ACCELERATING INNOVATION:

TELLING THE BRAIN STORY TO INSPIRE ACTION

Summary Report

Symposium 2014

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Volume 2

Alberta family wellness initiative

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PURPOSE OF REPORT

This report describes the second Symposium of the second phase of the Palix Foundation's multi-year knowledge-mobilization strategy in early brain and biological development, mental health, and addiction.

WRITER/EDITOR

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"Where else do you have so many folks who are so passionate about innovation? About pushing things forward? About moving the needle for kids and their families? The sheer drive to passion and the will to move things forward here is really remarkable."

Melanie Berry, PhD













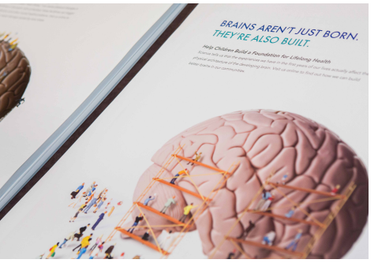
Symposium 2014, Accelerating Innovation: Telling the Brain Story to Inspire Action, launched the second year of the Alberta Family Wellness Initiative's (AFWI) two-year knowledge-mobilization strategy.

This initiative evolved from the AFWI's previous three-year strategy, which included Symposia and related actions built around the themes of Early Brain and Biological Development, and Recovery from Addiction. Together these strategies were designed to engage Alberta's science, policy, and practice communities in an unprecedented joint effort to apply evidence-based innovation that will positively impact the lives and well-being of Alberta's children and their families.

Hundreds of persons have engaged in this initiative over the past five years. Each has brought a wealth of experience, knowledge, and perspective to the table and has played an active role in furthering the initiative's objectives in his or her own professional sphere. More important, participants have worked together to forge new connections and create new networks for sharing and building upon each other's knowledge. They have reached across silos to adopt a common language of early brain and biological development, and its implications for mental health and addiction. The language, concepts, and scientific evidence presented at the AFWI Symposia over the course of the multi-year strategy have gradually permeated professional discourse in policy, practice, and training in areas ranging from health to education to justice – mirroring the range of professionals who have participated in the strategy. Like ripples from a pebble dropped into a pond, this language and knowledge have spread ever wider over the course of the strategy's development.

At the Symposia, participants heard the latest research findings from international leaders in the science of early brain development and the roots of addiction. Experienced change leaders told how information gets translated into policy and practice at individual and organizational levels. Alberta leaders described how change is already happening in Alberta in health, human services, justice, and education and pointed to the role the AFWI has played in bringing this change about. Observers tell us that Alberta is becoming a leader in this area and may be a model for other jurisdictions. One of the main lessons we have learned is that change is a continuous process. As we enter the final year of this strategy we can take momentary pride in our success to date, but we must also think about how we will sustain the momentum we have achieved. I am confident participants will continue to work with us in new and different ways to make this happen – for Albertans today and for generations to come.

Nancy Mannix, JD
Chair and Patron, Palix Foundation



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Palix Foundation
Created in 1997, the Palix Foundation is a proactive private foundation with offices in Calgary and Edmonton, AB. The Foundation is active in knowledge translation and transfer, applied research, evaluation, and networking. Through the Alberta Family Wellness Initiative (AFWI), it has established partnerships with numerous national and international organizations working in the areas of child development, addiction, and mental health to improve outcomes for all children and families.

THE CORE STORY OF CHILD DEVELOPMENT

The FrameWorks Institute developed the core story of child development in collaboration with the Harvard Center on the Developing Child and the National Scientific Council on the Developing Child.

FrameWorks is an interdisciplinary group of academics known for its development of Strategic Frame Analysis™, an empirically driven communications process that makes research understandable, interesting, and usable to help non-profits further public understanding about societal issues.

The core story is based on a set of principles that experts across the field of neuroscience and early child development believe are important for citizens and policy-makers to understand in order to make informed decisions about broad societal concerns ranging from health, human services, justice and education systems. A fully framed core story provides a consistent narrative framework for a variety of expert communications around an issue. The work of the Alberta Family Wellness Initiative (AFWI) is grounded in the science of brain development.

A fundamental concept in the core story is the idea that experiences in early life interact with genetics to affect the developing brain and influence health outcomes throughout life, including those relevant to mental health and addiction. As a knowledge broker, the AFWI strives to mobilize this scientific understanding across multiple sectors in Alberta to influence decision-making at the policy and practice levels.

Alberta Family Wellness Initiative

In 2007, the Palix Foundation created the Alberta Family Wellness Initiative (AFWI). Using a framework of epigenetics and developmental and behavioural neurosciences, the AFWI creates opportunities to better understand and apply scientific knowledge to factors influencing child development and its relationship to addiction and other mental health outcomes. It is hoped these efforts will encourage more informed decision-making to create, deliver, and fund a wide variety of appropriate services, programs, and policies that support healthy families in Alberta.

The AFWI has five core values that drive all of our programs and projects.

The AFWI is:

Committed
Our commitment to Alberta families includes long-term funding for the initiative, concrete action, and bringing the best minds from around the world together with the best and brightest Albertans to solve complex problems.

Proactive
We identify opportunities to act and bring together scientists, researchers, clinicians, policy-makers, funding organizations, and other stakeholders to achieve policy and practice outcomes.

Collaborative
We work collaboratively with leaders in policy, research, education, and service delivery to achieve measurable results.

Supportive
We support the efforts of scientists, researchers, clinicians, policy-makers, and other stakeholders in advancing and applying research into child development and its relationship to mental health and addiction.

Action-Oriented
We act as a catalyst, bringing people and organizations together to achieve concrete results.

THE CORE STORY

What actually develops?

It all begins with **brain architecture**. The early years matter because early experiences affect the architecture of the maturing brain. The quality of that architecture establishes the foundation for all of the development and behaviour that follow. Getting things right the first time is easier than trying to fix them later. The brain's architecture is composed of social, emotional, and cognitive strands that get woven together, strongly or weakly, to support subsequent development. What affects one affects all.

How does it work?

The process by which the brain gets built is much like the **serve and return** of a tennis game. Serve and return happens when young children instinctively reach out for interaction, through babbling, facial expressions, gestures, and cries, and adults respond by getting in sync and returning the same kinds of sounds and gestures. Serve and return works best with adults who are familiar to the child. If adults do not respond, the child's learning process is interrupted and incomplete. A young child needs many of these interactions per day, since they are literally the building blocks of brain architecture.

What matters most, genes or environment?

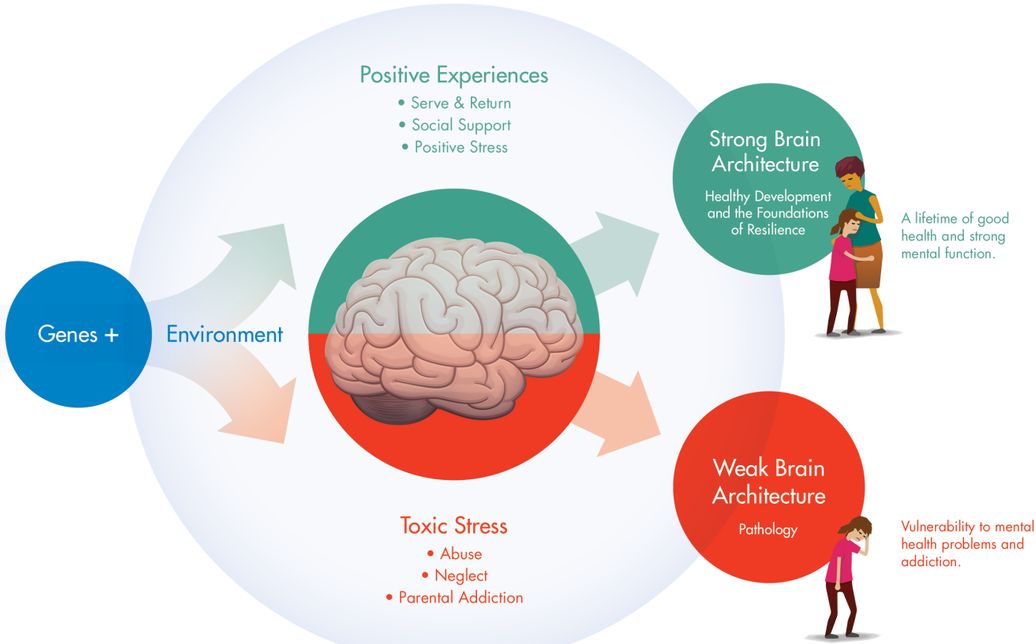
Experiences and environments count as much as genes and can even influence how genes work. Our genes have instructions on them that tell our bodies how to work. However, the environment has to authorize the instructions for them to be carried out. Positive experiences are environmental signatures that authorize instructions for positive outcomes. Negative experiences, like exposure to violence or abuse, authorize instructions for negative outcomes. Because **environmental signatures** on a person's genes can last a lifetime, society needs to ensure that genes get positve environmental signatures early on.

Early learning is foundational to everything that follows.

Children learn very early to pay attention by developing the **air traffic control** system in their brains. As a child learns to regulate the flow of his or her attention and to focus on tasks, he or she creates mental priorities. This mechanism – called **executive function** – needs to be geared up as early as possible. This can be done through innovative programs that give children opportunities to practise recognizing roles and sequences and joining in on cue, such as in play-acting or in taking turns. This mental flexibility makes it easier to learn new information and use skills in new and complex situations throughout life. Facilitating executive function skills requires parents and society as a whole to create, sustain, and support opportunities for children to use these skills, so that each successive phase of learning and development builds on a solid base.

What derails development?

Stress is the bad guy in the story of child development, but we have a lot to say as a society about the power of the stress our children are exposed to. A **positive stress** response happens in situations like the first day with a new caregiver or receiving an immunization. It's a normal part of healthy development and is characterized by short increases in heart rate and hormone levels. **Tolerable stress** activates the body's alert systems to a greater degree as a result of more severe, longer-lasting difficulties, such as the loss of a loved one or a frightening injury. If the stress is time-limited and buffered by supportive relationships with adults who help the child adapt, the brain and body recover from what might otherwise be damaging effects. A **toxic stress** response occurs when a child experiences strong, frequent, and/or prolonged adversity – such as physical or emotional abuse, chronic neglect, anxiety, depression or addiction in a caregiver, exposure to violence, and/or chronic family economic hardship – without adequate adult support. Prolonged activation of the stress-response system can disrupt the development of brain architecture and other organ systems, and increase the risk for stress-related disease and cognitive impairment well into adulthood. Toxic stress literally gets built into the brain and the body. Society can work to prevent toxic stress responses in young children by reducing their exposure to extreme environments and by providing buffering relationships at home, at school, and in the community.

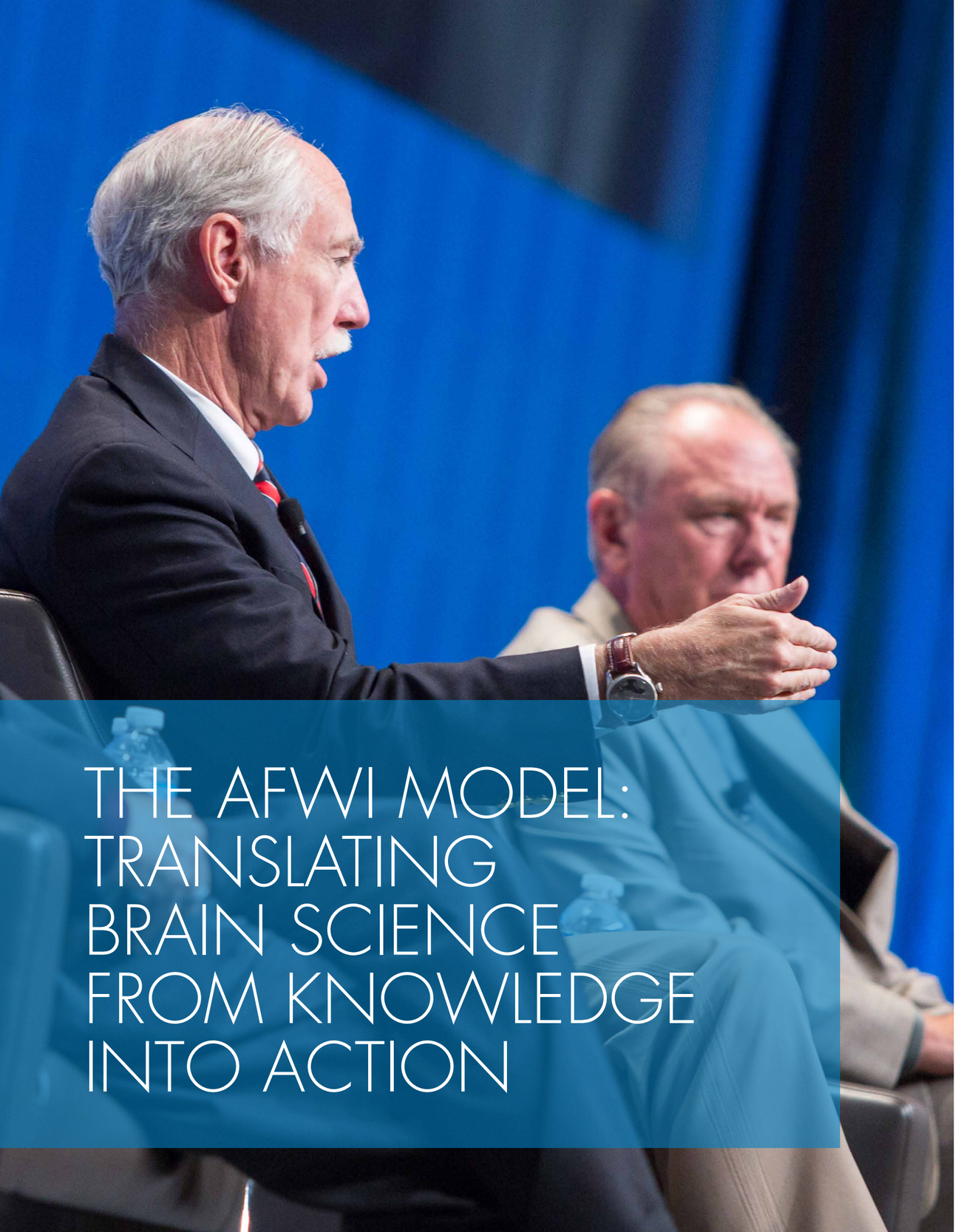


Can we prevent negative outcomes?

For many children, the consequences of early adversity, such as poor physical or mental health or addiction, may be many years in the future – or, if they are fortunate to land in strong communities, may not be triggered at all. Early negative experiences affect later development in the same way that faultlines sometime result in full-blown earthquakes. Like a faultline in the earth, **brain faultlines** can form in a number of ways. In some cases, they appear as the brain develops, or they can develop over time as people experience stress without supportive relationships. Also, people may have been born with brain faultlines. Just because there is a faultline doesn't mean there will be an earthquake. Brain faultlines are triggered by factors and experiences that turn them into earthquakes, which can do a huge amount of damage. There are things we can do to help prevent faultlines from developing, and to minimize the chances that existing faultlines will turn into earthquakes. There are also things we can do once traumas or addiction have happened to prevent damage from happening again.

What can we do to protect children from harm?

To prevent toxic stress and avoid triggering brain faultlines, society needs to focus on the child's ability to function at home and in the community. Promoting children's mental health is like using a sugar packet to level a table. The table can't function properly if it is on a slanted floor or if one of its legs is uneven. Similarly, children can't function fully if the environment in which they grow is unstable. This affects their mental health and undermines their development. The table can't level itself: we have to step in and provide assistance to steady the table's base. Putting a child in a violent or extremely unsupportive environment is like placing a table on uneven ground. When we intervene, by stabilizing the child's environment and helping him or her level out, the child's mental health is supported and he or she can get back in sync with a stable environment. Whether it's by supporting parents in their role, particularly those with addiction or mental health problems, providing stability in foster care placement, or making mental health professionals better trained and more available in very early care programs, interventions can help children achieve the levelness they need to grow a strong foundation for later development.



THE AFWI MODEL: TRANSLATING BRAIN SCIENCE FROM KNOWLEDGE INTO ACTION

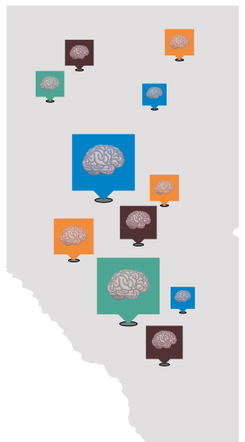
Convincing evidence from modern brain science has identified links between child development, mental health, and addiction. We now know that early childhood experiences interact with genes to influence the developing brain, resulting in lifelong effects on health, learning, work, and social and emotional well-being. Not all of this knowledge is reflected in policies and front-line practice.

The Alberta Family Wellness Initiative (AFWI) recognized this challenge and has taken action. The AFWI funds and originates a variety of activities and programs to drive evidence-based change that bridges the gap between what we know from science and what we do in policy and practice. Accelerating Innovation: Telling the Brain Story to Inspire Action is the second phase of a far-reaching multi-year, multi-disciplinary strategy to further this objective for the benefit of Alberta and its families.

The AFWI bridges the gap

The AFWI developed a unique knowledge-mobilization model that not only recognizes the link between child experiences and development, mental health, and addiction but also the need for an interdisciplinary approach to effect positive change in related policy and practice. In 2010, the AFWI partnered with the Government of Alberta and Alberta Health Services (AHS) to launch the first phase of its strategy. The initiative involved over 100 participants from multiple disciplines in each of two separate but parallel streams: one focused on Early Brain & Biological Development (EBBD) and the other on Recovery from Addiction (RFA). In each stream, participants attended three annual Symposia featuring presentations and workshops by leading scientists and change experts in these areas. During the Symposia, they also met in multi-disciplinary cohort groups to discuss the implications of the latest science in the Alberta context and worked together in learning teams to determine how they would incorporate what they were learning into their own work. Learning teams remained in touch between Symposia and disseminated what they had learned within their circles of influence.

Participants were selected for their capacity to influence research agendas, cross-ministerial collaboration, policy development, decision-making, professional development, training, program design, and practice at the organizational and community levels. Together, they represented the broad reach of child development, mental health, and addiction across society, in areas ranging from health, human services, justice and education.



Framing the core story in the Alberta context

Central to the AFWI model is a core story of child development and its implications for mental health and addictions. The AFWI supported the FrameWorks Institute in conducting research in Alberta to uncover the values and cultural models on which Albertans base their understanding of and attitudes about these topics. FrameWorks researchers shared their findings at the Symposia and provided workshops on framing the scientific knowledge on these issues into a core story that has proven potential to increase public insight. The core story provided a common language and framework of understanding that fostered discussion and collaboration among a wide range of researchers, practitioners, policy-makers, and the general public. It has also facilitated the significant progress that has been made since the beginning of the AFWI strategy.

Initiative makes major impact

Within the first year of its launch, the AFWI strategy made a significant impact that has continued to ripple throughout Alberta and beyond. In 2011, the Government of Alberta produced two major policy documents incorporating key learnings from the 2010 AFWI Symposia. Alberta's Chief Medical Officer of Health released *Let's Talk About the Early Years*, a report aimed at the general public that incorporated many elements of the core story of child development and addiction. The report included key concepts from the EBBD 2010 Symposium that underscore the importance of investing wisely in the early years. Also in 2011, the Alberta government published *Creating Connections: Alberta's Addiction and Mental Health Strategy*, which strongly reflects learnings from the 2010 EBBD and RFA Symposia. Several participants in the Symposia played a part in building the government's Strategy.

Elements of the core story and learnings presented at the AFWI Symposia were also incorporated into Together We Raise Tomorrow: An Alberta Approach to Early Childhood Development, a province-wide Alberta government initiative launched in 2013. The initiative was aimed at supporting the well-being, security, education, and health of all children in Alberta. The government invited Albertans to get involved in conversations and activities in their communities to identify local solutions and supports toward an integrated early childhood development system in Alberta. Response to the initiative indicated Albertans at the grass roots are prepared to make and support changes to the system that reflect the essence of the up-to-date scientific knowledge about child development and addiction that has been presented, discussed, and disseminated through the AFWI.

More than 80 per cent of participants remained engaged throughout the three-year initial phase of the AFWI strategy. Working individually and through their learning teams, they expanded their networks and spread change, innovation, and the core story of early child development and addiction throughout the system of health, human services, justice and education in Alberta and beyond.

Phase 2: Accelerating Innovation

The second phase of the AFWI strategy – Accelerating Innovation: Telling the Brain Story to Inspire Action – builds on the momentum generated from Phase 1. The key objective of Phase 2 is to create positive change in the outcomes of children by mobilizing knowledge about the intergenerational impact of addiction and toxic stress on the developing brain. The focus on innovation includes not only new ideas, but new and better ways to deliver current effective practices.

Phase 2 was launched with a Symposium in Edmonton October 27 through November 1, 2013, engaging a new cohort of nearly 200 Alberta change leaders and 39 mentors who had participated in the first phase. The Symposium presentations included Alberta speakers who outlined progress on Alberta's approach to child development and international experts who shared the latest foundational knowledge in child development and addiction and organizational change. Topics ranged from the intergenerational transmission of addiction and other negative health outcomes to early screening and interventions, including programs that improve parents' executive functioning skills. Particular emphasis was placed on the Frontiers of Innovation (FOI) model for change, which points to the limiting role toxic stress plays in early childhood and brain development and the potential for new protective interventions to counter early childhood adversity and restore a healthy trajectory. FOI, an initiative of the Center on the Developing Child at Harvard University, identifies innovating, science-based community-level programs and innovating jurisdictions across North America where a focused resource push could result in faster change. Alberta is one of those jurisdictions.

Participants further explored the issues raised in the presentations and workshops and discussed implications of the science in interdisciplinary cohort groups. They were organized into 21 Innovation Teams to create communities of purpose and were tasked with developing action plans to identify innovative ways to apply new or known information to prevention, intervention, and treatment of mental health and addiction issues across the lifespan. Team members remained in touch over the succeeding year and supported each other in implementing their action plans in their individual practices and workplaces.

The second Symposium of Phase 2 was held in Calgary October 6 through 10, 2014. The remainder of this report provides details on the Calgary Symposium.

Impact expands across Alberta and beyond

A small sampling of the numerous developments across Alberta and beyond related to the AFWI initiative includes:

- A four-phase study is underway in Alberta to determine the prevalence of adverse childhood experiences (ACEs) in the adult population and develop and test a treatment strategy for at-risk adults in primary care settings. This project is a collaboration between Alberta Health Services (AHS), the University of Calgary, and Primary Care Networks.
- The entire Fall 2012 issue of AHS' *Apple* magazine was devoted to child and brain development. Subsequent issues have carried articles featuring elements of the core story of child development, mental health and addiction presented at the AFWI Symposia.
- The Association of Faculties of Medicine of Canada and the Palix Foundation have developed a suite of e-learning tools on early brain and biological development and addiction for undergraduate medical education, including 13 podcasts based on presentations at the EBBD and RFA Symposia.
- Participants have noted increased opportunities for collaborative research across disciplines, including more involvement of clinicians in research. Many have observed that collaboration across disciplines, services, and AHS zones is becoming an expectation.
- Core story language and concepts are used in TeleHealth presentations for public health nurses and high school prevention programs for drug and alcohol use.
- Participants report that policies are being updated and reviewed based on Symposia learnings.
- Learnings related to early brain research, trauma, and the chronic disease model for addiction treatment are influencing the policy development of Alberta's Addiction and Mental Health Strategy and the beginnings of an early child development strategy for the province.
- Many participants report they have integrated assessment tools, such as the ACE questionnaire and other screening tools for children and adolescents, into their practices.
- A number of participants have developed workshops, presentations, lunch-and-learn series, and conferences based on Symposia learnings. Knowledge has spread both formally and informally among researchers, students, public policy-makers, family and youth judges, and patients via these and other media.
- Knowledge from the AFWI Symposia continues to be incorporated into institution-based professional education, including in the development of new courses in nursing; curriculum development in social work, health sciences, and pharmacy; changes to curricula in early childhood development programs; and incorporation of information on addiction treatment into MBA program lectures.

EXECUTIVE SUMMARY

The final Symposium of the Alberta Family Wellness Initiative's (AFWI) two-phase multi-disciplinary knowledge-mobilization strategy was held October 6 through 10 at the Hyatt Regency Hotel/TELUS Convention Centre in Calgary.

Symposium 2014, Accelerating Innovation: Telling the Brain Story to Inspire Action, challenged participants to move into action and craft innovative ventures to address the obstacles they face day to day in their work. The 218 participants included 191 returning for their second year and 27 attending for the first time. A learning group from Germany attended for a second year. The AFWI also welcomed a group of observers who were involved with FrameWorks in an initiative in the United Kingdom. Observers were also present from jurisdictions in Canada and the United States.

The Symposium opened with a video in which members of the Innovation Teams reported progress they had made in breaking down barriers between science and practice in their work. Their stories illustrated how policy changes were already underway in Alberta with a new focus on child development, mental health and addictions. Some of the activities reported in the video included:

- All programs at CASA Child, Adolescent and Family Mental Health in Edmonton build on the core story of child development and include a focus on developing parenting skills.
- A lawyer uses FrameWorks' metaphors to help separating parents find better ways to preserve their relationships with their children.
- A Family and Community Support Services (FCSS) supervisor said the core story of child development, mental health and addictions is a key part of the information she provides for parents.
- A family physician with an inner city health centre said the trauma-informed approach had expanded his available resources. It also resonated with clients who had experienced trauma by helping them understand how the challenges they faced had affected their lives.

- A neuroscientist whose research focuses on parental influences on brain development said she shows the Brain Builders video before each of her talks and asks people if it made a difference. Audience members for the most part had not been aware of toxic stress and its effects and indicated they would be more attentive to the issue in the future.

- A representative from an addiction recovery centre said that including the family system in an addiction treatment program has been helpful in reducing shame by acknowledging that addiction is not just one person's fault and that the family can pass on behaviour that makes some persons vulnerable.

A Knowledge Marketplace and Reception were held prior to dinner on the first evening, providing opportunities for participants to explore Innovation Team activities in more detail. Innovation Team members displayed posters and answered questions on their work and how the core story of child development had inspired action in their areas over the previous year. Judy Cameron, Professor of Psychiatry at the University of Pittsburgh, spoke after dinner about mechanisms for preventing the intergenerational transmission of adversity. She described The Brain Architecture Game, in which players use core concepts (represented by pipe cleaners and straws) to "build" a brain and understand the influence of early experiences and support systems on brain development. She told participants how the game was being used among various stakeholder groups both for training and enlisting support and gave examples of innovative community programs that involve groups, such as seniors, in working one-on-one in serve-and-return relationships with children at risk.

Each day opened with a plenary session showcasing expert presentations by Symposium Faculty on current scientific knowledge about child development, mental health and addiction, effective treatment and intervention programs and strategies, and organizational change. Participants had a choice each afternoon among workshops in which plenary speakers provided close-ups on aspects of their topics. They then met in Interdisciplinary Cohorts to discuss implications of the morning's presentations in the Alberta context, and later joined their Innovation Teams to develop innovative action plans for applying Symposium learnings. Throughout the week, participants honed their action plans into concise presentations, which they made on the final morning to a guest panel of senior-level decision-makers from academic, government, and health-related sectors.

Foundational knowledge

Faculty speakers began each day's discussions with presentations in a plenary session featuring a particular aspect of the overall Symposium theme. Setting the stage on the first day was a presentation on early brain development and how toxic stress, particularly neglect, impacts long-term health and well-being. A promising intervention strategy that could remediate the outcome was discussed. A second presentation reviewed the findings and concepts from the ground-breaking Adverse Childhood Experiences (ACE) Study and suggested the potential for a community-level preventive strategy. A third presentation traced the evolution of the core story of early childhood development and the roots of addiction, focusing on the challenges presented by the newest chapter dealing with child maltreatment and sexual abuse.

The second day focused on intervention programs for children and their parents aimed at breaking the cycle of intergenerational transmission of toxic stress and negative outcomes. Participants heard about a primary care setting in the Bronx that uses universal ACE screening to identify parents and children at risk and inform the level of care offered to the family. This includes Healthy Steps, which focuses on the development of the child, the well-being of the caregivers, and their dyadic relationship. A second presentation illustrated, using the Filming Interactions to Nurture Development (FIND) parent/caregiver video coaching program, how the iterative research-theory-practice cycle informs development of innovative interventions to promote positive outcomes for high-risk children. The final presentation of the morning looked at the emerging science of parenting as a developmental phase, the changes that occur in the brains of parents depending on their own histories of attachment, and the implications for the infants of severely depressed or addicted parents. Interventions that focus on developing mindfulness in the mother and expanding her social networks have been successful in reducing parental stress, helping mothers to become more responsive and empathic to their children and, in the case of substance-abusing parents, to achieve abstinence.

The theme for the third day was targeted approaches. The first speaker pointed out that, in the history of addiction treatment, gender-responsive services targeted at women are a belated, much-needed development. Participants were given an overview of an integrated, gender-responsive, trauma-informed treatment model for women and girls that addresses the relationship between addiction, mental health issues, and interpersonal violence. Through a case study, a second presentation looked at a genogram that illustrates the multi-generational transmission of addiction and its manifestations within the family system and the need to treat addiction as a family disease in order to break the cycle of transmission. A third presentation examined the impressive success rate of Physician Health Programs (PHPs) that combine chronic disease management and contingency management principles to motivate members to seek high-quality treatment and follow-up. The speaker pointed to many principles of these programs that might be transferred successfully to treatments for other populations.

Change within communities and systems was the backdrop for plenary presentations on the fourth day. The first presentation discussed how the development of the Internet and social media was changing the face of sex addiction, with a new type of sex addict emerging even as sex addiction is being recognized as a brain disease. It is important that society recognize these changes in order to meet the challenges they pose. Integrating care for substance use disorders into mainstream medicine was the topic of a presentation that showed how such a change could save significant amounts of money while improving general medical care. The presenter, using examples from the U.S. experience, illustrated ways to motivate policy-makers and practitioners to make the necessary changes, including diverting money from existing treatments that are not proven to be effective. A third speaker presented a simple model to improve access to and retention in treatment for people facing the challenges of addiction. Over 3,500 addiction treatment programs in the U.S. have successfully used the model, which is continually evolving to incorporate new technologies such as social media.

Implications for policy and practice

Since the findings of the ACE study began to be published in the late 1990s, data consistently show that ACEs have not only a cumulative effect but also a predictive validity regarding a person's lifelong health and well-being and on his or her ability to successfully parent the next generation. Universal screening with the ACE questionnaire has been used successfully in some primary care settings in U.S. jurisdictions to identify parents and children at risk and allocate appropriate targeted intervention resources. Scientific knowledge generated in the Bronx example, for instance, may be useful to primary care practices in Alberta, including a four-phase study currently underway in Alberta to determine the prevalence of ACEs in adults and develop appropriate interventions at the primary care level. Various studies point to the preventive value of programs designed to increase the mindfulness and serve-and-return skills of parents and other caregivers of children at risk. It is possible to provide programs at the community level that increase parents' executive functioning skills and in so doing optimize social, emotional, and cognitive development in their children. Likewise, there are examples of innovative community programs that enlist appropriate community members in providing one-on-one serve-and-return interactions with children at risk.

Convincing evidence from the U.S. shows that considerable savings to the healthcare system can be achieved by instituting a simple screening, brief intervention, and referral to treatment (SBIRT) element into primary care examinations. In addition to substance use at the level of addiction, SBIRT can pick up risky and medically harmful substance use at lower levels that can have negative effects on existing health problems. Addiction is gradually being understood as more complex than the brain disease and behaviour of a particular individual. Use of a genogram will illustrate how addiction is a multi-generational issue that requires attention in treatment to the whole family system. Likewise, addiction is a gender issue: a one-size treatment does not fit all. Aspects of women's lives, including subjection to real or threatened violence, require a treatment program that is trauma-informed and gender-specific.

Communicating the science

FrameWorks has continued to conduct research in Alberta to uncover the values and cultural models that are at the base of Albertans' understanding of early brain and biological development, mental health, and addiction. Their research has contributed to the evolution of a core story that frames the science in these fields in a compelling narrative that unites multiple disciplines and the general public in a common dialogue. This ever-expanding core story has the power to displace unproductive cultural models that people use to think about these issues and replace them with empirically tested values and metaphors that create public support for policies and practices that work. FrameWorks discussed their latest research, aimed at adding new elements to the core story to deal with the difficult issues of child maltreatment and sexual abuse. Cross-cultural research in the United Kingdom and in Alberta showed that people tend to blame the parents for maltreatment. However, when they hear the issue framed in a context of toxic stress or environments, for example, they are more likely to see it as a systemic issue and to look at solutions from a social responsibility angle. The issue of child sexual abuse is more complex and difficult for the public to address because they lack productive models for thinking about the causes of this behaviour. Because they can't understand or explain the phenomenon of child sexual abuse, people resort to fatalism, which makes it difficult for them to consider solutions. FrameWorks research in this area continues.

Ripples continue to spread

The final Symposium of the AFWI's multi-year knowledge-mobilization strategy closed with participants committing to continue to seek innovative ways to apply up-to-date scientific information to prevention, intervention, and treatment of mental health and addiction issues, particularly for children experiencing toxic stress and their families. Throughout the Symposium participants met in 21 Innovation Teams to define goals and action strategies to carry on their work individually and through the networks they had forged during their participation in the AFWI. A key part of their commitment was to continue to spread the core story of child development, mental health and addictions throughout the health, human services, justice and education systems and to introduce it to a much wider audience ranging from business people and culturally diverse community groups to teenagers – the parents of tomorrow.

Moving forward

Following the Symposium, participants returned to their communities and places of work ready to move forward and embrace their roles as knowledge-equipped leaders and change agents. As the Innovation Teams take leadership in their respective areas, the AFWI will continue to work with them and support their activities in several ways. The AFWI has set up a seed fund to support the development of Innovation Team ideas and will collaborate with teams to host community engagement and professional development events in their communities. As the network of Innovation Teams is a pivotal result of the AFWI's knowledge-mobilization strategy, the AFWI will continue to maintain the network through regular communication processes, relationship brokering across teams, and provision of staff liaison.

Resources

The AFWI website (albertafamilywellness.org) provides a portal for accessing an ever-expanding range of resources on child development, mental health, and addiction geared specifically to researchers, healthcare professionals, front-line professionals, policy-makers, and the general public. These include document and video libraries, learning modules, event listings, and information updates via e-mail. The resource library's robust collection includes all Symposia speaker presentations and summaries, the complete collection of Working Papers from the National Scientific Council on the Developing Child, the AFWI's first animated video – How Brains Are Built: The Core Story of Brain Development – and a growing body of policy documents, public-centred resources, and Alberta resources. The website is referenced as a resource in professional education and professional development curricula and is a continuing source of current information for all stakeholders.

THE SYMPOSIUM EXPERIENCE

The Alberta Family Wellness Initiative (AFWI) kicked off the second year of Phase 2 of its knowledge-mobilization strategy in Calgary with Accelerating Innovation: Telling the Brain Story to Inspire Action 2014.

The Symposium marked a pivotal transition in the AFWI's innovative strategy. The key objective of Phase 2 was to create positive change in outcomes for children by mobilizing knowledge about the intergenerational impact of addiction and toxic stress on the developing brain.

During the two years of Phase 2, the focus was on:

- Mobilizing and linking the science of brain development with mental health and addiction.
- Developing a shared understanding of the intergenerational effects of toxic stress and addiction at different ages and stages of development and the implications related to policy, practice, and research.
- Fostering Communities of Purpose that will be able to communicate and apply the knowledge to develop innovative and integrated approaches for prevention, intervention, and treatment of mental health and addiction issues across the lifespan.

Daily Content Themes

Day 1
Setting the Stage

Day 2
Taking Action: For Children

Day 3
Taking Action:
Targeted Approaches

Day 4
Taking Action: Changing Communities and Systems

Day 5
Taking Action: Synthesis, Next Steps, and Close

Guest Panel Representatives

Kathy Aitchison, MD
Alberta Centennial Addiction and Mental Health Research Chair, Professor of Psychiatry, University of Alberta

Kim Armstrong, BA, LLB, QC
Deputy Attorney General, Associate Deputy Minister, Justice and Solicitor General, Government of Alberta

Pierre Berube, MEd
Executive Director, Psychologists' Association of Alberta

Laura Calhoun, MD
Provincial Senior Medical Director, Addiction and Mental Health, Alberta Health Services

Alexander Clark, PhD, RN
Associate Dean (Research), Professor, Faculty of Nursing, University of Alberta

Christopher Doig, MD
Department Head, Critical Care Medicine, University of Calgary

William Ghali, MD, MPH
Scientific Director, Institute for Public Health, Professor, Medicine and Community Health Sciences, University of Calgary

Del Graff, BA, MSW
Alberta's Child and Youth Advocate, Government of Alberta

Evolution from learning to action

The 2014 Symposium was structured broadly to move participants from learning to action over its five-day duration. Presentations updated participants on key concepts of early brain development, the impact of adverse childhood experiences (ACEs), and evolution of the core story of child development, mental health and addiction. Current examples of intervention studies applying this knowledge to treatment of at-risk children and their parents illustrated innovative approaches to break the intergenerational cycle of transmission. Discussion of targeted approaches provided insights into and lessons to be learned from addiction programs designed for women, physicians, and families. Change leaders discussed the challenges involved in changing a system from an entrenched status quo. And finally, participants themselves presented their action plans for moving forward in their own spheres of influence with the momentum provided by the AFWI multi-year strategy and continuing support of the Palix Foundation.

Plenary sessions

Each morning featured a plenary session in which guest Faculty, including scientists and change leaders, presented information from their research and experience that would fuel the discussion sessions to follow in the afternoon. Participants had the opportunity to ask questions raised by the talks in a question-and-answer period with presenters at the end of each session.

Workshops

Each afternoon, participants had a choice of several workshops presented by Symposium Faculty or other researchers and change leaders. Workshops were an opportunity to explore presentation topics, or particular aspects of topics, in greater depth. Workshops included one exploring various models for disseminating the core story of child development, including an approach involving hospital volunteers engaging with parents of newborns. Another looked at ACE-based intervention and research at the community level, including research currently being conducted with adults in an Alberta primary care setting. A workshop providing an overview of the Filming Interactions to Nurture Development (FIND) video coaching program invited participants to consider ways they could incorporate serve-and-return interaction in their own work. Alberta-based researchers and a representative of the Harvard Center on the Developing Child provided perspectives on work being done in Alberta to use accelerated innovation to improve outcomes for children and their families facing adversity. The workshop looked at An Alberta Approach to Early Childhood Development and its research and innovation strategy and how Alberta's culture of research and innovation connects to the broader Frontiers of Innovation community. In another workshop, a panel of Alberta Health and Alberta Human Services leaders discussed several key policy actions that have been informed by the core story of brain development, including the Government of Alberta's Wellness Strategy and the Together We Raise Tomorrow strategy. Another group of Alberta researchers and practitioners presented a workshop on how they brought the brain story to the justice and the addiction and mental health systems in Alberta and the challenges involved in translating knowledge to action in public sector systems.

Knowledge Marketplace and Reception

A Marketplace and Reception held on the first evening gave Innovation Teams the opportunity to display posters showcasing the projects they had worked on during the preceding year. The Marketplace demonstrated the significant progress that had been made and the variety of ways the core story had inspired action. For example, one team in northern Alberta worked to introduce the core story to all stakeholders, especially families, in the community of Wood Buffalo and to assist organizations in incorporating the core story into their service delivery. Another team tackled the development of a project to translate the core story to an audience and service providers working with youth, eventually leading to a scientifically rigourous and pilot-tested brief training program for youth service providers that incorporates the core story. Innovation Team members were invited to check out the Marketplace for work similar to their own and to explore the synergies and advantages of working together in the future.

Guest Panel Representatives

Chris Hosgood, PhD
Dean, Faculty of Health Sciences, University of Lethbridge

Heather Klimchuk, BA
Minister, Human Services, Government of Alberta

Shoo Lee, MD, PhD
Scientific Director, Institute of Human Development, Child and Youth Health, Canadian Institutes of Health Research; Paediatrician-in-Chief and Director of Maternal-Infant Care, Mount Sinai Hospital

Chad London, PhD
Dean, Faculty of Health and Community Studies, Mount Royal University

Steve MacDonald, BCom
Acting Deputy Minister of Executive Council, Government of Alberta

Glenda MacQueen, MD, PhD, FRCPC
Vice Dean, Professor of Psychiatry, Faculty of Medicine, University of Calgary

Richard Sigurdson, PhD
Dean, Faculty of Arts, University of Calgary

Michael Trew, MD
Chief Addiction and Mental Health Officer, Alberta Health, Government of Alberta

Interdisciplinary Cohort discussions

Participants were divided into six facilitated Interdisciplinary Cohort groups, each consisting of a mix of researchers, clinical practitioners, and policy-makers with similar interests. Their task each day was to discuss learnings from the morning plenary session and the workshops and identify interrelationships between and among the areas of research, policy, and clinical practice. The focus was on strategies for implementation and opportunities or challenges involved in applying Symposium content in Alberta.

Innovation Team activities

At the first Accelerating Innovation: Telling the Brain Story to Inspire Action Symposium, in October 2013, each participant was assigned to one of 21 Innovation Teams sharing similar purpose and inspirational goals to his or her own. Each team was assigned mentors who had participated in Phase 1 of the AFWI multi-year knowledge-mobilization strategy to ensure carryover of momentum and build cumulative impact. Team members worked together throughout the Symposium week to develop personal and team action strategies and remained in touch by communicating and/or convening between Symposia. Their common goal was to find and implement practical ways to use new or known information in a different way to accelerate the changes needed to improve outcomes for children in Alberta.

The Innovation Teams reconvened at Accelerating Innovation 2014 to take stock of their individual and team progress, build on work done over the past year, share their insights, and identify new opportunities for personal and system-level engagement. Each team could continue to work together as they had over the previous year or evolve into a Community of Practice, in which members learn from each other and develop a shared body of resources, or a Community of Purpose geared toward empowering each other to action to achieve common goals. Innovation Teams are integral to continuing the mobilization of knowledge learned at the Symposia into the systems and services that will ultimately create positive change in outcomes in addiction and mental health for Alberta's children and families. It is expected that Innovation Teams will continue to work to achieve their identified goals buoyed by the momentum generated by their participation in the AFWI's Accelerating Innovation strategy. The AFWI will communicate regularly with and provide staff liaison for this network of Innovation Teams. As Teams take the lead in their respective areas, the AFWI will remain up-to-date on their work to find out what they need to support them moving forward.

Innovation Team presentations

A special guest panel of high-level academic, policy, and government leaders was convened on the final morning of the Symposium to view brief presentations by the Innovation Teams before a full gathering of Symposium participants. Presentations outlined how teams planned to continue working together to achieve the goals they had committed to during their participation in the AFWI strategy. Their plans included:

- Become a Community of Practice and spread the core story to the public, beyond professionals, agencies, and organizations.
- Engage local champions and natural leaders to share the core story. Hold a YouTube contest to showcase interpretations of the core story by youth – the parents of tomorrow.
- Adapt the core story to different cultural and age groups, such as seniors, youth, and immigrants.
- Continue to spread the brain story throughout the judicial system.
- Develop and share a version of the core story with the collaborative practice community and various stakeholders throughout the family law system who work with separating families in order to create a strong foundation for building brains and buffer the impact of divorce on children.
- Work on the micro level with the intent that people will spread the core story among themselves and then put pressure on decision-makers to take appropriate action.
- Find ways to inspire younger workers to carry on with these issues of early brain and biological development, mental health, and addiction with the same passion: we all have a responsibility to help sustain this initiative.
- Continue as a Community of Practice to engage and motivate corporate Calgary to become champions for early childhood development and better addiction and mental health treatment, with efforts to include feedback recommendations by business groups to tailor core story presentations and videos to specific audiences.

Participants and observers

Of the 221 participants, 191 were returning for their second year of engagement with Phase 2 of the AFWI's knowledge-mobilization strategy. Roughly one-sixth of them had also taken part in Phase 1 of the initiative and functioned as mentors on the Innovation Teams to which they were assigned. Among 47 observers who participated in the Symposium activities were a group from Germany returning for a second year and a new group from the United Kingdom who were engaged in related work with FrameWorks.

Symposium Sponsors

The 2014 Accelerating Innovation Symposium was made possible by the following private and public-sector sponsors:

Palix Foundation

Alberta Government

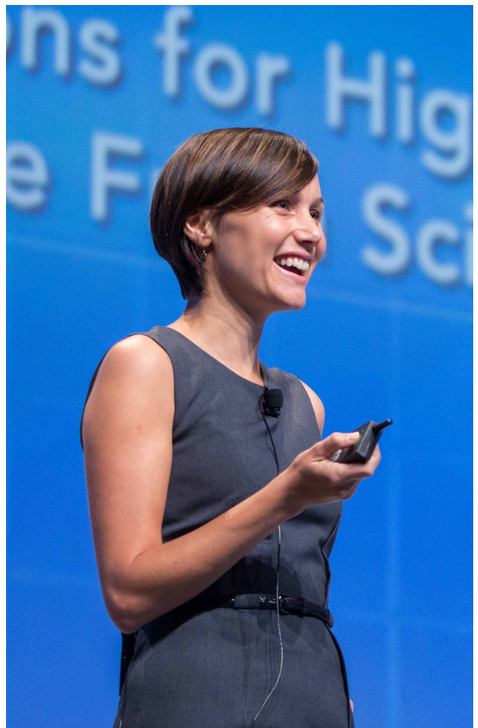
Alberta Health Services

Alberta Innovates Health Solutions

Participants brought perspectives from various backgrounds and professions, including Government of Alberta ministries, Alberta Health Services, Alberta's research-intensive universities, and community groups. They were selected for their experience and expertise in science or policy and/or practice regarding the impact of addiction and toxic stress on the developing brain. They included policy-makers, program developers, members of the judicial and corrections systems, health practitioners, clinicians, researchers, psychiatric residents in training, educators, students, advocates, funders, and representatives of professional organizations. Beyond their attendance at one or more of the Symposia, participants are expected to continue networking with their fellow Innovation Team members and continue to find new ways to incorporate Symposia learnings into their work and spheres of influence. (See Appendix 3 for a complete list of participants.)

Accreditation

The Symposium program met the accreditation criteria of The College of Family Physicians of Canada and was accredited by the Alberta College of Family Physicians for up to 33 Mainpro-M1 credits.



SYMPOSIUM LEARNINGS: WHAT THE EVIDENCE TELLS US

Symposium Faculty shared the results of their research and experience in presentations that provided the most current evidence-based knowledge about early childhood and brain development and the origins and treatment of addiction.They also discussed how this knowledge was being translated into clinical and community settings.

First-day presentations reviewed basic knowledge about early brain development and addiction, including brain plasticity, serve and return, and the impact of toxic stress from adverse childhood experiences (ACEs) on the developing brain and on lifelong health and well-being. Talks also touched on research involving laboratory and community-based interventions that might buffer the effects of toxic stress on children at risk. A review of the principles and benefits of framing outlined the challenges involved in producing the latest chapter of the core story of child development and the origins of addiction, which deals with child maltreatment and sexual abuse.

Participants learned about a program that successfully screens parents with a version of the ACE questionnaire in a primary care setting to identify children at risk and their families for intervention. Another presentation described a program that uses video to help parents identify and expand upon positive serve-and-return activities in which they already engage with their children. This talk highlighted the importance of the continuous research-to-theory-to-practice cycle required to move innovation forward. Research in the emerging science of parenting is revealing changes in the brains of new parents and suggests interventions currently being used with success on depressed or addicted mothers.

Presentations focused on the need to provide long-term supported care, including timely, targeted interventions within the framework of an evidence-based continuous care model. Specific interventions discussed included trauma-informed services for women and family interventions designed to break the cycle of addiction. A look at the record of success of Physician Health Programs (PHPs) suggested an opportunity to use aspects of these programs in treating addiction in the general public. Another presentation described the changing face of sex addiction in the digital age, particularly as an effect of easily accessed sexual imagery on the still-developing adolescent brain. An expert in addiction policy outlined the case for incorporating substance use disorders into mainstream healthcare and the challenges involved in making changes in an entrenched multi-stakeholder system. Another expert introduced a simple model of change used by nearly 3,500 addiction treatment organizations and discussed ways to ensure that change is sustained.

ABSTRACT

The Science of Neglect

By **Judy Cameron**, PhD

Three core concepts of healthy brain development are:

1. Brain architecture is established early in life and supports lifelong learning, behaviour, and health.
2. Serve-and-return interaction and stable, caring relationships shape brain architecture.
3. Toxic stress in the early years can derail healthy development.

Among sources of toxic stress in young children, postpartum depression and neglect are more prevalent than any form of abuse. A stable, caring adult can be a very effective intervention if introduced early.

There is strong evidence that early experiences influence brain development. For example, children who are raised in an environment in which they are read to, spoken to, and encouraged to speak will generally learn and retain more words and have a larger vocabulary than children who don't have the same opportunities. They will build brain circuits that are much better at reading and speaking, develop richer vocabularies at a younger age, and will enjoy using words throughout their lives.

Powerful evidence from the Adverse Childhood Experiences (ACE) Study quantifies how early experiences influence health. As an example, where once we thought that genetics and self-care were the key factors behind heart attacks, we now know that, on top of the genetic probability, if you've had seven or eight forms of adversity early in life, you have a three-fold greater chance of having a heart attack in your 50s or 60s than someone with only one ACE.

How does brain development occur? At birth, a child has almost all the brain cells, or neurons, he or she will ever have but not many connections between them. Genetics tells the brain cells to connect. Of the huge numbers of connections that form, those that get used most often stay and those that get little use are pruned away. That's where experience matters. In the child who is encouraged to talk and to read, neural circuits that develop in his or her brain will endure and form an excellent foundation for reading. Neural circuits are wired in a bottom-up sequence, sensory first, then language, and, much later, those for higher cognitive functions. From a policy perspective, it will cost more to teach people skills later in life, beyond the period of neuroplasticity when the particular connections for those skills are being formed.

Stable, caring serve-and-return relationships with adults play a key role in building brains. The baby serves, showing what he or she is interested in, through babbling and gestures. The adult responds with similar verbal expressions, encouraging the baby and saying the name of the object that interests the baby. Through this interaction, they build neural circuits, help to form a connection between visual objects and their names, and ultimately build a child who is attentive to and feels comfortable with other people. However, toxic stress early in life derails development, becomes embedded, and has a cumulative effect. The more adversity the child experiences, the greater the odds for adult substance abuse and for mental health disorders such as depression and anxiety.

"Much of the problem with early adversity is that it's the social situation that the child is in. It doesn't have to be the parent who helps with these situations; the community as a whole can come together and provide caring, attentive adults who can help the child. That would go a long ways towards helping a child that's growing up facing adversity."

Judy Cameron, PhD

As sources of toxic stress, postpartum depression and neglect produce effects that are just as serious as those produced by other forms of abuse. They are also more prevalent than any other form of abuse. How does neglect impact the brain? Genes are the recipes that direct the body's cells, but experiences influence which genes are expressed. In research on monkeys, baby monkeys were exposed to the loss of their mothers at different times in their development. Separated from their mothers at one week, baby monkeys lacked stable, caring adults to socialize them and grew up not having many close social relationships. Baby monkeys who lost their mothers at one month were already socialized and did not show a profound decrease in social interaction. Studies of monkeys' amygdala, a part of the brain regulating anger and emotion, show radical change in the expression of about 200 genes in monkeys separated from their mothers at one week. Monkeys separated at one month also experienced changes in amygdala gene expression, but in different genes.

Other studies show significant hormonal changes in response to stress. Ordinarily, a child's stress system is activated in response to stress and returns to normal in the presence of a caring adult. But without the adult buffer, a child's stress hormones remain on constant high alert. Other research suggests that children who grew up in adversity tend to see the world differently, anticipate more anger in their environments, and feel more stress and anxiety.

We are now seeking new protective interventions to block the effects of adversity. In monkeys, we have paired orphan baby monkeys with caring supermom monkeys at different times in their development. At one month, a good rapport developed and the baby became socialized. At 35 days, the pairing was effective but not nearly as effective as at one month. Pairing at 45 days showed no effect. The take-home message is: stable, caring adults can be a very effective intervention if introduced early. Timing is essential, and we think this monkey neuroscience is applicable to people.

ABSTRACT

Intergenerational Effects of Poor Parenting

By **Judy Cameron**, PhD

We know that children who grow up with adversity, stresses, neglect, and/or abuse often become parents who also have problems in those domains with their own children. We know what foundations are necessary for healthy development. Now we are trying to come up with preventive mechanisms early on and with therapeutic mechanisms so we can prevent the intergenerational transmission of adversity. How do we get the community to understand this and get involved?

"What works for one child or one community isn't necessarily going to work for all communities. You can have in mind things that would help children deal with adversity, but it really needs to be customized to the child, to the family situation, to the community, and to the environment."

Judy Cameron, PhD

The Brain Architecture Game helps players understand the issue of adversity and the importance of social supports. This game was developed by the Palix Foundation, the National Scientific Council on the Developing Child, the FrameWorks Institute and the University of Southern California originally to help policy-makers understand the issue of adversity and the importance of social supports. People play the game in groups and are given a set of life experience cards, which include various toxic stresses and social supports, and building materials including pipe cleaners and straws. The goal for each group is to build a well-balanced brain. The players draw from their life experience cards, and if they get social supports, they can thread the pipe cleaners through straws to build a more sturdy foundation. Toxic stress is a weight that has to be hung on the highest point of the brain. If the brain was built strongly at the start, it won't collapse due to the toxic stress. Discussion following the game focuses on lessons learned about brain development and the importance of social supports in preventing or mitigating the effects of toxic stress. The game has been played with policy-makers, school administrators, daycare providers, and other community leaders and works well to get them to internalize what it means to provide social supports. The Calgary United Way used it recently with business leaders to increase donations and support for early childhood development programs.

The Brain Architecture Game is also being used with university students in public health and social welfare programs.

New approaches are also needed for training people who deliver care to children directly. A whole workforce is required to provide one-on-one serve-and-return interactions with children. This will be different for each child, so a large number of people need to be trained. How do we create a training program for the people who have boots on the ground? Workers, especially in low-income, underserviced communities, want specific examples of how they might interact with children in their care, rather than theoretical information on neuroscience. At the University of Pittsburgh, we launched a new course called Translating Science, which involves developing new games, activities, movies, videos, and other media for getting the average person involved with science. Hundreds of students take the course and they come up with amazing, engaging, and creative ideas.

Where are we going to find the workforce in the community? Senior citizens are ideal. Retired and able to contribute, they know their communities well. Many are affiliated with community centres or churches and go to them regularly. In Pittsburgh we are now working with seniors and teaching them using tools like The Brain Architecture Game. But many of the activities the students at the University of Pittsburgh come up with involve electronics. So we paired the seniors with fourth graders in teams that go into daycares or pre-schools and work with children one-on-one. The seniors provide the adult interaction and the fourth graders offer the technological know-how, and it works very well for all involved. All the games so far have to do with language, problem solving, and conflict resolution, skills with which children who come from a background of adversity have trouble. The games help not only the young children, but also the volunteering fourth graders. A new game in development that shows great promise uses seniors' smartphones to place clues in the environment for children and seniors to explore together. The seniors benefit from increased mobility, cognitive stimulation, and a sense of being needed, and the children improve their school readiness. The community benefits from having increased control over health outcomes. Another very popular game in development for museum settings engages children and their parents in working together to interact with museum exhibits.

The take-home messages here are:

1. You are going to need manpower to provide one-on-one serve-and-return relationships in the community.
2. Work with the creative community to translate the neuroscience for the people who work directly with children.
3. Engage the whole community. Work with established community organizations including churches and other groups that people trust and to which they are already connected.
4. To improve life for all children, be more open-minded and creative; be everywhere and include everyone.

ABSTRACT

The Progressive Nature of Adverse Childhood Experiences: Building Self-Healing Communities

By **Robert Anda**, MD, MS

Adverse childhood experiences (ACEs) are progressive in their effects throughout the lifespan. Our job is to halt that progression so that it doesn't get passed on to the next generation. People who are affected by ACEs, either personally, in their family, or in people they know, outnumber those who are not. The scope of this public health issue is so large that we must engage people who have been affected by adversity to advocate for change. This community is the primary gear we need to get moving forward. Then, other gears, including the health, education, child welfare, and justice systems, will start turning and we will have momentum in the next generation.

The ACE study examined the health and social effects of ACEs throughout the lifespan among 17,421 members of the Kaiser Health Plan in San Diego County, California. These people generally were educated, middle class, and well. Subjects were asked about their experiences of 10 ACEs, including household dysfunction (such as substance abuse, mental illness, family violence, and parental separation); physical, psychological, and sexual abuse; and emotional and physical neglect. Only one in three subjects had no ACEs. Over a quarter had one, 16% had two, 10% had three, and 16% had four or more. ACEs tended to occur in clusters, and there was a cumulative dose response for major health and social problems ranging from early initiation of street drug use and teen pregnancy to addiction, major depression, and attempted suicide. ACEs are the major preventable pathway to mental illness and substance abuse. They are also a pathway to diseases such as coronary heart disease, lung disease, stroke, diabetes, cancer, and others. In a follow-up to the ACE study, people with six or more ACEs were found to have died on average 20 years younger than those with zero or one.

The conceptual framework for the ACE study is a pyramid forming the whole life model going up from conception, or even preconception, to death. At the bottom are ACEs leading to disrupted neurodevelopment, then to social, emotional, and cognitive impairments, then to health-risk behaviours, disease, disability, and social problems, and ultimately to early death.

At first, people did not believe the results of the ACE study. Once we began to understand the biology behind our results, people started to believe them. For example, epigenetics is the ability of the gene to be expressed or not expressed depending on what is happening in the environment. New studies show that adversity in childhood can leave chemical markers on genes that affect their ability to turn on or off. If experiences, including ACEs, influence gene expression, can positive relationships reverse those epigenetic fingerprints? We are now learning how to protect people from ACEs. More important, we look forward to a time when ACEs will be prevented from occurring in the first place.

"We usually ask people with adversity to adapt to the system, and now what I see as I travel is that people are creating policies to help the system adapt to the needs of the people that have experienced adversity."

Robert Anda, MD, MS

ACE results are predictable, and what is predictable is preventable. We spend large amounts of money at the top of the pyramid trying to avert the outcomes of ACEs at later stages, which is both expensive and generally ineffective. We need to disrupt the intergenerational transmission of adversity, remembering that secondary prevention for people who are affected by ACEs is primary prevention for their children. This requires a trauma-informed approach that sees adversity issues as the result not of what is wrong with a person but of what has happened to that person.

The ACE score provides a chance to rewrite the narrative of one's life and create a different path for the future, moving from shame, confusion, and negative adaptations to hope, meaning, and purpose. The power of this change has to start with people who have been affected by ACEs. Existing systems of health, education, child welfare, and justice are well-intentioned but don't fit the reality of people's lives. Schools are built for children with ACE scores of zero. Children with three or more ACEs are more likely to fail a grade, score lower on standardized tests, have language difficulties, and be suspended or expelled. ACEs are also a pipeline to poverty, prison, unemployment, and homelessness. To prevent the transmission of these risk factors to the next generation, we can start by helping people who are in those situations now. We can provide them with parental support and put them into systems that are non-traumatizing and that understand the consequences of adversity and toxic stress. I am already seeing bits and pieces of self-healing communities coming together. The public can drive change. Imagine if everyone who went to their healthcare provider had the information we have about ACEs. The healthcare system would have to learn it. I believe that a public health approach that includes everyone is going to create a demand for change in policy and practice in all of our systems.

The Next Chapter: Bringing Maltreatment and Sexual Abuse into the Core Story

By **Nat Kendall-Taylor**, PhD

The FrameWorks Institute has conducted framing research in Alberta and the United Kingdom to find effective ways of communicating what science knows about the causes, effects, and solutions to issues of child maltreatment and child sexual abuse. This research has sought to integrate issues of child maltreatment into the Core Story of Early Childhood Development – and the comprehensive communications strategy and science translation platform that FrameWorks has worked on with scientists for the last decade in the U.S. and Canada.

Framing is a foundation of successful communication about social and scientific issues. Public thinking is shaped by cultural models – a swamp of existing shared but implicit understandings – that shape the way that people understand and act on information and experiences. The essence of strategic communication is knowing what is in this swamp and being intentional in navigating it in order to achieve communication goals. Reframing, using values, metaphors, and other framing tools, provides new ways for people to think about information and talk about issues. Values can help people orient towards issues in more productive ways. Metaphors concretize understandings of abstract, complex, or unfamiliar concepts and processes. But both of these tools, and framing strategies more generally, need to be tested first to ensure that they have the desired effect.

Creating a core story that uses values, metaphors, and other tools to harness the power of narrative is one way to get the intended and perceived meaning of a message to line up. An effective core story helps people encode, remember, and retrieve information and pass it on to others. A core story is an empirically based communication strategy that can bring people together around common messages by using a common language. The core story that has been developed and tested in Alberta allows communicators to more effectively translate information on three main issues: early brain and biological development, mental health, and addiction. Recently FrameWorks researchers have been working to add the next chapter to this story – a section of the story that allows communicators to more effectively and productively engage members of the public and policy-makers in thinking about child maltreatment and child sexual abuse and what needs to be done to more effectively address these important social issues.

The story that researchers and advocates want to tell is contextually focused. It is not about the person but about what happened to the person. It focuses on contexts and circumstances such as poverty and social networks. This expert account is a story about how maltreatment disrupts development and about the ways of getting this process back on track to improve outcomes for children, families, communities, and society.

Public understanding is less contextual and shapes a different understanding of maltreatment. In the swamp, we see four main models that influence people's thinking about the causes of maltreatment: 1) Children exposed to maltreatment come to think of it as normal and adopt the same behaviour as adults; 2) Maltreatment is considered "normal" behaviour in specific cultural communities such as immigrants or First Nations; 3) Neglect is a rational decision made by selfish parents who put their own needs ahead of those of their children; 4) Stress, which is contextually caused, can lead to maltreatment. People tend to resist thinking causally about child sexual abuse – it is simply beyond comprehension. Or, if they do think causally, they lay the blame on bad apples who were born with "evil minds."

> *"People don't come to our issues as blank slates; they come with understandings that they use to make sense of whatever information we put in front of them. It's that pre-existing set of understandings that is pivotal to the power of framing. It's about knowing what is in that swamp and how the cues that you embed in information selectively activate parts of that swamp that shape people's understanding on issues."*
>
> **Nat Kendall-Taylor**, PhD

There is a tight correspondence between the causal model people use and the solutions they are able to see. When people use the first three models to think about child maltreatment, they tend to be fatalistic and punitive in how they think about solutions. But when they think about how stress might result from experiences and cause maltreatment, they think of solutions that are about programs and policies that address the sources of chronic stress. This is the communications gold mine. If our goal is to get people to see the importance of and support public programs and policies, we need to use frames that make the contextual model of maltreatment the operative lens through which people think and talk about child maltreatment.

Frameworks' cross-cultural work in the U.K. provides potential framing solutions. Part of the answer to reframing these issues lies in shifting people's sense of fatalism by working with values that give them a new way of looking at the issue – a way of seeing these as solvable issues. FrameWorks' research in the U.K. showed that a message based on the value of social responsibility was effective in providing this more productive perspective. Including prevalence facts with this value actually depressed people's sense of efficacy. But including solutions with facts and values was a highly effective communication strategy. Our challenge was to pull forward the context model to help people see systems causes and solutions on the issue of neglect. A set of on-the-street interviews in the U.K. showed that many of the same cultural models that were observed in Alberta were at play in the U.K. Using an explanatory metaphor, researchers were able to shift people's thinking away from demonizing a neglecting parent towards a perspective in which people could see and understand the role of *social determinants* in the issue.

This work emphasizes and illustrates three main points:

1. Frames drive change and are integral parts of larger strategies that influence outcomes.
2. More information is not necessarily better. What is better is telling better stories using research-based metaphors and values.
3. Know before you go. Research can help you be a better communicator.

ABSTRACT

Using the ACE Questionnaire in Practice

By **Rahil Briggs**, PsyD

If we want to prevent maltreatment, trauma, and toxic stress in children and identify children at risk as early as possible, the best place to focus our efforts is in primary care. The vast majority of children attend a regular primary care site that is universally accessed without stigma. If we can co-locate and integrate parent/child behavioural health and dyadic services to treat the child, the parent/child dyad, and the parent's challenges within that primary care setting, we might succeed in finding those children at risk and break the intergenerational cycles of risk and trauma. That's what we are attempting, with considerable success so far, through the Healthy Steps program in the Montefiore healthcare system in the Bronx. Use of the ACE (adverse childhood experiences) questionnaire is a key part of the program.

The Bronx ranks last of 62 counties in New York State in terms of health outcomes overall. As a first stop for immigrants, the Bronx features a constantly shifting mix of cultures. About 40 per cent of children live below the poverty line. Given the stresses associated with living in poverty, there is stress almost everywhere. We do know that the two-year-olds being seen with developmental delays were once six-month-olds with robust biology and ability to learn. No matter how robust the biology might have been, the period between 15 and 18 months is the time when environment starts to trump biology. The Healthy Steps program provides critical early intervention in the primary care setting.

A key part of the Healthy Steps model is co-location and integration of a mental health specialist as part of the team in pediatric primary care. During well-child pediatric visits from birth through five years, babies are seen by a Healthy Steps specialist in addition to their pediatrician. Healthy Steps specialists are experts in child development and have experience working with infants, toddlers, parents, and healthcare professionals. Children and their parents receive universal screening, assessment, treatment, and referral. The parents and children are screened for ACEs and the parents for depression. The ACE score may be the best way currently to identify children at risk. Children are also screened regularly for social/emotional development. The beauty of primary care is that one- and two-year-olds don't come in on their own, so it is a place where parents will be seen with their young children. It is also without stigma: no matter your background, you are a good parent if you take your child to the pediatrician. Healthcare providers in the program receive education in early brain development, attachment theory, and the importance of addressing and preventing toxic stress.

When Healthy Steps started at Montefiore in 2005, participating mothers and their partners and children were enrolled in a prevention study that started prenatally or before the child was two months old. The study was designed to quantify the relationship between a mother's own childhood experiences of abuse and neglect and her child's emotional development at age three and to determine if Healthy Steps had any effect on it. Results to date suggest that Healthy Steps was able to intervene significantly in the intergenerational transmission of trauma, toxic stress, and poor development in children of mothers with one or more ACEs compared to a matched control group that received no intervention. Healthy Steps is now being spread to practice sites throughout the Montefiore Medical Group.

"I think the ACE score is a really nice, measurable, concrete way to think about breaking intergenerational cycles of maltreatment, trauma, and toxic stress. So, if mom has an ACE score of seven, and her own mom had a score of eight, yet her baby has a score of only one, and if we work together in our program to keep it at one, then we know that we're setting that child up with a better foundation."

Rahil Briggs, PsyD

How did we get a Healthy Steps program started?
We began with a proof-of-concept study that was fully grant funded. It was important to work with the earliest adopters in the system first and to find a champion within the system to be our partner. We recognized that integrating Healthy Steps with adult mental health was critical: the money saved by treating adults can subsidize the pediatric side. This is population-based health, and the work we do now will have an effect on how healthy those children will be as adults. Workforce development was a challenge. Not many mental health providers know how to work within a primary care setting where you have to work short-term. You also need to identify those who need long-term care and refer them to the right community resources. Primary care is where we find problems when they are light pink flags, just starting to happen. We're there when families first notice the problem, and we're ready to work on the problem right away.

ABSTRACT

Interventions for High-Risk Children: The Bridge from Science to Action

By **Melanie Berry**, PhD

Work at the Stress Neurobiology and Prevention (SNAP) Research Laboratory provides an example of how the core story is being implemented into everyday practice. The laboratory focuses on bridging the gap between research and practice in the area of early development, early stress, and parenting related to high-risk children and their families. The work is essentially a translational research cycle focused on developing and testing innovative interventions to prevent or address the effects of early stress and to impact related policies and practices. The key to moving innovation forward is the iterative nature of the process: from research to theory to practice to research. The process doesn't stop and it can be accessed at any point.

Parent Management Training Oregon (PMTO) is an early example of translational research. The program started with basic research in the early 1970s looking at interactions in families where children were presenting with serious problem behaviour. At the time, interventions focused on the child were based on the common theory that the behaviour was driven internally. Researchers with the Oregon Social Learning Center took a different tack and looked at basic behavioural processes within the household, observing what was happening between the children and their caregivers. This basic research led to a new theory that called for targeting interventions at parenting, specifically at teaching the parents new skills and different ways of interacting with their children. PMTO has since been widely researched and disseminated and is the root of many evidence-based practices today. The research cycle started with the basic science of observing what happens in the household. There was a clear theory of change targeting parenting practices that could lead to a change in a child's behaviour patterns. This clear theory of change would also drive the evaluation, to ensure the researchers that they had effected the change they had targeted and that it led to the outcome they were interested in.

Filming Interactions to Nurture Development (FIND) is a current example of translational research that is now being tested in a number of settings with various populations, including one in Alberta. FIND is a video coaching program for parents and other caregivers of high-risk children. Short videos are taken of caregivers spending time with their child, the assumption being that they are already doing some positive things that are developmentally supportive of the child. Serve and return is a key theme of FIND, and elements of serve and return are pointed out to the parent or other caregiver when the videos are played back. These positive parental behaviours are built upon over about 10 sessions. The translational research cycle has been used to develop and test the program. The basic theory states that if high-risk parents could be engaged and their serve-and-return behaviours increased, then positive outcomes would be seen in the development of the child. The video coaching intervention was then developed and is now being implemented. The preliminary data are encouraging. There are increases in verbalization on the part of the child and early evidence of positive indications in the child's development. FIND is not yet an evidence-based practice, but it is evidence-informed. A full-scale research study of the FIND program is underway at the University of Oregon.

"We know what young children need in their earliest relationships to thrive. And serve and return plays an essential role. Young children serve when they make a sound, do something, or look at something. Adults return that serve when they respond to the child in a developmentally supportive way – encouragement, naming, giving the child a word for what they are seeing, doing, or feeling. Serve and return doesn't just happen at home. It happens in the environment of relationships where a child lives."

Melanie Berry, PhD

A clear theory of change is critical to the translational research process. Central to the theory of change is a clear sense of which skills and behaviours to target. What are you hoping to change? Do you have a sense of the underlying cognitive, emotional, and social processes or capacities that facilitate that change, for example attention, mentalizing, and self-monitoring on the part of the caregiver? What impact will these have on caregiving, such as a gradual increase in skills and in the subject's sense of competence as a caregiver? How will these changes ultimately impact the child's development, such as in thinking, behaviour, language, and emotion regulation abilities and in an increase in functioning at school and at home? Each target is linked to a specific underlying process and each process to specific outcomes that can be measured. A high level of specificity is essential to the process.

The next step in the translational process is to take the intervention to scale. A scalable model would involve brief interventions and the engagement and retention of families for up to 6 to 10 weeks. It would be targeted to home in on one or two critical components of a family's functioning and tied to a strong theory of change. The program would be highly specific as to participants, target, timing, location, and methodology. It would also be complementary and able to fit in with other services.

Interventions for Substance-Abusing Parents

By **Linda Mayes**, MD

The emerging science of parenting is revealing how the transition to parenthood impacts an adult's psychological and neuropsychological development. The circuits that seem to be most affected, either becoming enhanced or repressed, are the reward and stress circuits. Adults' own early experiences and sense of attachment with caregivers appear to be important sources of individual differences in their stress- and reward-response systems. Early adversity leads to a dysregulated stress response, which then leads to risk for addiction and related problems. These, in turn, lead to impaired parenting, the potential for neglect and abuse, and ultimately continuation of the intergenerational cycle. Understanding this key developmental phase of parenting can help reshape programs for prevention and intervention, impacting not only the child's development but also the intergenerational cycle.

"Parental capacity to respond to an infant's stress is related to his or her own ability for reflectiveness and emotion regulation. In the lab we have a computerized baby and ask parents to try to console it. Mothers with higher mindfulness skills persist longer even when comforting a simulated baby."

Linda Mayes, MD

Becoming a parent is a developmental process. The parent's attention, priorities, and sense of what is rewarding or stressful shift to focus on the infant. The baby is experienced as both highly rewarding and highly stressful, and there is an enhanced sensitivity to infant cues. Use of both fMRI and EEG/ERP methodology illustrates these changes in the stress and reward regions of the brain. Differences in patterns of neural response to infants' cues are consistent in terms of parents and non-parents. For example, event related potentials (ERPs, or brain activity related to sensory or cognitive processes) are heightened in mothers, compared to non-mothers, for infant cries. Cues of one's own infant are especially salient and motivating. Negative cues, such as cries, activate both the reward and stress systems in parents, possibly reflecting a parent's capacity to respond to the infant's stress and ability to anticipate relieving it. Grey matter increases between two to four weeks and three to four months postpartum, depending on the positive quality of the mother's experience.

There are a number of sources of individual differences in parental sensitivity at the neural and behavioural levels. Adult attachment security appears related to differences in brain response to infant cues. Positive response to photos of happy babies is much higher for mothers who describe their own attachment positively. Levels of depression or of positive mood also predict the mother's response to infant cues, with depressed mothers showing a blunted response. Mothers who are substance users show reduced activation in the pre-frontal regions of the brain in fMRI testing. They also have a lower brain wave response when seeing their infants. Addiction reduces parental sensitivity and enhances parental stress to infant cues. A parent's capacity to respond to an infant's stress is related to his or her own ability for reflectiveness and emotion regulation.

The basic science of parenting can help refine prevention and intervention programs for parents. We usually tell the attachment story from the child's point of view: the parent quickly detects a baby's discomfort, picks the baby up, and down-regulates the baby's emotional state. But in this context we want to tell the story from the parent's point of view. Early adversity in the parent's own childhood impacts the stress- and reward-response systems. The infant is perceived to be bothersome; there are feelings of guilt and ambivalence toward the infant and increased risk for abuse of the baby. Rewarding properties of the infant are dampened and stress properties are high. A dysfunctional/dysregulated stress response and a history of early adversity are common across a number of psychopathologies associated with impaired parenting. As the number of ACEs (adverse childhood experiences) increases, risk factors for adult substance abuse increase, leading to impaired parenting and intergenerational transmission of early adversity. The translational message for intervention in this model is to focus on the adult's needs as a parent and how the parent perceives and experiences the infant's cues. The aim is to increase the adult's distress tolerance, capacity to maintain decision-making in the face of stress, and ability to remain mindful of his or her own and the child's emotional states.

Two complementary approaches to programs for parents address the adult developmental stage of transition to parenting. One increases the parent's ability to become more mindful or reflective. The other assists in building more social networks. Together they reduce stress in parents and permit them to be more responsive, empathic, and reflective. Minding the Baby is a program that focuses on substance-using parents. Research shows it is possible to achieve abstinence by focusing on the relationship as a parent with the child, even without focusing on drug use itself. The Newhaven MOMS Partnership program brings multiple agencies together and trains and employs mothers to deliver services that promote skill building, mental health, and social connectedness in places, such as supermarkets, where mothers go. Smartphone technology is also being used to deliver social connectedness. A program called Momba creates networks of mothers in neighbourhoods and rewards mothers for doing things with their children and other adults that are developmentally appropriate for adults as parents. The program is having a good effect: mothers are connecting with each other and doing things with their babies, and rates of depression are going down.

ABSTRACT

Gender Matters: Creating Trauma-Informed Services for Women

By **Stephanie Covington**, PhD, LCSW

Regardless of the culture, women around the world use mood-altering substances in many forms. Beginning with the women's movement in the 1960s and 1970s, when women began speaking out about addiction, sexual abuse, domestic violence, and other realities of their lives, addiction services designed for women began to be available for women in the developed world. Today, girls and women are using alcohol and drugs more frequently and in greater amounts. They are also being incarcerated more often for crimes related to their drug and alcohol use. Patterns of services are also finally shifting from primarily male-focused treatment to what we refer to today as gender-responsive treatment. We have known for decades of the link between trauma and addiction in people's lives. Gender-responsive treatment looks at the issues, including trauma, that women bring to treatment. This is a shift that has to take place. The issue of trauma cannot be put off or ignored.

Certain themes are found in women's issues the world over. Addicted women carry more shame and stigma and experience more physical and sexual abuse than addicted men. They also face long waiting lists, poorly co-ordinated services, or complete lack of services for women. Violence against women is pervasive. Of all the various forms of trauma, women are at greater risk of interpersonal abuse than men. The difference begins in adolescence. For a boy, the greatest risk for abuse comes from people who dislike him. For girls and women, the greatest risk for harm comes from their relationships, from the people they love. Boys and girls live in different worlds, and we need to consider that when designing treatment services.

Trauma-informed services not only take trauma into account but avoid triggering trauma reactions. Core values of trauma-informed care include safety, trustworthiness, choice, collaboration, and empowerment. This is a shift in organizational culture that involves everyone, not just the clinical staff. It also involves all aspects of program activities, including setting, relationships, and atmosphere. Understanding trauma becomes the core of how we provide sufficient treatment. The Adverse Childhood Experiences (ACE) Study has huge implications in this regard. High ACE scores are linked to risk in terms of health, mental health, and longevity. The ACE score also has a powerful connection to smoking, alcoholism, injection of illegal drugs, and obesity. Women are 50 per cent more likely than men to have an ACE score of five or more. Experiencing early abuse is significantly associated with substance use in girls as young as 12 and is heavily correlated with drug abuse as well as further physical, emotional, or sexual abuse in a young woman's life.

Women's Integrated Treatment (WIT) is a holistic model based on a theoretical foundation and a set of guiding principles for gender-responsive and trauma-informed services. These principles involve gender, environment, relationships, services, socio-economic status, and community. Gender matters when designing services. The environment must be based on safety, respect, and dignity. Policies, practices, and programs must promote healthy connections to children, family, significant others, and community. Services must address substance abuse, trauma, and mental health issues and must be comprehensive, integrated, and culturally relevant. They must also provide women with the opportunity to improve their socio-economic conditions. No one treatment program provides everything a woman needs. There must be a system of comprehensive and collaborative community services.

"When the addiction field ignores trauma it misses a critical piece of the recovery process. We know that men and women who have trauma histories often use mood-altering drugs. It helps them to ignore and deny feelings. It helps them to forget. It helps to numb the pain. So they turn to alcohol and other drugs as a solution and then the solution becomes a problem. But what happens if they get into treatment where the program fails to discover what is underneath the pain? It is time that we use what we know and become more sophisticated in our interventions."

Stephanie Covington, PhD, LCSW

When we are working to help women and girls heal, we are working on multiple levels. When we do our own healing work and help another woman, it is on the individual level. But as we help women and girls become whole, we are also working on a political level in a world where there is still so much brutality against women and girls. I believe that as we help women and girls heal, we are also working on a spiritual level. What we are doing is working with the great feminine principle that has been lost in our world. As we heal and bring that great feminine spiritual principle in balance with the great masculine spiritual principle, that in fact is the only hope for our planet.

Family Systems in Addiction Treatment

By **Claudia Black**, MSW, PhD

Just a few decades ago, a family program in the context of addiction treatment was likely to be aimed at teaching wives of addicts, who were primarily men, how not to enable their spouses. We know now that addiction doesn't just belong to the addicted person. It also belongs to the family. The impact the addict and his or her addiction have on the family does not disappear even if the addicted person experiences recovery. Addiction seldom appears spontaneously within a family system. The chronic stress it causes becomes toxic, and the adverse childhood experiences affect the neurobiology of the family system, not just of the individual. When treatment focuses on the addict without focusing also on the family, the cycle of addiction continues through the generations. The time has come to regard addiction as a family issue.

"If kids live with addiction, they have the right to understand what it is they're living with. They know that something is wrong, and they often believe that they are the cause of it. It's really important for them to know that there is something else causing this, and it is called addiction. They need to know that they're not at fault. Kids, partners, and spouses take on a lot of responsibility for the addiction when in fact it is not their fault. We need to help them understand what addiction is and put that into perspective."
Claudia Black, MSW, PhD

A case study illustrates the transgenerational impact of addiction. A genogram of Theresa's family and the families of her former husbands reveals a history of alcoholism, compulsive gambling, violence, rage, sexually inappropriate behaviour, chronic illness, premature death, compulsive overeating, and chronic poverty going back at least two generations. Theresa's history was a training ground before she ever entered her addictive relationships. She had learned at a young age to tolerate inappropriate behaviour, to prioritize the needs of others above her own, to discount her own perceptions and give others the benefit of the doubt, and to fault herself for family problems. When she finally sought help, she was diagnosed with co-occurring depression and anxiety. She also had two children, ages 7 and 10. The genogram shows a much weakened family structure that is unable to assist in healthy caregiving for these children. Instead, this family system will perpetuate toxic stress and adverse childhood experiences and result in ongoing trauma responses. When the family itself is the source of trauma, children have no options to stand and fight or to flee to safety when their stress systems respond to trauma. Instead, their stress systems end up in a dysregulated arousal state. This is what we deal with when we work with families of addicted persons.

In addicted families we see both Big T and Little T traumas. Big T traumas in this context are acute or blatant, such as being subject to or witnessing physical or sexual abuse. Little T traumas are more subtle and covert but no less damaging. They involve the fear that comes from unpredictability, verbal abuse, and criticizing, embarrassment over what the addicted parent does or says, anger over broken promises, or guilt from thinking that he or she, the child, has caused this behaviour. The result is emotional abandonment – hiding a part of oneself in order to be more acceptable or to protect oneself. The more a person experiences emotional abandonment growing up, the more he or she is apt to abandon herself or himself as an adult. A large part of the treatment involving family members and addicted persons is about teaching them to recognize how they abandon themselves and what they need to do to embrace themselves today.

A child's injuries, because they are chronic and occur at a time when the body, brain, and personality are being formed, can change the brain in the way it interprets and responds to stress. This can make individuals more prone to both process and substance addiction and to depressive disorders and anxiety. The more abuse a person has in his or her history, the more likely the person is to have multiple addictions.

The legacy may not necessarily continue with an active addiction but with trauma repetition, such as getting into relationships with persons who are addicted. And the family transmission continues. At least four people on average are impacted by one person's addiction.

In working with families, remember that:

1. Family means partners, husbands, wives, parents, step-parents, grandparents, siblings, and children.
2. It is important to first stabilize and address the immediate crisis.
3. It is essential to provide access to a continuum of services in order to intervene with long-term consequences.
4. This work cannot be done without acknowledging the role of trauma: be trauma-informed.
5. Treatment must assist family members in recognizing their part in the addictive system.

ABSTRACT

Successful Management of Addictive Disorders: Learning from the Experience of Physician Health Programs

By **Michael Kaufmann**, MD

Whether addiction is inherited or develops due to early life experiences, it starts in the brain and is there for life. This is the principle that underscores the use of a chronic disease paradigm at the core of Physician Health Programs (PHPs). These programs vary among jurisdictions, but their nature and principles, combining chronic disease management (CDM) and occupational health, tend to be similar and lead to highly successful outcomes. Given that addicted doctors are very much like the people they serve – lifetime prevalence rates in the profession are the same as in the general population, about 12 to 15 per cent – it makes sense to consider how the CDM approach to addiction treatment can be used in the general population.

Chronic disease can generally be defined as one that is long-lasting or recurrent, with periods of remission. Addiction meets this definition and has parallels with several chronic diseases such as diabetes, Parkinson's, and hypertension. PHPs have been thinking about addiction as a chronic and lifelong condition for many years and have been applying CDM principles in combination with occupational health medicine to treating physicians with addiction. These principles include stratifying the population by degree of risk, use of specific screening tools for case finding, provision of continuum-of-care options, setting patient-defined goals, taking a multi-disciplinary approach, co-ordination of care and system supports, incorporating a range of disease management strategies, and carrying out ongoing long-term follow-up.

The PHP of the Ontario Medical Association provides a wide range of services. These include information and advice, intervention and assessment to referral for treatment, case management and monitoring, family support, education, and prevention. The PHP connects, facilitates, and co-ordinates. It does not provide treatment but motivates the patient to take the next step. A large number of community resources work with the PHP to provide comprehensive assessment and addiction treatment services. Case management involves continuous monitoring for a minimum of five years, with everyone on the team communicating with each other. Monitoring includes random toxicology testing, routine interviews, and prompt response to relapse. Occupational health principles are applied to ensure doctors recover sufficiently to perform their work with skill and safety. Doctors return to work with low-risk tasks and then move to the next stage. The PHP remains always in touch to see how the return to work is going. The doctors tend to adapt and adjust to a lifestyle and work style that support their recovery because their work is vital to them.

PHP outcomes are astonishing. A longitudinal study of 16 American PHPs involving more than 600 MDs showed 79% of them licensed and working after five years. The Ontario data are similar. In a study of the first 100 monitored participants in the Ontario program, 71% had no known relapse, 14% relapsed and went on to a successful recovery, and 15% relapsed and left the program. This is essentially an 85% success rate.

> *"Addiction eats away at the person's sense of who they are and eats away at their very soul. It's a highly isolating condition. As they continue to chase the addiction and the immediate reward that it brings, people retreat into their illness and disconnect from everything that matters: their friends, their families, their work, their values. To me it's a spiritual thing to reconnect to people, reconnect to one's sense of who one is, reconnect to our values, and reconnect to a sense of where we fit in life and in the world and what matters and what doesn't. It all matters; it's all of that and more."*
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> **Michael Kaufmann**, MD

What makes the PHP approach so successful?
Monitoring is key. PHPs stay close to their patients and get to know them. They make sure their patients continue to work on their recovery programs and use the resources available to them. PHP patients are also highly motivated. Among other motivators, such as marriage, family, and personal health, their work, professional status, and licence to practice are hugely important to them. This means the use of contingency management by the PHP is very effective. If a doctor relapses or if there is a concern he or she might relapse, the doctor can be pulled from his or her work. The success rate of PHPs appears to suggest that the care provided to addicted physicians through these programs may be significantly different from the care available to the general public. While it would be difficult to draw a direct parallel between PHP patients and the general public, it might be useful to think about how the CDM approach to addiction treatment can be used in general populations.

ABSTRACT

Sex Addiction and How the Internet Is Changing Everything

By **Patrick Carnes**, PhD

Evolutionary change usually takes centuries, even eons. But we may be watching evolution take place within a generation as the digital revolution literally changes the brains of our children. This digitally based problem is creating a shift in our sexuality and a tremendous vulnerability to addiction. Nearly 100 per cent of the sex addiction population that we see today are in some way involved digitally in terms of their sexual behaviour. Recent studies show that sex addiction is having an impact on how the brain functions. We can't duck this problem. We need to reduce the stigma around sex addiction and work together to address this issue.

"We're talking about a shift in our sexuality and why this is so all-important, especially when we're talking about children, family wellness, and the planet. It's probably one of our most important issues."

Patrick Carnes, PhD

Digitally based sex addiction is one of today's most important issues. Some of the most talented people in history, from Abraham Lincoln and Martin Luther King to Steve Jobs and Thomas Edison, struggled with mental health issues and addiction. Sex addiction remains one of the hardest of these issues to talk about. Yet the digital changes that are occurring so rapidly today are changing our brains in ways that we do not yet fully understand but are cause for concern. In 1983, there were more than 10 million computers in use in the United States; in 2014, there were an estimated 2 billion in use worldwide. Facebook, YouTube, and Twitter are roughly only a decade old. But they open so many new ways people can connect with each other sexually. This also means that access to sexually explicit materials has been dramatically magnified as well. In 2013, with over 428 million pages of pornography, the United States was the world leader in production of porn. This is big business and it is having a huge impact.

In 1991, we knew from our research how sex addicts developed and how their addictions interacted. They had attachment issues and sexual, emotional, and physical abuse issues. The more severely abused they were as children, the more addictions they had as adults. We had data on what went into making successful recoveries. Then we started seeing sex addicts with entirely different trajectories related to discovering Internet pornography and becoming addicted in a relatively short time. About 30% of our patients had similar stories. That figure is now 100%. Patients talk about a wide variety of different ways their sexuality is being affected by what they have seen online. A pioneering article in the journal *Pediatrics* in 2007 reported that two-thirds of adolescents, aged 12-16, were sexually active while doing their homework, and 34% were at risk for chronic sexually compulsive behaviour over their lifetime. We are seeing patients now who started looking at porn when they were 10 and never became socialized to normal sexual relationships. They started out looking at images of children because they were children and just kept looking at children. So at age 25, they are classified as sex offenders. We know that four hours of looking at Internet porn per week affects the executive function of the brain. A recent study found that 21% of college males know they have a problem with Internet porn, which is now one of the two leading causes of dropping out in the first year of college.

So much has been happening in sex addiction, it's a whole different picture than it was in 1991. Not only are there changes in the brain, but we are also seeing the same thing that shows up in compulsive eating and other addictions: the patient will want something but not like it. We are starting to see activation in the same parts of the brain where we see the chemical addictions and the other process addictions. And we're seeing that it is having an impact on how the brain functions. There has been criticism, especially from the pornography business, that research and clear diagnostic criteria are lacking in this area. Actually, there is a lot of agreement among researchers who work with sex addiction, and a very effective brief diagnostic screen, called PATHOS, has been developed and is used in both the medical and pastoral communities.

This issue of digitally based sex addiction is huge. We have a tsunami coming of children and people with lifelong issues around sex addiction getting into all kinds of trouble. You can't duck this problem. What we need to do in the mental health community first is to reduce sexual stigma. A new model for social change called Collective Impact provides a set of guidelines to measure, encourage, and achieve results. This is what I see you doing.

How Should We Integrate Care for Substance Use Disorders into Mainstream Medicine?

By **Thomas McLellan**, PhD

There are three good reasons why substance use care should be integrated into mainstream medicine: 1) It will improve general medical care; 2) It will save money; and 3) It is the law. The larger question is how to accomplish this. What kind of motivation and incentives are needed to move policy-makers and practitioners to make the necessary changes? Some lessons from the United States experience could be instructive in the Alberta context.

"Substance use, even at levels well below 'addiction,' can interfere with the diagnosis, management, costs, and outcomes of treating common, chronic illnesses such as diabetes, hypertension, asthma, and chronic pain. Basically you can't manage these illnesses without some attention to substance use. So a very important point is that the effort to integrate substance use disorders into the rest of healthcare is not just something that's right and important for the addiction field, it's a real gift to mainstream healthcare. It will improve the quality and reduce the costs of treating many other illnesses."

Thomas McLellan, PhD

A pyramid showing levels of substance use among adults is fundamental to this discussion. At the bottom is the number of U.S. adults who report no use or very moderate use. In the middle are the 40 million adults with substance use disorders short of addiction ("unhealthy use") but serious enough to affect health, particularly in the management of chronic illness, and significantly increase healthcare costs. Generally, there has been no prevention or early interventions directed at these "at risk" individuals. Care is typically targeted only at the top severity level – "addiction" – representing 23 million adults, and only about one-tenth of these people get any care at all.

Integrating care for substance use disorders into mainstream medicine will improve general medical care and save money. It will bring attention to the middle section of the pyramid where heavy drinking or use of other drugs produces drug x drug interactions, increased risk for breast cancer, prescription opioid overdose, and interference with commonly prescribed medications. In a primary care setting, roughly 20% of patients have significant substance use; in emergency rooms, the figure is 50 to 70%. A study of nine emergency rooms in Washington State compared patients who received a quick screening for alcohol and other substance use to patients who received the same screening plus a brief 5- to 10-minute intervention. A year later, the study showed that the use of screening and brief intervention (SBI) saved the state an average of $4,000 per patient during the following year.

Under the U.S. Affordable Care Act, the full spectrum of substance use disorder services will be covered. This includes prevention, brief intervention, medications, and specialty care. Coverage will be fully comparable to coverage for diabetes treatment. But there remains considerable resistance by doctors and insurance companies. It is always difficult to change individual or institutional behaviour. Evidence may change understanding, but behaviour is changed by incentives (negative and positive), laws and regulations, tools and protocols, and market forces (including supply, demand, and access).

Example 1: Many concerns had to be overcome to achieve integration of SBI into one healthcare system in eastern Pennsylvania. What about training? How do you ask someone about alcohol and drug use? Will questions upset the patients? In the case of a cancer centre in Philadelphia, training was built into the electronic health records so that it would be easy for staff members to do. The addition of SBI caused no intrusion to the workflow and there were no patient complaints. The cancer centre received a continuing quality improvement prize. The centre's head received praise and recommended that SBI be made part of the hospital's plan. SBI has been adopted and is being taught at all cancer centres in the northeast region of Pennsylvania, and the Continuing Quality Improvement Committee has added SBI as a performance measure.

Example 2: Providing consumer information on adolescent addiction treatment in Philadelphia. Copying the successful Consumer's Report methodology, researchers identified 64 quality features of addiction treatment for adolescents where at least two randomized control trials have shown that the availability of a particular feature leads to better outcomes. They assessed 17 treatment centres for these elements and found an average score of only 13 out of 64. Insurance companies were not interested in the results since they made money referring to the existing programs. The solution: researchers took the assessment tool to state directors and designed it for use by state licensing departments. They worked with unions, the employment office, and state directors to solve personnel, financial, and political change issues. No new dollars or staff were required. The revised system provided incentives for better programs by reducing the need to be relicensed every year.

Alberta will have a modern, fully integrated healthcare system when it has:

1. Sufficient demand for integration by general medicine, the major payer (Government of Alberta), and the public and/or employers.
2. Ability to integrate: protocols that fit into the system, meaningful credentials for providers, and money or incentives diverted from existing treatments that have not been proven effective.

ABSTRACT

Process and Improvement for Addiction: Making and Sustaining Change

By **David Gustafson**, PhD

Change is easy. Sustainability is hard. NIATx (originally known as the Network for Improvement of Addiction Treatment) is an easy-to-use model for process improvement designed specifically for behavioural healthcare settings. Its aims are simple: to improve access to and retention in treatment for people facing the challenges of addiction and mental illness. NIATx is also the story of the successful national dissemination of an innovation that is relevant at both the policy and individual organization levels. Since it was launched in 2003, about 3,500 organizations in the United States have adopted the NIATx approach to quality improvement. The success of the NIATx model provides valuable lessons that are applicable in the context of the Alberta Family Wellness Initiative (AFWI).

Lesson: Personally experience what your customers are going through. From the very start, NIATx embraced a fresh approach. It was headed by a change leader from outside the addiction field who started by getting himself admitted as a heroin addict in order to experience the detoxification and treatment process from the patient's perspective and to understand the barriers that existed to addiction treatment. Not only was the experience demoralizing, it revealed remarkable inefficiencies and quality challenges in the system. Even today, the personal walk-through is required of NIATx members.

Lesson: Keep it simple: stick to a few primary things. NIATx promotes system change and innovation with a focus on four simple aims:

1. Reduce time to treatment.
2. Reduce the numbers who leave treatment early.
3. Increase admissions to treatment.
4. Increase continuation of treatment.

NIATx principles are based on research into models of success in a wide variety of other fields. Among 80 factors critical to fostering change, 5 key factors were found to differentiate successful from unsuccessful organizations:

1. Deeply understand your customer.
2. Rather than try to get the CEO to buy in, buy into the CEO's agenda. What keeps the CEO awake at night? How does your program help the organization achieve its goals?
3. Use rapid-cycle testing: try small things to see how well they work before making a change. Test them in small studies, identify weaknesses, improve them, test again, and improve again. Pick changes small enough to accomplish the whole process within a month. For example, one organization facing a large number of no-shows, experimented with and twice revised a new idea for their existing appointment system before successfully adopting a method to eliminate appointments – all within three weeks.
4. Involve influential change leaders who have the respect of the CEO.
5. Reach outside your field to get ideas. Look at how other organizations in other industries do things better.

"If we think about what really goes on in addiction, it's really a behavioural problem that people are struggling with. There are a lot of fields that have worked on similar problems that we could learn from. The more we can learn from other fields, the more innovative we are and the better off we are because we don't need to rediscover some pretty big wheels that are out there."

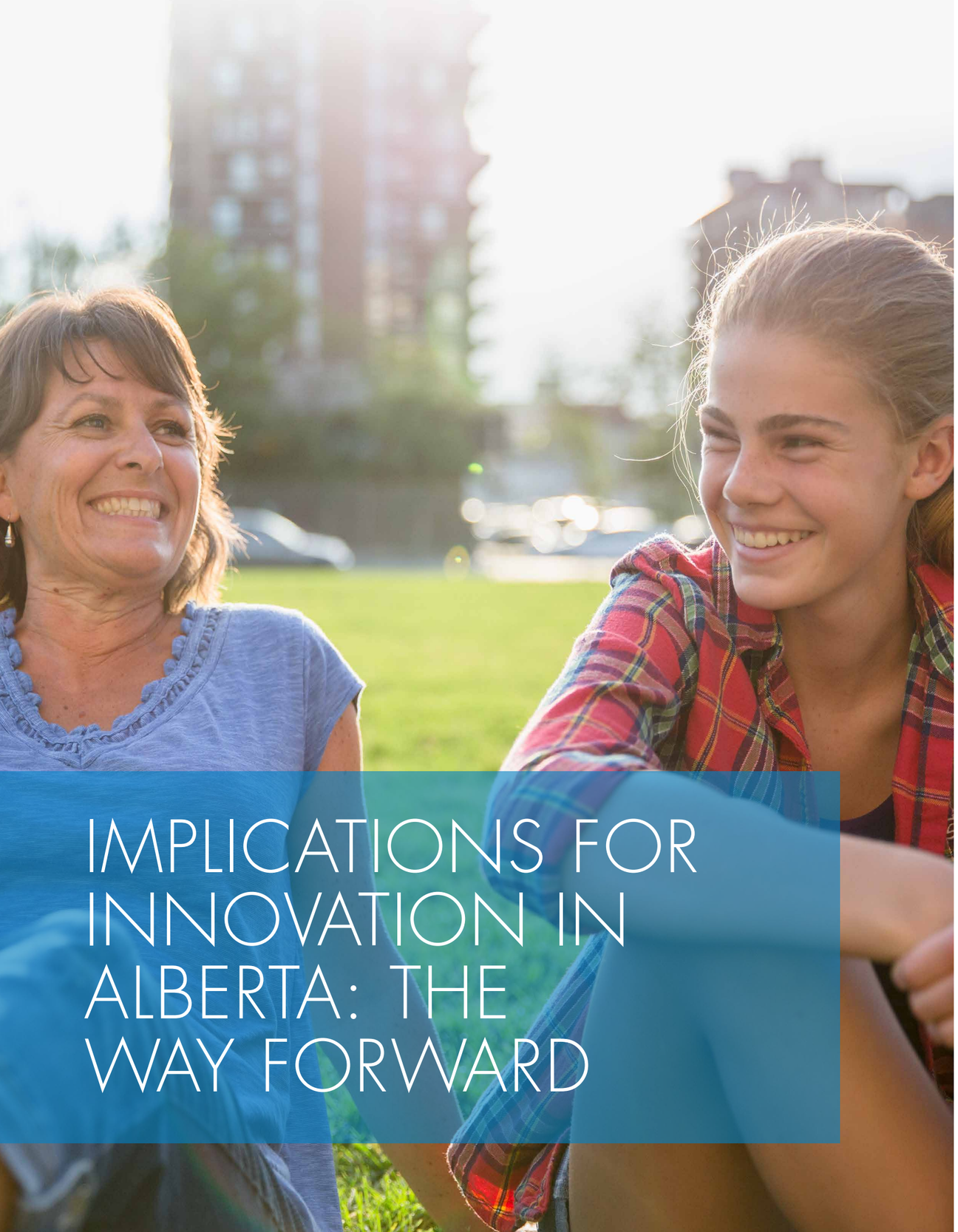
David Gustafson, PhD

Lesson: Cut data collection. Don't use existing databases unless they are perfectly suited to your study. Select only one or two items to measure, and collect only data that exactly measure what you want to know.

Lesson: Learn from your mistakes. Anything worth doing is worth doing wrong the first time. Test the idea early in its development and get reactions from people on how it can be changed or improved. When running ideas past people seek strengths and "suggested modifications" (not "weaknesses"). This approach suggests ways to improve.

A-CHESS: A NIATx addiction treatment system built around technology. Relapse is a central characteristic of addictive behaviours. A-CHESS (Addiction – Comprehensive Health Enhancement Support System) is a web portal for therapists and patients. It works as a mobile phone app and offers 17 different services, including social support, virtual counselling, outreach, games, relaxation tapes, GPS system, and others. A-CHESS asks how the patient is doing and feeling and provides reminders. It monitors patient status and predicts whether they will relapse within a week. In a trial, the combination of A-CHESS and medication led to a large drop in relapse and readmission. The Veterans Affairs administration in the United States will use A-CHESS on a national population of veterans with addictions.

NIATx/CHESS (Center for Health Enhancement Systems Studies) is located at the University of Wisconsin-Madison.



IMPLICATIONS FOR INNOVATION IN ALBERTA: THE WAY FORWARD

The Alberta Family Wellness Initiative's (AFWI) multi-year knowledge-mobilization strategy, beginning in 2010 with the Early Brain & Biological Development and the Recovery from Addiction symposia series, and culminating with the Accelerating Innovation symposia series, was an ambitious undertaking with the clear goal to bridge the gap between what we know in science and what we do in policy and practice in order to ultimately bring about change for the benefit of Alberta and its families.

This AFWI strategy has involved over 400 Alberta decision-makers and change leaders attending knowledge-packed Symposia on early childhood and brain development, the origins of addiction, and how to deliver quality treatment services. Between Symposia they worked alone and in teams across disciplines to bring their learnings to bear on improving outcomes for children and families in Alberta's health, human services, justice and education systems.

Successes came early and continuously expanded throughout the duration of the initiative. A sustaining momentum has been achieved. This final Symposium was not an end but the beginning of the next step forward as participants take the lead in their own spheres of influence with the continued support of the Palix Foundation. The implications of the learnings from the AFWI strategy point the way forward for innovation in Alberta.

Primary care has a key role to play

From prenatal and postnatal screening for children and families at risk to early detection of substance use issues and chronic disease management of addiction, primary care practitioners and Primary Care Networks (PCNs) have a key role to play in an effective addiction and mental health system in Alberta. PCNs could be leaders in two areas in particular:

Identification and treatment of children and families at risk

Primary care is the most likely place to find both parents and their pre-school age children. The simple use of the ACE (adverse childhood experiences) questionnaire with expecting and new parents in a primary care setting has been shown to have value in identifying families and children at risk that require early intervention. This helps the system to allocate scarce resources in a targeted way and to interrupt the intergenerational transmission of toxic stress, attachment issues, and addiction. A large-scale study involving ACEs in primary care is currently underway in Alberta. Early phases of the study examined the relationship between ACEs and adult health and healthcare utilization in Alberta and led to modification and validation of the ACEs measure. The next step for the ACEs-Alberta project includes the development and testing of a treatment program for adults with a history of ACEs. The ACEs-Alberta project is a collaboration among Alberta Health Services, several PCNs in the Calgary area, and the University of Calgary. Results of this study will have implications for primary care throughout Alberta.

Identification and chronic disease management for substance use

In the case of substance use, some jurisdictions in the United States have saved as much as $4,000 per patient by incorporating an SBIRT (screening, brief intervention, and referral to treatment) tool into routine physical examinations in primary care or emergency room settings. This involves a simple question about substance use asked during a physical examination, brief discussion of the possible negative impact of substance use on existing conditions such as diabetes or high blood pressure, and referral of more serious cases of substance use to treatment. The savings come at a level of use short of addiction, where substance use can be harmful and cause complications in common chronic conditions due to drug x drug interactions, increased risk for certain cancers, or interference with commonly prescribed medications. Patients whose substance use is at the level of addiction can be identified and referred to appropriate treatment. Once they have undergone treatment and have been stabilized, patients with addiction require routine monitoring in a primary care setting according to a chronic disease management model. While uptake of the SBIRT approach has been slow among primary care physicians in the U.S., possibly because of a lack of knowledge about the availability of treatment programs in their areas, there is reason to expect more adoption of this approach in Alberta due to the changes already taking place in the province as a result of the AFWI strategy. Knowledge about addiction is being incorporated into medical education in the form of e-learning resources on early brain and biological development, mental health, and addiction developed by the Association of Faculties of Medicine of Canada and the AFWI. Chronic disease management for addiction is identified as essential in Alberta's Addiction and Mental Health Strategy, and primary care is a key system within Alberta's Addiction and Mental Health Strategic Clinical Network. Current work on the development of an alcohol pathway will lead to expanding adoption of the chronic care model for addiction across Alberta.

Comprehensive care is essential in addiction treatment

As knowledge about the roots of addiction has increased over the past two or three decades, so too has the evidence that a comprehensive and targeted approach to addiction treatment produces the best results. Physician Health Programs (PHPs) provide a particularly successful model for a comprehensive, targeted approach. These programs use a chronic disease management model, close monitoring, contingency management, and inclusion of families in their treatment programs. Features of PHPs may be adapted to treatment programs available to the general population of persons with addiction.

Understanding the differences between the lives of boys and those of girls, especially with respect to their experience of violence and the threat of violence, has led to development of trauma-informed, gender-responsive treatment services that are relevant to women's experiences. Alberta has already incorporated some of these learnings into addiction treatment programs for women incarcerated in provincial institutions, but as our knowledge about the differences between the effects of drugs of abuse on men and women grows, so too may our incorporation of gender-responsive treatment practices. Because it is known that addiction is a multi-generational family issue, an addiction treatment program should attempt to involve the family system. The toxic stress caused by addiction affects the whole family and if the family system is not included in treatment, the cycle of addiction is likely to continue through generations.

Focus on supports for parents

Building adult competencies in parents and caregivers through coaching, mentoring, and practice is fundamental to the Frontiers of Innovation (FOI) theory of change. Programs that focus on enhancing parenting skills have shown significant positive results in improving outcomes for children at risk. A program called Filming Interactions to Nurture Development (FIND), for example, involves video-recording a parent interacting with his or her young child and capturing instances where the parent may be engaging in serve-and-return interaction. By making the parent aware of these positive actions, the program encourages the parent to recognize and seek out more opportunities to engage in developmentally positive serve-and-return activities with the child. This program is relatively inexpensive and has shown considerable success to date. It is evidence-informed and is currently being tested at a number of sites, including one in Alberta.

Work continues to advance in the emerging science of parenting. Imaging technology has made it possible to track developmental changes in the brains of new parents and to understand how attachment issues in the early years can impact parenting skills in adulthood. Infants of new parents who are addicted or severely depressed are at risk for neglect and abuse. Innovative programs that focus on parents' needs and on increasing parents' mindfulness are showing positive results in reducing substance use as well as increasing the quality of children's developmental context. Other programs designed to increase parents' social connectedness, such as outreach programs that engage parents where they tend to congregate in the community, are helping to reduce depression. Both types of programs reduce stress and increase responsiveness in parents. Some of these programs have been studied in the U.S. for several years and may be applicable in Alberta's context.

It takes a community

One of the key learnings of the AFWI strategy has been the importance of community supports, recognizing that early childhood development and recovery from addiction are a social responsibility. Children and families need a safe, stable, supportive community in which to thrive. This concept has led to innovative programs that pair community volunteers with children at risk to increase opportunities for the child to experience serve-and-return interaction with caring adults. Seniors are a particularly valuable community resource to target for this type of program: they have time and life experience, and are easy to reach through seniors' centres. Learnings from the AFWI strategy have informed Together We Raise Tomorrow: An Alberta Approach to Early Childhood Development. As this Alberta government initiative rolls out, there is evidence from feedback that Albertans at the community level are prepared to play a responsible role in providing a context in which all children and families thrive.

Continued evolution and dissemination of the core story

The core story of child development and its implications for mental health and addiction has been central to the AFWI strategy from the beginning. The story, which translates the science into an easy-to-understand narrative that cuts across professional disciplines, has continued to evolve and expand to explain what science knows about early brain and biological development, mental health, and addiction. It also incorporates concepts related not only to causes but to prevention, intervention, and treatment. The language and metaphors of the narrative are increasingly common among policy-makers, researchers, and practitioners and are now being disseminated to the general public. A scientifically enlightened public will be receptive toward and demand appropriate changes to health, human services, justice and education systems to ensure that programs are evidence-based. Work still needs to be done in this area to adapt the core story to the particular contexts of groups such as newcomers, Indigenous people, seniors, and youth.

Focus on continuous research

The iterative research-theory-practice process is essential to moving innovation forward. Practice is not a destination but a part of a continuous loop, providing research data that informs theory and practice going forward. This means practitioners at the front lines need to be part of the research team. This focus on research is essential to the Frontiers of Innovation (FOI) approach, which sees innovation as a continuous process. FOI uses short-cycle feedback, learning from failure, and rapid change and adaptation before taking proven effective strategies to scale. Alberta is one of the early innovating jurisdictions in the FOI community. What has been accomplished here has been cited as a model for others. Most important, it has laid the groundwork for innovation that will make a difference for future generations of Albertans.

Appendix 1

Symposium People: Development and Management

Planning Committee

Members of the Planning Committee helped to develop the strategy and design of the Accelerating Innovation: Telling the Brain Story to Inspire Action 2014 Symposium. They included:

Nancy Reynolds, DOT, BScOT, Chair, President, Sterling Lifestyle Solutions

Laurie Anne Bulmer, Events Coordinator, Palix Foundation

Marisa Etmanski, Director, Edmonton Office, Palix Foundation

Karen Ferguson, Assistant Deputy Minister, Human Services, Government of Alberta

Michelle Gagnon, MBA, PhD, Vice President, Palix Foundation

Glenda MacQueen, MD, PhD, FRCPC, Professor, Psychiatry and Vice Dean, Faculty of Medicine, University of Calgary

Nancy Mannix, JD, Chair and Patron, Palix Foundation

Tom McLellan, PhD, Chief Executive Officer, Treatment Research Institute

Gillian Najarian, PBA, EdM, Managing Director, Center on the Developing Child, Harvard University

Cathy Pryce, RN, MN, Senior Provincial Director, Addiction and Mental Health and Emergency Strategic Clinical Networks, Alberta Health Services

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Nicole Sherren, PhD, Scientific Director and Program Officer, Palix Foundation

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Ralph Strother, MD, CCFP, FCFP, Chief Investment Officer, Max Bell Foundation

Paula Tyler, President, Palix Foundation

Silvia Vajushi, BSW, MSW, RSW, Executive Director, Community Partnership, Human Services, Government of Alberta

Credit for their invaluable input and advice in developing this Symposium also goes to:

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Paul Bomke, German Learning Group
Terry Bullick, Alberta Health Services
Janet Chafe, Alberta Health Services
Dawne Clark, Mount Royal University
Ruth Collins-Nakai, The Muttart Foundation
Shannon Doram, YMCA Calgary
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Carol Gray, TallTrees Leadership
Carole Anne Hapchyn, CASA
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Margaret King, Glenarchy Consulting
Nicole Letourneau, University of Calgary
Lisa Luciano, Top of the World Ranch Treatment Centre
Brian Malloy, Alberta Health Services
Joan McGregor, Consultant
Beryl McNeill, McNeill Family Law
Leslie Ross, Children First: Child Care Network Society
Brent Scott, ACH Research Institute for Child and Maternal Health
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Parminder Thiara, First Nations and Inuit Health Branch, Health Canada
Sarah Todd, Calgary Immigrant Women's Association
Suzanne Tough, University of Calgary
Arlene Weidner, Arlene Weidner Consulting Ltd.
Judy Wry, BUKSA Strategic Conference Services

Appendix 2

Symposium People: Presenters and Faculty

Robert Anda, MD, MS
ACE Interface, LLC

Co-principal Investigator, Adverse Childhood Experiences (ACE) Study; Senior Scientific Consultant, with Carter Consulting, to the Centers for Disease Control. He played the principal role in the design of the ACE Study, which is now being replicated in numerous countries by the World Health Organization and is being used to assess the childhood origins of health and social problems in more than 21 U.S. states. Dr. Anda has conducted research in areas including disease surveillance, behavioural health, mental health and disease, cardiovascular disease, and childhood determinants of health. He now works as Co-founder of ACE Interface to deliver training materials at the state and community levels about neurobiology, ACEs, resilience, and community capacity development.

Melanie Berry, PhD
University of Oregon and Oregon Social Learning Center

Postdoctoral Research Associate with the University of Oregon and Oregon Social Learning Center. She has extensive experience working with at-risk children and families. She worked as an individual and family therapist in the San Francisco Bay area with multi-stressed children and their caregivers, many of whom were involved in the child welfare system. Currently Dr. Berry is a Postdoctoral Research Associate with Dr. Phil Fisher's Stress Neurobiology and Prevention Research Lab, where she studies the impact of early adversity on the developing brain and the development of targeted interventions to improve outcomes for high-risk children.

Claudia Black, MSW, PhD
The Meadows Treatment Center

Senior Fellow and Addiction and Trauma Program Specialist, The Meadows Treatment Center. She is an addiction and codependency expert, author, and trainer recognized internationally for her work with family systems and addictive disorders. She has offered models of intervention and treatment related to family violence, multi-addictions, relapse, anger, depression, sex addiction, and women's issues. Dr. Black designs and presents training workshops and seminars to professional audiences in the fields of family service, mental health, addiction, and correctional services. She serves as Senior Clinical and Family Services Provider for the Las Vegas Recovery Center.

Rahil Briggs, PsyD
Albert Einstein College of Medicine and Montefiore Medical Group

Associate Professor of Pediatrics, Albert Einstein College of Medicine; Director, Healthy Steps, and Director, Pediatric Behavioral Health Services, Montefiore Medical Group. She founded Healthy Steps at Montefiore in 2005 and has since expanded the program to multiple sites within the Montefiore Medical Group. Dr. Briggs' work concentrates on co-location of mental health specialists within primary care pediatrics, with a focus on prevention, early childhood mental health and development, and parent-child relationships.

Judy Cameron, PhD
University of Pittsburgh

Professor of Psychiatry and Director of Science Outreach, University of Pittsburgh. Over the past decade she has been a member of the MacArthur Foundation Research Network on Early Experience and Brain Development and is currently a member of the National Scientific Council on the Developing Child. Areas of interest in her laboratory include the effects of genetic factors and early life experiences on behavioural development and identification of factors that lead to stress sensitivity versus stress resilience. Dr. Cameron is a member of the Dana Alliance for Brain Initiatives, a non-profit organization of neuroscientists committed to advancing public awareness of brain research in an accessible fashion.

Patrick Carnes, PhD
Founder, International Institute for Trauma and Addiction Professionals (IITAP); Executive Director, Gentle Path Program, The Meadows Treatment Center

An internationally known authority and speaker on addiction and recovery issues, he has authored more than 20 books, including *Out of the Shadows* and *Don't Call It Love*. His research provides the architecture for the task model of treating addiction that is used by thousands of therapists worldwide. Dr. Carnes has helped to develop assessments critical to the diagnosis and treatment of sex addiction, such as the Sexual Addiction Screening Test (SAST) and the Sexual Dependency Inventory (SDI). IITAP provides CSAT® (Certified Sex Addiction Therapist) training and certification.

Stephanie Covington, PhD, LCSW
Institute for Relational Development and the Center for Gender and Justice

Co-director of the Institute for Relational Development and the Center for Gender and Justice. She has developed an innovative, gender-responsive, and trauma-informed approach to the treatment of women and girls that results in effective services in public, private, and institutional settings. Dr. Covington is the co-author of a three-year research project, *Gender-Responsive Strategies: Research, Practice, and Guiding Principles for Women Offenders*, for the National Institute of Corrections. This publication has been acknowledged for its outstanding contribution to the field of corrections in the U.S. and Canada. She is a former Chair of the Women's Committee of the International Council on Alcoholism and Addiction.

David Gustafson, PhD
University of Wisconsin-Madison

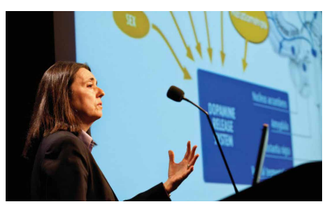
Founder and Director, Center for Health Enhancement Systems Studies, and Research Professor of Industrial and Systems Engineering, University of Wisconsin-Madison. The Center includes the national program office of the Network for the Improvement of Addiction Treatment (NIATx) and the Center of Excellence on Active Aging Research. Dr. Gustafson's research interests focus on developing systems engineering tools to support sustainable individual and organizational improvement. His individual change research involves developing and testing computer systems to help people deal with issues that affect quality of life, including addiction, cancer, asthma, and aging.

Michael Kaufmann, MD
Ontario Medical Association

Founding Director, Physician Health Program, Ontario Medical Association. Dr. Kaufman writes, teaches, and lectures widely on the subject of physician health, vulnerability, distress, and impairment. He speaks to audiences at medical schools, community hospitals, and conferences. He is the Chair of the Physician Health Committee of the Canadian Society of Addiction Medicine and is Chair of the Canadian Physician Health Network, a national affiliation of physician support programs and committees.

Nat Kendall-Taylor, PhD
FrameWorks Institute

Vice President of Research and Project Director, FrameWorks Institute. He employs social science theory and research methods from anthropology to improve the ability of public policy to positively influence health and social issues. This involves studying how cognitive theory can be applied in understanding how people interpret information and make meaning of their social worlds. His past research has focused on child and family health and on understanding the social and cultural factors that create health disparities and affect decision-making. He has conducted field work in Kenya, Azerbaijan, and Kazakhstan and has conducted ethnographic research on motivation in extreme athletes.



Linda Mayes, MD
Yale School of Medicine

Arnold Gesell Professor of Child Psychiatry, Pediatrics and Psychology at the Yale Child Study Center, Yale School of Medicine. At Yale she established a laboratory for studying infant learning and attention and a neurophysiology laboratory for studies of the startle response and related indices of emotional regulation in children and adolescents. She currently oversees the Developmental Electrophysiology Laboratory, which includes dense array electroencephalography as a method for studying brain activity in real time.

Thomas McLellan, PhD, Presenter and Moderator
Treatment Research Institute (TRI)

Chief Executive Officer, Chairman of the Board, and Co-founder of TRI and experienced substance abuse researcher. In 2009-2010, he was Science Advisor and Deputy Director of the White House Office of National Drug Control Policy, a congressionally confirmed presidential appointment to help shape the nation's public policy approach to illicit drug use. In this role, he worked on a number of issues including formulation and implementation of the President's National Drug Control Strategy and promotion of drug treatment through the broader revamping of the national healthcare system. In 1992, he co-founded TRI to transform the way research is employed in the treatment of and policy-making around substance use and abuse.

Paula Tyler, Moderator
Palix Foundation

Past President, Palix Foundation. She has had a long and distinguished career in human services, most recently as Vice President – Child and Women's Health and Specialized Clinical Services for the Calgary Health Region. She served as Vice President and CEO – Mental Health at Capital Health in Edmonton, Chief Executive – Child Youth and Family Services for the Government of New Zealand, and Deputy Minister for Alberta Children's Services. She has held several other senior executive positions with the Alberta Government, including Deputy Commissioner for Children's Services and Assistant Deputy Minister for Alberta Family and Social Services.

Workshop Presenters

Andrea Allen, BScN, Manager, Addiction and Mental Health Strategic Clinical Network, Alberta Health Services

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Joelle Cook, BSc, MPA, Associate Director, FSG Social Impact Advisors

Michelle Craig, MSLP, Director, Addiction Assurance and Strategies, Health, Government of Alberta

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Ken Dropko, Executive Director, Community Partnerships, Human Services, Government of Alberta

Sheryl Fricke, MBA, Executive Director, Early Childhood Development Priority Initiative, Human Services, Government of Alberta

Carole Anne Hapchyn, MD, FRCPC, Infant Psychiatrist, CASA Child, Adolescent and Family Mental Health; Medical Director, Autism Clinic, Glenrose Rehabilitation Hospital; Clinical Professor, Psychiatry and Pediatrics, University of Alberta

Lisa Luciano, PhD, Clinical Supervisor, Top of the World Ranch Treatment Centre

Judith Mason, MSW, RSW, Area Manager, Addiction and Mental Health, Alberta Health Services

Francesco Mosaico, MD, Family Physician, Inner-city Medicine/Addiction Medicine, Boyle McCauley Health Centre

Dennis Pusch, MSc, PhD, Co-Principal Investigator, ACEs-Alberta Research Project

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Margaret King, President, Glenarchy Consulting

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Appendix 3

Symposium People: Participants by Innovation Team

Innovation Team 1

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Robin Elson, Program Director, Children First: Community Child Care Network Society

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Leslie Ross, Executive Director, Children First: Community Child Care Network Society

Lynette Smith, BScN, RN, Clinical Operations Lead/ Registered Nurse, Wood Buffalo Primary Care Network

Innovation Team 2

Justin Boodhoo, BSW, Addiction Prevention and Mental Health Promotion Facilitator, Addiction and Mental Health, Alberta Health Services

Tami Buroker, BA, Child Life Specialist, Alberta Health Services

Ruth Collins-Nakai, MD, MBA, FRCPC, Past President, The Muttart Foundation – AFWI Mentor

Brett Drewry, MEd, Director, Barons-Eureka-Warner Family and Community Support Services

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Joe Reid, Family Services Coordinator, Cold Lake and District FCSS

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Monique Maisonneuve, Member, Provincial Advisory Council on Addiction and Mental Health

Judi Malone, MA, PhD, Psychologist and Director, Psychologists Association of Alberta

Beverly Moylan, RSW, Aboriginal and French Public Health Manager, North Zone, Alberta Health Services

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Appendix 4

Additional Resources: Knowledge-Transfer Reports, Policy Documents, Research Papers, Organizations, Websites

Each of the resources featured below is available online at no cost. Note that this is not an exhaustive list.

A Parent's Guide to the Teen Brain. A multi-media website for parents that presents research-based information on neurodevelopmental aspects of addiction risk for adolescents. This site was created by The Partnership at Drugfree.org, the Treatment Research Institute, and the WGBH Educational Foundation.
http://teenbrain.drugfree.org/

A Science-Based Framework for Early Childhood Policy: Using Evidence to Improve Outcomes in Learning, Behavior, and Health for Vulnerable Children. 2007. Boston, MA: Center on the Developing Child at Harvard University.
http://developingchild.harvard.edu/index.php/resources/reports_and_working_papers/policy_framework

Adverse Childhood Experiences (ACE) Study. One of the largest investigations ever conducted to assess associations between childhood maltreatment and later-life health and well-being. Centers for Disease Control and Prevention, Government of the United States.
http://www.cdc.gov/ace/index.htm

Alberta Family Wellness Initiative (AFWI). A multi-disciplinary initiative that connects child development, mental health and addiction. This site is a portal for accessing a wide range of resources geared specifically to researchers, healthcare professionals, front-line professionals, policy-makers, and the general public. These include document and video libraries, learning modules, event listings, and information updates via email.
http://www.albertafamilywellness.org/

The resources on the AFWI site are designed to help share information with professional and public audiences. Among the many resources available are:

SHARING THE BRAIN STORY. AFWI's Knowledge-Mobilization Strategy: Transforming Research, Policy, and Practice in Alberta. (2013). A summary of the first three years of the Alberta Family Wellness Initiative's (AFWI) multi-pronged strategy to connect policy-makers, professionals, and the public with the best science on brain development, child development, mental health, and addiction. Calgary, AB, Canada: Palix Foundation.
http://www.albertafamilywellness.org/resources/search

Accelerating Innovation: Telling the Brain Story to Inspire Action. Summary Report. Volume 1. (2014). Calgary, AB, Canada: Palix Foundation.
http://www.albertafamilywellness.org/resources/search

Early Brain & Biological Development: A Science in Society Symposium. Summary Report, Volume 1. (2010). Calgary, AB, Canada: Palix Foundation.

Early Brain & Biological Development: A Science in Society Symposium. Summary Report, Volume 3. (2011). Calgary, AB, Canada: Palix Foundation.

Early Brain & Biological Development: A Science in Society Symposium. Summary Report, Volume 5. (2013). Calgary, AB, Canada: Palix Foundation.
http://www.albertafamilywellness.org/resources/search

Recovery from Addiction: A Science in Action Symposium. Summary Report. Volume 2. (2011). Calgary, AB, Canada: Palix Foundation.

Recovery from Addiction: A Science in Action Symposium. Summary Report. Volume 4. (2012) Calgary, AB, Canada: Palix Foundation.

Recovery from Addiction: A Science in Action Symposium. Summary Report. Volume 6. (2013). Calgary, AB, Canada: Palix Foundation.
http://www.albertafamilywellness.org/resources/search

Building Better Brains translates "core story" metaphors developed by the FrameWorks Institute into print, video, and other presentation materials that Symposium members and AFWI supporters can share in their communities.
http://www.albertafamilywellness.org/building-better-brains

The AFWI Life Coach Series targets a young male audience and aims to shift popular understanding of addiction away from myths towards an evidence-based concept of disease and recovery.
http://www.addictionbrainstory.org/

The AFWI Seniors' Commercial is a 30-second commercial designed to make seniors aware that they can positively influence the lifelong health of a child by supporting healthy early brain development.
http://www.brainstory.org/#modal-banner-video

Alberta Health Services (AHS) – Addiction & Substance Abuse. Website featuring a large collection of resources and other information about addiction and substance abuse, including services provided by AHS.
http://www.albertahealthservices.ca/amh.asp

Alberta Medical Association – Physician & Family Support Program. Association-sponsored program that serves Alberta physicians, residents, medical students, and their immediate families experiencing difficulties with substance abuse and addiction, psychiatric and mental health concerns, and a variety of other heath and work/life issues.
https://www.albertadoctors.org/services/physicians/pfsp

Brain Hero. Based loosely on such games as Guitar Hero, SimCity, and The Game of Life, this three-minute video depicts how actions by a range of people in the family and community can affect a child's development.
http://developingchild.harvard.edu/resources/multimedia/videos/brain_hero/

While at this site, also check out:
Three Core Concepts in Early Development (Video Series)
In Brief: The Foundations of Lifelong Health
In Brief: Executive Function: Skills for Life and Learning

Calgary and Area Addiction Services Guide. Online inventory of major addiction-related services in the Calgary area.
http://www.calgaryaddiction.com/

Canadian Centre on Substance Abuse. Organization with a legislated mandate to provide national leadership and evidence-informed analyses and advice to mobilize collaborative efforts to reduce alcohol- and other drug-related harms.
http://www.ccsa.ca/Pages/default.aspx

Canadian Institutes of Health Research (CIHR) – Institute of Neurosciences, Mental Health and Addiction (INMHA). A unique institute designed to address all aspects of research dealing with brain-mind relationships. INMHA is a government organization that supports research on the functioning and disorders of the brain, the spinal cord, the sensory and motor systems, and the mind through prevention strategies, screening, diagnosis, treatment, support systems, and palliation.
http://www.cihr-irsc.gc.ca/e/8602.html

Child Maltreatment Report (2013). U.S. Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau. Rockville, MD: Author.
http://www.acf.hhs.gov/programs/cb/stats_research/index.htm#can

Creating Connections: Alberta's Addiction and Mental Health Strategy. (2011). Government of Alberta.
http://www.health.alberta.ca/documents/Creating-Connections-2011-Strategy.pdf

Depression in Parents, Parenting, and Children: Opportunities to Improve Identification, Treatment, and Prevention. (2009). National Research Council and Institute of Medicine. England, MJ. & Sims, LJ (Eds.). Washington, DC: The National Academies Press. (Can read the entire book online at no cost.)
http://www.nap.edu/catalog.php?record_id=12565

From Neurons to Neighborhoods: The Science of Early Childhood Development. (2000). Shonkoff JP, Phillips, DA (Eds.). Washington, DC: The National Academies Press.
http://www.nap.edu/openbook.php?isbn=0309069882

Frontiers of Innovation (FOI). In collaboration with a broad network of people and organizations across North America, FOI works to drive the design of intervention strategies grounded in scientific research that produce breakthrough outcomes for children facing adversity.
http://developingchild.harvard.edu/index.php/activities/frontiers_of_innovation/

Hazelden Betty Ford Foundation. A merger of the Hazelden Foundation and the Betty Ford Center, this foundation is the largest non-profit treatment provider in the United States. With 16 sites in California, Minnesota, Oregon, Illinois, New York, Florida, Massachusetts, Colorado, and Texas, the Foundation offers recovery solutions across the entire continuum of care for youth and adults and includes a recovery publishing house, an accredited graduate school of addiction studies, an addiction research centre, an education arm for medical professionals, and a unique children's program.
http://www.hazeldenbettyford.org/

Healthy Development: A Summit on Young Children's Mental Health. (2009). Partnering with communication scientists, collaborating across disciplines, and leveraging impact to promote children's mental health. Washington, DC: Society for Research in Child Development.
http://www.apa.org/pi/families/summit-report.pdf

International Institute for Trauma and Addiction Professionals. Organization that provides clinical training for professionals in trauma and addiction and manages the Sex Addiction Therapist (CSAT®) Certification Program. Also has a directory of CSAT®-certified therapists.
http://www.IITAP.com

KnowMo. A knowledge-mobilization website designed as a hub for addiction and mental health information in Alberta.
http://www.knowmo.ca

Let's Talk About the Early Years: Report by the Chief Medical Officer of Health. (2011). Alberta Health and Wellness, Government of Alberta.
http://www.health.alberta.ca/about/OCMOH-reports.html

National Institute of Drug Abuse (NIDA). NIDA's mission is to apply science to drug abuse and addiction problems by supporting research across a broad range of disciplines and encouraging the dissemination and use of research to improve prevention, treatment, and policy.
http://www.drugabuse.gov/

Network for the Improvement of Addiction Treatment (NIATx). A learning collaborative at the University of Wisconsin-Madison's Center for Health Enhancement Systems Studies. The Center supports payers and providers of addiction services through the application of process-improvement techniques to improve the cost and effectiveness of the care-delivery system.
http://www.niatx.net/

New Directions in Child Abuse and Neglect Research. (2014). In 1993, the National Research Council (NRC) issued a report, *Understanding Child Abuse and Neglect*, which provided an overview of the research on child abuse and neglect. *New Directions in Child Abuse and Neglect Research* updates the 1993 report and provides new recommendations to respond to this public health challenge. *Petersen A, Joseph J, Feit M* (Eds). Washington, DC: The National Academies Press. (Can read the entire book online at no cost.)
http://www.nap.edu/catalog.php?record_id=18331

Preventing Child Maltreatment: A Guide to Taking Action and Generating Evidence. (2006). World Health Organization and International Society for the Prevention of Child Abuse and Neglect. Butchart A, Harvey AP, Mian M, Furniss T. Geneva: WHO.
http://whqlibdoc.who.int/publications/2006/9241594365_eng.pdf

Preventing Child Maltreatment: Program Activities Guide. Outlines activities that are key to the Centers for Disease Control and Prevention's prevention work: monitoring and researching the problem, developing and evaluating prevention strategies, supporting and enhancing prevention programs, and encouraging research and development. Centers for Disease Control and Prevention. Atlanta, GA: Author.
http://www.cdc.gov/violenceprevention/pub/preventingcm.html

Preventing Mental, Emotional, and Behavioral Disorders Among Young People: Progress and Possibilities. (2009). A consensus report from the Committee on the Prevention of Mental Disorders and Substance Abuse Among Children, Youth and Young Adults. National Research Council and Institute of Medicine. Washington, DC: The National Academies Press.
http://www.iom.edu/Reports/2009/Preventing-Mental-Emotional-and-Behavioral-Disorders-Among-Young-People-Progress-and-Possibilities.aspx

Society for the Advancement of Sexual Health. Professional organization for the field of sexual addiction treatment. This website offers information and resources to those seeking support for sexual addiction.
http://www.sash.net

Strengthening Benefit-Cost Analysis of Early Childhood Interventions: Workshop Summary. (2009). National Research Council and Institute of Medicine. Beatty, A.; Committee on Strengthening Benefit-Cost Methodology for the Evaluation of Early Childhood. Washington, DC: The National Academies Press.
http://www.nap.edu/catalog/12777.html

Substance Abuse and Mental Health Services Administration. Large U.S. federal government-sponsored organization focusing on prevention, treatment, and recovery issues for substance abuse and mental health problems.
http://www.samhsa.gov/

Talking About Child Development and Children's Mental Health in Alberta. (2011). A toolkit that can help engage the public in understanding child development and child mental health, thereby improving the public conversation and decision-making. Washington, DC: Developed by the FrameWorks Institute for the Alberta Family Wellness Initiative (AFWI), supported by the Palix Foundation.
www.frameworksinstitute.org/toolkits/alberta/

The Foundations of Lifelong Health Are Built in Early Childhood. (2010). Boston, MA: Center on the Developing Child at Harvard University.
http://developingchild.harvard.edu/library/reports_and_working_papers/foundationsof-lifelong-health/

Transformative Neurodevelopment Research in Mental Illness: Report of the National Advisory Mental Health Council's Workgroup. (2008). Bethesda, MD: National Institute of Mental Health.
http://www.nimh.nih.gov/about/advisory-boards-and-groups/namhc/neurodevelopment_workgroup_report_33553.pdf

Treatment Research Institute. A non-profit research and development organization located in Philadelphia, PA, dedicated to science-driven reform of treatment and policy in substance abuse.
http://www.tresearch.org/

Unclaimed Children Revisited: The Status of Children's Mental Health Policy in the United States. (2008). Cooper JL, Aratani Y, Knitzer J, Douglas-Hall A, Masi R, Banghart P, Dababnah S. New York: National Center for Children in Poverty.
http://nccp.org/publications/pdf/text_853.pdf

Why Your DNA Isn't Your Destiny. Cloud J. (2010, Jan. 6). Time magazine.
http://www.time.com/time/health/article/0,8599,1951968,00.html

National Scientific Council on the Developing Child Working Papers

Available from: http://developingchild.harvard.edu/resources/reports_and_working_papers/

Working Paper 1. Young Children Develop in an Environment of Relationships. 2004.

Working Paper 2. Children's Emotional Development is Built into the Architecture of Their Brains. 2004.

Working Paper 3. Excessive Stress Disrupts the Architecture of the Developing Brain. 2005.

Working Paper 4. Early Exposure to Toxic Substances Damages Brain Architecture. 2006.

Working Paper 5. The Timing and Quality of Early Experiences Combine to Shape Brain Architecture. 2007.

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Appendix 5

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Glossary

Addiction – Addiction is a primary, chronic disease of brain reward, motivation, memory, and related circuitry. Dysfunction in these circuits leads to characteristic biological, psychological, social, and spiritual manifestations. This is reflected in an individual pathologically pursuing reward and/or relief by substance use and other behaviours. Addiction is characterized by inability to consistently abstain, impairment in behavioural control, craving, diminished recognition of significant problems with one's behaviours and interpersonal relationships, and a dysfunctional emotional response. Like other chronic diseases, addiction often involves cycles of relapse and remission. Without treatment or engagement in recovery activities, addiction is progressive and can result in disability or premature death. *The American Society of Addiction Medicine*

Amygdala – Part of the brain that performs a primary function in the processing of memory, fear, and emotional reactions.

Anxiety – Anxiety is a multi-system response to a perceived threat or danger. It reflects a combination of biochemical changes in the body, the patient's personal history and memory, and the social situation. Free-floating anxiety – anxiety that lacks a definite focus or content – frequently occurs as a symptom in other categories of psychiatric disturbance, such as depression.

Attachment Theory – The most important tenet of attachment theory is that an infant needs to develop a positive relationship with at least one primary caregiver for the child's successful social and emotional development. Attachment research has led to important findings concerning early child development and influenced the creation of programs to support early child-parent/caregiver relationships.

Brain Architecture – The basic architecture or physical structure of the human brain is constructed through an ongoing process that begins before birth and continues into adulthood. Like the construction of a home, the building process begins with laying the foundation, framing the rooms, and wiring the electrical system in a predictable sequence. Early experiences literally shape how the brain gets built; a strong foundation in the early years increases the probability of positive outcomes. A weak foundation increases the odds of later difficulties.

Brain Faultlines – A metaphor used to describe scientific knowledge about how addiction occurs. Faultlines can appear as the brain develops, often due to toxic stress, or people may have been born with brain faultlines. Just as faultlines can set off earthquakes, faultlines in the brain can affect brain architecture.

Brain Plasticity – Capacity of the brain to change structure, function, or organization of neurons in response to experience. This ability persists throughout the lifetime, but specific types of plasticity are age dependent.

Chronic Disease Management Model – A healthcare delivery model currently used to manage chronic diseases such as diabetes and hypertension and gaining favour for treating addiction. The goal is to keep patients healthier and disease-free for as long as possible through screening and early detection, multi-disciplinary and holistic care teams, patient education and self-care, and ongoing case management.

Core Story – A knowledge-translation technique from the FrameWorks Institute. A core story defines a topic in a consistent way, prioritizes the scientific knowledge, identifies the key points, and removes unnecessary detail.

A good core story unifies the many messages from the scientific community into a single storyline with several basic themes. This simpler model can be used to create a link between scientific findings and policy.

Depression – A psychiatric condition involving a primary disturbance of mood that affects a person's thoughts, feelings, behaviours, and physical functioning. Symptoms include feelings of sadness, hopelessness, worthlessness, anxiety, guilt, irritability, fatigue, and pain that persist for a significant period of time.

Epigenetics – The study of heritable changes in gene expression due to mechanisms other than changes in the underlying DNA sequence. A gene is basically like any other molecule in the cell and thus is subject to physical modifications. Collectively, these modifications can be considered as an additional layer of information that is contained within the genome and are referred to as the epigenome (from the Greek "epi" meaning "over" and genome).

Executive Function – A set of cognitive abilities that control and regulate other abilities and behaviours. Executive functions include planning and decision-making, abstract thinking, rule acquisition, and cognitive flexibility.

Positive Stress – Positive stress is moderate and short-lived, and is an important and necessary contributor to healthy brain development. It can help motivate individuals to accomplish tasks and achieve goals.

Process Addiction – An addiction to a particular behaviour rather than to a foreign chemical. Process addiction can occur in behaviours such as gambling, sexual activity, pornography, eating, shopping, work, and using the Internet.

Serve and Return – The metaphor of a game of tennis used in the core story of brain development to describe the positive interaction between a child and caregiver required for healthy development. The interactive influences of genes and experience shape the developing brain. Like the process of serve and return in a game of tennis, young children naturally reach out for interaction. When adults respond by mirroring back those interactive gestures in a consistent way, the child's learning process is complete.

Stress-Response System – A fight-or-flight function of the autonomic nervous system that initiates, within seconds of a perceived threat, an integrated repertoire of biobehavioural changes associated with accelerations of heart and respiratory rates, sweat production, and other physiological changes.

Tolerable Stress – Tolerable stress is a severe form of stress, but it occurs in the context of supportive relationships that help buffer its effects and facilitate adaptive coping. Tolerable stress does not produce long-lasting damage to the body.

Toxic Stress – Intense, long-lasting, or uncontrollable stress occurring in the absence of supportive relationships to buffer its effects. In children, toxic stress can occur as a result of unpredictable home environments, abuse, or being cared for by a parent with an addiction or significant mental health issue like anxiety and/or depression. Toxic stress in the early years of life damages the developing brain and can lead to lifelong problems in learning and behaviour, and increased risk for physical and mental health issues including addiction.

Trauma-Informed Approach – A model for services that are provided for problems other than trauma but require knowledge about the impact of trauma, thereby increasing their effectiveness. This model takes the experience of trauma into account and avoids triggering trauma reactions and/or traumatizing the individual. The behaviour of staff and organizations is adjusted to support the individual's coping capacity so that he or she is able to access, retain, and benefit from the services.

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