YOUR IMPACT

The DIFD Mach-Gaensslen Chair in Suicide Prevention Research

Winter 2023/2024

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Royal

Mental Health - Care & Research
Santé mentale - Soins et recherche

DIFD

Reflecting on your extraordinary impact

On behalf of all of us at The Royal, thank you for your tremendous support of cutting-edge progress in mental health research, care, advocacy, and education for young people. The entire community of DIFD supporters has continuously demonstrated compassion and deep care for young people navigating their mental health journey, and we could not be more grateful.

As one of Canada's foremost mental health care and research institutions, The Royal is driven by a dedication to transformational research, breakthrough diagnostics and treatments, and equitable access to effective care. The support of our donor community, coupled with the expertise and commitment of people like Dr. Zachary Kaminsky and his team, makes this all possible.

As the DIFD Mach-Gaensslen Chair in Suicide Prevention Research, Dr. Kaminsky has made remarkable strides in his research by bringing together two streams of expertise — one involving biological markers, the other using artificial intelligence — to overcome challenges our system faces in supporting people impacted by suicide.

The following report provides a glimpse into Dr. Kaminsky's research priorities and significant contributions to advancing suicide prevention here in Ottawa, and across our continent over the past five years.

Thank you once again for what you have made possible.

The Youth-Nominated Support Team

In a collaboration between The Royal, Suicide Prevention Ottawa, Pleo, and members with lived expertise, the Youth-Nominated Support Team aims to improve outcomes for young people who have recently reported a suicide attempt or have serious thoughts about suicide.

The pilot suicide prevention program addresses elevated risk for suicide post-discharge by guiding youth to identify a group of adults in their lives to support them following their hospital stay. Members of the supporting team may include adult family members, teachers, coaches, neighbours and religious or community leaders. Appointed adults undergo brief psychoeducational training, followed by weekly contact with the youth. The adults also receive support from a mental health professional for 12 weeks.

The rollout of the Youth-Nominated Support Team has been shown to reduce six-week suicidality and decrease long-term mortality amongst the participating youth. The group has helped 15 young people through the intervention to date.

What's next?

The Youth-Nominated Support Team continues to accept patients through the program. Meanwhile, Pleo is leading an evaluation of the program's participants, and the data is showing optimistic results complemented by supportive remarks from the adult supporters. Pleo will continue to evaluate the effectiveness of the program to inform improvements and to share results.

Dr. Kaminsky was recently appointed the co-chair of Suicide Prevention Ottawa, alongside Ben Leikin (Ottawa Public Health). He previously served as co-chair for the Research and Knowledge Exchange Committee and chair of the AI and Data Governance Working Group.

Suicide Prevention Ottawa is a group of individuals and organizations in Ottawa that fill gaps in suicide prevention services for children, youth, and young adults, centered around three key areas: research, suicide postvention (responding after a suicide), and capacity building.

Dr. Kaminsky's research expertise and scientific understanding of suicidal ideation enriches the efforts of the consortium, working towards a shared mission of reducing the harmful impacts of suicidal behaviour.

The launch of Suicide Prevention Ottawa in May 2019, with representation from The Royal, CHEO, Ottawa Public Health, Youth Services Bureau, and more.

Using artificial intelligence to predict suicide risk

As young people increasingly turn to social media platforms as a means to express their emotions and seek support, Dr. Kaminsky recognized a valuable opportunity to leverage artificial intelligence (AI) to identify suicidal ideation.

The AI algorithm behind this innovative approach, called the Suicide Artificial Intelligence Prediction Heuristic, or SAIPH, has been trained to recognize language around loneliness, stress, insomnia, depression and other emotional states associated with suicidal ideation. By assessing the results of an individual's score on the SAIPH report, Dr. Kaminsky can determine the likelihood of suicidal thoughts within the next five days.

In 2020, the team published a validation study of the algorithm in Nature Digital Medicine, demonstrating that it successfully predicted suicidal ideation in a university cohort of 150 people, and a national Canadian cohort of 300 people with around an 80 per cent accuracy. The study examined how people responded differently to the COVID-19 pandemic, showing elevated suicidality following social distancing implementation.

Algorithmic approaches like SAIPH have the potential to identify individual future suicide risk and could be adapted as clinical decision tools aiding suicide screening and risk monitoring using available technologies.

What's next?

In addition to continuing to leverage the SAIPH to detect risk, researchers at The Royal recently launched a new project that harness AI to predict mental health outcomes. The study looks at electronic health record data in Ontario.

The study has access to electronic health record data of over 130,000 unique individuals who have had a psychiatric admission in Ontario dating back to 2018. By leveraging AI, the study looks at people's likelihood to attempt suicide, with hopes of being able to use machine learning to triage medical records to recognize patients at a higher risk of suicide.
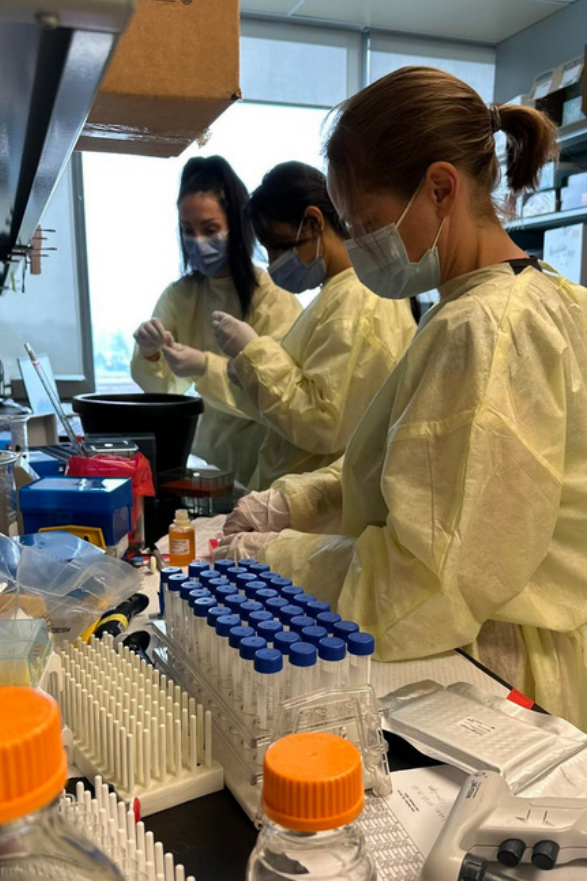
Novel Findings in Epigenetics and Suicide Prevention

Epigenetics, or the study of how the environment can affect how our genes work, is opening new doors in the realm of suicide prevention, with researchers like Dr. Kaminsky leading the way.

Over the past five years, his research has provided new frontiers in suicide prevention research by continuing his promising work in epigenetics and AI, unlocking new potential in understanding, identifying and preventing suicide in a range of mental health conditions. He has largely focused on groups that have a higher suicide risk including trauma, substance use health and postpartum depression.

Alcohol use disorder: Researchers, including Dr. Kaminsky, have identified a noted change in gene expression in people with an alcohol use disorder. Further, a pre-clinical study, in collaboration with partners at the National Institute on Alcohol Abuse and Alcoholism also noted a gene expression when exposure to chronic variable stress. Interestingly, the pre-clinical trial found a return of gene expression levels when administered ketamine, a promising drug used in treating depression. A paper on these findings is in preparation for submission to Molecular Psychiatry.

Post-traumatic stress disorder - *Multi Dimensional Assessment of PTSD Subtypes (MAPS):* Through a Department of National Defense funded multi-year trial, Dr. Kaminsky led a team of multi-disciplinary scientists to generate an AI model that predicts PTSD and PTSD-subtypes in military veterans from a 'whole body' scan of biological data including neuroimaging, qEEG, sleep data, and epigenetics. The epigenetic data has been leveraged into a new biosignature that predicts suicidal thought using AI.

The MAPS team includes Dr. Zachary Kaminsky (Principal Investigator), Dr. Jakov Shlik, Dr. Rebecca Robillard, Dr. Natalia Jaworska, Dr. Robyn McQuaid, Dr. Clifford Cassidy.

Postpartum depression: Dr. Kaminsky and his team performed the largest epigenome-wide association study on postpartum depression to date, collecting over 500 samples spanning multiple phases of pregnancy and postpartum. By analyzing the rich data set that couples blood tests with postpartum neuroimaging, they hope to generate new knowledge about the causation of the disease and identify novel biomarkers capable of predicting risk using blood tests.

Dr. Kaminsky has co-founded a start-up, Dionysus Digital Health in collaboration with US and International entrepreneurs, scientists, psychiatrists and AI experts. The group is generating a digital platform of tools to model individual wellness and to develop and evaluate novel digital suicide interventions.

The group was a recent winner in the highly competitive US National Institutes of Health Rapid Acceleration of Diagnostics Technology (RADx Tech) for Maternal Health Challenge for their work in offering an epigentic test taken during pregnancy that may predict future postpartum depression risk. This recognition brings attention and funding to their important work in the field.

What's next?

The next step in the postpartum depression research study is to conduct a large clinical study in a partnership between The Royal and Dionysus Digital Health. The purpose is to explore the use of a clinical blood test for diagnosing and preventing postpartum depression -- an often unrecognized complication of childbirth. It is exciting to see predictive modelling in action to potentially offer early interventions and prevent lifeling cononsequences for mothers and families.

# Celebrating Dr. Kaminsky's Leadership in Suicide Prevention

Dr. Kaminsky is a highly accomplished researcher in genetics and suicide prevention. With a drive to better understand the biological underpinnings of suicide, his contributions to the scientific community are incredibly vast and highly impactful.

Across the sector, Dr. Kaminsky is disseminating his work to the larger scientific community, challenging stigma, and scaling the impact of his discoveries. Since joining The Royal in 2018, some highlights of Dr. Kaminsky's accomplishments include:

- Co-authoring 14 scientific publications, totaling over 60 publications during his career, and over 5,000 citations in subsequent publications.
- Media interviews in highly regarded outlets, including Ottawa Citizen, The Globe and Mail, CBC, CTV, and Hospital News.
- Speaking to a wider audience, including young people, at community events. Highlights from the past year include:
    - A student-facing Bell Let's Talk event at Algonquin College;
    - The Carleton Challenge Conference, speaking to industry leaders, policymakers and politicians; and
    - The Royal's annual Leaders for Mental Health Breakfast.
- Volunteering as a Crisis Responder at Kids Help Phone, offering text-based mental health support to young people across Canada.
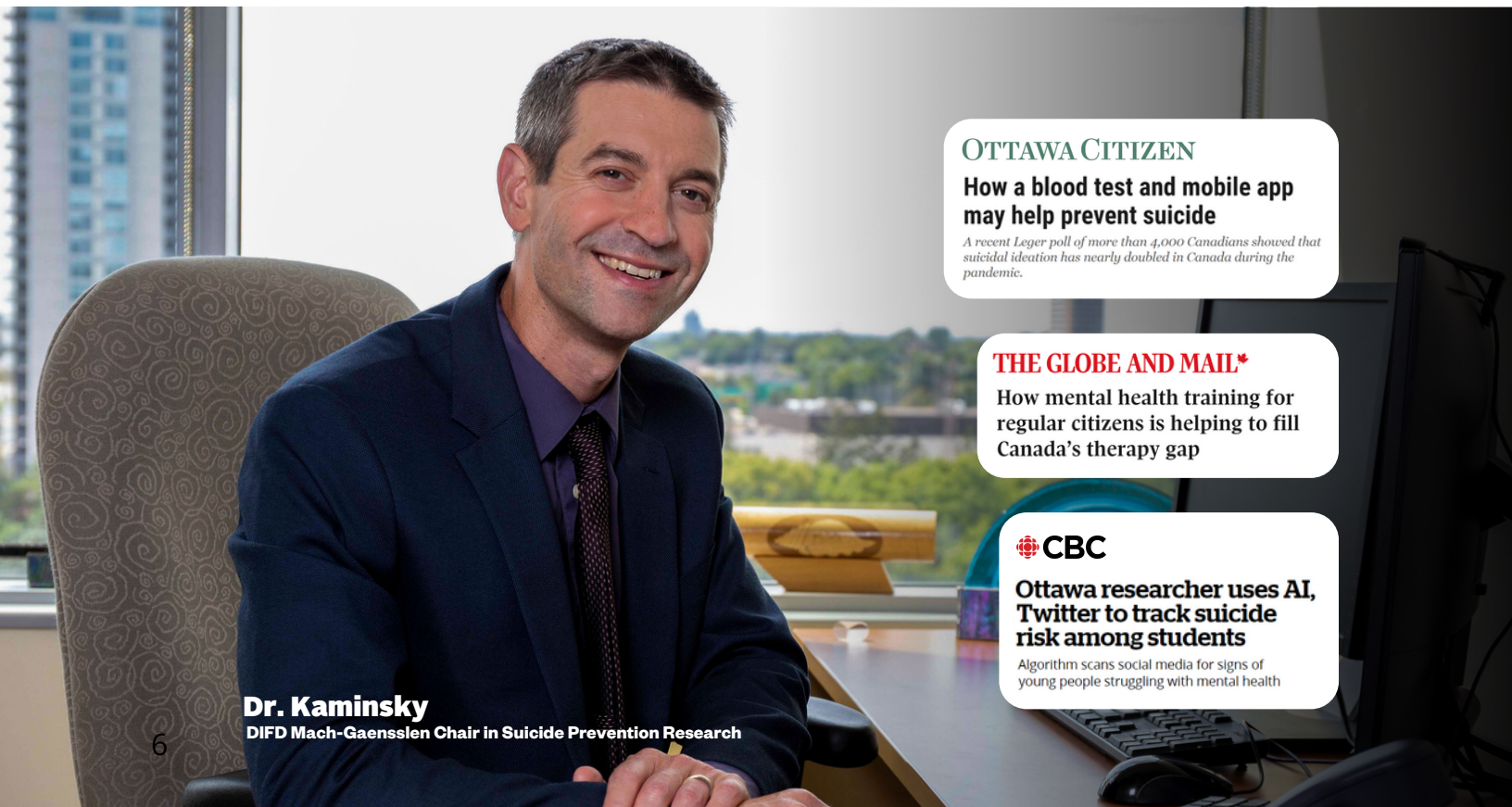
OTTAWA CITIZEN

How a blood test and mobile app may help prevent suicide

A recent Leger poll of more than 4,000 Canadians showed that suicidal ideation has nearly doubled in Canada during the pandemic.

THE GLOBE AND MAIL*

How mental health training for regular citizens is helping to fill Canada's therapy gap

CBC

Ottawa researcher uses AI, Twitter to track suicide risk among students

Algorithm scans social media for signs of young people struggling with mental health

Dr. Kaminsky
DIFD Mach-Gaensslen Chair in Suicide Prevention Research

Thank you!

We hope you share our gratitude and admiration of the incredible work Dr. Kaminsky has achieved during his tenure as the DIFD Mach-Gaensslen Chair in Suicide Prevention Research. None of this would be possible without the generosity of an incredible community of DIFD supporters, including yourself.

Your support has been crucial in advancing mental health, substance use health, and suicide prevention research at The Royal, particularly for young people.

At The Royal, we believe in a future where everyone with a mental illness or substance use disorder can get the care they need, the moment they need it. Thank you, and everyone who has rallied behind DIFD initiatives, for your role in helping make this vision become a reality.

"Just like heart disease or cancer, depression is an illness. Mental illness is not just "in the mind", and it's not something that you can "power through".

This is something that is becoming more and more apparent, the more we understand the biology of mental illness and suicide. This understanding is helping us to de-stigmatize suicide, and encourage people to seek help."

Dr. Zachary Kaminsky
DIFD Mach-Gaensslen Chair in Suicide Prevention Research

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