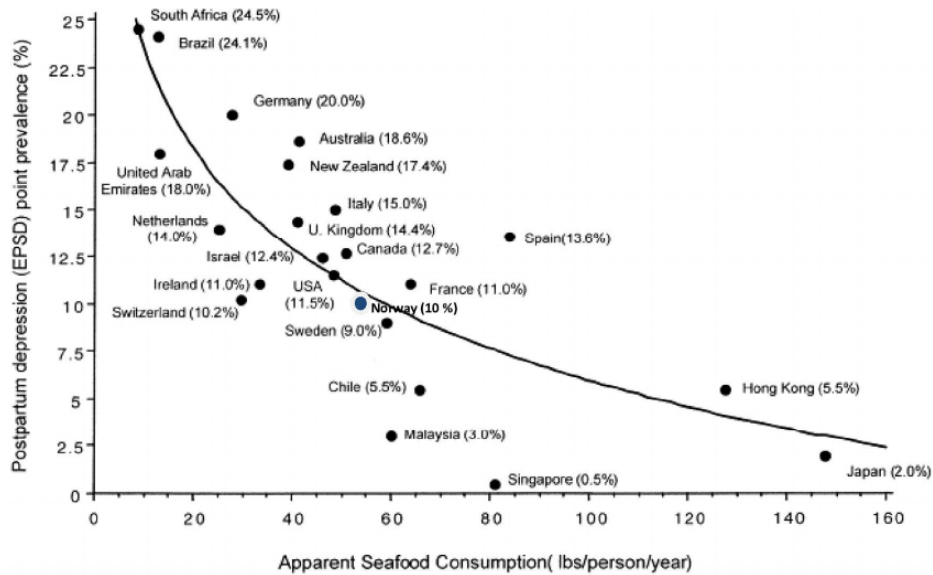


Figure 5. Seafood consumption and prevalence rates of postpartum depression. Postpartum prevalence rates for Australia, New Zealand, Sweden, the United Kingdom and the United States were derived by meta-analysis. All other countries are represented by a single study, see text. Apparent Seafood consumption lb./person/year is an economic measure of disappearance of all fish and seafood from the economy and is calculated by imports plus catch minus exports. A logarithmic regression was used for analysis ( $r = 2\ 0.81$ ,  $p$ ,  $0.001$ ). In Norway the seafood consumption is (47 lbs./person/year = 21,3 kg/person/year [94] and the prevalence of postpartum depression is 10% [3]. Modified from Hibbeln et al. [30]. doi:10.1371/journal.pone.0067617.g005

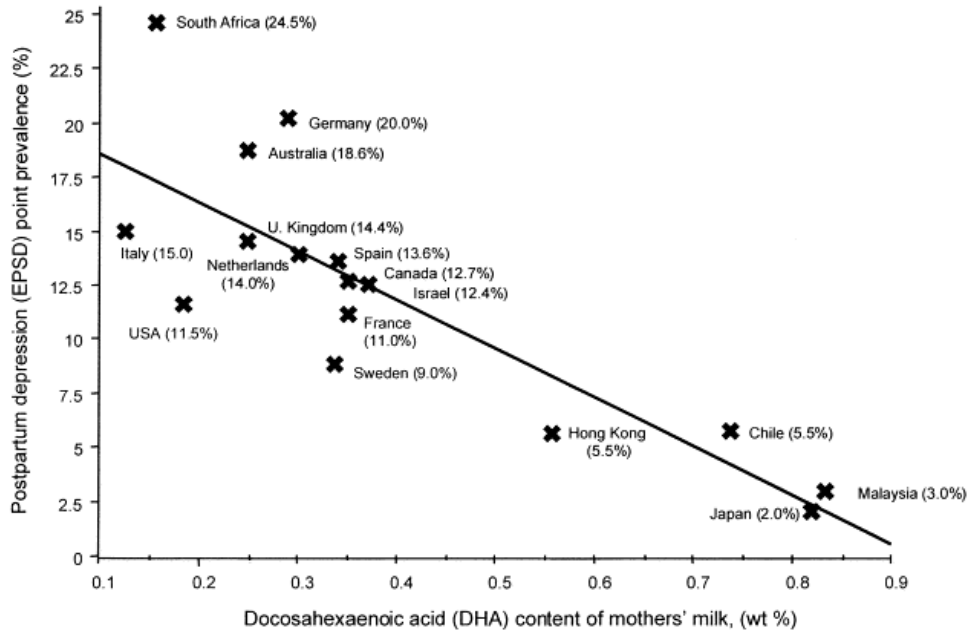


Figure 6. DHA contents of mothers' milk and prevalence rates of postpartum depression. Postpartum prevalence rates for Australia, Sweden, the United Kingdom, and the United States were derived by meta-analysis. All other countries are represented by a single study, see text. DHA content of mother's milk is expressed as the weight percent of docosahexaenoic acid of mature milk. A simple Pearson's product moment correlation was used for regression analysis ( $r = 5\ 2\ 0.84$ ,  $p$ ,  $0.0001$ ).

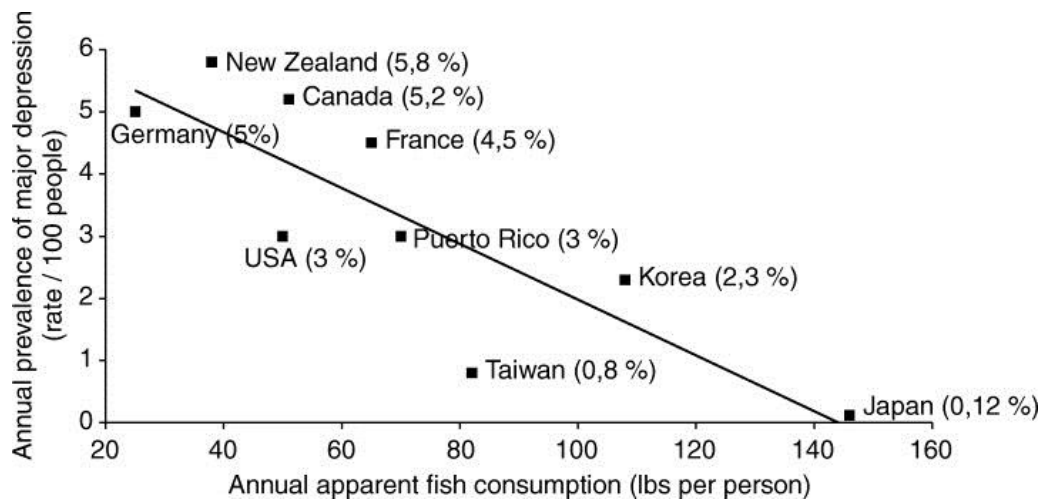


Figure 7: Fish consumption and prevalence of major depression (from Hibbeln et al. 1998). Simple correlational model with Pearson product moment analysis indicates a potentially substantial interaction between the nearly 60-fold range in annual prevalence rates of major depression and the more than 100-fold range of apparent fish consumption, in a multinational comparison ( $r = -0.84$ ,  $p < 0.005$ ) 1 lb. = 0.4536 kg. Polyunsaturated fatty acids in depression - Scientific Figure on ResearchGate

**ii) Exercise** –Exercise in a rigorous randomized trial has been shown to reduce depression (Dunn et al 2001, 2005). “the role of exercise on mood is so pronounced that many psychiatrists have begun adding a regimen of physical activity to the normal course of therapy. But in one experiment with depressed individuals, rigorous exercise was actually substituted for antidepressant medication. Even when compared against medicated controls, the treatment outcomes were astonishingly successful. For both depression and anxiety, exercise is beneficial immediately and over the long term. It is equally effective for men and women, and the longer the program is deployed, the greater the effect becomes. It is especially helpful for severe cases and for older people.” (Medina 2008)

**ii) Activities- Laughter** “Did you know that Abraham Lincoln had periods of bad depression well into adulthood? He even thought about killing himself and had some days when he didn’t get out of bed. In his later life, however, he learned to treat his bad feelings with laughter. He became a very good storyteller and loved to tell jokes. He learned that when he laughed, he felt better” (Amen 2015); **Influencing negative thoughts** The story of Katie – and her transformation when she came to the “realization that when she believed her [negative] thoughts, she suffered, but when she questioned her thoughts, she didn’t suffer (Amen 2015). “When you bring your attention to the things you are grateful for in your life, your brain actually works better” (Amen 2015).

**iii) Purpose in Life, Altruism and helping others:** “Greater purpose in life consistently predicted lower mortality risk across the lifespan (Hill and Turriano 2014)) ...”Barbara Bush is a great example of this. In her early fifties, the former first lady went through a period of depression, when she felt like crying every day and had really dark thoughts. Like so many people, she was ashamed to seek help. She found that when she started to volunteer and direct her attention to help others, she started to

feel much better. When she had a reason to get up and a purpose to her day, it had a healing effect” (Amen 2015).

**iv) Psychotherapy** - Studies of the prevention of depression have shown that Interpersonal Psychotherapy – Adolescent Skills Training (IPT-AST) can be an effective tool to reduce depression. For example in a randomized trial adolescents who received IPT-AST used in those at risk, reduced depression diagnoses from 28.6% of the adolescents who received regular school counseling to 3.7% of those receiving IPT-AST. IPT-AST also reduced parent-child conflict which is a significant risk factor for depression. A Coping with Stress program also reduced depression compared to a non-intervention group (Young et al 2016). Depression behavior therapy (not sleep medications) aimed at better sleep habits can help lower depression rates (Jensen and Nutt 2015).

### **Recommendation**

**74. The Working Committee on Optimum Brain Health review the evidence with respect to depression and make recommendations with respect to what are the most effective measures we can take in Manitoba to reduce the overall incidence of depression in our province, and to achieve the most effective treatment possible for those with depression including the potential of a multimodal or multifaceted approach.**

## **11. Suicide**

Suicide has been a major concern in Manitoba, and Manitoba has a higher rate of suicide than most other provinces. A number of suicides in Cross Lake in 2015 and early 2016 have drawn additional recent attention to this issue. The issue is so serious the Children’s Advocate has completed phase I and phase II of a study of suicide. Many of the children and youth in Manitoba who have committed suicide have had exposure to the Child and Family Services system and were removed from their homes before the suicide occurred.

The situation of northern communities like Cross Lake needs particular attention. There are also anecdotal reports of increased suicides in communities like Lake St. Martin, Little Saskatchewan and Dauphin River which have suffered prolonged evacuation. In Winnipeg, we are aware of an instance of a suicide which occurred in an adult in a psychiatric facility, and others which have occurred on recent discharge of adults from an Emergency Room or Crisis Centre. These events need to be the subject of a review or research study to understand the circumstances and to make specific recommendations relative to Manitoba.

Suicide can occur from childhood to old age. It is one of the leading causes of death among adolescents and young adults.

## **Risk factors and protective factors for suicide**

### **a. Factors associated with an increased incidence of suicide can be grouped into six categories**

- i) **Medical and Psychiatric Conditions:** depression, bipolar disorders, trauma and post-traumatic stress disorder, autism spectrum disorder/hyperactivity disorder, anxiety disorders, obsessive-compulsive disorder, and eating disorders, particularly anorexia, psychotic disorders, personality disorders, alcohol and substance use disorders, Studies show that almost half of teens with anorexia have considered suicide, and almost 10 percent have actually attempted it. Also associated with suicide are having low cholesterol levels, having a head injury, particularly an injury to or an anomaly in the left temporal lobe; decreased activity on a SPECT scan in the pre-frontal cortex at rest; chronic pain and low serotonin levels with marked over activity in the ACG Gyrus and a *Toxoplasma gondii* infection.
- ii) **Nutritional Conditions:** deficiency in DHA and EPA, low levels of vitamin D or a low seafood diet. Individuals who were on active duty in the US Military with low levels of DHA were 62 per cent more likely to commit suicide.
- iii) **Social Conditions:** Historical Trauma, Community Distress, Wounded Family, Traumatic Stress and Early Adversity, poverty.
- iv) **Individual Behavioural Characteristics:** aggression and impulsivity, previous self-harm or previous suicide attempts or suicidal ideation, hopelessness, ideas about death as a relief from suffering, sleep problems, difficulties with communication or problem solving, LGBTQ+ youth, poor school attendance, doing poorly in school, learning disabilities, criminal justice involvement, substance use (youth and parent), smoking, foster placement instability, attachment insecurity; being unmarried, living alone, being a victim of bullying, being a veteran of a war, having ever been in the care of child and family services, copycat self-harm behavior of adolescents who are depressed and have an underdeveloped frontal cortex (effectively a lack of self-regulation ability).
- v) **Individual Circumstances** - prior suicide by a peer or family member, domestic violence, physical or mental abuse or exposure to trauma, bullying or cyber bullying, social isolation, family stress, childhood abuse, stress from having a child taken away by child and family services, lack of physical exercise, availability of lethal means, life events and psychosocial stressors
- vi) **Immediate triggers** – feeling of shame or rejection, teasing by peers, breakup or loss, reminders of traumatic experience or abuse, family conflict, being unemployed especially after a mass layoff and particularly from 15 to 26 weeks of unemployment. Antidepressant medication can trigger suicide. Teens react differently from adults to standard antidepressant medications such as Prozac, Zoloft and Wellbutrin and have a greater risk of developing suicidal thoughts and behaviours.

Of all these factors prior documented suicide attempts have been found in previous studies to have one of the strongest associations. Adolescent depression is more likely to be chronic and is associated with a thirtyfold increase in the risk of suicide. Being a victim of bullying also carries a substantial risk, being associated with up to 11 times greater risk for adolescents involved in bullying compared with adolescent counterparts who were not – in an analysis of 31 studies. Being a veteran of a war also carries a particularly high risk with 46 percent of these who had been deployed to Iraq or Afghanistan (the majority of whom saw combat) reporting suicidal thoughts and young veterans were seven times more likely to have made a serious suicide attempt than nonveteran college students. In one report, left temporal lobe abnormalities were found in 62 percent of patients who had serious suicidal thoughts or actions.

Some differences are found based on age. For children aged 5-11, a major associated condition was relationship problems with family members/friends (60.3%). Also ADD/ADHD – 59.3%; and depression 33.3%. For children aged 12 -14, major issues were depression (65.6%, relationship problems with family members/friends – 46%; ADD/ADHD – 28%; boy/girlfriend problems – 16%). (Sheftall et al. 2016)

(Amen 2015; Children’s Advocate Manitoba 2016; Compton and Shim 2015; Ein Dor and Doron 2015; Fatemi and Clayton 2016; Grudet et al 2014; Haddad and Gerson 2015; Hibbeln 2001; Jensen and Nutt 2015; National Inuit Suicide Prevention Strategy 2016; Smith 2014; Sublette et al 2006; Umhau et al 2013)

### **Factors associated with a decreased risk of suicide:**

A decreased risk of suicide is associated with:

Secure attachment in childhood, with good school attendance and doing well at school, with not ever being in the care of Child and Family Services, with having normal or higher levels of DHA in the blood, with higher vitamin D, with increased seafood in the diet, with cultural continuity, with social equity, with family strength, with healthy development, with mental wellness, with the ability to cope with acute stress, with regular physical exercise, with having a reason for living , religious beliefs, moral objections to suicide, survival and coping beliefs and family responsibilities.

Dialectical Behaviour Therapy (DBT) is a highly effective treatment for suicidality and for preventing suicide , and is the best established therapy to date (Linchan et al 2006). Treatment used to improve a person’s micro biome, and removal of a temporal lobe cyst have been associated with an ending of suicide ideation (Amen 2015; Fatemi and Clayton 2015; Grudet et al 2014; National Inuit Suicide Prevention Strategy 2016; Sublette 2006; Perlmutter 2015).



## Recommendation

**75. The provincial government should ensure a full review is undertaken of suicides in Manitoba to extend the review of the Children's Advocate on children and youth suicide to provide a comprehensive picture which includes adult suicides and suicide clusters.**

In the prevention of suicide the following considerations need to apply:

Identifying individuals at high risk and implementing a high risk protocol to prevent suicide. Risk factors for suicide are known. Among the strongest of these is a previous attempted suicide. Identifying such individuals and putting in place a prevention plan is vital. To some extent this has been done at Cross Lake where individuals at risk have been identified and measures put in place to prevent suicides. Other northern communities with high incidences of suicides need to have in place a similar prevention approach. In this context, the approach taken in Cross Lake and the approach to engage community members as in the 2Dads4Suicide Safe Communities Project (<http://www.vitalcorelife.com/2dads4>) have promise. Mobile crisis teams have a role. The use of telehealth for northern communities has promise and this needs to be pursued actively. The availability of telehealth 24/7 has the potential to reduce emergency transfers and save dollars, but it would likely only be feasible if used province-wide, or even Canada wide.

Based on current evidence there does not appear to be a province-wide protocol for those at high risk of suicide. This has been emphasized by deaths by suicide in those recently discharged from health facilities and in those in health care facilities. Such a protocol needs to be in place and to be implemented as soon as possible. Such a protocol may need to consider among other issues - Anyone appearing in an Emergency Room, where they or a family member indicate they are suicidal, or potentially suicidal, or who have a history of suicidal thoughts and suicide attempts needs to be triaged as a possible and a "suicidal emergency protocol" needs to be established and implemented on a province-wide basis. Fundamentally, where there are known major risk factors for suicide – including previous attempted suicide, these need to be taken seriously and a multifaceted approach to reducing risks needs to be employed. The Supported Transition, Evaluation and Planning (S.T.E.P.) program used in the Prairie Mountain Health Region is a good example of a program which is getting positive results.

The protocol for discharge from the Emergency Room or from the Emergency Crisis Centre, needs to include:

- a) Ensuring that an emergency referral to a psychiatrist or psychologist is made with a time-line for the person to be seen on an emergency basis.
- b) Ensuring a circle or network of support among family, friends, community supporters and/or a peer support worker is available pending the individual being seen by a psychiatrist or a psychologist so

that the person is never alone. Changes to the mental health act are needed (recommendation 36) to ensure it is easier to share information than currently exists.

c) Ensure that all bases have been covered which may potentially relate to suicide – diet/ exercise /sunlight/ vitamin D/psychotherapy/medications.

### **Recommendation**

**76. That a province wide protocol be developed and implemented for individuals at high risk for suicide.**

A broader comprehensive and multimodal suicide prevention approach needs to be implemented which includes attention to the diet of Manitobans, to activities and physical exercise for youth, for community based facilities to ensure there are opportunities for youth and to a jobs and employment plan for communities where opportunities are few. This plan needs to include strategies for improving brain health and reducing suicide which includes strategies with regard to diet, exercise, and better support of psychological therapy. Since depression can be a precursor to suicide, this strategy should build upon a province wide depression reduction strategy.

In view of the beneficial impact of exercise on brain health generally and in view of the need to end feelings of hopelessness, it is important that all communities have easy access to social activities and exercise for youth and adults. There needs to be a provincially and federally supported community based approach to ensuring basic services for young people exist in all communities – athletic facilities, availability of activities, enhanced availability of learning and job opportunities. In view of the fact that lack of employment is a risk factor for suicide a strategy needs to be developed for northern communities where unemployment rates are high, and for individuals with brain health issues who are having difficulty finding employment. For northern communities, one of the essential opportunities for learning and for employment which is critical is access to broadband internet services. It is for example, unacceptable that there are communities in Manitoba without the broadband access which is essential for up to date learning and employment opportunities.

### **Recommendation**

**77. The implementation of a comprehensive multimodal plan for suicide prevention to reduce the number of suicides in Manitoba. This plan should include: a) an approach targeted to individuals at risk of suicide, b) a province-wide suicide reduction plan and c) a community based approach to ensuring activities and facilities are available to young Manitobans so that they have access to facilities, to activities, to learning opportunities and to employment opportunities in their community.**

**78. The provincial government review all communities in Manitoba and implement an action plan to ensure that these communities implement activities and exercise opportunities for youth and adults.**

**79. The provincial government develop and implement a plan for rural and northern communities to have broadband internet access to enable improved education and employment opportunities.**

**80. The provincial government work with First Nations and Metis people in Manitoba to develop an education strategy to improve education for First Nation and Metis people in Manitoba.**

**81. The provincial government develop approaches specifically designed to address unemployment in northern and rural Manitoba and to address unemployment in individuals with brain health concerns.**

## **12. Schizophrenia.**

Schizophrenia is a condition which may include delusions, hallucinations, disorganized speech, catatonic behavior and negative symptoms. The current diagnostic criteria include that it must be present for at least 6 months, cause impairment of social and occupational functioning, and that other diagnoses need to be ruled out (Fatemi and Folsom 2016).

There are varied hypotheses for the cause of schizophrenia all of which are based on the belief that the condition is caused by biochemical changes in the brain. These include the dopamine hypothesis, the serotonin hypothesis, the glutamate hypothesis and the GABAergic hypothesis (Fatemia and Folsom 2016), as well as an oxidative stress hypothesis and an epigenetics hypothesis (Walsh 2012). Treatment with antipsychotic medications has greatly advanced therapy for schizophrenia. Cognitive Behavioural Therapy for psychosis (CBT-P) has a role in therapy of psychotic conditions including schizophrenia (Wright et al 2014). Walsh, advocating the epigenetics theory, has divided schizophrenia into three major biotypes -over methylation, under methylation and pyrrole disorder with specific nutritional approaches to each based on the underlying postulated biochemistry. He also includes rarer biotypes – gluten intolerance, thyroid deficiency, polydipsia, homocysteinuria, porphyria and drug induced schizophrenia. Walsh's theories are not generally accepted and while nutrition may prove to be important in the treatment of schizophrenia, but its role, except in the general promotion of brain health, is unproven (Walsh 2012). There is, however, a move toward multimodal therapy which may include as well as pharmacologic treatment, CBTP, nutrition, exercise, sunlight and vitamin D.

Since stress can trigger relapses, it is particularly important that individuals with schizophrenia have support in relation to housing and support for individuals is there if issues arise, as with peer support. Increasing the use of trained and certified peer support workers could have a role in improving the outcomes of people with schizophrenia in Manitoba (Chris Summerville personal communication). The first episode psychosis clinic in Winnipeg is working well, but similar clinics are needed in Brandon, Thompson and Steinbach. Above all, it is important to provide hope for those with schizophrenia.

## **Recommendation**

**82. First Episode psychosis clinics should be established in Brandon, Thompson and Steinbach.**

### **13. Traumatic Brain injury**

Brain injuries are a significant factor and have a significant impact on brain health. Individuals with traumatic brain injuries are also a significant cost to our health care and social support system, and so addressing this area can be cost effective.

“Improving circumstances for individuals with traumatic brain injury: A discussion with David Sullivan” Executive Director of Brain Injury Association of Manitoba, and an individual with a traumatic brain injury, highlighted to us the challenges faced by those with brain injuries.

- 1) There is frequently short term memory loss with the result that individuals live in the moment and have difficulty remembering things like appointments and turning off their stove. The latter could be helped by having stoves which automatically turn off after a specific time period – perhaps 15 minutes. The former can be helped by having email and other reminder messages about appointments, and by having case managers or care navigators helping with care.
- 2) Often those with traumatic brain injury will have impulsive outbursts involving swearing. Such outbursts are short lived, but they mean that it is difficult to be in social circumstances with those who do not understand that this behavior is related to this condition. Individuals with a traumatic brain injury often are isolated and feel isolated as a result. This means it is useful for individuals with a traumatic brain injury to associate with others with this condition who understand and are not troubled by this behavior. As an example, many individuals with traumatic brain injury gather regularly (travelling considerable distances walking or by bus) to watch a movie or have fun together even in severe weather.
- 3) Housing is important. I was told that too many individuals with traumatic brain injury are housed in room and board “that you would not allow your dog to be in.” Further, individuals with traumatic brain injury often are put in personal care homes which are not appropriate, yet are the place of last resort for individuals with traumatic brain injury. Creating more appropriate housing space for

individuals with traumatic brain injury would free up spaces in personal care homes for seniors who need them.

4) There is a need to relook at the caps for support under Manitoba Public Insurance Corporation (MPIC) for those in a car accident as the caps are not realistic in terms of the needs of some individuals with traumatic brain injuries.

5) Brain fitness software may be helpful for some individuals with traumatic brain injury.

6) Putting these observations together, an optimum solution might be a centre for those with traumatic brain injury which incorporates housing (with features like stoves which turn off themselves) entertainment, social and outdoor space, and a case manager for those with traumatic brain injury.

Attention to concussions as a form of traumatic brain injury has increased in recent years. Some work suggests that there may be a role for dietary supplementation with DHA and EPA to aid recovery in mild traumatic brain injury including concussions(Barrett 2014).

### **Recommendations**

**83. That a centre be developed for individuals with traumatic brain injury.**

**84. That a case management approach with care navigators be developed for those with traumatic brain injuries, and together with this the cap in support under MPIC for those with traumatic brain injuries from car accidents be reassessed**

**The Public Trustee:** Following a traumatic brain injury, sometimes individuals fall under the Public Trustee. For example three years ago, an individual who received a brain injury during a home invasion, had his life taken over by the Public Trustee. The trustee had all his belongings taken away and then had difficulty in removing the Public Trustee from controlling his life when his health returned. This matter needs to be reviewed and changes made.

### **Recommendation**

**85. That the province review the treatment of individuals with brain injuries in Manitoba. With specific attention to changes which are needed to the role of the Public Trustee's approach to individuals with brain injuries and to those with serious brain conditions who may recover.**

**Employment:** Individuals with traumatic brain injury can often work short shifts, or as much as a full day or two a week. The Social security system in Manitoba is not designed for this because if an individual on social assistance works short periods or one or two days a week, the province claws back seventy percent of earnings providing a major disincentive to work. The system needs to be changed. This change is addressed further under the Employment section.

Prevention of traumatic brain injuries: Fortunately, in recent years there has been much more attention given to head injuries and particularly concussions. Chief among causes of traumatic brain injury are car accidents, bicycle accidents and interpersonal violence involving hammers, bats etc. It would be logical to review this area and develop a made in Manitoba approach to prevention.

### **Recommendation**

**86. That the province have a plan to reduce traumatic brain injuries in Manitoba**

## **14. Addictions**

There have been significant advances in the prevention and treatment of addiction in the last two decades. It is impressive to realize the extent to which current addictions treatment is based on science and evidence (Galanter and Kleber 2008). The science has validated the effectiveness of some traditional approaches – for example the ten steps approach used by Alcoholics Anonymous. Attempts to provide separable categories of addictions and for a better understanding of the varied approaches to treatment have been made. On the basis of presentation and on functional imaging, addictions have been divided into a) compulsive addicts, b) impulsive addicts, c) impulsive-compulsive addicts, sad or emotional addicts, e) anxious addicts and f) temporal lobe addicts (Amen 2015), though such a division is not widely accepted. Treatment plans may seek the complete cessation of use of the substance to which the person is addicted, and where this is not successful may treat the addiction as a chronic, relapsing disease, or a chronic disease with a harm reduction approach which seeks to maintain the addict on the substance to which he or she is addicted or shift the addiction to a safer alternative. In circumstances where a person has a substance use issue and a brain health condition, then integrated treatment which manages both conditions is vital.

In Manitoba and across Canada, there has been a very considerable increase in deaths from fentanyl overdose to the extent that this is now considered a crisis in some provinces. This crisis needs urgent attention.

In Manitoba we heard repeatedly that support for addictions help and treatment is underfunded and though there are some excellent programs, overall the system needs to be much better organized so that people can get the help when they need it, in the way they need it and through a system which is easy to navigate. There needs to be a clear addictions strategy with coordination of services in Manitoba as there is in other provinces.

**Risk factors for substance abuse** (Galanter and Kleber 2008):

i) **Medical and Psychiatric Conditions:** Attention-deficit hyperactivity disorder (ADHD), major depression, bipolar disorder, and dysthymic disorder are associated with substance abuse conditions. Having one substance use disorder conveys an elevated risk of abuse of or dependence on another.

Individuals with child and adolescent conduct disorder and antisocial personality disorder are associated with a higher incidence of substance abuse disorder.

ii) **Nutritional conditions:** Early cessation of breastfeeding (less than three weeks of age) has been found to be associated with an increased incidence of alcoholism (28 percent) compared to infants who were breastfed for three weeks or longer (9 percent) in a group which included a substantial proportion of children whose parents were alcoholic (Goodwin 1999). This could be a nutritional effect, or it might reflect that early termination of breastfeeding is associated with a difficulty in attachment. However, the latter does not seem likely given evidence that duration of breastfeeding was not found to be associated with sensitivity or security of attachment (Britton et al 2006).

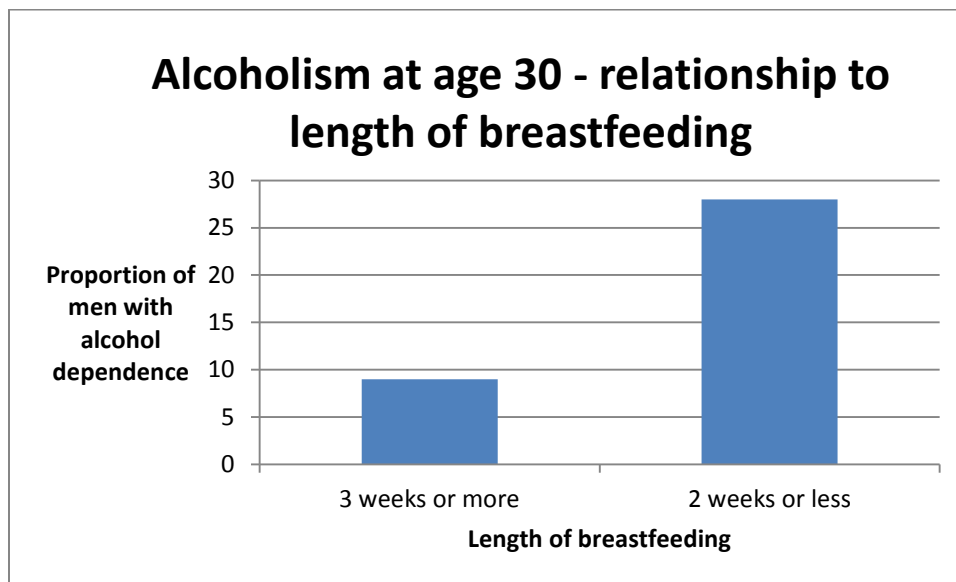


Figure 8: Data from Goodwin et al 1999. The incidence of alcohol dependence is high possibly because the sample was enriched in individuals with a parent with alcoholism.

Alcohol has been shown to deplete brain DHA (Pawlok and Salem 1995). But to date supplementation with DHA and EPA has not been found to be an effective addition to treatment of individuals with alcoholism (Fogaca et al 2011).

iii) **Social conditions:** Low socioeconomic status, residence in an impoverished and stressful neighbourhood, living in a neighbourhood marked by social disorganization and living in a neighbourhood with increased drug abuse are associated with a higher incidence of substance abuse.

iv) **Individual behaviours:** Poor sleep habits in teens is related to increased use of alcohol and marijuana (Jensen 2015). Early use of alcohol – “more than 40 percent of individuals who start drinking before age of thirteen will develop alcohol abuse problems later in life” (Jensen 2015). Preadolescents who score high on novelty seeking behavior (almost 20 times as likely as their peers to abuse alcohol as adults). Impulsivity and lack of emotional control, individuals who have problems establishing and maintaining relationships with others, association with peers who use drugs or alcohol and having a partner who is involved in substance abuse are all associated with an increased rate of substance abuse.

v) **Individual circumstances:** "Adolescents with insecure attachments to their parents are more likely to use alcohol and drugs" (Branstetter 2009). Teenagers get addicted to every substance faster than adults – teenage brains are more prone to addiction (Jensen 2015). Parental substance abuse/dependence, parental depression, anxiety, antisocial tendencies or poor coping skills or emotional or behavioural problems are associated with higher rates of substance abuse. Being divorced, single or experiencing marital dissatisfaction, being a victim of intimate partner violence or having a work environment with high work demand and low control over the work are also associated with an increased incidence of substance abuse.

### **Protective factors for substance abuse**

#### **i) Medical or Psychiatric conditions**

- Having a genetic condition with high levels of monoamine oxidase A expression is protective for substance abuse.

**ii) Nutritional conditions:** Being breastfed for three weeks or longer is associated with a decreased likelihood of alcoholism (Goodwin et al 1999).

**iii) Individual behaviours:** "teenagers who felt loved and connected to their parents had a significantly lower incidence of drug use" (Resnick et al 1997) This finding should never be used in reverse to imply that all children who become addicted have parents who are not loving. Indeed, significant numbers of children with very loving and caring parents do become addicted and do need help.

**iv) Individual circumstances:** Improved approaches within child and family services and the support of families have been shown to be associated with a dramatic reduction in substance abuse in Nelson House. Life Skills Training and Project Alert both of which involve sessions in schools (Botvin et al 1995; Ellickson et al 2003) have been shown to be effective in reducing substance use and/or abuse. Peer support workers can reduce alcohol and drug use among patients with co-occurring mental health and substance abuse issues.

### **Treatment of Addictions:**

The best time to help someone with their addictions is when they are ready to seek help. There should be no delay, when someone is ready. For many this should be treated as an emergency. This is true not just for alcohol but for drug addictions. Manitoba's approach has been very problematic in not providing immediate help.

There is a need for additional medical beds for detoxification in Winnipeg, and in particular one which is a better place for young people with a drug addiction. One young person who was sent to the current detox centre found himself beside the drug pusher who had been selling him drugs and he felt very intimidated, not only by this but also by the fact that he was surrounded by "drunks". An addiction's centre which can provide for detoxification in a controlled way and an appropriate setting



for young people addicted to opioid drugs is an urgent need. The prevention of overdose and death due to drug (fentanyl and other) overdose is an urgent need in Manitoba. It needs a system which is easier to navigate and a system which can respond quickly and well when needed.

Where there are both addiction and other brain health issues, both need to be treated together. Lack of coordinated care of those with brain health issues (other than addictions) which treats both the brain health issue and the addiction has been a problem in Manitoba. There needs to be highly coordinated care.

Wait times to access treatment for addictions are currently unacceptably long in Manitoba. Such wait times need to be shortened. We were told that agencies which treat addictions in Manitoba have not received increases in their funding since 2007-2008 and that underfunding is one reason for the long wait times. It was also recommended that all addictions centres be accredited. Overall, the system to support those with addictions in Manitoba needs to be reviewed, better coordinated, numerous gaps addressed and better funded.

The fentanyl overdose crisis needs to be addressed. Deaths from overdoses now surpass deaths from motor vehicle accidents in adolescents and young adults. There is too much desolation and despair in the loss of loved ones. Naloxone needs to be much more widely available. This is now improving in response to recent public pressure, but more needs to be done. It is positive that the police have endorsed the good Samaritan law which protects those who help at times of emergencies. There needs to be a fentanyl education campaign which promotes much better knowledge of fentanyl addiction, an understanding of what to do in the case of an overdose and how people who are using fentanyl can find help and assistance.

When an individual is hospitalized for an overdose there needs to be strong follow up, because having one overdose puts a person at higher risk for a second. The individual should have a clear treatment path, and should as part of this leave hospital with a naloxone kit in case of a subsequent overdose.

There is a tendency to stigmatize an individual with an addiction. This needs to change. Individuals with an addiction including those who have overdosed need to be treated in a non-judgmental way and with compassion as with other medical conditions.

### **Recommendation**

**87. Manitoba urgently needs an Addictions Plan. The plan needs to include changes to the funding for and provision of help for those with addictions so that assistance and programming can be there when it is needed not a day, a week, a month or a year later. The plan also needs to include a comprehensive response to the crisis of fentanyl overdose deaths occurring in Manitoba.**

In Portage la Prairie, it was found that close coordination of detoxification and follow up treatment is optimum. To have an individual complete detoxification and then not be able to have a coordinated follow up did not work nearly as well as having an individual move directly from detoxification to a follow up plan.

### **Recommendation**

**88. That there be close coordination between treatment at a detox centre and follow up treatment.**

## **15. Epilepsy:**

Epilepsy occurs in about 0.6 percent of the Canadian population. From a public health perspective, it is important because there is often a stigma associated with the diagnosis of epilepsy, and a proportion of those with epilepsy will have associated conditions including learning disabilities. The Epilepsy and Seizure Association of Manitoba has well represented and advocated for those with epilepsy in Manitoba to ensure there are adequate resources and specialists in Manitoba. It is also to be noted that diets, in particularly the ketogenic diet, may be useful to assist in the treatment of epilepsy.

## **16. Parkinson's Disease**

The lifetime risk of developing Parkinson's Disease is one in forty. The mean age of onset is 60 years. Epidemiological studies have found weak links between Parkinson's Disease and drinking well-water, as well as with pesticide exposure and farming and rural dwelling (Edwards et al 2016). Anecdotal evidence supports the use of exercise, an in particular "conscious control over walking" as able to reduce and reverse symptoms of Parkinson's Disease (Doidge 2015).

## **17. Multiple Sclerosis**

Multiple Sclerosis is the most common serious neurological disease in young adults living in temperate climates (Murray 2005). It is common in Manitoba, and the age-adjusted prevalence in Manitoba of 227 persons per 100,000 population "is among the highest in the world." (Marrie et al 2010). Known factors associated with a higher incidence of Multiple Sclerosis are smoking, previous infectious mononucleosis, increased body size, lower level of vitamin D, high intake of saturated fats, processed meats and dairy products. Factors associated with a lower risk of multiple sclerosis include increased outdoor activity, increase cod liver oil supplementation, consuming a low saturated fat diet, higher level of vitamin D and higher level of education (Bjornevik et al 2016a and b, Jelinek 2016; Malosse et al 1992; Munger et al. 2004, Swank 1950; Swank and Duggan 1990).

Pharmaceutical treatments for Multiple Sclerosis have advanced significantly over the last 20 years, with a number of drugs now established as decreasing the extent of Multiple Sclerosis, though none of the drugs is a cure (Tarkildsen et al 2016).

Because the course of Multiple Sclerosis can be variable, definitive statements, and randomized controlled studies of diets and exercise are few, there remains uncertainty about optimum approaches. That being said Jelinek (2013, 2016) reports his experience in using a multimodal approach including reducing or eliminating meat consumption, eliminating dairy products, increased vegetable intake, increased flaxseed and flaxseed oil and fish and seafood consumption, exercise, meditation (including mindfulness meditation) to reduce stress, and supplementing with vitamin D to achieve blood levels about 150 nmol/L. His case reports show remarkable improvements in a number of individuals with Multiple Sclerosis including individuals whose lesions have disappeared – and have been asymptomatic for some time (possible cures).

Another approach which has been associated with improvement in Multiple Sclerosis is Non-invasive Neuromodulation – a technique which uses a Portable Neuromodulation Stimulator to deliver electrical impulses to the tongue (Tyler et al 2014, Doidge 2015).

The use of multimodal approaches in Multiple Sclerosis appears to have considerable promise. Due to the very high prevalence in Manitoba preventing and more effectively treating Multiple Sclerosis should be a provincial priority. As discussed under the section on vitamin D, Scotland is now recommending all adults take vitamin D, in part to prevent multiple sclerosis and to reduce their high incidence, and this should be considered for Manitoba.

### **Recommendations**

**89. Manitoba should become an international centre of excellence for research, for prevention and for treatment of Multiple Sclerosis.**

**90. Action research which involves multimodal approaches to prevent and treat Multiple Sclerosis in Manitoba should be supported provincially to see if the promise of advances in understanding in recent years can be put into practical benefits in Manitoba as fast as possible.**

## **18. Stroke**

Manitoba has fallen far behind other provinces in stroke care and does not yet have a dedicated stroke unit. Such dedicated stroke units have been in place in other provinces for many years, in some cases for decades. They have been proven in many studies to reduce the disability and death from stroke. This will help with the quality of care in Manitoba, and will help in the coordination of improved stroke care throughout Manitoba. Manitoba needs to act with urgency to put in place a dedicated stroke unit.

## Recommendation

**91. Manitoba should act with the greatest possible urgency to put in place a dedicated stroke unit to improve stroke care in Manitoba.**

### 19. Dementia

Dementia is a major public health issue today and it is increasing. Dementia affects 5.4 million Americans and 564,000 Canadians (Alzheimer Society Canada 2016). In Manitoba, 10.6 percent of Manitobans over age 55 have dementia (Manitoba Centre for Health Policy 2013). The cost of dementia in the U.S. is estimated at \$200 billion annually (Perlmutter D 2015). In Canada the cost to care for people with dementia is estimated at \$10 billion annually.

“Alzheimer’s Disease, a devastating progressive form of senile dementia, is the cause of one of the most common memory problems in the elderly. Unfortunately, it robs many people of their retirement years and can leave families, physically, emotionally and financially exhausted. SPECT scans can be an important tool in diagnosing this disorder. Before functional studies were available, the only way to diagnose Alzheimer’s was through autopsy. SPECT studies show a typical Alzheimer’s pattern of decreased activity in both temporal lobes, the parietal lobes, and often in the posterior cingulate. This pattern is seen on SPECT years before the onset of symptoms, when interventions are likely to work” (Amen 2015).

#### **Risk and protective factors for dementia:**

This list is important, as we show below, because it can provide important information for public policy related to the prevention of Alzheimer’s Disease and may help in suggesting approaches which can be useful in the treatment of Alzheimer’s Disease.

#### **Factors associated with an increased risk or likelihood of having dementia include:**

- i) **Medical and psychiatric conditions:** Cardiovascular disease, coronary artery stenosis, hypercholesterolemia, hypertension, high plasma homocysteine levels and hyperhomocysteinuria, diabetes mellitus, , head trauma – a single head injury with loss of consciousness or several head injuries without loss of consciousness, alcohol dependence or drug dependence in the past or present, major depression or ADD/ADHD diagnosed by a physician in past or present, history of a stroke, cancer chemotherapy, Parkinson’s Disease, Sleep apnea, periodontal disease and elevated inflammatory markers
- ii) **Nutritional conditions:** low vitamin D, low vitamin B12, celiac disease, low magnesium, decreased zinc and elevated serum copper are associated with an increased risk of dementia and Alzheimer’s Disease. Biotin and pantothenic acid deficiencies have been observed in individuals with dementia.

- iii) **Social conditions:** less than a high school education
- iv) **Individual circumstances;** Aging, obesity, limited exercise – less than twice a week, a job or jobs that do not require new learning, smoking cigarettes for ten years or longer, low estrogen in females or low testosterone in males or females are associated with increased risk of Alzheimer’s Disease. A common polymorphism of Apolipoprotein E (APOE4) is associated with a striking correlation between high blood sugar and risk of dementia. Even slight elevations in blood sugar that are far below the average for diabetes are associated with a significantly increased risk of developing dementia. (Crane et al. 2013). The elevation of inflammatory markers in the bloodstream can be used to predict cognitive decline and the development of dementia. This refers to C-reactive protein, interleukin six and tumor necrosis factor (Perlmutter 2015) “having a high CRP [c-reactive protein] level is correlated with as much as a threefold increased risk of dementia, including Alzheimer’s disease. It has also been linked to cognitive impairment and general thinking problems.” (Andrasi et al 2005; Amen 2015; Barbagall et al 2011; Cooper 2008; Fatemi and Clayton 2016, Halter et al 2009, Littlejohns et al 2014; Perlmutter 2015 ; Seshadri et al 2002; Squitti et al 2005).

### **Factors which are associated with a lower risk of dementia (are or maybe preventive)**

- i) **Nutritional factors:** “Elderly people who added more fat, in the form of olive oil or mixed nuts, to their diets maintained their cognitive function much better over a six year period than people who ate a low fat diet.” (Perlmutter 2015); Consumption of fish is associated with a lower risk of Alzheimer’s Disease (Barberger et al 2002; Morris et al 2003). Higher levels of vitamin D are associated with a low incidence of dementia and Alzheimer’s Disease (Littlejohns et al 2104). Notable vitamin D supplementation in elderly populations (mean age 60) has been found in a meta-analysis to reduce falls by more than 20 percent (Bischoll-Ferrari et al 2004). Eating curry has been associated with a decrease in Alzheimer’s Disease. Curcumin (turmeric) present in curry, has been found to reduce levels of the primary protein found in the amyloid plaques of Alzheimer’s Disease, the amyloid peptide A-beta (Mishra and Palanivelu 2008). Moderate consumption of red wine is associated with a lower risk of Alzheimer’s Disease (Orgogozo et al 1997; Linday et al 2002; Truelsen et al 2002; Luchsinger et al 2004). Consumption of coconut oil, and medium chain triglycerides has been associated with improvement in dementia (Fife 2011, 2013). Treatment with a magnesium supplement is associated with improvement in Alzheimer’s Disease (Li et al 2014). Treatment with zinc has been shown to protect against cognitive decline in Alzheimer’s Disease (Brewer and Kaur 2013). Treatment with the cognitive and memory enhancer Bacopa monnieri has been found to improve cognitive function in those with mild cognitive impairment (Zanotta D et al 2014, Pase et al 2012). There is “an impressive risk reduction for the development of dementia in people who drink coffee. Moderate coffee drinkers (3 to 5 cups a day) showed an incredible 65 percent decreased risk for developing Alzheimer’s disease in comparison to low drinkers (zero to two cups a day) (Eskelinen et al: 2009).

Some research has shown a reduced risk of Alzheimer's disease with antioxidants, but the results have not been consistent (Zandi et al 2004).

ii) **Exercise:** Participation in leisure time physical activity reduces the odds of getting Alzheimer's Disease by 60 percent. (Medina J 2008 ). Interestingly walking on rough surfaces is particularly effective in preserving brain function compared to walking on a sidewalk, perhaps because the rough surface engages the person so much more and is constantly challenging and keeping the individual alert while walking a smooth sidewalk does not have the same impact.

iii) **Activities: Activities which involve learning or using the brain can slow loss of brain function.**

iv) **Social conditions:** Higher education and maintaining social connections are associated with a decreased risk of dementia.

### **Treatments for Alzheimer's Disease and dementia:**

About 200 drugs have been assessed for effectiveness in treating dementia and the results have been modest benefit from a few drugs, with failure in the remainder (Shneider et al 2014). An alternative approach is needed.

We will explore the study by Brederson in some depth. It suggests that dementia is reversible. It is not a randomized controlled trial, and such trials will be needed. Indeed, one such trial (Kivipelto et al 2013) exists. It uses a similar framework of multimodal or multi-domain intervention, and it has demonstrated positive results in a randomized controlled trial (Ngandu et al 2015). We will explore the Bredenssen study because it provides a glimpse of how multimodal therapy for a brain condition may work. The multimodal approach builds on findings that improved treatment of cancer and HIV can be achieved using a multimodal approach to therapy, and that improved prevention and treatment of high blood pressure and cardiovascular disease can result from identifying and modifying risk factors associated with the conditions.

Use of Bredenssen's (2014) comprehensive and personalized treatment program has been shown to have impressive results to improve thinking and memory in those with Alzheimer's disease. The results of Bredenssen's small series of patients (10) were remarkable. "Six of the patients had had to discontinue working or were struggling with their jobs at the time of presentation, and all were able to return to work or continue working with improved performance."

Bredenssen's work evaluates 25 separate potential contributors to dementia and seeks to optimize the individual person's response in these 25 areas. Many are common sense – including diet, exercise, sleep and brain stimulation and reducing stress. The approach seeks to optimize health, not just to move parameters above a minimum acceptable level. At first glance 25 variables looks like a lot. However, we can break this down to several broad areas. Of interest is that fact that nutritional

factors make up 16 of the 25 areas covered. This serves to highlight the important yet complex impact nutrition has on brain function.

### **Nutrition:**

1. DHA/EPA – this is included as an “anti-inflammatory” diet effect, and to provide brain structural components. There is much evidence that adequate DHA and EPA are needed for optimum brain health.
2. Vitamin D – Vitamin D levels are optimized at 50-100 ng/ml to address the fact that low vitamin D is associated with suboptimal brain health
3. Vitamin B12 – optimize to address the fact that vitamin B12 deficiency has a negative impact on brain health
4. Insulin/Diabetes status – optimize diet, optimize fasting insulin and Hemoglobin (Hgb) A1C in view of evidence that elevated Hgb A1C is associated with increased dementia; fasting 12 hours a night including 3 hours before bedtime.
5. Optimize Homocysteine in view of the fact that elevated homocysteine can have an adverse impact on brain function, and ensure adequate vitamin B6.
6. Optimize Zinc to copper ratio – to address the fact that low zinc, and elevated copper, can have an adverse impact on the brain.
7. Medium chain triglycerides (MCT) – to build on evidence that MCTs have been found to be beneficial for the energy production and function of the brain.
8. Prebiotics and probiotics – to address the possibility that the gut micro biome is important to brain health.
9. Curcumin – given based on evidence that curcumin is associated with a decreased incidence of Alzheimer’s disease and can decrease the A-beta which is the major component of amyloid plaques in Alzheimer’s Disease.
10. Magnesium supplements to address low magnesium in Alzheimer’s Disease
11. Antioxidants – mixed tocopherols and tocotrienols, selenium, blueberries, n-actyl-cysteine, ascorbate and alpha-lipoic acid.
12. Nutrients to aid mitochondrial function – CoQ or ubiquinol, alpha-lipoic acid, Polyquinoline quinone, N-acetyl-cysteine, acetyl-L-carnitine, selenium, zinc, resveratrol, ascorbate and thiamine.
13. Pantothenic acid– supplement to address the requirement for pantothenic acid for acetylcholine synthesis.
14. Resveratrol – an ingredient in red wine which some evidence shows can counteract the impact of the ApoE4 and may reduce Alzheimer’s disease (Theendakara 2013, Barra et al 2005; Turner et al 2015).
15. Optimize diet for a low glycemic impact on blood sugar
16. Optimize diet for anti-inflammatory effect to keep C-reactive protein low

## **Non-nutritional medical Conditions:**

Hypothyroidism - evaluate thyroid status – and optimize to address the fact that thyroid deficiency is known to result in suboptimal brain function. Also evaluated were estrogen and testosterone levels

## **Physical Exercise**

30 to 60 minutes per day 4 to 6 days a week

## **Mind Exercise**

Brain stimulation through Exercises for the mind

## **Psychological Health**

1. Reduce stress –using a personalized approach, employing yoga, meditation, music or other.
2. Exclude sleep apnea, and treat it if present
3. Optimize sleep – 8 hours' sleep per night, use of melatonin and tryptophan if awakening.

## **Cognitive stimulants**

1. Bacopa monnieri. This medicinal plant species has been shown to be effective in improving cognitive function, particularly memory.
2. ALCAR (L-carnitine) or Hericium erinaceus. These agents can stimulate nerve growth factor which is important to healing in the brain. Some evidence supports a potential benefit in mild cognitive impairment (Mori et al 2008; Taglialatela et al 1994; Montgomery et al 2003).

## **Addressing brain toxic substances:**

Evaluate mercury, lead and cadmium levels and if they are high, initiate treatment.

The results of the Kivipelto and Bredensen approach to multimodal intervention to prevent dementia will need to be confirmed and extended in future large trials. There is at the same time an urgency to move forward and to ensure that aspects of this approach are being implemented even as the full approach is being further assessed. The recommendation with respect to exercise, for example, should already be part of physicians and public health advice and not just for reasons of preventing or treating dementia. Recommendations with regard to addressing vitamin deficiencies (vitamin B12, vitamin D) and DHA deficiency, as well as testing and treating those with hypothyroidism should be part of a standard set of diagnostic and therapeutic approaches to anyone with dementia. With dementia, in which various aspects of a person's genetic makeup and lifestyle may combine to lead to dementia, it is logical to employ a treatment approach which addresses the various areas where there is potential for improvement. The effective prevention and treatment of dementia has the potential for huge cost savings to our health care system and to our society as well as the large benefit to individuals.



### Recommendation

**92. The Working Committee on Optimum Brain Health needs to assess the multimodal approach of Bredensen and make recommendations that will ensure that Manitobans at risk of dementia and those with dementia are benefitting from advances in dementia prevention and treatment as rapidly as possible.**

**Blood sugar and Dementia:** In view of the evidence of a close link between blood sugar levels (as monitored using Hemoglobin A1c) and the risk of dementia, and that this link applies at levels below those associated with diabetes. (Crane et al. 2013), wider screening of individuals for Hemoglobin A1c should be considered.

### Recommendation

**93. The Working Committee on Optimum Brain Health should make recommendations as to the optimum screening for hemoglobin A1c.**

There is currently also much interest in understanding the bacteria present in the human gastrointestinal tract and the link between such bacteria and various health conditions, including brain conditions such as Alzheimer's Disease and Multiple Sclerosis. A growing body of evidence links the nature of gut bacteria and human health, and a gradually increasing experience is now available in the use of approaches, such as a probiotic diet and/or fecal transplant, to change such bacteria to more beneficial types with beneficial results on disease states. The data presently available may be too premature to act upon currently, except to recommend research in this area to clarify the situation and the validity of claims being made.

## 20. Phenylketonuria (PKU)

It is perhaps fitting that the last condition in this section deals with phenylketonuria as this was one of the first diseases where diet was shown to be effective in treating a genetic disorder. Today children with PKU are able to receive provincial support to help with the cost of the special diet they need for their brain to stay healthy. Adults with PKU do not yet receive such support. It is time adults with PKU are able to receive such support as for many it makes the difference for them in enabling their brain to stay healthy so that they can be able to work and to be contributing citizens.

### Recommendation

**94. Funding be provided to help adults with PKU afford the special diet they need for their brain to stay healthy.**

## Section 6: Human Resources:

We were able to identify several areas where additional human resources are needed. There is a clear need for more psychologists in Manitoba, and this will be particularly true if there is greater access to psychologists as is proposed in this report. There is also a need for many more peer support workers in Manitoba, with adequate training and adequate planning to incorporate them into the mental and brain health system in Manitoba. With the importance of diet to brain health, there is a need for additional dietitians. There needs to be a more complete look at the human resources including psychiatrists, needed to fully address what is needed in the area of brain and mental health in Manitoba. It needs to be said that there has been an increase in the number of psychiatric residency spaces in Manitoba in recent years and this should help address a shortage of psychiatrists.

### Recommendation

**95. The province needs to develop and implement a human resources plan for brain health in Manitoba, and this should start with plans to address needed increases in psychologists, peer support workers and dietitians.**

## Section 7: Funding

Overall, the proportion of Manitoba's health care budget which is used for mental health is said to be low. We were told it is about 4-5%, though we have not seen an accurate assessment ourselves. Nationally the proportion is known to be low at 7%. In the United Kingdom, Australia and New Zealand the proportion is 10-12%. The Canadian Alliance on Mental Illness and Mental Health in its Sept 2016 report recognizes that Canada as a whole needs to increase the proportion of health spending going to address mental illness and mental health says "Government funding for mental health should increase from 7.2% of total public health spending to a minimum of nine percent." There is no doubt that mental and brain health is underfunded in Canada and that this needs to increase. This being said, it is important to recognize that there are a considerable number of areas where spending more to address mental and brain health can substantially decrease health care costs in emergency rooms, in institutions like hospitals, in our education system, in our criminal justice system, in our child welfare system, in our social assistance system and at the same time improve the employment and productivity of Canadians and so improve our economy. On balance – as assessed in the cost-benefit assessment below, there is a net positive bottom line for governments in making these new investments in brain and mental health, providing they are done smartly, and using scientific evidence.

## Recommendation

**96. That the health budget be adjusted to increase the proportion of funding for mental and brain health to 9 percent of provincial health care spending.**

### Cost Benefit and Return on Investment Assessment

The return on investment in mental and brain health can be very large. Indeed, the savings are such that it is hard to see how our health care system can be sustainable if we do not act to make these investments in mental and brain health. Several of the items are listed below individually.

1. **DHA and EPA supplementation in pregnancy, for breastfeeding mothers, for those with learning disorders, and those in institutions** – The cost effectiveness of this measure has been clearly shown in respect to decreasing prematurity and decreasing the number of children needing to be put in the neonatal intensive care unit (Makrides et al 2010, Carlson et al 2013). The cost effectiveness of its use in children with learning disorders and with incarcerated individuals with regards to improved learning and decreased violence is highly likely.
2. **Vitamin D supplementation for all Manitobans over age one.** Scotland has now recommended all people in Scotland over age one have supplemental vitamin D. The projected savings are large – at 18.7 times the cost of implementation of this initiative. This is a very large return on investment.
3. **Psychological services under medicare** – The cost effectiveness of covering psychological services under medicare has been clearly shown in a detailed analyses. A “meta-analysis of 91 research studies published between 1967 and 1997 found that average health care cost savings due to psychological interventions were in the range of 20-30% across studies” (Hunsley J 2002). As an example, “over a two year period, pharmacologic treatment is likely to cost 30 percent more than cognitive behavioural treatment.”
4. **Emphasizing attachment.** Putting an emphasis on developing and sustaining secure attachment has not been studied for its cost savings but based on our current understanding of the importance of attachment to long run psychological health, measures in this area have great promise as cost effective measures.
5. **Decreasing addiction and preventing FASD.** Reduction of FASD through an approach which better supports families and reduces child apprehensions as well as addressing addictions has been shown to be effective. The cost of looking after children with FASD is very high, providing evidence that this approach to reduction of FASD can be highly cost effective. The approach taken at Nelson House which provides better support for families saves substantial costs from fewer apprehensions of children as well as from the reduction in FASD in the community. The effective treatment of addictions can save hospitalizations. We were told of individuals with multiple hospitalizations during the period they were waiting for treatment,

with an estimate that the cost savings from moving quickly to treatment can save a lot of health care dollars.

6. **Addressing learning disorders:** Much quicker assessment and treatment of learning disorders is vital if we are to help children early on that will make a difference in reducing brain health problems and in reducing criminal justice issues later. The cost of this is small in comparison to the benefit to society and to the reduction in later costs to society.
7. **Using multimodal therapies to prevent and treat dementia and other neurological disease** – With dementia increasingly a major issue as people age, effective prevention and treatment can enable individuals to delay or avoid dementia and those diagnosed with early dementia to work and be productive. Lessening the high cost of looking after individuals with dementia can be highly cost saving to our health care system.
8. **Employing Peer support workers:** A careful assessment of the use of peer support workers and of six studies which have looked at the cost-effectiveness of this approach has shown that “peer support workers bring about significant reductions in hospital bed-use among the patients they support, leading to financial savings which are well in excess of additional pay costs” (Trachtenberg et al 2013). In-patient bed use is one of the most costly components of the mental health system and reductions in in-patient bed use can not only save dollars, but may be of vital importance in saving dollars which would otherwise be needed for the construction of new beds in critical areas like stroke care and in reducing the waiting times for hospital beds which currently exist.
9. **Prevention and treatment of depression, anxiety and suicidal ideation**– A comprehensive approach which includes attention to nutrition, exercise, psychological support, peer and community support, emphasizing positive life goals and opportunities has the potential to be effective in reducing depression, anxiety and suicide. Reduce bullying in areas like weight based discrimination will also have a positive impact. A Conference Board of Canada study (Sutherland and Stonebridge 2016) has estimated that improved prevention and treatment of depression and anxiety could boost Canada’s economy by up to \$50 billion a year (this would be more than \$1 billion a year for Manitoba).
10. **Improving the criminal justice system** – Improved efficiencies within the criminal justice system and decreasing the number of criminals have the potential to be cost effective in reducing the number of criminals and saving money in reducing the very high incarceration rates in Manitoba. This can change the system which has often been “Set up to Fail” to one which better understands the nature of brain health and which fully supports and integrates with behavioural health professionals and extended family and community members to change to “Set up to Succeed” system.
11. **Prohibiting weight based discrimination** – Decreasing bullying and discrimination has the potential to decrease depression and suicide and to increase individual productivity and fitness of those who are overweight. This has the potential to be a very cost effective measure.

12. **Housing First** – Cost effectiveness of Housing First has been demonstrated in a very large national study (Gaetz et al 2013).

**Recommendation**

**97. That the investments be made to support the changes in this report because they are needed, and recognizing that these changes are essential if Manitoba's health care system is to be sustainable financially.**

## **Section 8: One last question – Is Manitoba's population more deficient in DHA/EPA than other provinces – and could this account for several areas of poor provincial performance?**

This last question must be asked. If a population were relatively deficient in DHA and EPA compared to other populations one would predict based on present knowledge that the population which is relatively deficient in DHA/EPA might have the following characteristics.

- a. a high infant mortality due to high rate of premature births and low birth weight infants
- b. children who are behind cognitively in reading, language, math and science.
- c. A high rate of violence in the society -
- d. A high rate of depression
- e. A high rate of suicide

In fact, as the graphs below show Manitoba has the highest infant mortality rate of all province, the highest violent crime severity index, among the lowest scores on the international PISA tests in reading, language, math and science, as well as high rates of depression and suicide.

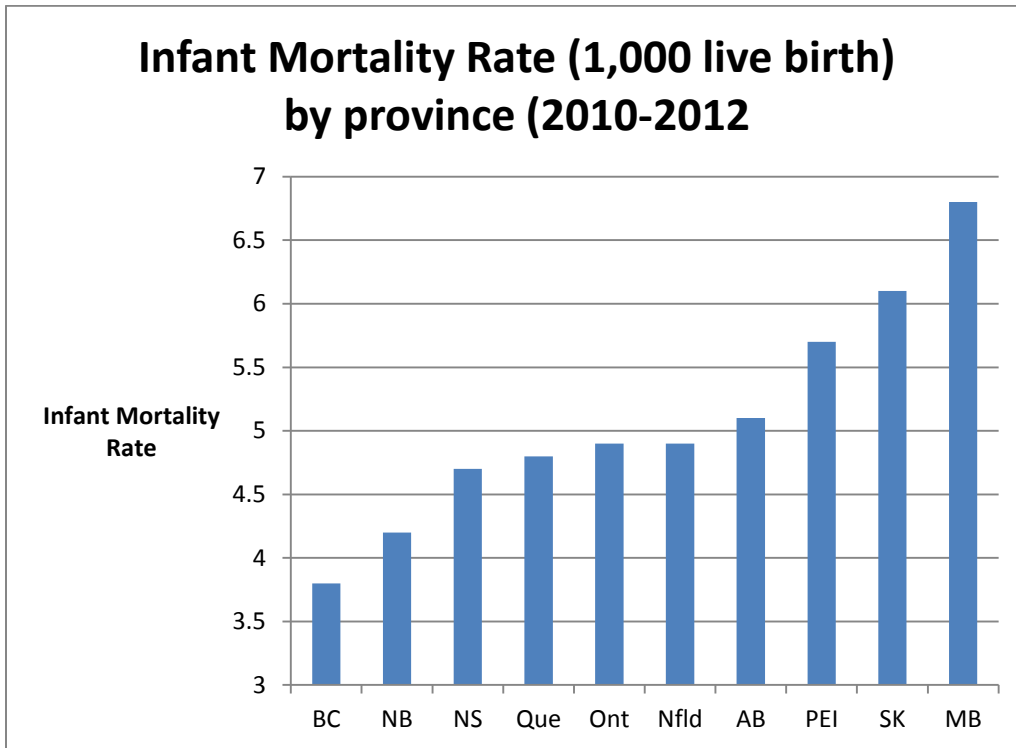


Figure 9: Infant Mortality Rate by Province – Data from Statistics Canada

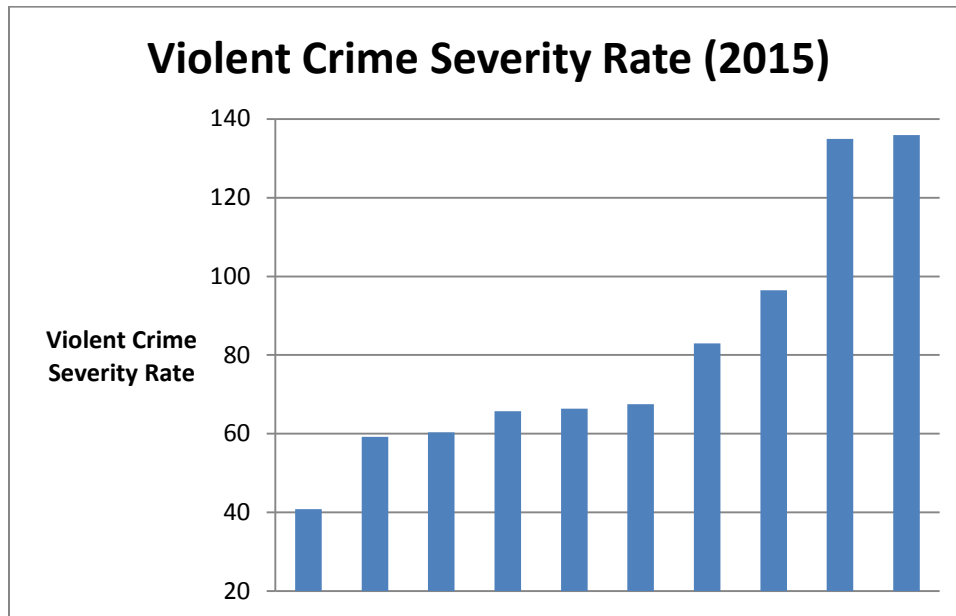


Figure 10: Violent Crime Severity Rate by Province. Data are from Statistics Canada

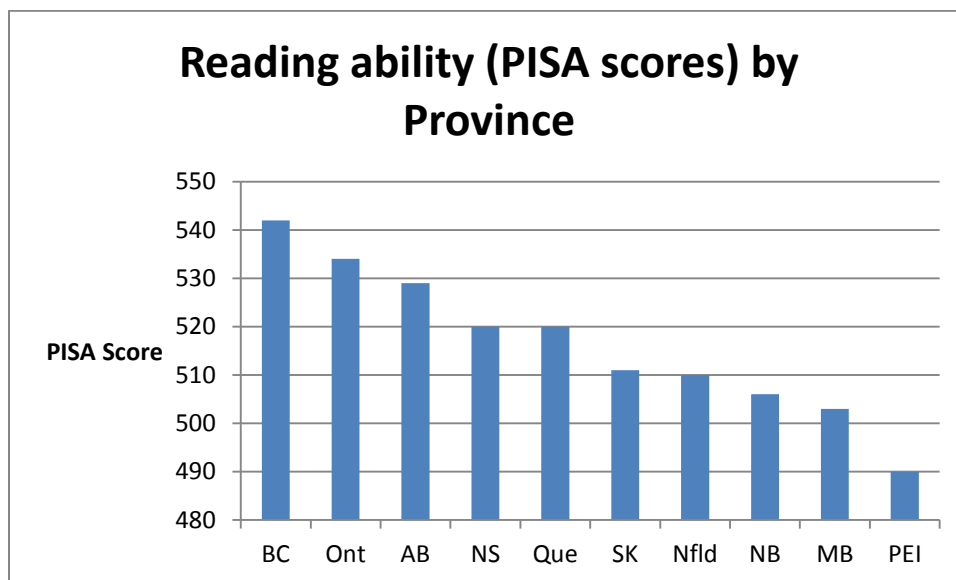


Figure 11: Reading ability by province. Data are from the Programme for International Student Assessment (PISA)

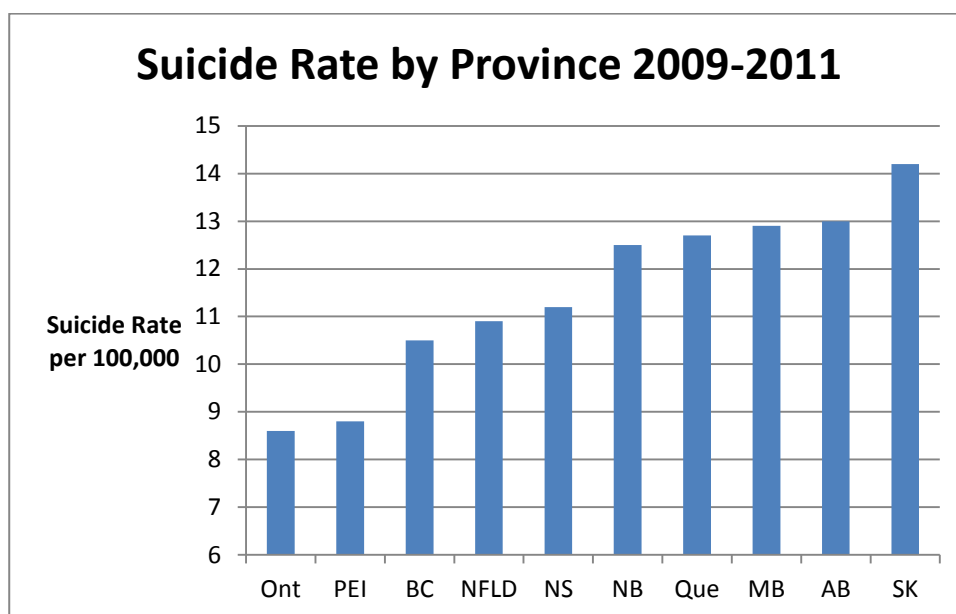


Figure 12: Suicide Rate by Province. Data are from Statistics Canada.

Could the profile of Manitoba be a result of the diet of Manitobans and in particular our low intake of fish and seafood? This is a question which deserves at least some research.

We do not know if Manitoba's fish and seafood consumption is lower than other provinces, but it is possible and this should be looked at. We do know that most Canadian children are deficient in the omega-3 fatty acids DHA and EPA (Madden et al 2009).

## Recommendation

**98. If Manitobans fish and seafood consumption is found to be low, then the Working Group of Optimum Brain Health should be charged with making recommendations to address this.**

## Section 9: Overview

This section shows an alignment of the major points in the summary with the recommendations under each point. Recommendations are numbered as in the numbering in the text above.

General Recommendations

Nutrition and exercise

Psychological services

Attachment

Learning disorders

Ending discrimination

A “my team” approach

Multimodal therapy

Addictions

Traumatic Brain Injury

Preventing depression and suicide

Addressing homelessness and unemployment

Changing the criminal justice system and child and family services

### General recommendations:

1. A primary objective is to achieve optimum brain health for every Manitoban.
2. A secondary objective is to recognize that every person’s brain is unique and that optimizing health is different from person to person.
3. A third objective is to ensure public dollars are spent wisely.
4. It should be general public policy to promote a better understanding of the brain and its function.
5. The provincial government should ensure that adequate knowledge of brain health and the general factors which either promote or adversely affect brain health is a formal part of the health curriculum in our K-12 primary and secondary school system.
6. The provincial government should establish a Working Committee on Optimum Brain Health which has the ability to check facts and a) make general statements with regard to the brain and its function



and b) make general proposals for improving the brain health of all Manitobans and c) making recommendations as to how to ensure this information is generally available to Manitobans. This working committee should provide its recommendations for improving brain health on a regular basis as the nature of the science and evidence in this area develops.

7. The Working Committee on Optimum Brain Health should catalogue and disseminate knowledge of life experiences which can have positive impact on brain health, and those which can have negative impacts. This knowledge should be incorporated into the K-12 school health curriculum so that all children will have some knowledge of how to look after their brain.

10. The Government of Manitoba must implement an action plan based on science and evidence.

11. The Government of Manitoba must increase support for the research efforts needed to move our province forward and position Manitobans at the forefront of the understanding of the human brain and how we can best benefit Manitobans. We heard there is a particular need for the province to fund individuals in the transition period after their start in research and before they receive funding from the Canadian Institute for Health Research.

12. The Government of Manitoba, in moving forward with a brain health action plan must engage in a public awareness effort which helps all Manitobans to understand why this effort is so important and must, where needed, engage in public consultations as part of this process.

95. The province needs to develop and implement a human resources plan for brain health in Manitoba, and this should start with plans to address needed increases in psychologists, peer support workers and dietitians.

96. That the health budget be adjusted to increase the proportion of funding for mental and brain health to 9 percent of provincial health care spending.

97. That the investments be made to support the changes in this report because they are needed, and recognizing that these changes are essential if Manitoba's health care system is to be sustainable financially.

### **Nutrition and Exercise.**

13. The Government of Manitoba needs to make, through its Working Committee on Optimal Brain Health, formal nutritional recommendations for improving the brain health of Manitobans.

14. Strong consideration should be given to DHA and EPA supplementation for all women in Manitoba during pregnancy, beginning by week 20 of pregnancy in Manitoba. (A possible exception may be women with bleeding conditions where there is a theoretical possibility the DHA and EPA could worsen the condition).

16. Individuals who are inmates in jails should receive diets containing sufficient fish and seafood or diets which are supplemented with DHA and EPA and vitamins to reduce violent activities in our jails.

18. The Working Committee should be charged specifically with addressing on an urgent basis (in cooperation with existing organizations like the Manitoba Pediatric Society) issues such as a) Should it be recommended that all (or only those with inadequate dietary intake of fish) breast feeding women, and all children under the age of 5 years who are not being breast fed or receiving DHA and EPA in their formula be recommended to receive supplemental DHA and EPA, and if so that such supplements should be fully covered under pharmacare?

20. Given the importance of access to fish for communities, changes should be made to the Freshwater Fish Marketing Corporation to allow locally produced fish to be sold by fishermen to local groceries, local restaurants, and local institutions like hospitals and personal care homes in the home community of the fisherman in order to enable greater incorporation of fish into local diets. Together with this effort to market local fish, the DHA and EPA content of fish species in Manitoba should be listed on the Province of Manitoba web site.

17. Since DHA and EPA are important for brain health, Manitoba should reinforce existing recommendations from Health Canada and Dietitians of Canada with regard to DHA and EPA in the diet or in supplements, and the advice of the Working Group on Optimum Brain Health should be sought as to the best way to ensure as high a proportion as possible of Manitobans are meeting these daily requirements.

19. Provincial support for research to study the impact of diet on brain conditions should be enhanced. As an example, research is needed to establish the extent of fish and seafood consumption by Manitobans and the levels of DHA in Manitobans.

98. If Manitobans fish and seafood consumption is found to be low, then the Working Group of Optimum Brain Health should be charged with making recommendations to address this.

21. The province needs to sustain and enhance the role of the Child Nutrition Council in improving the diets of children in our primary and secondary schools.

22. The province should evaluate the number and distribution of dietitians in Manitoba and take measures to ensure there are adequate numbers of dietitians and that sufficient dietitians are present in areas of high need.

23. The provincial government needs to evaluate on an ongoing basis the activity levels of Manitobans and to do this by region and by community in order to provide a basis for an action plan to improve the level of physical activity province wide.

24. Exercise, because of its general benefit for brain and cardiovascular health should be promoted by health professionals and governments for its beneficial impact. The provincial government should make a public health recommendation for exercise for optimal brain health and for prevention of Alzheimer's Disease, and task the Working Group for Optimum Brain Health to make recommendations for specific effective actions that the government, organizations or individuals should take.

94. Funding be provided to help adults with PKU afford the special diet they need for their brain to stay healthy.

25. The Manitoba College of Physicians and Surgeons should be asked to evaluate the extent to which physicians are talking to their patients and providing information about exercise, and should make recommendations for exercise to support optimum brain health.

26. The Working Committee on Optimum Brain Health needs to consider the evidence with respect to sunlight and vitamin D on brain health, particularly in relation to depression and multiple sclerosis, make a recommendation for where research is needed and where preventive treatment (for example to optimize vitamin D levels) can be incorporated into general practice, and whether Manitoba should follow Scotland in recommending all Manitobans over the age of one take vitamin D supplements. At a minimum those over age 50 should have supplementary vitamin D because of clear evidence it reduces falls in the elderly.

61. The Working Group on Optimal Brain Health should evaluate the evidence relating the cause of autism to diet and environmental influences and make recommendations for further research into prevention and treatment approaches that are evaluated based on the findings.

### **Psychological Services**

29. The Government of Manitoba should start including certain psychological services under medicare as with physicians' services to make sure they are available to those who need them.

30. Manitoba needs to review with the Manitoba Psychological Society the scope of psychologists practice and make changes to allow psychologists to more fully participate in health care prevention and treatment, and have a greater role in certain critical areas such as the care of suicidal patients on discharge from a hospital or the Crisis Response Centre.

**Attachment:**

8. That attachment theory be part of the K-12 health and parenting curriculum
9. That the understanding of attachment theory, and the implementation of public health approaches which maximize the extent to which secure attachment develops be a central part of the plan to optimize brain health in Manitoba.

**Learning Disorders:**

15. The Manitoba Pediatric Society should be asked to make recommendations with regard to children who are in the lower 20 percentile in reading and who are aged 7 to 9 as to whether such children should routinely receive a DHA/EPA supplement. If so, the cost of the supplement should be covered under pharmacare.
27. Assessment of interactive reading with a child and assessment of preschool learning should be a normal part of the brain health history of every child, and addressing these issues when they are lacking should be part of the assessment of every child's brain health and development by their physician. The Manitoba College of Physicians and Surgeons should be asked to evaluate the extent to which this is currently happening and whether measures to improve current physician practice are needed.
60. The financial resources need to be provided by the Manitoba government to ensure every child with autism has access to therapy. Given the increase in the number of children diagnosed with autism in recent years, a yearly increase will be needed. For the immediate future, until the situation stabilizes, it will likely require an additional \$2 million per year for the next two to three years.
62. The province should work with the Learning Disabilities Association of Manitoba to enable a doubling in size of LDAM in Winnipeg, and its expansion to include satellite centres so that children all over Manitoba can receive services promptly when needed.
63. DHA/EPA supplements should be included under pharmacare when prescribed by a physician for a child with a delay in reading.
66. There needs to be a recognition that the pay for those who work in the community with those who have intellectual disabilities, needs to move closer to the pay rates for those working in institutions.
67. An approach to prevention of intellectual disabilities, including autism associated with intellectual disability, is needed in a more comprehensive and more vigorous fashion. This will include investment in research and in planning, but can have great long term cost-benefit as we have fewer children with intellectual disabilities and those who do have an intellectual disability will have a better chance for a fuller life. Investments in research today, to prevent autism for example, could have a very positive long term health and cost benefit.

70. That the Working Group on Optimizing Brain Health be asked to make recommendations for how to help people work with individuals with ADHD so that they can perform at their best – emphasizing stimulating environments, the use of praise and how best to handle conflicts with individuals with ADHD – using quieter, soft, effective language rather than screaming as an example.

### **Ending Discrimination: .**

33. Legislation be implemented to include discrimination on the basis of physical size or weight to be under Manitoba's Human Rights Code

65. Attention needs to be paid to post-traumatic stress disorder in those with intellectual disabilities as part of helping them achieve a healthy life.

### **A "My team" approach**

34. The Working Committee on Optimum Brain Health make recommendations to the province on the optimum approach to create effective and optimal teamwork among all behavioural health professionals and those involved in the justice system and in other areas to support optimum brain health for Manitobans. Included in these recommendations need to be measures to help clients of our health care system with brain health issues navigate the system, taking into account the fact that those with brain health conditions may have unique needs in this respect.

35. A brain health "Dashboard" be developed to allow individuals to efficiently find the wide variety of resources which are available in Manitoba.

36. The potential to use technology to delivery therapy into the homes of Manitobans be explored.

37. The Working Committee on Optimum Brain Health make recommendations for the optimum approach achievable in Manitoba for creating effective networks of support to assist those with brain health issues. These recommendations need to include changes to the Mental Health Act to make it easier for health professionals to share information with family members and possibly with other members of the person's circle of support.

38. The Province of Manitoba ensure that all RHAs have programs which employ peer support workers for those with brain health issues.

39. The Province of Manitoba begin a training program for peer support workers who can be certified through PSACC.

40. The Province of Manitoba advocate with the federal government for a national training program for peer support workers with national funding.

51. The course in Mental Health First Aid given by St. John's Ambulance should receive provincial support so that this course, or an acceptable alternative (some school divisions will choose an alternative), can be taken by grade 11 students in Manitoba.

52. The Manitoba College of Physicians and Surgeons should assess the potential for family physicians and emergency rooms to use simple screening questions or questionnaire to assess the possibility of brain or mental health issues at each patient visit.

### **Multimodal therapy**

28. Assessment of the extent to which an adult is engaged in learning programs should be part of the brain health assessment of adults with respect to the prevention and treatment of dementia. The Manitoba College of Physicians and Surgeons should be asked to assess current practices and whether measures to improve current physician practice are needed.

68. The province should support efforts to look at and use multimodal approaches to the treatment of ADHD.

74. The Working Committee on Optimum Brain Health review the evidence with respect to depression and make recommendations with respect to what are the most effective measures we can take in Manitoba to reduce the overall incidence of depression in our province, and to achieve the most effective treatment possible for those with depression including the potential of a multimodal or multifaceted approach.

90. Action research which involves multimodal approaches to prevent and treat Multiple Sclerosis in Manitoba should be supported provincially to see if the promise of advances in understanding in recent years can be put into practical benefits in Manitoba as fast as possible.

91. Manitoba should act with the greatest possible urgency to put in place a dedicated stroke unit to improve stroke care in Manitoba.

92. The Working Committee on Optimum Brain Health needs to assess the multimodal approach of Bredensen and make recommendations that will ensure that Manitobans at risk of dementia and those with dementia are benefitting from advances in dementia prevention and treatment as rapidly as possible.

93. The Working Committee on Optimum Brain Health should make recommendations as to the optimum screening for hemoglobin A1c.

## **Addictions:**

58. That there be a provincial addictions and FASD reduction strategy designed and implemented based on an understanding of the situation at Nelson House where there is substantive evidence for a reduction in addictions and in FASD.

59. That progress in understanding the nature of effective help and treatment for children and adults with FASD be formally put into that provincial plan to better help children and adults with FASD and to reduce the potential for children and adults with FASD to be involved with the criminal justice system.

71. Manitoba develop a provincial plan for treatment of individuals with eating disorders in order to reduce wait times, to address areas including the need for professional development, research, improved statistics, prevention, awareness and the development of a publicly funded Manitoba residential treatment program.

72. Until the provincial plan is developed and a Manitoba residential treatment centre is in place, affected individuals needing access to residential treatment should have access to such treatment in other jurisdictions and the cost should be covered under medicare whether provided in Manitoba or in another province.<sup>81</sup>: First Episode psychosis clinics should be established in Brandon, Thompson and Steinbach.

87. Manitoba urgently needs an Addictions Plan. The plan needs to include changes to the funding for and provision of help for those with addictions so that assistance and programming can be there when it is needed not a day, a week, a month or a year later. The plan also needs to include a comprehensive response to the crisis of fentanyl overdose deaths occurring in Manitoba.

## **Traumatic Brain Injury:**

83. That a centre be developed for individuals with traumatic brain injury.

84. That a case management approach with care navigators be developed for those with traumatic brain injuries, and together with this the cap in support under MPIC for those with traumatic brain injuries from car accidents be reassessed.

85. That the province review the treatment of individuals with brain injuries in Manitoba. With specific attention to changes which are needed to the role of the Public Trustee's approach to individuals with brain injuries and to those with serious brain conditions who may recover.

86. That the province have a plan to reduce traumatic brain injuries in Manitoba

## **Prevention of Depression and Suicide:**

31. That an evaluation of the current extent of bullying in Manitoba be undertaken to assess the effectiveness of recent anti-bullying legislation, and whether changes are needed.
32. Legislation should be passed to include bullying under Manitoba's Human Rights Code so that those who are adversely affected by bullying have can have their concerns considered.
74. The Working Committee on Optimum Brain Health review the evidence with respect to depression and make recommendations with respect to what are the most effective measures we can take in Manitoba to reduce the overall incidence of depression in our province, and to achieve the most effective treatment possible for those with depression including the potential of a multimodal or multifaceted approach.
76. That a province wide protocol be developed and implemented for individuals at high risk for suicide.
77. The implementation of a comprehensive multimodal plan for suicide prevention to reduce the number of suicides in Manitoba. This plan should include: a) an approach targeted to individuals at risk of suicide, b) a province-wide suicide reduction plan and c) a community based approach to ensuring activities and facilities are available to young Manitobans so that they have access to facilities, to activities, to learning opportunities and to employment opportunities in their community.
78. The provincial government review all communities in Manitoba and implement an action plan to ensure that these communities implement activities and exercise opportunities for youth and adults.
79. The provincial government develop and implement a plan for rural and northern communities to have broadband internet access to enable improved education and employment opportunities.
80. The provincial government work with First Nations and Metis people in Manitoba to develop an education strategy to improve education for First Nation and Metis people in Manitoba.
81. The provincial government develop approaches specifically designed to address unemployment in northern and rural Manitoba and to address unemployment in individuals with brain health concerns.

## **Addressing homelessness and unemployment:**

41. Housing First be extended as expeditiously as possible to all Manitobans with serious brain health issues for whom benefit for housing first was shown in the national study. That the approach be one which works in partnership with private sector landlords as well as public sector and non-profit sector landlords as in Medicine Hat.
42. The Social Assistance system needs to be redesigned so that it is useful for those with brain and mental health conditions who work for short periods, or part time or sporadically, so that they do not



have a very high (70%) marginal tax or claw back rate. The 70% claw back rate should be reduced to 50%.

43. The Working Committee on Optimum Brain Health be tasked with making recommendations for optimum support for individuals with brain health issues with regard to finding and maintaining employment.

44. Manitoba should proceed expeditiously to implement a plan which includes employing a substantial number of peer support workers.

64. Manitoba needs to focus efforts in areas like SCE Lifeworks which are working with individuals with intellectual disabilities to enable them to find and work in regular jobs earning regular wages. This effort is paying off in improved morale and improved self-esteem, and is highly cost effective.

**Changes to the criminal justice system and in child and family services: .**

45. Every effort possible needs to be made to have a comprehensive, responsive and effective Justice System to address brain health issues so that wherever possible individuals with brain health issues are not criminalized.

46. The issues raised in "Set up to Fail: Bail and the Revolving Door of Pre-Trial Detention" needs to be addressed urgently and changes made in Manitoba by the provincial government.

47. Ensure systematic approaches are used to assess the potential for violent tendencies in individuals, that adequate diagnostic approaches are taken to be sure there is not underlying pathology which can be addressed, and that optimal approaches to brain health as well as to coordinating the activities of police and behavioural health professionals are taken to provide safety to Manitobans.

48. Research is needed to understand the potential relationship between those who commit violent acts and their intake of DHA and EPA.

49. There should be a focus on Transition planning including ensuring all those who are in a correctional institution are helped to ensure they have a Manitoba Health Card, a Social Insurance Card and have a transitional plan for housing.

50. A province-wide approach to preventing interpersonal violence through education in our schools should be implemented.

52. The Manitoba College of Physicians and Surgeons should assess the potential for family physicians and emergency rooms to use simple screening questions or questionnaire to assess the possibility of brain or mental health issues at each patient visit.

54. Expose all children, but especially those in CFS care, to what it means to dream big so that they recover at a later point in life, and so that they will always carry this inner vision and thus strive for that vision. For our CFS children this exercise especially needs to be documented and continually to be a focal point of discussion for their assigned worker.

55. For children taken into CFS care, there needs to be an assessment through engaging in simple activities to determine whether a child may be predisposed to the stress vulnerability gene and for such children train them to develop self-aware coping skills such as relaxation skills and social skills. Yoga in the classroom has been shown to dramatically reduce undesired behaviour. Again, for our CFS children this exercise especially needs to be documented and continually be a focal point of discussion for their assigned social worker.

56. By knowing that our brains can reshape our memories by new experiences we need to begin supporting children in middle school to journalize positive stories from their life, the goal is to create "better" memories from which they will rely on in later years. Again, for our CFS children this exercise especially needs to be documented and continually be a focal point of discussion for their assigned social worker.

57. The Working Committee on Optimum Brain Health should specifically set standards for nutrition for children in CFS care; every child entering CFS care should have a nutritional assessment and recommendations by a dietitian, funding for nutritional supplements needed should be covered under pharmacare or NIHB (Noninsured health benefits) and be made available in every health office or nursing station in every First Nation, and CFS workers should document the nutritional status of children in CFS care.

69. The Working Group on Optimizing Brain Health should look carefully at the issue of ADHD its diagnosis and treatment, children in the care of CFS and adolescents and adults in the criminal justice system to be sure we are doing everything we can be doing to change the outcomes for children with ADHD so that they can be fully contributing members of society with good opportunities for employment.

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## **Appendix I: Summary of Recommendations**

1. A primary objective is to achieve optimum brain health for every Manitoban.
2. A secondary objective is to recognize that every person's brain is unique and that optimizing health is different from person to person.
3. A third objective is to ensure public dollars are spent wisely.
4. It should be general public policy to promote a better understanding of the brain and its function.
5. The provincial government should ensure that adequate knowledge of brain health and the general factors which either promote or adversely affect brain health is a formal part of the health curriculum in our K-12 primary and secondary school system.
6. The provincial government should establish a Working Committee on Optimum Brain Health which has the ability to check facts and a) make general statements with regard to the brain and its function and b) make general proposals for improving the brain health of all Manitobans and c) making recommendations as to how to ensure this information is generally available to Manitobans. This working committee should provide its recommendations for improving brain health on a regular basis as the nature of the science and evidence in this area develops.
7. The Working Committee on Optimum Brain Health should catalogue and disseminate knowledge of life experiences which can have positive impact on brain health, and those which can have negative impacts. This knowledge should be incorporated into the K-12 school health curriculum so that all children will have some knowledge of how to look after their brain.
8. That attachment theory be part of the K-12 health and parenting curriculum
9. That the understanding of attachment theory, and the implementation of public health approaches which maximize the extent to which secure attachment develops be a central part of the plan to optimize brain health in Manitoba.
10. The Government of Manitoba must implement an action plan based on science and evidence.
11. The Government of Manitoba must increase support for the research efforts needed to move our province forward and position Manitobans at the forefront of the understanding of the human brain and how we can best benefit Manitobans. We heard there is a particular need for the province to fund individuals in the transition period after their start in research and before they receive funding from the Canadian Institute for Health Research.

12. The Government of Manitoba, in moving forward with a brain health action plan must engage in a public awareness effort which helps all Manitobans to understand why this effort is so important and must, where needed, engage in public consultations as part of this process.
13. The Government of Manitoba needs to make, through its Working Committee on Optimal Brain Health, formal nutritional recommendations for improving the brain health of Manitobans.
14. Strong consideration should be given to DHA and EPA supplementation for all women in Manitoba during pregnancy, beginning by week 20 of pregnancy in Manitoba. (A possible exception may be women with bleeding conditions where there is a theoretical possibility the DHA and EPA could worsen the condition).
15. The Manitoba Pediatric Society should be asked to make recommendations with regard to children who are in the lower 20 percentile in reading and who are aged 7 to 9 as to whether such children should routinely receive a DHA/EPA supplement. If so, the cost of the supplement should be covered under pharmacare.
16. Individuals who are inmates in jails should receive diets containing sufficient fish and seafood or diets which are supplemented with DHA and EPA and vitamins to reduce violent activities in our jails.
17. Since DHA and EPA are important for brain health, Manitoba should reinforce existing recommendations from Health Canada and Dietitians of Canada with regard to DHA and EPA in the diet or in supplements, and the advice of the Working Group on Optimum Brain Health should be sought as to the best way to ensure as high a proportion as possible of Manitobans are meeting these daily requirements.
18. The Working Committee should be charged specifically with addressing on an urgent basis (in cooperation with existing organizations like the Manitoba Pediatric Society) issues such as a) Should it be recommended that all (or only those with inadequate dietary intake of fish) breast feeding women, and all children under the age of 5 years who are not being breast fed or receiving DHA and EPA in their formula be recommended to receive supplemental DHA and EPA, and if so that such supplements should be fully covered under pharmacare?
19. Provincial support for research to study the impact of diet on brain conditions should be enhanced. As an example, research is needed to establish the extent of fish and seafood consumption by Manitobans and the levels of DHA in Manitobans.
20. Given the importance of access to fish for communities, changes should be made to the Freshwater Fish Marketing Corporation to allow locally produced fish to be sold by fishermen to local groceries, local restaurants, and local institutions like hospitals and personal care homes in the home community of the fisherman in order to enable greater incorporation of fish into local diets. Together

with this effort to market local fish, the DHA and EPA content of fish species in Manitoba should be listed on the Province of Manitoba web site.

21. The province needs to sustain and enhance the role of the Child Nutrition Council in improving the diets of children in our primary and secondary schools.

22. The province should evaluate the number and distribution of dietitians in Manitoba and take measures to ensure there are adequate numbers of dietitians and that sufficient dietitians are present in areas of high need.

23. The provincial government needs to evaluate on an ongoing basis the activity levels of Manitobans and to do this by region and by community in order to provide a basis for an action plan to improve the level of physical activity province wide.

24. Exercise, because of its general benefit for brain and cardiovascular health should be promoted by health professionals and governments for its beneficial impact. The provincial government should make a public health recommendation for exercise for optimal brain health and for prevention of Alzheimer's Disease, and task the Working Group for Optimum Brain Health to make recommendations for specific effective actions that the government, organizations or individuals should take.

25. The Manitoba College of Physicians and Surgeons should be asked to evaluate the extent to which physicians are talking to their patients and providing information about exercise, and should make recommendations for exercise to support optimum brain health.

26. The Working Committee on Optimum Brain Health needs to consider the evidence with respect to sunlight and vitamin D on brain health, particularly in relation to depression and multiple sclerosis, make a recommendation for where research is needed and where preventive treatment (for example to optimize vitamin D levels) can be incorporated into general practice, and whether Manitoba should follow Scotland in recommending all Manitobans over the age of one take vitamin D supplements. At a minimum those over age 50 should have supplementary vitamin D because of clear evidence it reduces falls in the elderly.

27. Assessment of interactive reading with a child and assessment of preschool learning should be a normal part of the brain health history of every child, and addressing these issues when they are lacking should be part of the assessment of every child's brain health and development by their physician. The Manitoba College of Physicians and Surgeons should be asked to evaluate the extent to which this is currently happening and whether measures to improve current physician practice are needed.

28. Assessment of the extent to which an adult is engaged in learning programs should be part of the brain health assessment of adults with respect to the prevention and treatment of dementia. The

Manitoba College of Physicians and Surgeons should be asked to assess current practices and whether measures to improve current physician practice are needed.

29. The Government of Manitoba should start including certain psychological services under medicare as with physicians' services to make sure they are available to those who need them.

30. Manitoba needs to review with the Manitoba Psychological Society the scope of psychologists practice and make changes to allow psychologists to more fully participate in health care prevention and treatment, and have a greater role in certain critical areas such as the care of suicidal patients on discharge from a hospital or the Crisis Response Centre.

31. That an evaluation of the current extent of bullying in Manitoba be undertaken to assess the effectiveness of recent anti-bullying legislation, and whether changes are needed.

32. Legislation should be passed to include bullying under Manitoba's Human Rights Code so that those who are adversely affected by bullying have can have their concerns considered.

33. Legislation be implemented to include discrimination on the basis of physical size or weight to be under Manitoba's Human Rights Code

34. The Working Committee on Optimum Brain Health make recommendations to the province on the optimum approach to create effective and optimal teamwork among all behavioural health professionals and those involved in the justice system and in other areas to support optimum brain health for Manitobans. Included in these recommendations need to be measures to help clients of our health care system with brain health issues navigate the system, taking into account the fact that those with brain health conditions may have unique needs in this respect.

35. A brain health "Dashboard" be developed to allow individuals to efficiently find the wide variety of resources which are available in Manitoba.

36. The potential to use technology to delivery therapy into the homes of Manitobans be explored.

37. The Working Committee on Optimum Brain Health make recommendations for the optimum approach achievable in Manitoba for creating effective networks of support to assist those with brain health issues. These recommendations need to include changes to the Mental Health Act to make it easier for health professionals to share information with family members and possibly with other members of the person's circle of support.

38. The Province of Manitoba ensure that all RHAs have programs which employ peer support workers for those with brain health issues.

39. The Province of Manitoba begin a training program for peer support workers who can be certified through PSACC.

40. The Province of Manitoba advocate with the federal government for a national training program for peer support workers with national funding.
41. Housing First be extended as expeditiously as possible to all Manitobans with serious brain health issues for whom benefit for housing first was shown in the national study. That the approach be one which works in partnership with private sector landlords as well as public sector and non-profit sector landlords as in Medicine Hat.
42. The Social Assistance system needs to be redesigned so that it is useful for those with brain and mental health conditions who work for short periods, or part time or sporadically, so that they do not have a very high (70%) marginal tax or claw back rate. The 70% claw back rate should be reduced to 50%.
43. The Working Committee on Optimum Brain Health be tasked with making recommendations for optimum support for individuals with brain health issues with regard to finding and maintaining employment.
44. Manitoba should proceed expeditiously to implement a plan which includes employing a substantial number of peer support workers.
45. Every effort possible needs to be made to have a comprehensive, responsive and effective Justice System to address brain health issues so that wherever possible individuals with brain health issues are not criminalized.
46. The issues raised in "Set up to Fail: Bail and the Revolving Door of Pre-Trial Detention" needs to be addressed urgently and changes made in Manitoba by the provincial government.
47. Ensure systematic approaches are used to assess the potential for violent tendencies in individuals, that adequate diagnostic approaches are taken to be sure there is not underlying pathology which can be addressed, and that optimal approaches to brain health as well as to coordinating the activities of police and behavioural health professionals are taken to provide safety to Manitobans.
48. Research is needed to understand the potential relationship between those who commit violent acts and their intake of DHA and EPA.
49. There should be a focus on Transition planning including ensuring all those who are in a correctional institution are helped to ensure they have a Manitoba Health Card, a Social Insurance Card and have a transitional plan for housing.
50. A province-wide approach to preventing interpersonal violence through education in our schools should be implemented.

51. The course in Mental Health First Aid given by St. John's Ambulance should receive provincial support so that this course, or an acceptable alternative (some school divisions will choose an alternative), can be taken by grade 11 students in Manitoba.
52. The Manitoba College of Physicians and Surgeons should assess the potential for family physicians and emergency rooms to use simple screening questions or questionnaire to assess the possibility of brain or mental health issues at each patient visit.
53. The Province make changes to Child and Family services based on best practices in Manitoba (the Nisichawayasihk Cree Nation Child and Family Services, Westman Child and Family Services based in Brandon, the Mothering Project at Mount Carmel Clinic and Family Group Conferencing delivered by Ma Mawi Wi Chi Itata Centre are examples) and elsewhere (Family Group Conferencing in New Zealand and Signs of Safety in Perth Australia are examples) so that families and children are better supported, so that more children develop secure attachment and so that fewer children need to be taken into the care of Child and Family Services.
54. Expose all children, but especially those in CFS care, to what it means to dream big so that they recover at a later point in life, and so that they will always carry this inner vision and thus strive for that vision. For our CFS children this exercise especially needs to be documented and continually to be a focal point of discussion for their assigned worker.
55. For children taken into CFS care, there needs to be an assessment through engaging in simple activities to determine whether a child may be predisposed to the stress vulnerability gene and for such children train them to develop self-aware coping skills such as relaxation skills and social skills. Yoga in the classroom has been shown to dramatically reduce undesired behaviour. Again, for our CFS children this exercise especially needs to be documented and continually be a focal point of discussion for their assigned social worker.
56. By knowing that our brains can reshape our memories by new experiences we need to begin supporting children in middle school to journalize positive stories from their life, the goal is to create "better" memories from which they will rely on in later years. Again, for our CFS children this exercise especially needs to be documented and continually be a focal point of discussion for their assigned social worker.
57. The Working Committee on Optimum Brain Health should specifically set standards for nutrition for children in CFS care; every child entering CFS care should have a nutritional assessment and recommendations by a dietitian, funding for nutritional supplements needed should be covered under pharmacare or NIHB (Noninsured health benefits) and be made available in every health office or nursing station in every First Nation, and CFS workers should document the nutritional status of children in CFS care.



58. That there be a provincial addictions and FASD reduction strategy designed and implemented based on an understanding of the situation at Nelson House where there is substantive evidence for a reduction in addictions and in FASD.

59. That progress in understanding the nature of effective help and treatment for children and adults with FASD be formally put into that provincial plan to better help children and adults with FASD and to reduce the potential for children and adults with FASD to be involved with the criminal justice system.

60. The financial resources need to be provided by the Manitoba government to ensure every child with autism has access to therapy. Given the increase in the number of children diagnosed with autism in recent years, a yearly increase will be needed. For the immediate future, until the situation stabilizes, it will likely require an additional \$2 million per year for the next two to three years.

61. The Working Group on Optimal Brain Health should evaluate the evidence relating the cause of autism to diet and environmental influences and make recommendations for further research into prevention and treatment approaches that are evaluated based on the findings.

62. The province should work with the Learning Disabilities Association of Manitoba to enable a doubling in size of LDAM in Winnipeg, and its expansion to include satellite centres so that children all over Manitoba can receive services promptly when needed.

63. DHA/EPA supplements should be included under pharmacare when prescribed by a physician for a child with a delay in reading.

64. Manitoba needs to focus efforts in areas like SCE Lifeworks which are working with individuals with intellectual disabilities to enable them to find and work in regular jobs earning regular wages. This effort is paying off in improved morale and improved self-esteem, and is highly cost effective.

65. Attention needs to be paid to post-traumatic stress disorder in those with intellectual disabilities as part of helping them achieve a healthy life.

66. There needs to be a recognition that the pay for those who work in the community with those who have intellectual disabilities, needs to move closer to the pay rates for those working in institutions.

67. An approach to prevention of intellectual disabilities, including autism associated with intellectual disability, is needed in a more comprehensive and more vigorous fashion. This will include investment in research and in planning, but can have great long term cost-benefit as we have fewer children with intellectual disabilities and those who do have an intellectual disability will have a better chance for a fuller life. Investments in research today, to prevent autism for example, could have a very positive long term health and cost benefit.

68. The province should support efforts to look at and use multimodal approaches to the treatment of ADHD.

69. The Working Group on Optimizing Brain Health should look carefully at the issue of ADHD its diagnosis and treatment, children in the care of CFS and adolescents and adults in the criminal justice system to be sure we are doing everything we can be doing to change the outcomes for children with ADHD so that they can be fully contributing members of society with good opportunities for employment.

70. That the Working Group on Optimizing Brain Health be asked to make recommendations for how to help people work with individuals with ADHD so that they can perform at their best – emphasizing stimulating environments, the use of praise and how best to handle conflicts with individuals with ADHD – using quieter, soft, effective language rather than screaming as an example.

71. Manitoba develop a provincial plan for treatment of individuals with eating disorders in order to reduce wait times, to address areas including the need for professional development, research, improved statistics, prevention, awareness and the development of a publicly funded Manitoba residential treatment program.

72. Until the provincial plan is developed and a Manitoba residential treatment centre is in place, affected individuals needing access to residential treatment should have access to such treatment in other jurisdictions and the cost should be covered under medicare whether provided in Manitoba or in another province.

73. The Working Committee on Optimal Brain Health should be tasked with providing recommendations to improve the understanding of links between attachment insecurities and anxiety disorders and making recommendations for a population health approach to reduce anxiety disorders in Manitoba.

74. The Working Committee on Optimum Brain Health review the evidence with respect to depression and make recommendations with respect to what are the most effective measures we can take in Manitoba to reduce the overall incidence of depression in our province, and to achieve the most effective treatment possible for those with depression including the potential of a multimodal or multifaceted approach.

75. The provincial government should ensure a full review is undertaken of suicides in Manitoba to extend the review of the Children's Advocate on children and youth suicide to provide a comprehensive picture which includes adult suicides and suicide clusters.

76. That a province wide protocol be developed and implemented for individuals at high risk for suicide.

77. The implementation of a comprehensive multimodal plan for suicide prevention to reduce the number of suicides in Manitoba. This plan should include: a) an approach targeted to individuals at risk of suicide, b) a province-wide suicide reduction plan and c) a community based approach to ensuring activities and facilities are available to young Manitobans so that they have access to facilities, to activities, to learning opportunities and to employment opportunities in their community.
78. The provincial government review all communities in Manitoba and implement an action plan to ensure that these communities implement activities and exercise opportunities for youth and adults.
79. The provincial government develop and implement a plan for rural and northern communities to have broadband internet access to enable improved education and employment opportunities.
80. The provincial government work with First Nations and Metis people in Manitoba to develop an education strategy to improve education for First Nation and Metis people in Manitoba.
81. The provincial government develop approaches specifically designed to address unemployment in northern and rural Manitoba and to address unemployment in individuals with brain health concerns.
82. First Episode psychosis clinics should be established in Brandon, Thompson and Steinbach.
83. That a centre be developed for individuals with traumatic brain injury.
84. That a case management approach with care navigators be developed for those with traumatic brain injuries, and together with this the cap in support under MPIC for those with traumatic brain injuries from car accidents be reassessed.
85. That the province review the treatment of individuals with brain injuries in Manitoba. With specific attention to changes which are needed to the role of the Public Trustee's approach to individuals with brain injuries and to those with serious brain conditions who may recover.
86. That the province have a plan to reduce traumatic brain injuries in Manitoba
87. Manitoba urgently needs an Addictions Plan. The plan needs to include changes to the funding for and provision of help for those with addictions so that assistance and programming can be there when it is needed not a day, a week, a month or a year later. The plan also needs to include a comprehensive response to the crisis of fentanyl overdose deaths occurring in Manitoba.
88. That there be close coordination between treatment at a detox centre and follow up treatment.
89. Manitoba should become an international centre of excellence for research, for prevention and for treatment of Multiple Sclerosis.

90. Action research which involves multimodal approaches to prevent and treat Multiple Sclerosis in Manitoba should be supported provincially to see if the promise of advances in understanding in recent years can be put into practical benefits in Manitoba as fast as possible.
91. Manitoba should act with the greatest possible urgency to put in place a dedicated stroke unit to improve stroke care in Manitoba.
92. The Working Committee on Optimum Brain Health needs to assess the multimodal approach of Bredensen and make recommendations that will ensure that Manitobans at risk of dementia and those with dementia are benefitting from advances in dementia prevention and treatment as rapidly as possible.
93. The Working Committee on Optimum Brain Health should make recommendations as to the optimum screening for hemoglobin A1c.
94. Funding be provided to help adults with PKU afford the special diet they need for their brain to stay healthy.
95. The province needs to develop and implement a human resources plan for brain health in Manitoba, and this should start with plans to address needed increases in psychologists, peer support workers and dietitians.
96. That the health budget be adjusted to increase the proportion of funding for mental and brain health to 9 percent of provincial health care spending.
97. That the investments be made to support the changes in this report because they are needed, and recognizing that these changes are essential if Manitoba's health care system is to be sustainable financially.
- 98: If Manitobans fish and seafood consumption is found to be low, then the Working Group of Optimum Brain Health should be charged with making recommendations to address this.

## **Appendix II: Individuals and Groups Consulted, Events Attended and Forum Held**

### **Organizations:**

Alyssa Stevenson Eating Disorder Memorial Trust, Elaine Stevenson – Co-Administrator  
Alzheimer Society of Manitoba – Wendy Schettler, Chief Executive Officer.  
Artbeat Studio – Executive Director Lucille Bart, Nigel Bart and others  
Behavioural Health Foundation – Jean Doucha, Executive Director, and colleagues Mike Calder, Sheila Bogoch, Conny Anderson  
Brain Injury Association, David Sullivan, Executive Director  
Canadian Mental Health Association, Marion Cooper, Executive Director, Terra Johnston Director of Regional Affairs, Policy and Research; Deborah Dasner, Information and Referral Worker, Information and Education Services.  
Canadian Mental Health Association: Curtis Brandt, Senior Rehabilitation Worker, Rehabilitation and Recovery Service, Natalie Rich, Employment Specialist, Employment with Supports, Rehabilitation and Recovery Service  
Child Nutrition Council of Manitoba – Melanie Ferris, Executive Director, Norma Alberg President, Wendy Bloomfield Executive Director.  
Community Living Manitoba, Sid Rogers, Executive Director.  
Community Living of Winnipeg, Janet Forbes – Executive Director  
Dietitians of Canada, Jennifer Wojcik  
Ikwe Widdjiitiwin, Trudy Lavallee Executive Director  
The John Howard Society, Sharon Perrault, Bail Assessment Support and Supervision Program.  
Learning Disabilities Association of Manitoba, Marilyn MacKinnon – Executive Director and Yvonne Swiderek Community Engagement Coordinator.  
Manitoba Psychological Society, Dr. Andrea Piotrowski, President, Dr. Teresa Sztaba Executive Director  
Manitoba Schizophrenia Society, Chris Sommerville, Executive Director  
Manitoba Teachers Society: James Bedford, Vice President, Roland Stankevicius Assistant General Secretary, Liam Martin, Public Affairs Facilitator.  
Multiple Sclerosis Society of Canada: Erin Kuan, President, Manitoba and Saskatchewan Divisions, Darrell Hominuk, Director, Programs, Services and Government Relations.  
Pharmacists Manitoba – Dr. Brenna Shearer, Chief Executive Officer  
St. Amant – John Leggat – President and CEO, Dr. Kerri Walters Senior Manager for Autism Programs.  
St. John’s Ambulance, Richard Fetherson, Director of Training and Operations  
Mood Disorders Association of Manitoba; Richard Walker, Board Member,  
Winnipeg Harvest - David Northcott, Executive Director.

### **Individuals:**

Dr. Harold Aukema, Professor, Department of Human Nutritional Sciences, University of Manitoba  
Demetre Balaktsis – Registered Suicide Intervention Trainer  
Michel Blanchette – private citizen

Bonnie and George Bricker, parents of Reid Bricker  
Paul Brault  
Christine Dobbs  
Peter Eck, Assistant Professor, Department of Human Nutritional Sciences, University of Manitoba  
Dr. Margaret England, Endocrinologist  
Ian Gillies, Chair of the Board, Macdonald Youth Services  
Lynda Hiebert  
Dr. Bruce Holub, Professor Emeritus, Department of Human Health and Nutritional Sciences,  
University of Guelph  
Don Hornby  
Vicki Hornby  
Neil Johnston,  
Arlene Kolb,  
Dr. Lawrence Katz – Child and Adolescent Psychiatrist, and expert on Dialectical Behavioural Therapy,  
University of Manitoba  
Dr. Moe Lerner – physician  
John Melnick – Advocate for those with mental health issues  
Rajiv Mesta  
Dr. Catherine Moltzan  
Scott Newman – Criminal Defense Lawyer  
Kelly Nord  
Dr. Joseph Partyka, Emergency Room Physician  
Jim Cornelius  
Dr. Jitender Sareen – Professor and Head, Psychiatry, University of Manitoba, Medical Director and  
Head, WRHA Mental Health Program.  
Laura Toews  
Liz Wolff, Program Manager, Training Resources for Youth, New Directions

**Events attended:**

Rally for improved mental health organized by Bonnie Bricker, August 28, 2016  
International Overdose Awareness Day Rally – August 31, 2016  
SCE LifeWorks Gala  
Take your MLA to work day – featuring employment opportunities for those with brain health issues  
Crime Prevention Breakfast and Workshop – Manitoba Criminal Justice Association – with Guest  
Speaker Dr. Ginette Poulin, Medical Director of the Addictions Foundation of Manitoba.  
Multiple Sclerosis MLA reception at the Manitoba Legislature  
First Nation Caring Society Dinner with Cindy Blackstock as guest speaker  
Hope Walk, Manitoba Schizophrenia Society  
Hope in the Face of Poverty breakfast – the Salvation Army.  
Manitoba Addictions Awareness Week Launch

**Forum Held**

October 2 Forum with Dr. Bruce Holub, Bonnie Bricker, Dr. Andrea Piotrowski and Dr. Lawrence Katz

