

Dr. Monica Justice in the lab with Dr. Neeti Vashi. Dr. Justice is renowned for her pioneering work on mouse models of human disease.

# RESEARCH CATALYSTS

**SICKKIDS RESEARCH INSTITUTE  
PETER GILGAN CENTRE FOR RESEARCH & LEARNING  
2022 PROGRESS REPORT**



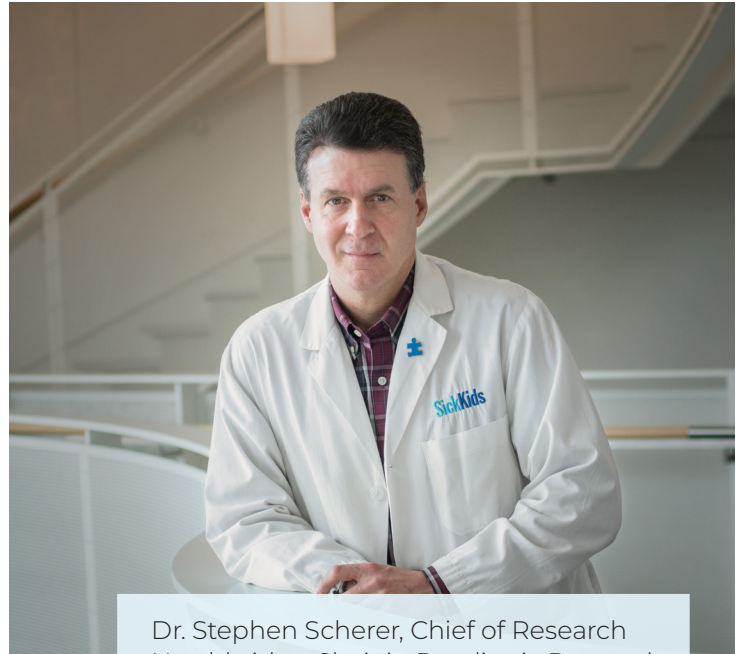


# MESSAGE FROM THE CHIEF OF RESEARCH

**“THANK YOU** for your generous support of the Peter Gilgan Centre for Research and Learning (PGCRL) and scientific teams across the SickKids Research Institute. Last year, donors contributed 32% of our funding, an impressive \$87.2 million. You play a part in our discoveries, our commercial successes, and our global standing. The stories here are a few highlights from an outstanding year.”

## HIGHLIGHTS

- ✓ Micro-robots for brain surgery successfully prototyped
  - ✓ National COVID-19 databank now houses 10,000 genomes from Canadians diagnosed with the virus
  - ✓ Cancer predisposition screening app validated by international study
  - ✓ SickKids-led international Research group uncovered genetic changes in cardiomyopathy, the leading cause of heart failure and sudden death in children and young adults
  - ✓ Discovery of a biomarker that could be an early predictor of cystic fibrosis in infants with an inconclusive diagnosis at newborn screening
  - ✓ Global study identified predictors of severe outcomes from opioid intoxication in children and youth
- Visit SickKids News for the latest research advances.



Dr. Stephen Scherer, Chief of Research  
Northbridge Chair in Paediatric Research

## SHOUTOUTS



**DR. ZULFIQAR BHUTTA\*** received the prestigious John Dirks Canada Gairdner Global Health Award for his work on maternal/child health and nutrition in the first 1,000 days of life



**DR. NICOLA JONES**, Principal Investigator, secured a \$2.3 million grant to fund a new national training program for future leaders in digestive health research



**GARRY HURVITZ** donated \$50 million to SickKids in support of paediatric brain and mental healthcare



**DR. JAYNE DANSKA\*** and University Health Network scientists made cancer breakthroughs that led to a UHN-SickKids partnership with an Ontario biotech firm, acquired by Pfizer Inc. in 2021

\* Dr. Bhutta is the Robert Harding Chair in Global Child Health and the Ibn Sina Scholar in Global Child Health, supported by Islamic Relief Canada. Dr. Danska is the Anne and Max Tanenbaum Chair in Molecular Medicine.

## CANCER DISCOVERIES

Ellie's world turned upside-down when she was diagnosed with acute lymphoblastic leukemia (ALL). Leukemia is the most common childhood cancer, and ALL its most common type. Patients often receive chemotherapy to the brain and spinal cord to prevent their cancer from spreading to the central nervous system.

Dr. Jayne Danska, the Anne and Max Tanenbaum Chair in Molecular Medicine, studies how ALL behaves and spreads. Her lab discovered that ALL cells 'drill' through bone from their origins in bone marrow cavities. The team then discovered that ALL cells access the brain and spinal cord by drilling through bone from marrow cavities in the skull or vertebrae. These discoveries could lead to precision therapies that target cancerous cells and spare healthy ones, making treatment less of an ordeal than it was for Ellie.

## EQUIPPED FOR BREAKTHROUGHS

The PGCRL's 18th floor is home to specialized instruments that can analyze and purify millions of single cells at high speed, giving researchers deep insights into human health and disease. The advanced technology detects, identifies, and counts cells by simultaneously measuring many fluorescent (up to 28) or metal (up to 40) labelled molecules. Led by Dr. Cynthia Guidos, the SickKids-UHN Flow and Mass Cytometry Facility is the biggest academic facility of its kind in Canada, serving about 200 labs a year. Immunology research is a key beneficiary, and the facility has enabled SickKids breakthroughs on diabetes, HIV, and different cancers, including Dr. Danska's recent leukemia discoveries.

## COVID & BEYOND

The scientific response to COVID-19 was transformative for Dr. Jean-Philippe Julien and his team. Supported by donors Kirk and Anke Simpson, the lab has pushed the limits of protein engineering and developed a powerful molecule against SARS-CoV-2 that's now in preclinical testing. Their research caught the attention of the Bill & Melinda Gates Foundation, leading to a US\$2.3 million grant and access to international networks. Donor funding also helped the team develop a distinct "immunotargeting" platform technology, a vaccine innovation that's been licensed exclusively by Canadian biotech firm Providence Therapeutics.

Dr. Julien's research is tackling the biggest barriers to vaccine efficacy—new variants, lasting immunity, and equitable access—for COVID-19, HIV, and malaria. His tenacity has been rewarded with a place in Canada's Top 40 Under 40.

After many gruelling rounds of chemo, Ellie's cancer is in remission, and she's getting back to what she loves: swimming, being outdoors, and mastering the alphabet!





# THANK YOU

Your support helps fund the scientists, teams, facilities, and operations behind the SickKids breakthroughs that are transforming lives for children and youth in Canada and worldwide.

**#1 IN CANADA**  
**MOST RESEARCH-INTENSIVE  
HOSPITAL IN CANADA**

(Research Info Source Inc. 2021)

**EVERY \$1**  
**INVESTED IN A SICKKIDS SCIENTIST  
YIELDS \$5.95 IN EXTERNAL GRANTS**

**1 OF TOP 3**  
**CHILDREN'S RESEARCH  
HOSPITALS WORLDWIDE**

(Nature Index 2021)

**17**  
**FLOORS OF LAB SPACE**

**7**  
**RESEARCH PROGRAMS**

**16**  
**CORE SCIENTIFIC FACILITIES**

**4**  
**CLINICAL RESEARCH FACILITIES**

**663**  
**SCIENTISTS AND PROJECT INVESTIGATORS**

**1,144**  
**RESEARCH STAFF**

**1,357**  
**RESEARCH FELLOWS, TRAINEES, & STUDENTS**

**\$272 MILLION**

**TOTAL RESEARCH FUNDING AT SICKKIDS IN 2021-2022, WITH 32% FROM DONORS**

**SickKids Foundation**  
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SickKids Foundation is accredited under the Imagine Canada Standards Program, demonstrating excellence in Board governance, financial accountability and transparency, fundraising practices, staff management, and volunteer involvement.