A HEALTHY INVESTMENT

CELEBRATING 30 YEARS OF

HEALTH RESEARCH IN MANITOBA

BIO-MEDICAL

CLINICAL

HEALTH SYSTEMS

POPULATION HEALTH

Manitoba Health Research Council

The Manitoba Health Research Council provides funds for research in the health sciences through a number of grants and awards programs.

Core programs are funded by grants from the Government of Manitoba. Funding for 2012/13 is $6,002,600 from the Department of Innovation, Energy and Mines.

MHRC's funding focuses on the support of new and mid-career investigators through the Manitoba Chairs Program and Operating and Establishment Grants. In addition, salary support for trainees is provided through Clinical Fellowships, Co-Ordinated Post-Doctoral Fellowships and Co-Ordinated Graduate Studentships.

MANDATE

The Manitoba Health Research Council has a mandate to promote and assist basic, clinical and applied research in the health sciences in Manitoba and advise the minister on such matters relating to health research as the minister may refer to the council for consideration.

GOVERNANCE

As a provincial agency, the Manitoba Health Research Council reports to the Minister of Innovation, Energy and Mines.

The Chair of Council is Dr. Brian Postl, Dean, Faculty of Medicine, University of Manitoba. There are 12 council members; ten are appointed by the provincial government and two are appointed by the University of Manitoba.

COUNCIL HISTORY

The Manitoba Health Research Council was created through an act of the legislature on June 30, 1982.

An account of the MHRC's history through excerpts from articles written by Drs. Lyonel Israels, Frits Stevens and John Hamerton, who played key roles in the development of the MHRC, can be found at www.mhrc.mb.ca.

Reflecting on our past, planning for the future

Christina Weise, Executive Director, Manitoba Health Research Council

Thirty years ago, the Government of Manitoba consulted on a proposal to create a provincial funding body dedicated to health research.

The ideas put forward stemmed from those of prominent members of the health research community. The proposal focused on our province's acknowledged strengths in health research and provided an ambitious solution to the challenges we faced. There was consensus that the creation of the Manitoba Health Research Council was the way forward.

The MHRC has delivered and continues to deliver what it set out to do – promote the growth and co-ordination of the health research enterprise in Manitoba.

The MHRC manages the province's funding devoted to health research in a way that endorses excellence, nurtures researchers and, in turn, provides our health-care system with the evidence on which better services, better care and better outcomes can be attained.

The MHRC exists to foster knowledge, and we have done that. The next step is to share and celebrate the achievements of Manitoba's researchers with the wider community.

As each segment of this special report suggests, the health research community in Manitoba is generating knowledge and having an impact. From bio-medical, clinical, and health systems and services to social and population health studies, the health research enterprise is contributing every day to the well-being of Manitobans. The stories on the pages that follow tell a compelling story about researchers who are trying to prevent suicide, reduce the prevalence of diabetes and help people die with dignity. These pages provide just a glimpse of the past, present and future of health research in the province, but it is what inspires the MHRC to actively support and celebrate these people and their life's work.

MHRC's 30th anniversary this year gives us a chance to reflect on and celebrate three decades of health research advances and impacts. More importantly, it is also an opportunity to plan for the next 10 years.

Manitobans deserve the most innovative health research to respond to the complex range of health issues we currently face and those that will come. The MHRC is committed to building and strengthening collaboration between those doing research and those who can advance research in all sectors of the economy, so we can all benefit from innovation and research.

Health research is part of our lives as Manitobans and Canadians, and our future depends on it.

I hope this special report is both an education and an inspiration.

Enjoy!

MHRC COUNCIL

The MHRC's Council includes membership from the health research community, provincial government, business, academic institutions and health agencies. They are:

Dr. Brian Postl (Chair)
Dean, Faculty of Medicine, University of Manitoba

Dr. Judith Bartlett
Associate Professor, Adjunct Scientist (Manitoba Centre for Health Policy), Department of Community Health Sciences, Faculty of Medicine, University of Manitoba

Mr. Bob Brennan
Former President and CEO, Manitoba Hydro (Retired)

Ms. Jan Currie
Former Vice-President and Chief Nursing Officer for the Winnipeg Health Region (Retired)

Mr. Grant Doak (Invited Member)
Deputy Minister, Department of Innovation, Energy & Mines

Dr. Digvir Jayas
Vice-President (Research & International), University of Manitoba

Mr. Kevin Kavanagh
Past President, Great-West Lifeco

Dr. John Langstaff

Dr. Susan McClement
Associate Professor, Faculty of Nursing, University of Manitoba Research Associate, Manitoba Palliative Care Research Unit, CancerCare Manitoba

Dr. Peter Nickerson
Associate Dean (Research), Faculty of Medicine, University of Manitoba

Ms. Cathy Nieroda
Vice President, Manitoba Region, HP Enterprise Services

Mr. Milton Sussman (Invited Member)
Deputy Minister, Manitoba Health

Dr. Barbara L. Triggs-Raine
Professor, Department of Biochemistry and Medical Genetics, University of Manitoba

Ms. Arlene Wilgosh
President & CEO, Winnipeg Regional Health Authority

MHRC STAFF

Ms. Christina Weise
Executive Director

Mr. Ambrosio P. Catalla Jr.
Evaluations and Policy Analyst

Dr. Jim Davie
Scientific Director

Ms. Liz Ford
Administrative Officer

Ms. Kristen Hooper
Communications Officer

Ms. Lesley McKenzie
Administrative Assistant, Funding Programs

Ms. Shannon Rogalski
Manager, Funding Programs

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MAKING A DIFFERENCE


Photography: Marianne Helm

The Manitoba Health Research Council has supported more than 1,300 health researchers over the last 30 years. In doing so, it has spurred numerous improvements to the delivery of health care in this province and helped build Manitoba's reputation as a leader in health research.

By Murray McNeill

In 1983, a man who would go on to become one of the province's most accomplished health researchers arrived in Winnipeg, eager to establish a program in the field of epigenetics, the study of factors that influence the operation of genes.

Dr. Jim Davie was born in England and spent his childhood in Winnipeg before moving to Vancouver as a teen. He obtained a Bachelor of Science degree and a PhD from the University of British Columbia and did his post-doctoral training in chromatin structure and function at Oregon State University.

He was returning to his home province because the University of Manitoba's Faculty of Medicine had offered him a research/teaching contract. It also gave him $30,000 to put toward the establishment of a research laboratory.

While the university money was a big help, it wasn't enough to cover the cost of setting up a lab. That meant Davie had to find additional funding from somewhere else. So he turned to the Manitoba Health Research Council (MHRC), a new funding body created the previous year by the provincial government to serve as the go-to place for health research funding in the province.

There was a lot riding on Davie's submission to the MHRC. If he couldn't obtain the extra funding he needed, his research/teaching contract at the University of Manitoba would not be renewed, and he'd be looking for another job and another place to hang his research hat.

Fortunately, his proposal was impressive enough to land him an establishment grant from the newly minted research council. That provided him with the extra money needed to properly equip his lab and stock it with the necessary supplies. It also helped him land a scholarship from the Medical Research Council of Canada, now known as the Canadian Institutes of Health Research (CIHR).

Davie received MHRC funding that year, and again in fiscal 1992/93. After nearly three decades, he doesn't recall exactly how much he received from the council that first year, but he does remember how important the money was to his budding research career.

"Getting the (MHRC) award made a world of difference," he says. "I was able to focus on my research."

It also changed his status at the University of Manitoba. He went from being a contract employee to a contingent faculty member, which later led to a tenure track position with the university.

"Going from contract to contingent was a huge step forward," he says. "And having that (MHRC funding) told the department and the university I was a credible researcher."

The MHRC's help didn't end there for Davie. Some of the graduate students working in his research program have also received Graduate Studentship Awards from the MHRC, which meant money he would have spent on student salaries could be used to buy more lab equipment and supplies.

Davie says it's difficult to say what would have happened if he hadn't received MHRC support. Maybe he would have found funding somewhere else, but maybe not.

"All I can say is that I got it at a time when it was really needed. It was a critical time in my research career, no question," he says.

There are cancer patients who, all these years later, are also benefitting from the

Dr. Jim Davie holds a slide that has been prepared to be analyzed by a gene sequencing machine.

support Davie received from the MHRC. He says his research in those early years identified a group of compounds, called histone deacetylase inhibitors, which are effective in inhibiting a particular enzyme that fuels the growth of cancer cells.

Preventing that enzyme from functioning properly not only stopped cancer cells from growing, but eventually caused them to die. Other international researchers picked up on his findings, and subsequently developed new inhibitor drugs that are now being used in the treatment of some cancers.

Davie says he would have liked to have been the one who carried that particular research through to the end, "but it was nice to have played a role."

Today, Davie is still involved in epigenetics research at the University of Manitoba. He's a professor in the Department of Biochemistry and Medical Genetics, Scientific Director for the MHRC, and Leader of the Terry Fox Research Institute Prairie Node. He also holds a Canada Research Chair in Chromatin Dynamics and is past-president of the Canadian Society for Molecular Biosciences.

Davie is one of 1,312 researchers who have received MHRC funding over the past three decades. During that time, MHRC has funded 1,994 research projects, including 84 in fiscal 2011/12.

In supporting these and hundreds of other researchers, the MHRC has helped spur numerous improvements to the delivery of health care in this province and played a pivotal role in building Manitoba's reputation as a leader in health research.

As Christina Weise, Executive Director of the Manitoba Health Research Council, points out, "MHRC plays a catalytic role in the province's health research community and gives researchers the start they need to accomplish great things in Manitoba."

As the MHRC marks 30 years of service this year, Weise says much of the credit for the agency's success and contributions must go to those who helped get it off the ground.

One of the driving forces behind the creation of the MHRC was Dr. Arnold Naimark, President Emeritus of the University of Manitoba and Dean of its Faculty of Medicine from 1971 to 1981.

In the late 1970s, Naimark gave a speech in Winnipeg in which he urged the Manitoba government to follow the lead of other provinces and create its own health research fund. The news media picked up on the story, and the government soon began talks with him and other key industry players, including Drs. Henry Friesen and Lyonel Israels. Those talks led to the creation of the MHRC.

Naimark says he originally proposed that the government allocate one-tenth of one per cent of its annual health-care budget as funding for health research – or about $2 million. At the time, that was the standard used by many jurisdictions to set health-care research funding.

The province did give the MHRC about $500,000 in 1982. But it didn't tie the funding to future increases in health-care spending, as Naimark had suggested, so the agency's level of funding grew slowly to about $1.95 million in 1994/95, where it remained until 2002/03. By 2006, MHRC funding climbed to $6 million, where it remains today.

Now as then, the question remains: Is that enough funding to support health research?

Naimark says if the province had adopted his original funding formula, the council would now be receiving between $20 million and $25 million per year. Instead, the level of funding here ranks in the bottom one-third among the provinces per capita. Only New Brunswick, Prince Edward Island and the Territories spend less on health research.

As costs rise and the number of research applicants grows – 298 this fiscal year alone – MHRC officials have asked the province for a substantial increase in funding, in the range of $12 million, an amount first referred to in the MHRC's 2006 strategy paper.

Weise says that level of funding would allow the MHRC to leverage additional funds from other funding partners it works with, including the Canadian Institutes of Health Research, the CancerCare Manitoba Foundation, the Health Sciences Foundation, and the University of Manitoba.

In 2011, for example, MHRC leveraged an additional $2.1 million in partnership funding to go with the $6 million it received from the province. With $12 million in funding from the province, Weise estimates the MHRC might be able to leverage an additional $8 million, for a total of $20 million in funding. Researchers would then be able to use MHRC funding to leverage other financial contributions.

Dr. Brian Postl, Dean of the University of Manitoba's Faculty of Medicine and Chair of MHRC's Board of Directors, says

the council's funding acts as "seed money" that researchers use to leverage additional funding from other organizations, such as the Canadian Institutes of Health Research or Heart and Stroke Canada.

He says, on average, every $1 of MHRC research funding attracts $6 in additional funding from other organizations (this includes the additional contributions that researchers leverage after receiving their initial MHRC funding). "So the more money the province puts in, the more money it brings in."

If MHRC funding was increased, it would not only help local researchers leverage additional funding from other sources, it would also enable the council and its clients to participate in a new patient-oriented research program recently announced by CIHR. "We are going to require some matching funds from the province to be able to attract some of that federal money," Postl says.

The MHRC would also like to expand some of its existing programs and develop new initiatives.

Weise notes the council's role has evolved over the years, from that of a funding body to a funding/co-ordinating body that's also involved in the planning and implementation of new health-research strategies and in fostering increased co-operation between the different players within the health-research community.

The last increase in funding made a huge difference in terms of research in this province because it allowed MHRC to establish the Manitoba Research Chair Program, which provides $500,000 over five years to "star" researchers. The program has been used to support 11 Chairs since the program's inception in 2008.

Looking ahead, the MHRC would like to use any additional funding to support the development of "research clusters," not just in Winnipeg, but throughout the province. (Research clusters are groups of researchers from different backgrounds who share expertise to advance research in a specific area.) The additional funding would help Manitoba recruit and retain scientific talent, something that is always a challenge because many of the other provinces Manitoba competes with, including the other three western provinces, have larger health research budgets, and researchers often go where the money is.

In any case, Postl says everyone realizes that the provincial government recognizes the value of Manitoba's research community, not just in terms of delivering better health care, but also as a driver of the provincial economy. The question is whether the province will be in a position to chip in more money next year.

"They know we're very interested in expanding our research activity," says Postl. "But we've got to wait and see how the provincial economy does. There are lots of people looking for increases (in funding) at a time when dollars are hard to come by."

Dr. Brian Postl is Dean of the University of Manitoba's Faculty of Medicine and Chair of the Manitoba Health Research Council.

MHRC SUPPORTS LOCAL RESEARCH

Here are a few facts and figures about the Manitoba Health Research Council.

.5

Amount in millions of dollars MHRC invested in local health research in 1982, the year it was established.

6

Amount in millions of dollars MHRC invests in local health research today.

1,312

Number of researchers supported by MHRC over the last 30 years.

1,437

Number of submissions MHRC has received in the last seven years.

496

Number of submissions approved by MHRC in the last seven years.

298

Total number of submissions for funding received in 2011/12.

215

Number of submissions deemed "fundable" in 2011/12.

84

Number of submissions for funding approved in fiscal year 2011/12.

INVESTING IN EXCELLENCE

Researchers compete for Manitoba Health Research Council funding

Obtaining Manitoba Health Research Council funding is a bit like landing a highly coveted scholarship. The competition is fierce and the demand far outweighs the supply.

This year, for example, the council received 298 applications for funding, 215 of which were deemed "fundable." That means they scored above 3.5 on a scale of zero to 4.9. But the MHRC was only able to fund 84 of them.

Statistics show the number of applicants has been growing steadily over the last half-dozen years, climbing from 147 in fiscal 2006/07 to 298 this year. The quality of the applicants and research projects has also been improving, making the selection process even more challenging.

"This year, we had some people in the Operating Grants Program who were ranked in the excellent range (4.0 to 4.4), but they didn't get any money because we didn't have enough," says Christina Weise, Executive Director of the Manitoba Health Research Council. "So it (deciding who gets funding and who doesn't) isn't easy."

Weise says MHRC provides funding for four types of research: basic bio-medical, clinical, health services and population health. The bulk of money goes to bio-medical research – laboratory work with cells and animals – because that's where most of the research work is being done. But Weise says MHRC officials would like to see more funds allocated for the other types of research. "We're striving for a bit more of a balance."

Funding flows through nine key programs:

Clinical Research Fellowships: These fellowships are worth $35,000 and are designed to address a shortage of clinician-scientists in the province. They provide funding support, on a matching basis, for a period of research training for candidates with under-graduate medical degrees, or the equivalent, who intend to pursue a career as a clinician researcher.

Post-Doctoral Fellowships: Students can obtain up to $36,750 to help them prepare for careers as independent health researchers.

Graduate Studentships: These grants, worth $17,850, are also provided on a matching basis to help Master's and PhD trainees prepare for careers as independent health researchers.

PhD Dissertation Awards: These grants of up to $5,000 each are used to support graduate students in population and health-related social sciences who incur costs while working on projects not directly related to their supervisor's research program.

Operating Grants: New faculty members can use these grants to defray direct costs incurred in completing their post-doctoral training or conducting research. In 2011/2012 the average Operating Grant was $49,000 per year.

Establishment Grants: These grants assist faculty members who have recently moved to the province to establish an independent health research project here, and are worth up to $100,000 over three years.

Manitoba Research Chairs: These grants are worth up to $500,000 in funding over five years and are available to mid-career researchers who work as independent investigators.

Bridge Funding: This program offers matching support to researchers who have recently lost long-standing funding from a national funding agency. It is designed to enable researchers to maintain their programs for up to a year while they obtain new funding. The average bridge funding amount per recipient between 2006 and 2011 was $27,375.

Regional Partnership Program: This program offers up to $100,000 and is for researchers who are below the funding capacity of the Canadian Institutes of Health Research's base budget and need another organization to jointly fund their research program.

So who decides who gets a research grant and who doesn't?

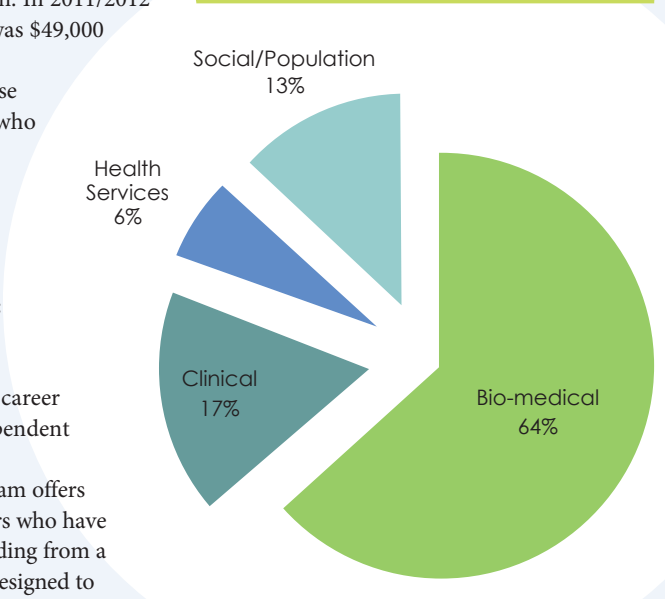
The MHRC uses a competitive process and peer review to evaluate and select research funding proposals for the Board's approval. Peer review is undertaken by a committee of active health researchers and health professionals constituted appropriately to suit the nature of applications under review. Each committee is chaired by a respected researcher from a relevant field. Manitoba Research Chairs are evaluated by reviewers from outside the province. MHRC board members make final approvals of all grants and awards, based on review committee recommendations, compliance with all requirements and budget considerations.

Although a certain amount of funding is set aside for each program, Weise says those allocations aren't set in stone.

"We do sometimes make adjustments and move money from one program to another. It depends on the scores and the number of applications we have."

Where the money goes

MHRC funding by research pillar, 2011/12



RESEARCH FOR BETTER HEALTH

MHRC-funded researchers enhance care for people living in Manitoba – and beyond

By Liz Katynski

Each and every day, a small army of researchers, technicians, lab assistants and grad students arrive for work in various locales around the province with one objective: to discover new ways to improve treatments for diseases and conditions, thereby improving outcomes for patients.

The Manitoba Health Research Council plays an important role in supporting the people who are doing this work. Through its funding programs over the last three decades, the MHRC has directly or indirectly helped veteran scientists and student researchers alike achieve their goals.

In doing so, the MHRC is helping to support researchers who are working to create a healthier future for people in Manitoba and throughout the world.

Here are just a few of the researchers who have received MHRC funding, along with a look at some of the work they have done.

REWRITING THE RULES

Research enhances suicide prevention efforts

Dr. Jitender Sareen's research has helped save lives that might otherwise have been lost to suicide.

His research has led to enhanced community prevention programs, the creation of a new category for suicidal behaviour and new guidelines for how suicides are covered in the media.

A professor of psychiatry at the University of Manitoba's Faculty of Medicine, Sareen launched a study into suicide among residents of Swampy Cree First Nation in 2007.

At the time, suicide among residents of the northern Manitoba community was five times higher than that of the general Canadian population. Through his research, he discovered that issues such as substance abuse, depression and anomie – a feeling of being disconnected from the community – all contributed to suicidal behaviour, especially among young people.

As a result, community-based and family-based interventions were developed in partnership with the community.

So far, the results have been positive. "We've had excellent partners in the community. Programs are aiming to reduce the risk of substance use and depression in youth, and to connect people who feel disconnected with their community," says Sareen.

Through his work, Sareen has been able to better understand the factors contributing to suicidal behaviour. He says about 90 per cent of people attempting suicide have a mental disorder, but the rest do not. His research shows that other factors, such as panic attacks and financial stress, can contribute to suicidal behaviour.

Based in part on his work, the American Psychiatric Association recently introduced a separate condition called Suicide Behaviour Disorder-DSM-5. "The new category will increase awareness in clinicians to carefully assess for suicide risk," he says.

As well, after considering Sareen's research, the Canadian Psychiatric Association recently introduced media guidelines for the reporting of suicides in order to minimize the contagion effect – people who follow through on suicidal thoughts after seeing the suicide of a celebrity or other person reported in a sensational manner in the media.

"They are raising awareness of how important it is not to report suicide in a sensational manner."

PERSONAL CARE

Identifying the needs of nursing home residents

There are close to 10,000 Manitobans living in personal care homes today, and experts predict the province will have to find spaces for about 6,000 more within 30 years.

But exactly what kinds of health care will all these residents need going forward?

Dr. Malcolm Doupe is attempting to answer that question. He is working on the first comprehensive review of the needs of nursing home residents, looking at both the numbers and the needs of residents in order to understand how to plan for the future.

Since the 1970s, the Manitoba Centre for Health Policy (MCHP) has been receiving administrative data on people going into personal care homes, including names, ages, and medical conditions, from Manitoba Health for research purposes. They have also acquired clinical data on the health-care needs of residents from the Winnipeg Health Region, dating back to 2005.

Doupe, an associate professor in the Department of Community Health Sciences, at the University of Manitoba's Faculty of Medicine, and a senior research scientist at MCHP, is linking the two sets of data in order to gain insights into how Manitoba's aging population can be better served.

The research has the potential to influence policy, says Doupe. "Linking the data systems provides us with a rich research environment. Never before have we had such a clear picture of the range of needs of those going into nursing homes," says Doupe. "Policy makers can look to it when they decide to adjust their policies and criteria."

Knowing the specific needs of people going into nursing homes can help determine better strategies for accepting people into nursing homes, and once they get in, the right staffing levels, number and types of beds, and other supports that will be needed in order to plan to meet the needs of an aging population. It will also help to determine if nursing homes are the right environment for some people, or if other, less costly options should be put in place.

As well, Doupe is looking at nursing home facilities and measuring the quality of care on an ongoing basis, and he is studying nursing home residents' use of other services, including Emergency rooms.

So far, Doupe has found that about seven to eight per cent of people admitted into nursing homes may be eligible for some community-based options, such as supportive housing. Nursing home residents themselves have a huge range of needs, highlighting complexities of providing high-quality care for these people.

HEALTHY BABIES

Breastfeeding study helps reduce risk of Type 2 diabetes and obesity

A research study designed to promote breastfeeding at Sagkeeng First Nation is leading to healthier babies at less risk for Type 2 diabetes and obesity.

Dr. Patricia Martens started working alongside members of the community in 1992. At the time, it had been established that breastfeeding could reduce respiratory and gastrointestinal infections in infants. The challenge was to encourage reluctant moms to breastfeed their babies.

Martens, along with research assistant Linda Romphf, worked with the community in 1995 to develop resources to promote breastfeeding, including an educational booklet and video. The community health unit also created a pilot peer counselling support program in 1997 that encouraged breastfeeding. In two years, breastfeeding rates jumped from 38 per cent to 70 per cent. The duration rate also increased, with 40 per cent of moms still breastfeeding at six months, compared to a national average of 25 per cent for women across the country.

That success prompted the community to permanently fund the peer counsellor program in 1998. Around that time, other research also revealed reductions in Type 2 diabetes and obesity among people breastfed as infants. Martens, along with other U of M scientists, later showed the same result in Manitoba: First Nations teens that had been breastfed as babies were less likely to have early-onset Type 2 diabetes, and the longer the duration of breastfeeding, the lower the risk.

"The Sagkeeng materials are now being used in other First Nation communities to boost breastfeeding rates," says Martens, who is now the Director of the Manitoba Centre for Health Policy and a professor in the Department of Community Health Sciences at the U of M's Faculty of Medicine. "That's pretty cool," she says.

Another of Martens' research studies in Manitoba hospitals also revealed that breastfed babies lost 5.5 per cent of their body weight in the first few days of life (which is normal), while formula-fed babies lost only 2.5 per cent, implying the bottle-fed babies were being overfed. It is important not to overfeed babies because that might predispose them to obesity and Type 2 diabetes later in life. Partly as a result of Martens' work, Manitoba hospital protocols have evolved to encourage only appropriate volumes of formula be fed to newborns, and only minimal supplementation be provided to breastfed babies when required.

REDUCING THE RISK

Researcher's efforts help reduce risk of cancer

The results of two research projects conducted by Dr. Harminder Singh are helping to reduce the risk of cancer for patients with gastrointestinal issues.

The first study, which took place between 2010 and 2012, involved people living with inflammatory bowel disease (IBD), a condition affecting more than 200,000 Canadians, with as many as 9,000 new cases every year.

Many people with IBD take a class of drugs called thiopurines (azathiopurine and 6 mercaptopurine) to keep their disease under control, says Singh, an assistant professor of medicine in the Departments of Internal Medicine and Community Health Sciences at the University of Manitoba's Faculty of Medicine. Studies have shown that people with IBD are at a slightly higher risk for skin cancer. But Singh's study discovered something new: people who take thiopurines are at much greater risk for a more aggressive kind of skin cancer called squamous skin cancer.

In fact, his research suggests that people who have IBD and take thiopurines – two factors that suppress the body's immune system – are six to 20 times more likely to develop squamous cell skin cancer than those without IBD and not taking the drug.

As Singh explains, IBD tends to occur in younger people who will need to take thiopurines over a long period of time. They need to understand that they must take precautions to protect against skin cancer.

"They need to be cautious of exposure to the sun," he says, adding that any skin lesions that develop should be looked at promptly. "Such simple measures should help reduce the risk of developing skin cancers. We are also hoping that with increased awareness, skin cancers are picked up early because the earlier they are caught, the better the outcomes."

A second project, which took place between 2009 to 2010, looked at the effectiveness of colonoscopies in reducing deaths due to colon cancer in usual clinical practice. Studies have shown that having a colonoscopy does reduce the risk of death from colon cancer located in the lower part of the bowel. But the protective effect appears to be less for tumours that develop in the upper part of the bowel. There appears to be a very large variation in the performance of colonoscopy by different physicians, says Singh. "Our health-care administrators now recognize the need to decrease this variation and ensure that everyone gets similar care, which should lead to lower cancer rates," he says.

IMPROVING CARE

Screening for Type 2 diabetes

Sandy Bay First Nation has one of the highest rates of amputation due to diabetes in the province. But that is changing, thanks to research led by Dr. Sharon Bruce.

An associate professor in Community Health Sciences at the University of Manitoba's Faculty of Medicine, Bruce launched a study in 2002 to determine the burden of diabetes-related problems and if people were getting the care they needed to manage their condition.

Diabetes can often lead to a number of health complications, including circulatory problems and nerve damage in the lower limbs. This can lead to amputation unless the patient receives proper care.

That wasn't happening at Sandy Bay. Of the 101 people identified with diabetes, 14 had advanced foot complications requiring specialist physician care, and 26 required regular foot care nursing. All of them had neuropathy – nerve damage that decreases sensation in the foot, and an early indication of problems to come. At the time, there was one foot-care nurse visiting the community monthly who was able to see 10 clients per trip. The people identified by the study were on a waiting list for foot-care services.

The study helped bring about change in the delivery of diabetes foot-care services. The Sandy Bay Home and Community Care Program took over foot-care services and now all people with diabetes have access to foot care. "We provided the information to the community and they made changes to the way foot care is delivered," says Bruce. "Now (people with diabetes) get a basic foot exam every year and referrals to a physician as needed," she says.

Bruce did the study with four community research assistants as well as her graduate student, Dhiwya Attawar, and a Sandy Bay community diabetes advisory group. Their work continues. "We are now developing a community-based diabetes prevention program," she says. "When research information translates into action, it is very rewarding to see that information used and some good come out of it."

JUST IN TIME

Faster treatment saves thousands of lives every year

Septic shock is the leading cause of death in intensive care units in the developed world. But now, thanks to the work of Dr. Anand Kumar, thousands of people every year are surviving this condition, which is caused by a loss of blood pressure due to severe infection.

"We had the magic bullet, but we just needed to use it correctly," says Kumar, an associate professor in the Departments of Medicine, Microbiology, Pharmacology and Therapeutics at the University of Manitoba's Faculty of Medicine. The "magic bullet" is a reference to antibiotics administered to patients in septic shock. In the normal course of events, patients who go into septic shock are stabilized and then given antibiotics to knock out the infection.

In 2004, Kumar launched a study to determine how long it took for patients in septic shock to receive antibiotics. Physicians told Kumar that it generally took between 60 to 90 minutes to deliver the antibiotics. But upon reviewing the data, Kumar discovered it generally took an average of six hours.

"We examined the impact of the speed of delivery of antimicrobial therapy in the treatment of septic shock," he says. "Dropping the median time from six to three hours increased the odds of survival from 38 per cent to 60 per cent."

As a result, protocols in Winnipeg and around the world are being changed to speed up delivery of antibiotics to patients who experience septic shock. "We are now saving 100 to 150 lives in Winnipeg each year. That's great news," Kumar says, adding that medical students are now taught about the importance of quickly administering antibiotics to patients in septic shock. Studies suggest that reducing the time it takes to deliver antimicrobials in cases of septic shock can save tens of thousands of lives across North America.

Kumar says his research was made possible because of data collected by the Winnipeg Health Region, which was one of the first health jurisdictions to code septic shock under its own designation, starting in 1989. Other regions record it under the condition that led to the infection.

The availability of this information, plus a study of septic shock in the lab during another project, prompted Kumar to look into the effects of delays in providing antibiotics to patients. "It's very cool," says Kumar. "All doctors working in academic medicine want to make a difference. We are very excited to see people who would have died going home to continue their lives."

KIDS HELPING KIDS

Aboriginal youth mentors help children to be active

How do you encourage children to become more physically active? Dr. Joannie Halas believes part of the answer involves creating culturally relevant programs that promote a holistic approach to overall health. The Rec and Read program is a case in point.

Halas, Associate Dean of the Faculty of Kinesiology and Recreation Management at the University of Manitoba, started the program 10 years ago as part of her research into how to engage Aboriginal youth in physical education and physical activity.

As a former school teacher, Halas knows that a meaningful physical activity program can be used to "connect" young people to their school environments. But through her research, she also knows that young people aren't always as physically active as they would like to be. In some cases, this is because they have a tough time fitting into the local community club or school sports scene. In other cases, it's because they can't afford the right equipment or clothing, or because they just don't feel welcome.

"What we found out is that some Aboriginal students weren't feeling connected in their physical education programs. They wanted to be more involved."

That's where Rec and Read comes into play. As Halas explains, the after-school physical activity, nutrition and education program for students Grades 4 to 6 is based on a circle of relationships. Students from the U of M's Faculty of Kinesiology and Recreation Management work with high school students to create a program for the younger children at a nearby early-years school. "We call it a relationship-based communal approach to youth mentoring through physical activity. The university students are working with the high school students to run the after-school program, and they are all learning from each other in the program."

Together, they develop a program that features games and healthy snacks, and ensures all kids are able to participate.

This approach has two main benefits. First, the program is better suited to the needs and desires of the kids. Second, the structure of the program means the university students, many of whom will go on to become phys-ed teachers, are learning how to work inter-culturally with Aboriginal students.

The Aboriginal students, in turn, are learning leadership skills that may lead to a job or further education. That's important because education and employment are two key determinants of health.

In addition to encouraging kids to be physically active, the program also promotes cultural activities, such as sharing circles, as well as opportunities for the older mentors to read and play educational games that promote literacy with the younger kids.

"Because they have been in the gym, they build nice relationships through play and laughter, then they sit down and they do some reading one-on-one, and it just reinforces a very holistic approach to healthy development," she says. Since it was launched, Rec and Read has been adopted by 20 schools and continues to engage hundreds of children and youth each year.

LESSONS FOR LIFE

Research aims to help people with intellectual disabilities

Dr. Melanie Gregg is looking for ways to improve the lives of people with intellectual disabilities. And she believes athletes with intellectual disabilities can help.

An associate professor in the Kinesiology Department at the University of Winnipeg, Gregg is studying how athletes with intellectual disabilities cope with the pressure of playing sports, and how they transfer those skills to everyday life.

"Some of the skills used by these athletes include setting goals, managing their emotions before, during and after an event, and coping under pressure," she says. "I looked at whether they were nervous, excited or fearful of the event they were playing in, and how they got through that."

In the first phase of her research, Gregg surveyed athletes with intellectual disabilities on a range of issues, such as what they liked or disliked about the pressure of competition and how they dealt with it.

The next phase in Gregg's study is to ask those athletes how they use their sports-associated skills outside of sports. After this phase is completed, Gregg says the answers will be used to form a training method to teach non-athletes with intellectual disabilities.

"It might be in the form of a workbook or workshops," says Gregg, adding this could then be used by schools or health-care organizations that deal with people with intellectual disabilities.

"For example, an athlete uses imagery to play a sport. A non-athlete would use the same technique, imagining something like how to get to their bus stop, get on the bus and pay for their ticket, and where to get off the bus. This imagery or visualization is done before the trip even starts."

TACKLING TYPE 2 DIABETES

Recreational program may help prevent chronic condition

Studying how physical activity can be used to reduce the risk of Type 2 diabetes is near and dear to Dr. Jon McGavock's heart.

In fact, his research focuses on the cardiovascular complications in youth that are associated with Type 2 diabetes. His work in this area has taken him to the Garden Hill First Nation. Located in northeast Manitoba, Garden Hill has a Type 2 diabetes rate that's 400 to 500 times higher than the general population.

A few years ago, McGavock and key stakeholders from Garden Hill set out to determine whether a peer mentoring program called Rec and Read could help reduce that rate by encouraging young people to eat healthier and become more physically active, two factors associated with reduced risk of Type 2 diabetes.

"Rec and Read encourages people to adopt a healthier lifestyle, get active and improve their self-esteem so they can become role models for others in their community," says McGavock, an associate professor of Pediatrics and Child Health at the University of Manitoba's Faculty of Medicine, and co-leader of Diabetes Research Envisioned and Accomplished in Manitoba at the Manitoba Institute for Child Health.

Rec and Read was developed by Dr. Joannie Halas, Associate Dean, Faculty of Kinesiology and Recreation Management at the U of M, and McGavock worked with her to expand the model for the prevention of Type 2 diabetes.

In the Garden Hill version, local high school students were hired to deliver a program of healthy snacks, physical activities and bonding within a traditional medicine wheel concept to about 80 Grade 4 students in 2010/11 and 2011/12. Although it's too early to tell whether it can help reduce Type 2 diabetes rates, the program has had a positive effect. Teen mentors from Garden Hill recently shared their take on the program at a special presentation attended by 75 members of the Faculty of Medicine. Many felt inspired by their presentations, says McGavock. "It motivated us to see a lot of hope for the future, for people facing an overwhelming burden of chronic disease."

KNOCKING OUT CANCER

New delivery method may enhance treatment

Dr. Thomas Klonisch is working on a research project that could one day lead to a cure for brain cancer, one of the most difficult of all tumours to treat.

In fact, the project, led by Klonisch and Drs. Jörg Stetefeld and Jerry Krcek, has already generated positive results in early in-vitro and animal testing and could be ready for clinical trials within the next few years.

The research centres on the development of an efficient mechanism to deliver chemotherapy to destroy brain cancer cells.

Krcek, a neurosurgeon at Health Sciences Centre, identifies three ways currently used to treat brain cancer – surgery, radiotherapy and chemotherapy. But the success of these treatments is limited, and for certain types of brain cancer there is no cure.

Klonisch says he, Krcek and Stetefeld hope to change that, with the help of a family of proteins that can form tubes. One of these proteins is found in a bacterium that grows deep down on the sea floor.

An associate professor of biochemistry at the University of Manitoba, Stetefeld has discovered that these proteins, called "right-handed coiled-coil proteins," lend themselves to forming "tubes" that can be used to convey chemotherapy using noble metals like platinum. "These coiled protein aggregates create little nano-tubes," says Klonisch, Head of the Department of Human Anatomy and Cell Science at the University of Manitoba's Faculty of Medicine. "And we use those nano-tubes as carriers for chemotherapeutics," he says.

The proteins are a story all on their own. "What is really fascinating about this is the tubes come from a bacterium, and the bacterium grows near volcano-like openings at the bottom of the ocean, more than 3,000 metres below the surface. This is a harsh environment these tubes are exposed to. They are very resilient," he says, explaining why they can handle chemotherapeutic drugs.

Klonisch and his colleagues have found different ways to make platinum used in chemotherapy treatments interact with the nano-tubes and be released over time. So far, the team has had success in treating brain cancer cells in the lab. "Under the right conditions, these coiled protein nano-tubes with platinum are highly effective in killing tumour cells," Klonisch says.

The next phase of the project involves more testing using human brain cancer cells in the lab to confirm the findings. Now that Klonisch knows that the platinum-laden proteins can kill cancer cells under certain conditions, the challenge going forward will be to determine whether the delivery system can effectively penetrate the blood-brain barrier. "The work is all ongoing, and the good thing is it is all ongoing here with local experts," says Klonisch. For example, the team is collaborating with experts in neurosurgery, neuropathology, pharmacology, chemistry and anatomy to develop ideas about how to get the platinum-loaded protein nano-tubes into the brain. Other experts will be consulted once the team firms up its evidence, Klonisch says.

HISTORY OF EXCELLENCE

By Joel Schlesinger

Manitoba researchers have helped change the face of health care

Manitoba has a special place in the annals of modern medical research history.

Over the years, this province's researchers have made major contributions in a variety of fields, ranging from the discovery of new treatments to cure disease to the development of new approaches to enhance the delivery of health care.

It all started more than 40 years ago with pioneers like Drs. Bruce Chown and John Bowman. In the 1960s, this remarkable duo teamed up to develop a vaccine for Rh disease, a potentially deadly disorder for fetuses and newborns. Their work has benefitted thousands of women worldwide, and is often cited as the single most important medical research discovery in Manitoba's history.

These scientists and many others like them have laid the foundation for Manitoba's rich heritage in health research. While some have been recipients of Manitoba Health Research Council (MHRC) funding, all have demonstrated the importance of home-grown research. Their contributions underscore the benefits of supporting the scientists who follow in their footsteps. Here is list of some Manitoba researchers who have played a major role in advancing the delivery of health care, not just here in Manitoba, but around the world.

Dr. Arnold Greenberg

Dr. Arnold Greenberg helped shed new light on the role of cells in preventing disease. In doing so, he helped shape modern medicine's understanding of cancer, immunology, cardiology and genetics.

Born in Winnipeg in 1941 and educated at the University of Manitoba and Johns Hopkins Medical School in Baltimore, Greenberg helped found the Manitoba Institute of Cell Biology, serving as its director from 1988 to 2000.

A distinguished professor at the University of Manitoba, Greenberg was one of the first to understand the molecular mechanisms at play when a cell became damaged, eventually leading to its death. He is renowned in the medical community for discovering that human bodies have natural defences – specific immune system cells – that identify and attack disease.

Prior to his work on cellular immunology, medicine's understanding of how the immune system selected damaged cells and then induced their death was largely a mystery. His team found the smoking gun molecule that played a central role in the cellular biochemistry – a discovery that may lead to new vaccines, antibiotics and treatments for cancer, heart diseases and degenerative neurological disorders, just to name a few.

Greenberg died in 2001. An obituary that ran in *Nature* – one of the world's leading scientific journals – called him "a beloved and highly admired member of the scientific community."

Dr. Lyonel Israels

Without the work of Dr. Lyonel Israels, it's hard to fathom where clinicians' understanding of hematology would be today. The former professor of medicine at the University of Manitoba's Faculty of Medicine died in 2003, yet he has left a profound legacy of research in Winnipeg and beyond.

A founding member of the Manitoba Institute of Cell Biology, Israels conducted research to build our understanding of how blood works on a cellular level. He explored the role of red blood cells in maintaining our health and their connection to bone marrow.

His studies included groundbreaking observations on the role of hemoglobin – which carries oxygen to cells in the body – and blood clotting. Most importantly, he helped provide an understanding of how these two functions of the blood become impaired by illness.

Israels, who was born in Regina in 1926 and obtained a medical degree from the University of Manitoba in 1949, also studied the role of Vitamin K in fetal development and tumour formation. And as the first director of the Manitoba Institute of Cell Biology, he set its course for decades to come, advancing its role in exploring the origins of cancer, cell biology and our understanding of how the body heals itself. Perhaps most notably, he was a dedicated mentor and teacher who helped build Manitoba as a medical research centre for the world, including helping to establish the Manitoba Health Research Council.

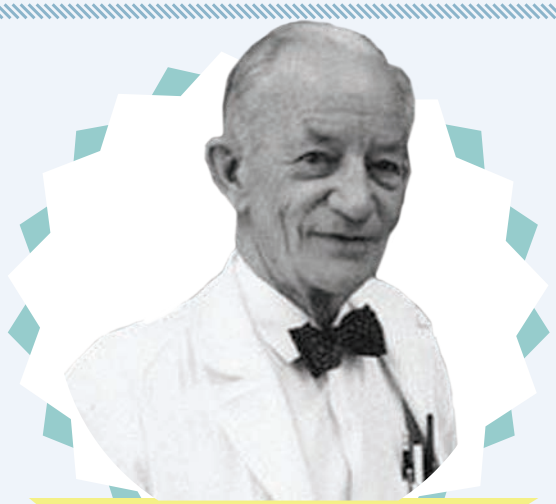
Dr. John Hamerton

Any discussion about Canada's most distinguished medical geneticists must include Dr. John Hamerton.

Born in England in 1929, he arrived in Canada to carry out genetic research in 1969 at Winnipeg's Children's Hospital. His contributions to research include uncovering the role genetics play in pediatric illness. He also made significant contributions to the advancement of the Human Genome Project, which mapped the blueprint of our genes.

Hamerton passed away in 2006, but his legacy is alive and well. He helped establish the University of Manitoba's Department of Biochemistry and Medical Genetics at the Faculty of Medicine. And he was responsible for putting Winnipeg on the map as a centre for serious study of human genomics – a potential treasure trove of cures for many of the leading causes of disease around the world.

A founding member and former president of the Canadian College of Medical Geneticists, Hamerton brought modern genetic research into the centre of the medical establishment. Without his groundbreaking work in the study of cytogenetics – the study of chromosomes within the nucleus of the human cell – some of the advances today in preventing in utero genetic-related diseases would not have been possible.



Dr. Bruce Chown

Born in Winnipeg in 1893, Dr. Bruce Chown was one of the first Manitobans to make a major contribution to the world of medical research.

The son of a pioneer surgeon, Chown is best known for developing a cure for a potentially deadly disease for in utero and newborn babies.

Rh – or Rhesus factor negative syndrome – is a type of blood antigen, similar to A, B, O and AB antigens. People are born either Rh positive or negative. When a mother and her unborn child had different Rh factors – namely the mother was Rh negative and the fetus was Rh positive – her immune system might attack her baby. Potentially, this could lead to all sorts of complications in the development of the heart, lungs and brain. In some cases, it would lead to death in utero or life-threatening complications after birth. Chown's work eliminated this threat. His research in the mid-1960s led to the discovery of a serum that largely cured the problem and prevented countless miscarriages, neo-natal deaths and lifelong birth-related illnesses.

But the impact of his work extends beyond bedside neo-natal care. It broke ground for Manitoba's medical community because he was the first from the province to complete landmark research that led to the commercialization of a major new drug – work that ultimately laid the foundation for all research in the province to follow.

Chown obtained his medical degree from the University of Manitoba in 1922. He also trained as a pediatrician at Johns Hopkins, Cornell and Columbia universities before taking a position as a pathologist at the Children's Hospital in Winnipeg.

Dr. John Bowman

Dr. John Bowman played a critical role in helping Dr. Bruce Chown develop the world's first vaccine to Rhesus factor (Rh) negative syndrome.

A physician and professor at the University of Manitoba's Faculty of Medicine, Bowman helped develop anti-RhD immunoglobulin by clinically proving it could be administered to a pregnant woman to prevent the condition. The treatment could also be administered after pregnancy as a precaution against the woman's body developing an immune-response factor that could be passed on through breastfeeding to a newborn. This discovery had such a profound effect on prenatal and neonatal care that *Time* magazine named it one of the top 10 medical discoveries of the 1960s.

A founding member of the Winnipeg Rh Institute, Bowman worked with Chown to commercialize the vaccine called WinRho SD. The drug is now sold in 35 countries by the Manitoba-based research firm Cangene.

Bowman and Chown not only helped form of one of Canada's largest life sciences firms, they set a course for future researchers in the province, demonstrating how a discovery could be commercialized for the benefit of people around the world.

Born in 1925, Bowman attended Gordon Bell High School and graduated with a degree in medicine from the University of Manitoba in 1949. In addition to his work as a researcher and teacher, Bowman also practised in the Pediatric Department at the Manitoba Medical Clinic. He died in 2005.

Dr. Allan Ronald

Two aspects of science make Dr. Allan Ronald's heart sing. One is making a scientific observation no one else has made, and subsequently having it confirmed by colleagues. The other is mentoring up-and-coming scientists to do the same. And his heart has had plenty to sing about over a career of more than five decades.

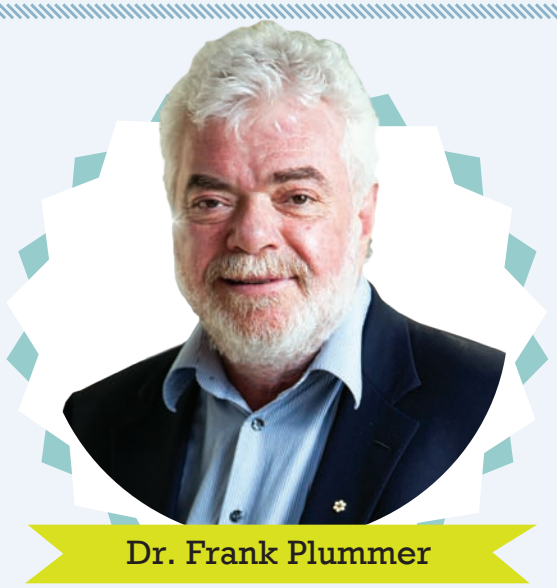
Born in Portage la Prairie in 1938, Ronald is a pioneer in the study of infectious disease and microbiology. Recently inducted to the Canadian Medical Hall of Fame, the professor emeritus first gained recognition for uncovering the reasons for recurrent urinary infections and developing effective ways of assisting women to manage this frustrating common illness. That was in the late 1960s and 1970s.

A few years later, he was at the forefront of research into sexually transmitted diseases. During the mid-70s when Winnipeg experienced an outbreak of chancroid, a sexually transmitted bacterial disease commonly found in Africa, his team stemmed the spread by finding a simple cure, using antibiotics.

That work led to an invitation to travel to Kenya to provide advice on how to treat the disease there, a place where it was much more widespread and problematic.

It was during his work in Kenya that Ronald found himself at the front lines of the HIV pandemic. Soon he became a leading expert on the disease in Africa and helped make game-changing discoveries as well as mentoring many leading lights in HIV research, like Drs. Frank Plummer and Keith Fowke – both now based in Winnipeg.

Among the many contributions he and his disciples have made to HIV research are the importance of sex trade workers in the spread of the disease and how circumcision prevents its transmission.



Dr. Frank Plummer

Many Canadians are familiar with Dr. Frank Plummer.

During the H1N1 influenza pandemic of 2009, the head of the Public Health Agency of Canada's National Microbiology Laboratory was frequently seen front and centre at news conferences on TV, informing the public about the outbreak of the potentially deadly flu.

In fact, whenever a major outbreak of infectious disease occurs in Canada or anywhere in the world, Canada's own version of the U.S.'s Centers for Disease Control is the "go-to" team in fighting it. And Plummer has been at the helm since its founding in 2000.

Although born in Winnipeg in 1952, the world-renowned infectious disease microbiologist did not cut his teeth here. He established himself as a brilliant scientist in Africa in the 1980s and 1990s. There, Plummer gained world recognition as a pioneering researcher in HIV, and was among the first to discover that some individuals had a natural immunity to the disease.

Having studied under Dr. Allan Ronald, he soon took over a leading role in fighting HIV's spread. His work fighting the disease continues today, funded by leading national and international organizations, including the Bill & Melinda Gates Foundation.

Plummer describes his team's success as a case of being in the right place at the right time mixed with an ability to look at the problem from a different angle. Early on, for example, most experts agreed HIV was a male disease, but Plummer and his team proved otherwise.

"We were the first on the ground in Africa when HIV became recognized as a problem," he says. "And we thought outside the box, not ascribing to conventional wisdom at the time." His work has led to many new discoveries that will one day lead to an HIV vaccine.

Plummer, who graduated from the University of Manitoba's Faculty of Medicine in 1976, says he is indebted to those who came before him here in Winnipeg, scientists such as Ronald and Dr. Henry Friesen – who helped bring the national disease lab to the city. "I inherited the National Microbiology Laboratory, and together we have made it the best or as good as any disease research lab in the world."

Key dates in Manitoba health research history

1883 Manitoba Medical College is established

1919 Dept. of Biochemistry established at the new Faculty of Medicine

1944 Dr. Bruce Chown establishes Rh Laboratory

1946 Dept. of Clinical Research created at U of M

1969 U of M creates Canada's first Dept. of Immunology

1969 Manitoba Institute of Cell Biology established

1880 1920 1930 1940 1950 1960

Timeline compiled by Jordan Bass, Faculty of Medicine Archivist

Dr. Henry G. Friesen

Dr. Henry Friesen is considered one of the godfathers of medical research in Manitoba.

In addition to making groundbreaking discoveries, Friesen was also one of the original founders of the Manitoba Health Research Council and helped transform the nature of medical research in this country as an architect and champion of the creation of the Canadian Institutes of Health Research – the leading funding provider for health research in Canada.

Born in Morden, Manitoba, in 1934, Friesen is best known for his research on hormones of the pituitary gland, an olive sized structure at the base of the brain. In the 1970s, he uncovered the identity and role of a pituitary hormone called prolactin.

Initially, the scientific community scoffed at the idea that prolactin existed in humans, let alone that it might affect female infertility. But Friesen proved them wrong. After developing simple tests to measure blood levels of prolactin he found a connection between high levels of the hormone and infertility.

His work eventually revealed that many women with high levels of prolactin who were infertile had small tumours of the pituitary gland that produced too much of the hormone.

Friesen went on to collaborate with neurosurgeons and drug companies to pioneer treatment of patients with pituitary tumours and elevated prolactin levels. Either surgical or drug therapy effectively eliminated the tumours, normalized prolactin levels and cured the disorder, enabling hundreds of thousands of women around the world who were infertile to become pregnant.

Drs. Leslie & Noralou Roos

When Drs. Leslie and Noralou Roos were at the Massachusetts Institute of Technology in the 1960s, they could have hardly foreseen they'd become trailblazers in the world of health care.

The married couple both got PhDs in political science – about as far as one can imagine from health care. In their graduate program, they were offered training in using computers.

When they arrived in Manitoba in the 1970s and discovered that every physician visit and every hospital admission generated computerized records for the whole population, they told Manitoba Health: tell us what you want to know and we'll figure out how to use the data to find answers.

Ever since, the Rooses have been at the forefront of analyzing health-care data. They have pioneered new ways to use information collected by not just the health-care system but by education and social services. Noralou was quoted once: "I've never met a data set I didn't want to work with."

In 1991, they were involved in founding the Manitoba Centre for Health Policy, at the request of then provincial health minister Don Orchard.

It was a time when the health-care system was in a state of flux. Budget cuts had forced the closing of almost a quarter of the hospital beds in Winnipeg, and the government wanted to know the effects on care. So the Manitoba Centre went to work. "There were headlines suggesting people would be dying in the streets if they couldn't get into a hospital," Noralou Roos says.

What they found was counter to the conventional wisdom at the time. Instead of more people dying and having complications, or being unable to get into hospital, access to high-quality care had actually not been substantially affected. It was the first major step toward making systematic data analysis an integral piece of policy planning for health-care delivery in Manitoba.

Independent from the government, the Manitoba Centre for Health Policy – now led by Dr. Patricia Martens – provides policy advice for many of the big issues that challenge the health-care system, such as wait times and the effectiveness of dollars spent on programs.

But the scope of what the Rooses created extends beyond Manitoba. Ontario, British Columbia, Alberta and Quebec all have major centres working with government data generated by the health-care system. More recently, both the United Kingdom and Australia have sought the Rooses' advice as part of their commitment of millions of dollars for setting up their own centres that use administrative data for health research.

The Rooses have worked with leading researchers in clinical epidemiology, health economics, health services research, population health, child development and knowledge transfer.

1971 Children's Hospital Foundation of Manitoba is created

1982 Province creates Manitoba Health Research Council

1991 Manitoba Centre for Health Policy is created

2001 Manitoba Institute of Child Health established

2004 International Centre for Infectious Diseases is founded

2008 U of M creates Regenerative Medicine Program

1970 | 1980 | 1990 | 2000 | 2010 | 2020

Photography: Marianne Helm

Drs. Naranjan Dhalla (left) and Pawan Singal are two of the many top-flight researchers who have been drawn to Manitoba.

GLOBAL CONNECTIONS

By Joel Schlesinger

Manitoba's reputation as a centre for research has attracted scientists from around the world

Naranjan Dhalla was a gangly 25-year-old with dreams of a bright future when he left his home in India more than 50 years ago.

Having just graduated with a science degree, Dhalla first headed to the United States to study pharmacology. It would turn out to be a temporary stop.

After a few years south of the border, he took a position as a professor at the University of Manitoba's Faculty of Medicine. It was a fortuitous move.

Over the next four decades, the slim young man from northern India would go on to become one of the world's leading cardiac researchers.

Through his work – which has been cited more than 14,000 times in medical journals – Dhalla has advanced the understanding of cardiovascular disease and helped to develop new treatments. He has also helped put Winnipeg on the map as a centre for cardiac sciences, attracting research dollars and mentoring talented young scientists.

His contributions have not gone unnoticed – a bust of his likeness can be found in the city's Assiniboine Park Citizens Hall of Fame.

But Dhalla's story is more than a tale of one man's success. It is also a prime example of the important role immigration has played in helping to build Manitoba's medical and health research community, one that continues to this day.

Over the years, Manitoba has attracted dozens of brilliant minds from around the globe, thanks in no small part to the Manitoba Health Research Council.

This provincial funding body for health research has provided incentives to attract graduate and post-graduate students from India, China, France, Japan, and many other countries. Many are embarking on promising careers in medicine and science. Their work is helping to establish Manitoba as a leader in research in Canada and around the world.

Now in his mid-70s, Dhalla is quick to credit his adopted home as a large reason for his success in health research.

"I had an extraordinary experience living in Manitoba," says Dhalla, a principal investigator at the Institute of Cardiovascular Sciences at St-Boniface Hospital. "People have been so kind to me; it's unbelievable."

He also credits the MHRC for helping to attract the best and the brightest to the province. Not only has the council helped fund Dhalla's research, it has also helped attract and retain some of his colleagues, including Dr. Pawan Singal, a principal investigator specializing in cell pathophysiology.

Singal is also from northern India and originally immigrated to Edmonton to work on his PhD in physiology. He then worked on his post-doctoral fellowship in physiology at the University of Saskatchewan and landed a position at the University of Manitoba in the late 1970s as a lecturer and associate researcher.

Singal was just embarking on his own career path in research when the MHRC opened its doors for business. It was a case of perfect timing: its funding helped keep him here in the province.

"That (MHRC) grant was my seed money in Manitoba to set up a lab," Singal says. "And indeed, that funding turned out to play a huge role for me to bring in more funding from national sources."

That's what MHRC funding is all about – getting young investigators started. They can launch their research, get some early results, and that promise attracts money from larger funding sources.

That concept worked very well for Singal. Today, he is the Director of the Institute of Cardiovascular Sciences at St-Boniface Hospital Research and a leading researcher in cardiac cell biology.

"My budget, from that start of $10,000, has grown to as high as $400,000 annually," he says, noting that much of the money comes from sources such as the Canadian Institutes for Health Research, Heart and Stroke Foundation of Canada, and Canadian Breast Cancer Foundation.

The return on investment in both Dhalla and Singal's instances has been remarkable, as they have both helped to advance medicine in their respective fields.

Singal, for example, has spent much of his career studying how heart tissue cells die. Typically, when heart muscle cells are starved of oxygen, they become damaged. They do not regenerate and most often quickly die. This leads to heart failure – the heart muscle's capacity is reduced so it's less able to pump blood to provide the needed supply of nutrients to the rest of the body.

Through his work, Singal has also investigated the role free radicals play in heart failure. Free radicals are unstable molecules that cause oxidization in cells, which is a little bit like rust on metal.

Singal discovered that cell damage and death aren't necessarily caused by a lack of oxygen. It's often the mishandling of oxygen by the cell during times of stress that causes problems.

Like Singal, Dhalla's research into cardiovascular disease has also been groundbreaking. His work helped prove the connection between diabetes and cardiomyopathy – the medical term for heart tissue infections.

"At one time, many scientists thought there was no connection whatsoever," he says. "Now, we know it's a fairly common complication and understand its causes."

Dhalla's team has also studied the effects of hormones on the heart tissue during heart attacks. As well, he has been instrumental in understanding the role of calcium and oxidative stress during heart attacks and ischemic strokes.

This work has led to the development of early drug treatment interventions for stroke and heart attack sufferers in the Emergency Department, saving several thousands of people from life-threatening damage to their hearts, brains and other major organs.

Both Singal and Dhalla's research has had enormous impact at home and abroad. Singal organized the Winnipeg Heart International Conference in October 2011, partly supported by the MHRC. The focus of the conference was to bring back former trainees and collaborators to Winnipeg. A total of 300 delegates came from 23 countries, representing a direct impact of their training in Winnipeg.

Like many other researchers who have come from other parts of the world, received MHRC funding and established themselves as top-notch scientists, Dhalla and Singal are also mentors, educators and benefactors. They want to share their knowledge with the rest of the world – and in particular, with their country of origin.

This is not unusual, says Dr. Peter Nickerson, Associate Dean (Research) at the University of Manitoba's Faculty of Medicine, and a member of the MHRC's board. Researchers from other countries who come to Winnipeg often help build relationships with other research centres and universities around the world.

He cites the example of Dr. Patrick Choy, a cardiovascular health researcher and a former associate dean (Research) at the University of Manitoba's Faculty of Medicine. Choy's research has provided insight into how fat proteins cause atherosclerosis, the leading cause of cardiovascular disease. Atherosclerosis is a buildup of fatty deposits, known as plaque, in the lining of the arterial walls. Part of his research has involved the medicinal uses of Chinese herbs and other natural products to promote arterial health.

Although he lives and works here, Choy still has one foot in China. And he's a firm believer in the exchange of ideas between medical communities in both nations.

These kinds of connections can help attract funding dollars. For example, Nickerson says Choy helped attract funding from successful Chinese businessman Li Ka-Shing's foundation to establish an exchange program between the U of M and Shantou University in China.

"We've sent our medical students to observe and learn how medicine is practised in China and they've sent their students to do the same here," he says.

Similar relationships are now found all over the world. HIV researchers Drs. Frank Plummer and Allan Ronald, for example, have forged very strong ties with African nations like Kenya and Uganda, as well as leading research centres in Europe and the U.S.

These relationships have helped Manitoba earn a stellar reputation as a research centre, and have helped attract top experts, including Dr. Jean-Eric Ghia.

Ghia is one of the world's leading researchers in inflammatory bowel disease, studying the role of the neuro-endocrine system – basically the systems regulating the brain and the body's hormones – in digestive disorders like colitis and Crohn's disease.

"We've had students come from around the world," Nickerson says. "They come here to complete their degrees and then they go back to their home countries to set up their research labs, and certainly, we have researchers in Manitoba who have research projects set up around the world."

And today, as in the past, many got their start in part because of funding from the MHRC. It's a pattern that will likely only become more pronounced in the future as word spreads about the province's reputation as a place for nurturing aspiring world-class medical scientists.

Certainly, attracting top talent is great for our health-care system. But it's more important than just the local effect, Singal says. "It's about bringing up the level of health research around the world and growing the global brain capital in fighting disease."

RESEARCH CENTRES, INSTITUTES & GROUPS

Research centres, institutes and shared facilities promote the exchange of ideas and provide collaborative research environments that stimulate multidisciplinary research and development. They also afford novel training opportunities for students and are valuable resources for the community at large. Here are some of the health-related research centres, institutes, groups in Manitoba:

UNIVERSITY OF MANITOBA, FORT GARRY CAMPUS

Richardson Centre for Functional Foods and Nutraceuticals
Manitoba Centre for Nursing and Health Research (MCNHR)
The Centre on Aging

UNIVERSITY OF MANITOBA, BANNATYNE CAMPUS

Centre for Aboriginal Health Research (with Health Sciences Centre)
Centre for Global Public Health
Centre for Human Models of Disease
Centre for Professional and Applied Ethics
Manitoba Centre for Health Policy
Manitoba Institute for Child Health
Manitoba Centre for Proteomics and Systems Biology (with Health Sciences Centre)
Centre for Regenerative Medicine
Great-West Life Manitoba Breast Cancer Research and Diagnosis Centre (with CancerCare Manitoba)
Health, Leisure and Human Performance Research Institute
Community Acquired Infections Research Group
Developmental Health Research Group
Gastroenterology Research Group
Military and Veteran Health Sciences Research Group
Mood and Anxiety Disorders Research Group
Palliative Care Research Group
Manitoba Institute of Cell Biology (CancerCare Manitoba)
Spinal Cord Research Centre
Psychiatric Neuroimaging Research Group

KLEYSEN INSTITUTE FOR ADVANCED MEDICINE, HEALTH SCIENCES CENTRE

UNIVERSITY OF MANITOBA IN PARTNERSHIP WITH ST-BONIFACE HOSPITAL

Canadian Centre for Agri-Food Research in Health and Medicine (with St-Boniface Hospital and Agriculture and Agri-Food Canada)
Institute of Cardiovascular Sciences (with St-Boniface Research)
Centre for the Research and Treatment of Atherosclerosis

CONCORDIA HIP AND KNEE INSTITUTE

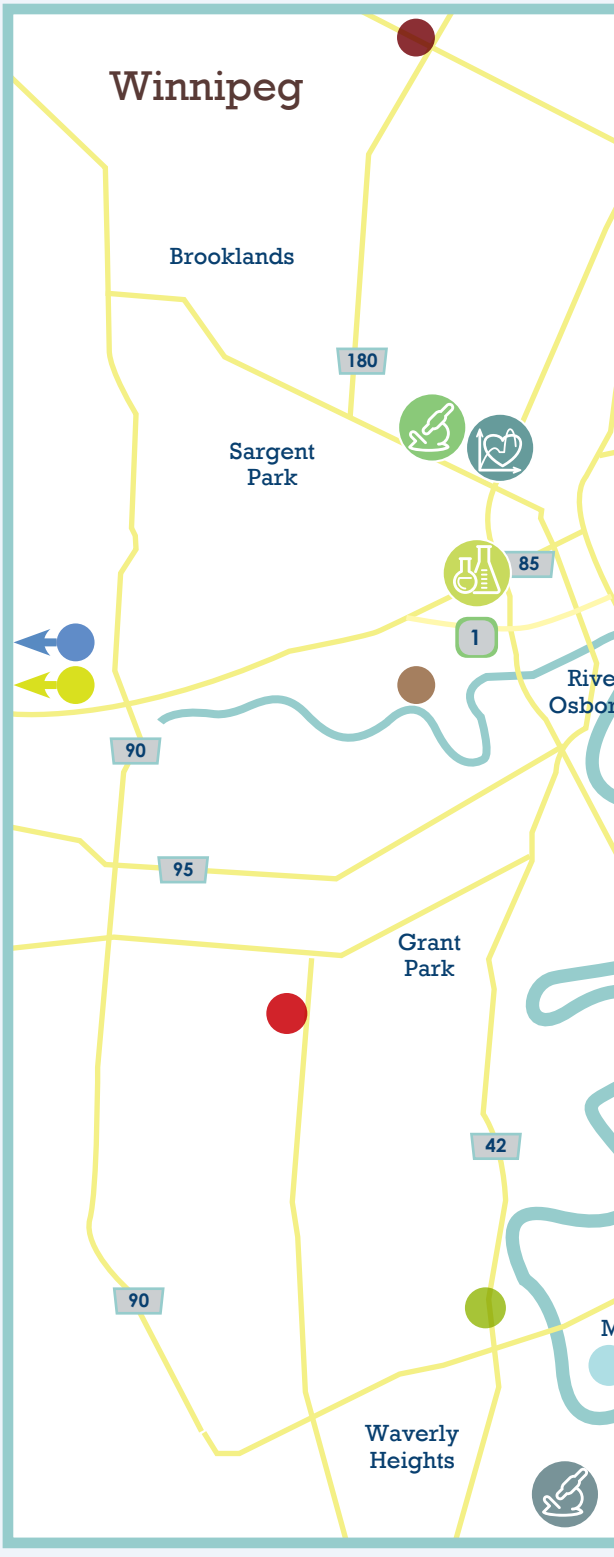
NATIONAL MICROBIOLOGY LABORATORY

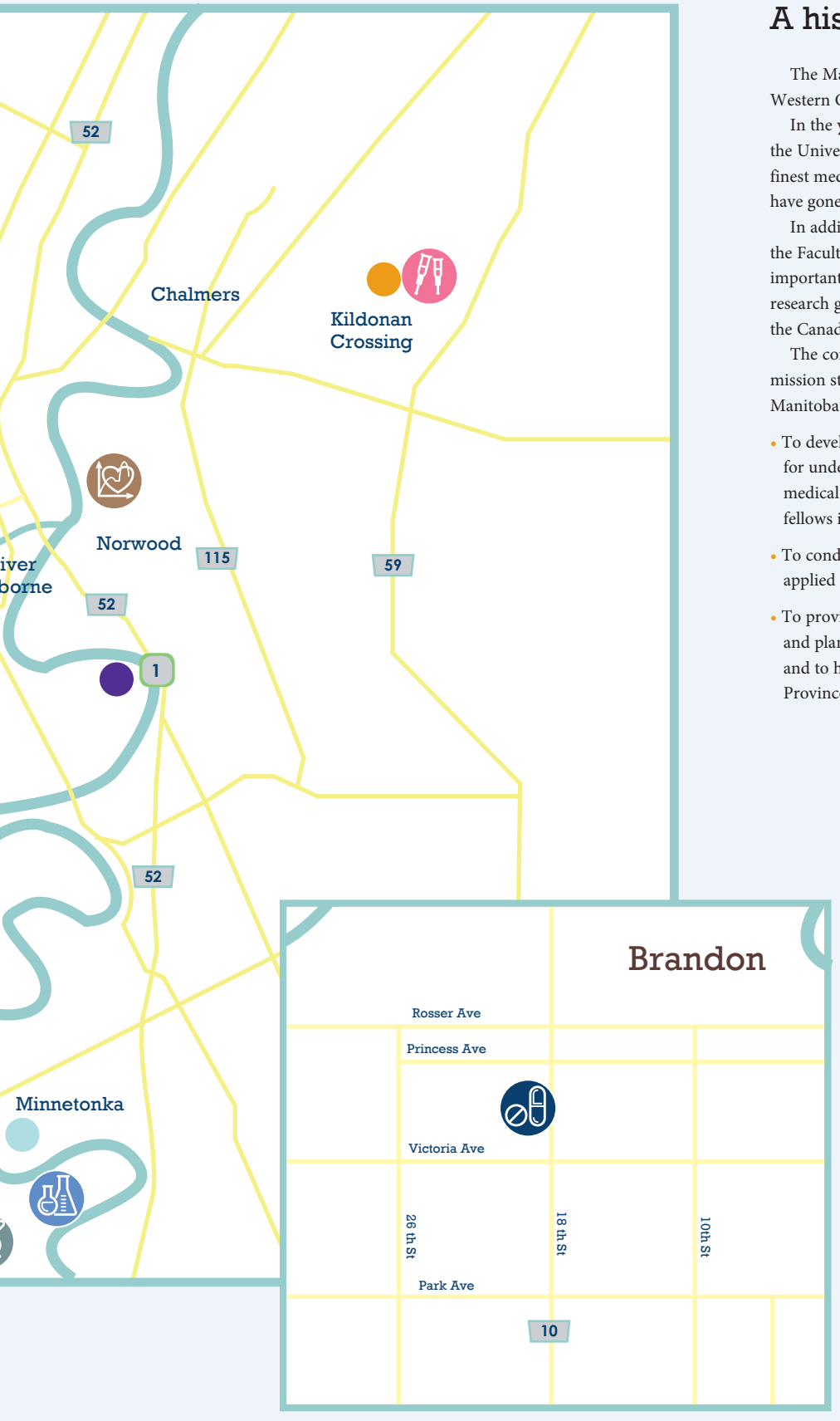
UNIVERSITY OF WINNIPEG

Medical and community-based health research

BRANDON UNIVERSITY

Community-based health research





A history of health research

The Manitoba Medical College, the first school of its kind in Western Canada, was established in Winnipeg in 1883.

In the years since, this little school on the prairie has evolved into the University of Manitoba's Faculty of Medicine, one of Canada's finest medical schools, graduating more than 7,000 physicians who have gone on to become dedicated doctors and medical leaders.

In addition to training the majority of Manitoba's doctors, the Faculty of Medicine has also blossomed into one of the most important health research centres in the country, and includes 37 research groups approved under a regional partnership program with the Canadian Institutes of Health Research.

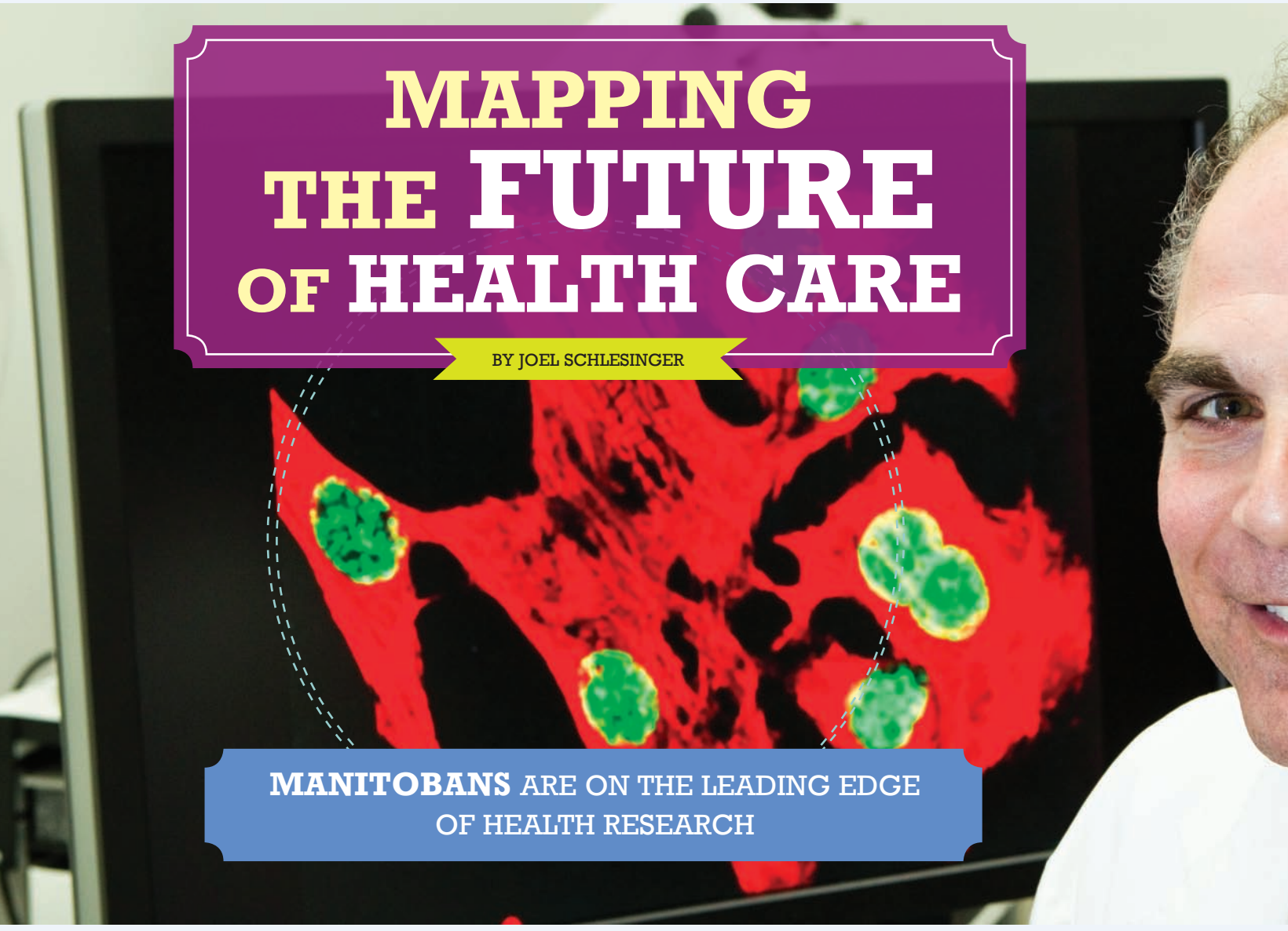
The commitment to health research is written into the faculty's mission statement, which says the focus of the University of Manitoba's Faculty of Medicine is:

- To develop, deliver and evaluate high quality educational programs for undergraduate and postgraduate students of medicine and medical rehabilitation, for graduate students and post-doctoral fellows in basic medical sciences and for physicians to practice;
- To conduct research and other scholarly enquiry into the basic and applied medical sciences; and
- To provide advice, disseminate information to health professions and plan for the development and delivery of health-care services and to help improve health status and service delivery to the Province of Manitoba and the wider community.

University of Manitoba

Research is also carried out at the following hospitals and health centres.

- PAN AM CLINIC
- CONCORDIA
- GRACE
- SEVEN OAKS
- VICTORIA
- DEER LODGE
- MISERICORDIA
- RIVERVIEW
- ST. AMANT RESEARCH CENTRE



MAPPING THE FUTURE OF HEALTH CARE

BY JOEL SCHLESINGER

MANITOBANS ARE ON THE LEADING EDGE OF HEALTH RESEARCH

When Dr. Lorrie Kirshenbaum decided to investigate how genes affect the life and death of heart cells, he came up with a novel approach to study the problem.

First, he developed a virus. Nothing too serious – just a run-of-the-mill cold virus.

Then he took the gene in question and inserted it into the virus. Once that was done, he dropped the gene-carrying bug into the heart tissue of a lab rat.

Through this process, which Kirshenbaum pioneered in 1993, he was able to observe how genes affect heart cells. In fact, this technology allowed Kirshenbaum to be among the first investigators to manipulate adult heart cells with certain genes that promoted DNA synthesis and cell growth. He has also used this approach to genetically engineer heart cells with special genes that make them resistant to injury and death after heart attack. In effect, he created a new theatre in which to study heart disease and, perhaps, how to cure it.

Now, nearly 20 years later, the gene-in-a-virus technique is helping Kirshenbaum take another major step towards his ultimate goal. Earlier this year, he announced that he had identified a series of genes that switch on when the heart muscle is deprived of oxygen.

The discovery is an intriguing one. Learning how to prevent the genes from switching on when starved of oxygen could lead to new treatments to prevent damage to heart muscle cells during heart attacks, says Kirshenbaum, who is the University of Manitoba's Canada Research Chair in Molecular Cardiology at St-Boniface Hospital Research. It could also open the door for new approaches to treating cancer.

"What we discovered was that the genetic pathway that gets switched on in the heart when the cells are deprived of oxygen is the same as the one that gets switched off in cancer cells," says Kirshenbaum, who is also a professor in the Departments of Physiology and Pharmacology and Therapeutics at the University of Manitoba's Faculty of Medicine. "So this research could have a major impact in the treatment for both diseases."

Kirshenbaum's ongoing investigation into the life and death of cells is considered world-class, and is just one example of the leading edge research taking place in Manitoba today. Everywhere you look, researchers working in the lab or out in the community are pushing the boundaries of knowledge in their respective disciplines as they map a path for the future of health care.

Photography: Marianne Helm

Dr. Lorrie Kirshenbaum looks on as a computer screen displays an image of a heart cell.

In doing so, today's researchers are building on the legacies of a previous generation of Manitoba research icons, people like Drs. Bruce Chown and John Bowman, who developed a cure for Rh disease, and Dr. Joseph Doupe, who is credited with transforming the University of Manitoba's medical school following the Second World War by emphasizing the importance of research in the delivery of care.

But while the quest for knowledge may be as old as the test tube itself, there are important differences in the way researchers go about their work today, says Dr. Peter Nickerson, Associate Dean (Research) for the University of Manitoba's Faculty of Medicine.

For example, researchers now have access to an array of technologically advanced tools to help them explore whole new frontiers of medicine, including molecular biology, proteomics and stem cell research. "Compared to the tools that we had then, the tools we have now are unbelievably more sophisticated," says Nickerson, who is also a member of the Manitoba Health Research Council's Board of Directors.

He cites the case of American researcher Craig Venter who decided about 10 years ago to map the human genome. "That whole exercise took about a year," he says. Now, with the acquisition of the latest technology in the form of the AB 5500 XL gene sequencer, "We can do that in a week. It's an explosion of capacity and speed that is generating genetic data in a way we never could do before."

Another example is the QStar Elite mass spectrometer, used by scientists to analyze the makeup of proteins. The instrument is based on a design developed by a group led by Dr. Ken Standing, professor emeritus, and Dr. Werner Ens, professor, in the Departments of Physics and Astronomy at the University of Manitoba. "The earlier versions of the mass spectrometer would take days and give us a low level of resolution (of a protein). Now that we have much more sophisticated machines, they are able to go through the analysis much faster and with a much higher level of sensitivity. We're able to detect low-level proteins that, before, we didn't even know were there."

Nickerson likens advances in research techniques to exploration of space. "It's like looking at the moon through binoculars 50 years ago, and now you have the Hubble telescope," he says. As a result, scientists are better able to piece together how cells, proteins and genes interact with each other in the human body. "And it is through that interaction that we are able to actually think about how we might modify that interaction… so that in the case of cancer, you shut off cancer growth, or in the case of auto-immune disease, you shut off the auto-immune process, and have healing and recovery of normal function. In that sense, it is a new world," says Nickerson.

Kirshenbaum's work is a case in point. In order to carry out his research, he first needed to develop the technology or technique of dropping the gene into a virus. Then, using a number of highly sophisticated molecular biology techniques coupled with a laser scanning fluorescence microscope, he was able to see where the genes he introduced into the heart cells were located and their effects on cell growth.

Kirshenbaum and his team of 10 researchers, comprised of students, post-doctoral trainees, and research associates, are not the only ones coming up with new answers to old problems. Within the last few years, the University of Manitoba's Faculty of Medicine has opened, directly or in partnership with other groups, a number of labs to explore new fields of medical research. They include:

* The Regenerative Medicine Program: Headed by Dr. Geoff Hicks, this lab includes eight principal investigators, 36 graduate students, 20 technologists and 10 post-doctoral fellows. The objective is to develop stem cell therapies to treat conditions ranging from cancer to spinal cord injury.

* The Manitoba Centre for Proteomics and Systems Biology: Led by Dr. John Wilkins, this lab has seven principal investigators and about 35 support staff. It was created to study proteins, the biochemical compounds that essentially build every living cell. Understand how proteins operate and you can gain new insights into what happens when cells become infected or diseased.

These groups represent a new wave of research that is emerging in Manitoba, all of it aimed at developing better care for people in Manitoba and beyond.

One of the province's more established research groups can be found at the Manitoba Institute for Child Health. As the Director of Research, Dr. Terry Klassen heads one of the largest research organizations of its kind with more than 200 affiliated principal investigators. He says the impact of research on patients can be seen every day. "When you look at our major themes of Biology of Breathing and the Diabetes groups, what you'll find is leading researchers and clinicians tackling major health problems that have a tangible benefit to care here in Manitoba," says Klassen, who is also Associate Dean (Academic) and professor of Pediatrics and Child Health at the University of Manitoba's Faculty of Medicine. "Asthma and diabetes are both huge issues in Manitoba, and we've been able to bring together the basic bio-medical researchers and clinicians caring for these children."

In health research parlance, the idea of gathering researchers from different backgrounds under one roof is known as "clustering." For example, the Biology of Breathing group at MICH includes experts from completely different backgrounds who are all working on different problems. But working side by side has its benefits. Simply put, they feed off each other's passion, experiences and wealth of expertise.

As evidence of this, Klassen cites the work of Dr. Richard Keijzer, who came to work at MICH from the Netherlands because it offered him the opportunity to run a research lab and still see patients.

As a pediatric surgeon, Keijzer performs minimally invasive laparoscopic procedures on newborn babies. But he also conducts important research on lung development problems of the fetus in utero. His experimental techniques will someday lead to a less invasive treatment for what's referred to as a "diaphragmatic hernia," a developmental defect in utero that causes the lungs of newborns to be malformed, leading to lifelong breathing problems.

Keijzer's innovative research involves nano-technology. Together with Dr. Malcolm Xing, he developed a treatment for the disorder using nanoparticles – which are essentially engineered molecules – that has already shown promise in the lab. A cure is likely still a number of years away, but in the meantime, Keijzer carries on as a pediatric surgeon, helping to improve outcomes for mothers and newborns. "He (Keijzer) is a clinician who brings a very important skill to the province," explains Klassen. "By recruiting him, with a strong commitment to research, the kids in Manitoba now benefit."

Working alongside Keijzer, who was recently named the U of M's Thorlakson Chair of Surgical Research, are Xing, an assistant professor in the Department of Mechanical and Manufacturing Engineering at the University of Manitoba's Faculty of Engineering, and an expert in bio-engineering and nano-medicine, and Dr. Andrew Halayko, Canada Research Chair in Airway Cell and Molecular Biology at the University of Manitoba, Head of the Biology of Breathing Group, and a leader in personalized medicine and lung disease.

While they're all focused on their own specific research, their work frequently intersects. For example, if Halayko is trying to figure out how to regenerate lung tissue, he may seek out the experience of Keijzer, who treats pediatric patients with lung disorders. Or Xing may develop a new form of fibre that can serve as a framework to create living airway tissue in a lab that Keijzer and Halayko can use in their research. "That's the very essence of clustering," says Klassen.

The Manitoba Health Research Council, which already plays an important role in helping to fund new research in Manitoba, sees merit in supporting the clustering concept. As Nickerson explains, efforts are underway to develop core strengths throughout the research community that can be bolstered through additional funding and recruitment. "For us to be successful, for us to compete for federal funding, for grant funding, and investment by industry, we have to be focused. And focus means getting groups of people to cluster together and say, 'We're going to work on a challenge; this is going to be our focus.'"

In addition to the Biology of Breathing group, Nickerson says there are many other examples of clustering going on in Winnipeg's research community. The Cardiac Sciences group at St-Boniface Research, which includes Kirshenbaum, is one example. The HIV research group at the National Microbiology Laboratory, which includes Drs. Frank Plummer and Keith Fowke, is another. "We clearly have strengths, areas where we have well-established groups leading in their area and who are successful at getting grant funding," says Nickerson.

The concept of clustering can also be used to link researchers in different organizations. Take, for example, a project touted by the MHRC that involves people from the University of Winnipeg, Health Sciences Centre and the Winnipeg Health Region.

As Dr. James Currie, Dean of Science at the University of Winnipeg, explains, scientists in the university's Physics Department are working with staff from HSC and the Region on a new method of producing medical isotopes that doesn't require a nuclear reactor.

"We are creating medical isotopes using a linear accelerator," Currie says. Someday, their work may lead to a replacement for the isotopes produced at Chalk River, the aging nuclear reactor in Ontario. This new method will produce little waste – unlike a nuclear reactor. Currie calls it a "green way" of producing the isotopes necessary for medical imaging used in mapping cancerous tumours and other disease. Demand for isotopes is high all over the world, so it's likely that innovation here in Winnipeg will benefit health care everywhere.

The U of W is also home to several other MHRC-supported researchers, including those working in the field of environmental science. "Dr. Charles Wong is a Canada Research Chair in Environmental Toxicology," Currie says, adding that Wong has recently received an MHRC establishment grant. He is studying the persistence and fate of man-made chemicals on the environment – a subject obviously critical to human health." Normally, when people think of the MHRC, they might think of medical school," Currie says. "But here's a chemist who is also in the Department of Environmental Studies and Sciences."

The idea of clustering is not limited to the hard sciences. As Nickerson points out, community health research has become an increasingly important component of health research overall. "There are researchers who are looking at how social environments affect health," he says. "How do they put people at risk for disease? If you can prevent those situations, then you can prevent diseases from occurring in the first place."

He points to the example of the Diabetes Research Envisioned and Accomplished in Manitoba (DREAM). This group of researchers, scientists and medical doctors is working with community outreach workers and others to tackle the growing problem of Type 2 diabetes among young people, mostly in northeastern Manitoba. In addition to the lab work that will help identify biomarkers that may signal the early warning signs of Type 2 diabetes, other members of the team are looking at how other factors, such as physical activity, sleep, diet and stress may affect a child's health. "Why is health care so expensive? Because we are reacting all the time to the diseases we are presented with as opposed to investing in prevention. Those investigations are looking at how to help people avoid (developing disease) in the first place," says Nickerson.

Beyond Winnipeg, MHRC is also supporting health-care research focused on rural areas. "Historically, most of the funding that has been provided by MHRC is for researchers based in Winnipeg, primarily for the University of Manitoba," says Dr. Dean Care, acting Vice-President, Academic Provost at Brandon University. But in the last few years, researchers at Brandon University's Faculty of Health Studies have received MHRC funding, which is then used to leverage more funding from the national fund providers, such as the Canadian Institutes for Health Research.

Care is a member of the research team that has received funding from MHRC. The team is studying the health of rural post-secondary students at Brandon University and the University of Saskatchewan campus in Prince Albert. The goal is to identify ways to help students avoid developing unhealthy behaviours. Like the saying goes, an ounce of prevention is worth a pound of cure.

The student health study is just the beginning. "The 'M' in MHRC stands for Manitoba, but it has been seen as the Winnipeg Health Research Council," Care says. "Today, this funding support means there is more than just lip service being paid to rural areas, and we see ourselves as part of the future of health-care research. That's very encouraging."

BOOSTER SHOT

Medical research helps create a healthy economy

The first goal of health research is to find new ways to improve the health of individuals.

But having a robust research community can also help boost the health of the local economy, an important point that is often overlooked.

Health research in Manitoba involves hundreds of people working at various institutes and centres located in various facilities, including the University of Manitoba, the Winnipeg Health Region, Health Sciences Centre and St-Boniface Hospital Research Centre.

But most researchers are affiliated in some way with the University of Manitoba, which also attracts the largest health research investment in the province.

In the fiscal year 2010/11, the U of M received $167 million in total research funding, according to Gary Glavin, Associate Vice-President (Research) for the university.

About half that amount would flow through the University's Faculty of Medicine, according to Dr. Peter Nickerson, Associate Dean (Research) for the University of Manitoba's Faculty of Medicine. The rest would flow through other health-related faculties, including kinesiology and recreation management, nursing, and science.

Much of the money spent on research in Manitoba comes from sources outside the province, such as the National Institute of Health Research, the Canada Foundation for Innovation, and the Canada Research Chairs Program. The Manitoba Health Research Council spends about $6 million a year on local research.

Nickerson says the economic benefits of research are broad and varied.

"The first thing research does is employ people," says Nickerson. "It's employing knowledge workers in Manitoba who are absolutely critical to our economy."

Nickerson says the U of M's Faculty of Medicine has approximately 300 lead investigators on staff, including many who also teach at the university and/or work within the health-care system. Those investigators will have a support staff of graduate students, resulting in as many as 1,000 people involved in research in the Faculty of Medicine alone.

One of the less appreciated aspects of health research is how important it is to driving improvements in local care.

Nickerson cites as an example the work done in kidney transplantation a little more than a decade ago. In the late 1990s, researchers and medical staff at Health Sciences Centre started work on developing a new way of testing the compatibility of kidney donors and transplant patients to reduce rejection rates. Their new cross-matching approach, introduced in 2000, ended up boosting the kidney transplant success rate from 90 per cent to 99 per cent.

"We made that our standard of care here a decade ago," says Nickerson. "But it did not get established right across this country until 2010. That's a decade delay. I think that shows you that if you are investing in research and clinical development, it brings better patient care here to Manitobans sooner than in other places."

Occasionally, research can also lead to the creation of stand-alone companies. Research by Drs. Bruce Chown and John Bowman led to the development of a vaccine for Rh disease in pregnant women. That led to the establishment of a Winnipeg company to make and distribute the vaccine. That company eventually became Cangene, which employs about 500 people in Winnipeg and has two offices in the United States.

But research helps the economy in other ways as well. For example, researchers were able to demonstrate that increasing the number of kidney transplants done in Manitoba could actually save money over the longer term by reducing the need for those individuals to be on dialysis. And, of course, improved treatments and care will often lead to helping people get well sooner and back to work quicker. "And that," says Nickerson, "means that they are able to work and contribute to the economy."

LEADING THE WAY

Today's researchers focus on providing better care tomorrow

By Joel Schlesinger

Manitoba researchers have made numerous contributions to the world of medicine over the years. But there is more to come.

The research community in this province has never been as large or as vibrant as it is today. Throughout the province, the work being done by local researchers is leading the way to better health care here in Manitoba and beyond.

Their efforts are changing the way we create healthy communities for aging seniors and improving the effectiveness of hip and knee replacement surgeries. And one day, research done here in Manitoba may lead to cures for cancer and cardiovascular disease.

Many of the researchers working in Manitoba have been supported at one time or another by the Manitoba Health Research Council. Here are just some of the Manitoba researchers who are working today to improve health care tomorrow.

Dr. Andrew Goertzen

At first glance, the University of Manitoba's Department of Physics & Astronomy might seem to have little in common with the advancement of health-care research.

But for medical physicist Dr. Andrew Goertzen, an associate professor in the Department of Radiology at the University of Manitoba, the work being done by his research team could advance medical research into new treatments for diseases like Alzheimer's disease, cancer and heart disease. Goertzen's team, comprised of researchers from Radiology, Engineering and Physics & Astronomy, works on trying to find a better way for scientists to study disease in mice. To do that, they are building a high resolution positron emission tomography machine – one that's small enough for mice. More precisely, their research aims to develop small animal imaging systems and multi-modality hybrid PET-MRI. Basically, it's a way to look inside lab mice to better understand how disease works and how experimental new treatments may or may not prevent or cure disease.

This is important for one big reason: the mouse stays alive. "What this allows us to do is track a single animal over an extended period of time in the same way that we monitor patients in a clinical setting," says Goertzen. Presently, researchers need large numbers of animals with identical genetics to track the progression of disease and whether experimental treatments work.

"The use of imaging techniques such as hybrid PET-MRI allows the same subject to be imaged at multiple time points to study the evolution of the disease and treatment process," he says. "This use of imaging accelerates the translation of basic discoveries in animal models of human disease to implementation in trials involving human subjects."

Goertzen's approach merges magnetic resonance imaging (MRI) and positron emission tomography (PET) – both expensive and complex technologies – into one device by allowing the PET system to fit inside conventional animal MRI systems such as the one presently installed at the U of M. "Really, it's a great example of the whole being greater than the sum of the parts because the types of information you get from the PET and MRI are highly complementary." So while they're not building a better mousetrap, they're on their way to developing a better research lab – and pushing medical research years ahead.

Dr. Verena Menec

Nothing would please Dr. Verena Menec more than helping to make Manitoba the best place on earth to grow old. And she has spent much of her career trying to do just that.

A professor in the Department of Community Health Sciences at the University of Manitoba's Faculty of Medicine, Menec is considered a leader in working to make Manitoba "age-friendly," a term used to describe an approach to creating a welcoming environment for the province's aging population.

As Menec explains, an "age-friendly" community is one that provides a wide range of supports. It's about affordable and safe housing, accessible transportation and welcoming neighbourhoods as much as it is about providing comprehensive health-care services. Without these basics, seniors are hard-pressed to live healthy, fulfilled lives.

"If you're a senior and you don't have transportation, you can't get to the health-care services," says Menec, a social psychologist specializing in gerontology who has been studying age-friendly programs in communities across the province.

What she's found is that while many communities do some things very well, such as providing affordable housing, they may not do a good job of linking that housing with good transportation.

"Many communities have fragmented services and we end up with people who aren't healthy and don't have as good a quality of life as possible," says Menec, a Canada Research Chair in Healthy Aging and Director of the Centre on Aging at the U of M.

Menec says her work aims to bring seniors, their families and government departments together to create an age-friendly province that will improve the well-being of aging Manitobans. It's a multi-pronged approach for preventive health care, making sure every Manitoban and government department understands the connection between healthy communities and healthy seniors.

"If seniors are healthier, they have a better quality of life and ultimately less use of the health-care system."

Dr. Eric Bohm

Winnipeg orthopedic surgeon Dr. Eric Bohm says the auto industry has the right idea.

But he's not talking about fuel efficiency or safety. What really impresses Bohm is how car manufacturers listen to their customers.

"When you buy a new car, you get those questionnaires from the dealership and manufacturer about whether you're happy with the purchase," says the Director of Research for the Concordia Joint Replacement Group at Concordia Hospital's Hip and Knee Institute. "The car manufacturer gets lots of good information on the quality of its product and makes changes when something isn't working."

Bohm liked the idea so much, he helped make it standard practice to track the results of patients receiving hip and knee replacements at the institute, which is Manitoba's central hub for most joint replacement procedures. "It's a bit embarrassing to say, but it's sort of novel to ask health-care patients in the system whether they're satisfied with their experience."

In some cases, that might not make as much sense. "Who wouldn't be gracious for successful life-saving surgery?" he asks rhetorically. "But hip and knee replacement surgeries are elective operations that are done to improve quality of life, so you really want to maximize the positive effects of the operation and minimize the possibility of complications."

Bohm says he was drawn to the Hip and Knee Institute 10 years ago by the chance to work with patients and conduct research at the same time. This offered the unique opportunity to improve surgical techniques and the effectiveness of implants, reduce wait-times and make the experience of patients the best it can be. Since he arrived, the institute has set up a wear-and-tear lab to test new implants, and, in 2005, a Region-wide registry was created to track patients who've received the procedures. All these initiatives have one overarching goal: helping knee and hip replacement recipients have fewer complications from surgery and get back to enjoying their lives sooner.

Dr. Harvey Max Chochinov

No one would question the common sense of treating patients with kindness and dignity. But the question of just how compassion can enhance experience in the health-care system has been difficult to answer.

That is until Dr. Harvey Max Chochinov, the only Canada Research Chair in Palliative Care and one of the world's top experts in palliative care, started to answer the question almost 20 years ago.

"We began looking at psychological issues and the experiential landscape of end-of-life," says the Distinguished Professor of Psychiatry at University of Manitoba's Faculty of Medicine.

His team's research shone a light on the need for a holistic approach to health care that addresses the physical, psychological, spiritual and existential needs of patients. His findings have changed the way the medical community cares for patients who are dying, while also enhancing the quality of care for all patients. The Canadian Medical Association recognized his achievements this year by bestowing its highest honour, the F.N.G. Starr Award.

"We all ascribe to the idea that we ought to be providing patients and their families care that is mindful of preserving dignity," says Chochinov, Director of the Manitoba Palliative Care Research Unit with CancerCare Manitoba. "Our research focused an empirical lens on this issue, examining exactly what it means to patients and how it might be achieved within our system of health care."

Thanks to his research, dignity has become a central part of palliative care. His research team developed "Dignity Therapy," a psychological intervention for patients facing the end of their lives that allows them to discuss their thoughts about the life they've lived. This approach has been studied and adapted by many palliative care programs around the world. "It allows patients to leave a legacy, while enhancing their own quality of life and providing comfort for those left to grieve their passing."

Perhaps more than any accomplishment, Chochinov says he hopes his work has provided evidence that compassion and respect are foundational to quality medical care. And when patients are nearing the end, Chochinov reminds us that, "while dying is inevitable, dying poorly ought not to be."

Dr. Grant Pierce

Cell biologist Dr. Grant Pierce has been studying the causes of heart disease for decades. But his focus hasn't been so much on the organ itself as it has been on the roadways that lead away from the heart: the arteries.

"I would say 80 per cent of heart disease is not a heart problem," says the principal investigator at the Institute of Cardiovascular Sciences at St-Boniface Hospital Research.

"It's actually vascular problems, meaning it's a problem with your arteries," says Pierce, who is also a principal investigator at the Canadian Centre for Agri-Food Research in Health and Medicine.

Heart attacks and most strokes are caused by blockages in the arteries. In the case of a heart attack, the coronary artery is partially blocked, limiting blood flow to the heart muscle. This can lead to heart failure and death.

Pierce, a professor of physiology at the University of Manitoba's Faculty of Medicine, and his team have been trying to understand what leads to poor arterial health and what can be done to keep our vascular system in tip-top shape to reduce atherosclerosis, the leading cause of strokes and heart attacks.

To that end, they've been working on a number of fronts, including studying the role of flaxseed in maintaining healthy arteries and repairing damaged ones. "Flax reduces the plaque build-up in arteries, and we think it does this because it has anti-inflammatory properties," he says. "It also appears to stop something called 'cell proliferation,' which is when one cell divides into two, then into four, then turning into eight, etc." Cell proliferation leads to a build-up of plaque in the artery wall, which in turn reduces blood flow.

Pierce has been exploring on a molecular level why this happens, and his team has uncovered many of the molecular mechanisms that lead to unhealthy arteries. It's research that could someday lead to new treatments. But their work's potential benefits extend beyond treating cardiovascular disease.

"Cell growth is a central figure in just about every disease," Pierce says, adding that uncontrolled cell growth is cancer's calling card. "If we can find ways to prevent that cell growth in arteries, we have a nice target for many different illnesses."

Dr. Renee Robinson

Home isn't just where the heart is. It's also the basis for good mental health.

That's certainly no surprise to leading researchers like Dr. Renee Robinson, an associate professor of Psychiatric Nursing at Brandon University's Faculty of Health Studies.

Her area of study is mental health services in rural areas. And while many challenges exist to provide care to people with ongoing, severe mental illness in Manitoba's more sparsely populated regions, they often do receive good care. "In some ways it's considerably better than in urban areas."

Yet housing and access to social programs remain challenges – even in a more urban setting like Brandon, she says. "From a community health perspective, it's not surprising that where you live and how you spend your time is more important than crisis intervention services because you're not in a crisis all the time," she says.

But programs for adequate housing and recreation, which have been proven to reduce acute health-care interventions for individuals

Dr. Maureen Heaman

Dr. Maureen Heaman began her career as a maternal health nurse in 1978.

And maternal health has come a long way since the late 1970s, says Heaman, a Canadian Institutes of Health Research Chair in Gender and Health. But for Winnipeg's lowest-income mothers, there's still a long way to go.

That's the focus of Heaman's most recent research: finding new ways to help at-risk, expectant and new mothers – and their newborns – get the health care they need.

"What we have found is there were high rates of inadequate care in Inkster, Downtown and Point Douglas, which are essentially the inner city areas of Winnipeg," says the professor at the University of Manitoba's Faculty of Nursing.

Young mothers – teens in many cases – with low incomes were most at risk, her research found. Typically during a healthy pregnancy, mothers have between 12 to 14 health-care visits during their pregnancy, but mothers in the inner city, among the at-risk group, often had four or fewer visits. And many didn't seek medical attention until the final stages of their pregnancy.

There is a reason why these women failed to seek care, and it's not because they wanted to have an unhealthy baby. Like all mothers, most cared about getting the best care possible, but they encountered several barriers preventing them from doing so. "If you're a young, single, pregnant mom – already with kids – getting to prenatal care in the middle of winter and then waiting awhile in the waiting room is a tall order," she says. Moreover, many mothers in the high-risk group did not recognize the importance of getting regular medical visits while pregnant.

To address the problem, Heaman is partnering with the Winnipeg Health Region and Healthy Child Manitoba, among others, to implement three new initiatives to improve access to prenatal care. One of these initiatives involves integrating midwives into six Healthy Baby/Healthy Start community-based prenatal programs in low-income neighbourhoods. She says it's all about meeting women where they live.

"It's about being proactive, and seeing that they get the care they need."

Dr. Judith Bartlett

Although the Métis are an integral part of Manitoba's history, they have largely been invisible when it comes to their health and well-being. That's not to say they haven't received basic health care, says Dr. Judith Bartlett, a Métis physician and associate professor in the Department of Community Health Sciences at the University of Manitoba's Faculty of Medicine, and adjunct scientist at the Manitoba Centre for Health Policy (MCHP). But the Métis haven't been the focus of any substantial health research in Manitoba. That is until Bartlett and other researchers at MCHP, Manitoba Health, and the Manitoba Métis Federation (MMF) came together to produce a comprehensive health study that is also uniquely Métis.

The Profile of Métis Health Status and Healthcare Utilization in Manitoba: A Population-based Study features health data from approximately 93,000 Métis and looks at 80 different areas of health. Among other things, the study shows health care for Métis people could be much better. "If you look at premature mortality, Métis are 21 percent higher (than the general population), so they're dying too soon," she says.

But Bartlett wasn't satisfied with crunching numbers. "There's not much point in that document if it's going to sit on a shelf," she says. The data needs to be explained, and that's where the Métis became involved. Bartlett's MMF team set out to develop Knowledge Network discussion tables involving Métis people and the health-care system across the province to illustrate the data with meaningful stories about the Métis people's economic, social and political situations. They also wanted to learn how chronic diseases like diabetes were affecting their health and well-being. "You've got the data, which is one piece. Then you've got the experience of the citizens, the regional health authorities and MMF community services. It gives a really full picture," she says.

The study – referred to as the Métis Health Atlas – is just a start. Now, Bartlett and other stakeholders are using Knowledge Networks to help address the Métis people's health needs.

"The goal for Métis is to contribute to the health system's understanding of Métis health," she says. "Everything that's done is a win-win type of approach"

who suffer from mental illness, are often patchy in rural areas, and in Brandon, too – as her studies have discovered. But it's not just those people suffering from acute mental illness who lack adequate housing.

"We hear heartbreaking stories about women who come seeking shelter who have no choice but to return with their children to very unhealthy, even dangerous situations because there's no alternative," she says.

More broadly, leaving home is often an unavoidable fact of life for most people who grow up in rural areas. They often must leave their homes for work, school and health reasons. That's stressful enough. Add the anxiety of not being able to find decent shelter, and you've got a recipe for poor mental health. That's largely the reason why Robinson has expanded her focus of research recently, finding that affordable housing, social programs and even health-care services are not just good remedies for sufferers of severe mental illness. They're a good prescription for everyone's mental health.

Dr. Geoff Hicks

Winnipeg has long been a leader in the world of genetic research. Dr. Geoff Hicks is building on that tradition.

More than a decade ago, the Director of the Regenerative Medicine Program at the University of Manitoba's Faculty of Medicine returned home from the Massachusetts Institute of Technology to do what many others in the research community thought was years away from being possible: functionally mapping the genetics of human disease.

At the time, it was widely thought it would take years if not decades. But Hicks found a way to do it in a matter of days. And he has a mouse to thank for his success.

It's a special kind of rodent – one called a "knock-out mouse." Hicks and his team didn't invent the knock-out mouse – a lab animal that has one of its 22,000 genes either muted or expressed to emulate disease in humans. What he did was find a shortcut to identify the genes involved in the cause of disease.

He looked at gene sequences instead of single genes, which advanced the hunt for the genetic causes of disease ahead of schedule by decades. In fact, Hicks's work became a foundational part of genomic research (studying all genes at the same time). And that success helped lead to the foundation of the world-renowned Mammalian Functional Genomics Centre in Winnipeg – one of only four in the world.

Today, the centre has stem cell models to breed lab mice specifically designed for research on thousands of different human genetic variations of disease.

"In the last four years, we've gone from a handful of knock-out mouse models being available to one now being available for almost every gene," he says. This has helped move research for cures from the test tube to living organisms – mice – with which we share most of our genetic makeup.

"We can now determine from studying these mice that if you have this gene variation, you might be susceptible to this disease, or that this particular treatment may work for you or be very harmful," he says. "It's really helped usher in the age of personalized medicine."

Dr. Dean Kriellaars

When it comes to grade school, numeracy and literacy are the first two items on the learning to-do list. If Dr. Dean Kriellaars has his way, physical literacy will be number three on that list.

In fact, it's very likely that will soon be the case at schools across Canada. The professor at the University of Manitoba's School of Medical Rehabilitation is working with PHE Canada and Sport for Life to help foster physical literacy in curricula across the country.

As part of the effort, he has developed a series of instructional videos for teachers to demonstrate how the basics of physical literacy – those chiefly being running, jumping, catching, throwing – should be taught in a classroom.

This may seem elementary – something all kids should acquire naturally – but it's increasingly not the case. And that's bad news for young children.

Studies have found that inactivity increases the risk of developing many life-threatening illnesses later in life, including cardiovascular disease, Type 2 diabetes and cancer. "Forty-two different diseases are related to a lack of physical activity," says Kriellaars.

Studies have also demonstrated that adequate exercise can dramatically reduce the risk of many diseases. That's 60 minutes of moderate to difficult physical exercise a day for kids and 150 minutes every week for adults. "That means you're huffing and puffing, and those are the minimum amounts."

Kriellaars says most Canadians don't even come close to the minimum level of exercise. And a poor, life-long attitude toward fitness starts early, often between Grades 3 and 6. If children don't get in the habit of being active before age 12, they likely won't have the basic physical literacy tools to maintain good health later in life, he says.

It's not just a glum prognosis for children, it's an ill omen for our health-care system overall. As our population ages, the health-care system will be increasingly stretched to provide services.

Kriellaars says physical exercise is our silver bullet of prevention. And that regular exercise mindset has to start in the classroom because the education system is the only framework that can widely promote physical literacy to maintain lifelong health. "If it can't do the job for us, then we have no real way to reverse the tide."

Dr. Song Liu

Dr. Song Liu wants to make that old saying "like ripping off a bandage" a phrase of the past.

Liu isn't a medical doctor. He is a textile engineer and an assistant professor who has established the University of Manitoba's Medical Textile Surface Engineering Laboratory in its Department of Textile Sciences at the Faculty of Human Ecology. And he is developing a better bandage to be used for burn victims and other patients suffering from painful wounds that are susceptible to infections.

Studies show the pain caused by removing burn dressings is related to severe depression and post-traumatic stress disorder symptoms. So Liu has engineered a new kind of polyester bandage that has hydrogel – a moisturizing compound – chemically bonded to its fibres to prevent it from sticking to the wound.

"Hydrogel isn't new, but the major innovation here is I can grow hydrogel with well-controlled thickness from the fibres of flexible knit fabrics to retain the flexibility of the dressing. A good dressing must be flexible to conform to the contour of the body," he says.

Liu has proven the bandage is effective in the lab, and the next step is to demonstrate its effectiveness in animal tests. If successful, the bandage could be used in hospitals, burn wards and wound clinics treating people with diabetes who have hard-to-heal skin ulcers. Liu says what makes the dressing unique is the infusion of two known antimicrobial agents – N-chloramine, used in swimming pools, and quaternary ammonium salt, found in hand soaps. But he says his work extends beyond bandages. In fact, his broader ambition is making hospitals less prone to spreading infection, one surface at a time.

Using similar innovative chemical engineering techniques, he aims to infuse antimicrobial properties into just about every surface in a hospital setting, from privacy curtains to countertops.

At the same time, he says he is also working on developing more biocompatible synthetic materials for vascular grafting – used in surgeries like cardiac bypasses – which will last longer, lead to less scarring and reduce the risk of rejection.

MHRC: Partners in Research

The MHRC believes that working together with organizations in Manitoba to achieve common goals is the most effective approach to fostering and promoting excellence in health research in our province.

The goal is to create an all-encompassing network of health research, health system, government and non-government organization stakeholders.We seek inspired partners who share our vision and wish to join us in working towards it by partnering on their specific areas of interest.

Following is a list of organizations with which the MHRC currently partners:

- Brandon University
- Canadian Institutes of Health Research
- CancerCare Manitoba and Foundation
- Crohn's and Colitis Foundation of Canada
- Health Sciences Centre and Foundation
- Heart and Stroke Foundation of Manitoba
- Hôpital St-Boniface Hospital and Foundation
- Life Science Association of Manitoba
- Manitoba Health
- Manitoba Innovation, Energy and Mines
- Manitoba Institute of Child Health
- Manitoba Medical Services Foundation
- Networks of Centres of Excellence
- Regional Health Authorities of Manitoba
- The Lung Association, Manitoba
- The Terry Fox Research Institute
- University of Manitoba
- University of Winnipeg
- Winnipeg Regional Health Authority

CONTACT INFORMATION

Manitoba Health Research Council
205-445 Ellice Avenue
Winnipeg, MB Canada
R3B 3P5

Telephone 204 775 1096
Fax 204 786 5401
Email info@mhrc.ca

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