PATHWAYS TO

IMPROVED WELL-BEING

MONTREAL
HEART
INSTITUTE

Research into the Psychosocial Determinants and Correlates of Health:

Pathways to Improved Well-Being

Just as we were born, we will one day die. Of course, we typically hope this happens peacefully in our sleep, much later in life, and content with the health and the life we have lived. Some of us may be lucky enough to experience this. So many more, instead, will become ill, die prematurely, or live with an impoverished quality of life for years. Indeed, across the globe, and particularly among industrialized nations, the leading causes of disease and mortality are chronic conditions, such as cardiovascular diseases, diabetes, and arthritis that cannot be cured but instead must be managed over decades. The social and personal costs of such diseases are considerable and likely to increase with the aging of our population.

What then contributes to such vastly different outcomes and what can we do about it? Research can offer surprising answers to these questions, if we are open to them.

Determinants of health and disease: Much more than you expect!

It is true that the genes we are born with may play a role in increasing our risk for illness, but research suggests that for most health problems, genetics reflect but (a small) part of the story. Rather, it is the interplay of a myriad of biological (including genetics), environmental, social, and psychological factors that contributes to health and illness.

The Heart & Mind Research Unit in Behavioural and Complementary Medicine that I lead at the Montreal Heart Institute seeks to understand what and how psychosocial and psychophysiological factors impact health, with the goal to apply this knowledge in improving wellbeing and preventing disease. The various projects undertaken by my group reflects these multiple goals.

LIFESTYLE FACTORS AS EXAMPLE

There is widespread recognition today that lifestyle behaviours play a significant role in health, accounting for upwards of 50% of many diseases. It is generally believed that if patients are armed with the correct information about what health behaviours are bad for their health, then they would stop them. Of course, we now know that this is insufficient, and too frequently the patient is blamed for failure to change. However, research into the biopsychosocial determinants of health has shown that there are forces within the individual's environment (for example, lack of access to safe or affordable alternatives, lack of support), and importantly, within the individual himself that contribute significantly to the behaviours that he adopts, and these are not typically addressed by health practitioners. It is now clear, for example,

that behaviour is strongly influenced by one's preferences, values, and beliefs about the behaviour or suggested alternatives, by one's self-esteem and self-efficacy, by the presence of stress or other distress factors (particularly when health behaviour is used as means to cope with these), and as shown by modern neuroscience, hardwiring of the behaviour into the brain. Importantly, research has also shown that when such factors are addressed in interventions aimed at behaviour change, success rates are by far superior to current practices. This obviously has implications for both prevention in healthy individuals and treatment for individuals who have already developed a health problem and in whom alteration of lifestyle plays a significant role in the overall management of the disease.

Strong from this research, we are currently evaluating the efficacy of a pan-Canadian interdisciplinary web-based intervention (CePPORT), spearheaded by Robert Nolan, at improving the self-care behaviours, coping skills, and quality of life of patients with congestive heart failure. We have developed tailored ehealth interventions based on state-of-the art empirical psychosocial and medical research. Such programs can help patients navigate through the multiple (physical, emotional, family, and financial) difficulties associated with the diagnosis and management of life-altering conditions that can make adherence to recommendations more tenuous.

Psychological distress factors (stress, anxiety, depression, hostility) can negatively influence health behaviours and therefore disease development, but considerable research over the past decades has also shown that they also influence health and illness independently of lifestyle. A case in point, the prevalence of coronary artery disease is increased in individuals who are more hostile, who have experienced greater depressive symptomatology, and/or who have experienced trauma in their lives. These factors similarly increase risk of further morbidity and mortality among those who have already suffered a myocardial infarction. While the exact mechanisms are still unknown, it likely reflects the impact of these factors on multiple bodily functions that are of import to the maintenance of vascular integrity.

We have shown, for example, in a prospective study of initially healthy adults that individuals who are more cynical and mistrustful of others, angry, and/or aggressive are at an increased risk for atherosclerosis, independently of lifestyle factors. Indeed, they show more disturbances across a cluster of metabolic risk factors (abdominal obesity, blood pressure, glucose, triglycerides, high-density lipoproteins) and these disturbances worsen over

time, particularly among older participants. More hostile individuals similarly show elevations in markers of inflammation known to contribute to atherosclerosis.

In BEL-AGE, we are furthering this exploration of mechanisms through which environmental and psychological factors contribute to premature ageing and CAD morbidity/mortality. By study's end, more than 1500 men and women with and without CAD will have been followed over time. Added to metabolic, inflammatory, and autonomic measures, are telomere length and cognitive functioning. Telomeres cap and protect the end of our chromosomes. As telomeres shorten with age and consecutive cell divisions, organisms become more vulnerable to disease and premature aging or death. Data from this and other laboratories is emerging that certain personality traits, as well as psychological stress and distress are associated with altered telomere regulation. BEL-AGE will provide us with a unique opportunity to examine whether these psychological variables contribute to CAD development, progression, and mortality, in part, through more rapid shortening of telomeres, and whether these effects are independent of, moderated by, or mediated by other behavioural (lifestyle), social, environmental, or biological processes.

INDIVIDUAL REALITIES

Men and women differ in many respects that may ultimately impact health, though this is insufficiently addressed in practice. At a biological level, for example, we have shown sex differences in the number and type of symptoms associated with CAD that may delay diagnosis of CAD in women. Indeed, women are typically diagnosed later in the disease process, when they are older and suffering from greater co-morbidity. This complicates both their quality of life and treatment.

In addition to significant biologically-based sex differences, other gender-related issues are also of import. Gender relates to the social and personal constructs of what it is to be a man or a woman, and that influence the "roles, behaviours, expressions, and identities" that one adopts or expects of oneself, and that may be expected of the person by others in that society. These gender constructs impact how people are perceived (by themselves and others), how they behave, how they perceive and respond to the world around them and importantly, determine the balance of power and resources to which they are privy in society.

Biological and gender-related factors interact and likely contribute to the growing observation that degree, time-course, and consequences of disease

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are often different in men and women. For example, we have documented sex differences in lifestyle, physiological responses to psychological stress, as well as differential impact of these stress responses on metabolic disturbances. We have similarly shown that while basal inflammatory activity may be particularly elevated in more hostile women and younger individuals, stress and aging may lead to greater increases in inflammatory activity among hostile men and older individuals.

Addressing these issues is key to our programme of research.

CONSEQUENCES OF DISEASE

Physical illnesses can wreak havoc on a person's life. We noted for example, that psychological distress was highly prevalent among 907 patients undergoing investigation for coronary artery disease. This was all the more true among women, and increased their risk and intensity of angina symptoms. In a study led by Dr Gilles Dupuis among individuals who suffered a myocardial infarction (a heart attack), we observed a high prevalence of symptoms of post-traumatic stress disorder. While the event had come and gone, patients kept re-experiencing it in their mind over extended periods of time, remaining hyper-vigilant, stressed, and fearful for their health and life. In most cases, these symptoms, which were not targeted as standard of care, were associated with a poorer prognosis over a one year follow-up.

In individuals suffering from recurrent syncope (fainting), psychological distress and psychiatric morbidity were similarly high, particularly among women and individuals in whom a clear diagnosis could not be established. Psychological morbidity was under-diagnosed and treated, despite the fact that it contributed to impoverished quality of life, loss of functioning, and recurrence of syncope. Our research and that of others suggests that patients' beliefs about the nature and consequences of their medical condition, their lack of confidence about being able to cope with syncope, as well as avoidant coping strategies contributes to poor outcome. Unfortunately, these are not typically considered as targets for intervention in standard of care. Yet, according to a small pilot randomized study in which we addressed these various psychological and psychophysiological factors via a standardized cognitive-behavioural intervention, we were able to show dramatic improvements in psychological health, functioning, and syncope. An additional corollary of this set of studies on syncope was the realization that following head-up tilt diagnostic testing, patients, especially those that had experienced syncope or pre-syncope during the test, often did not retain the medical education they received from their MD. Obviously,

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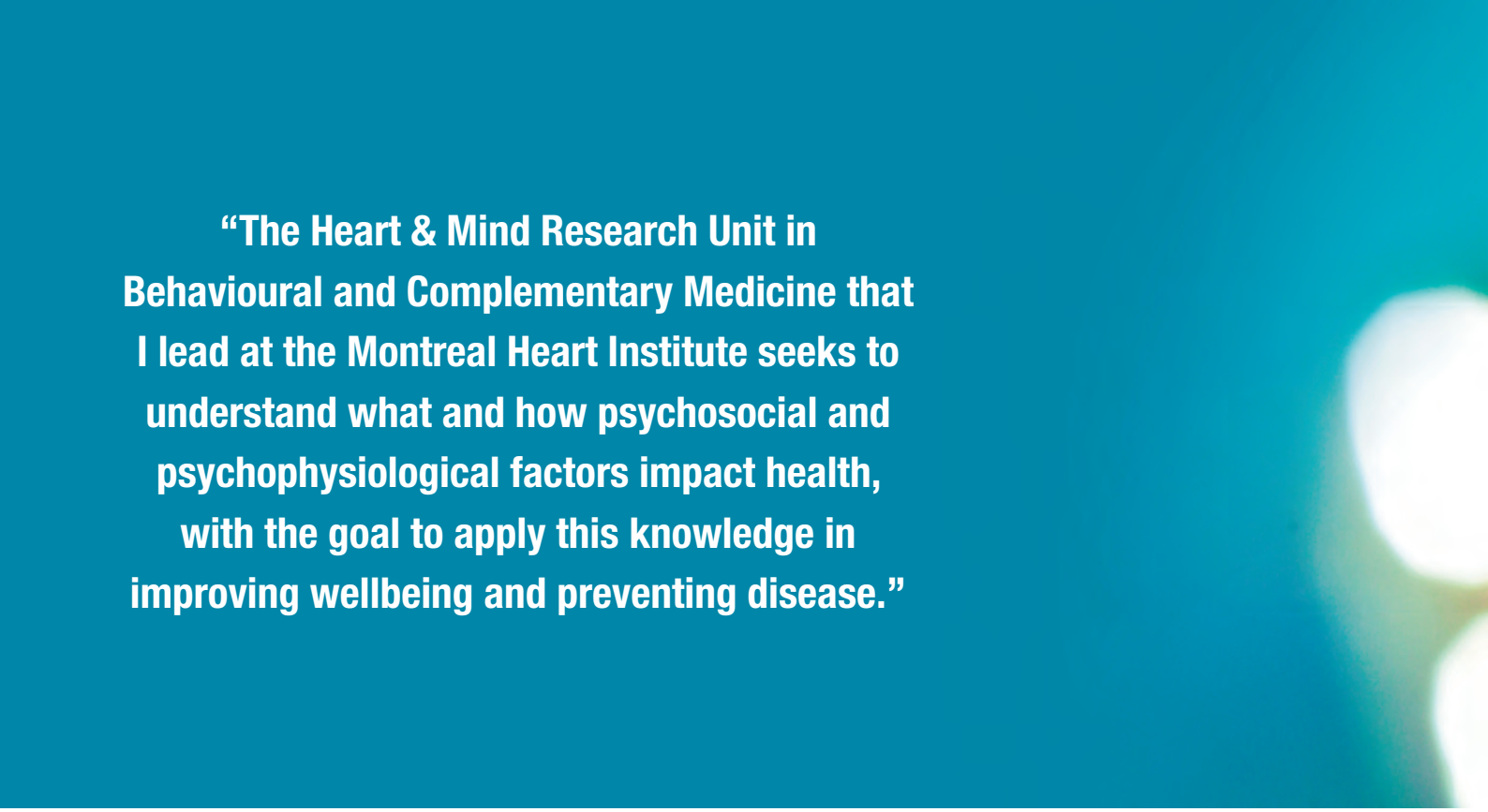


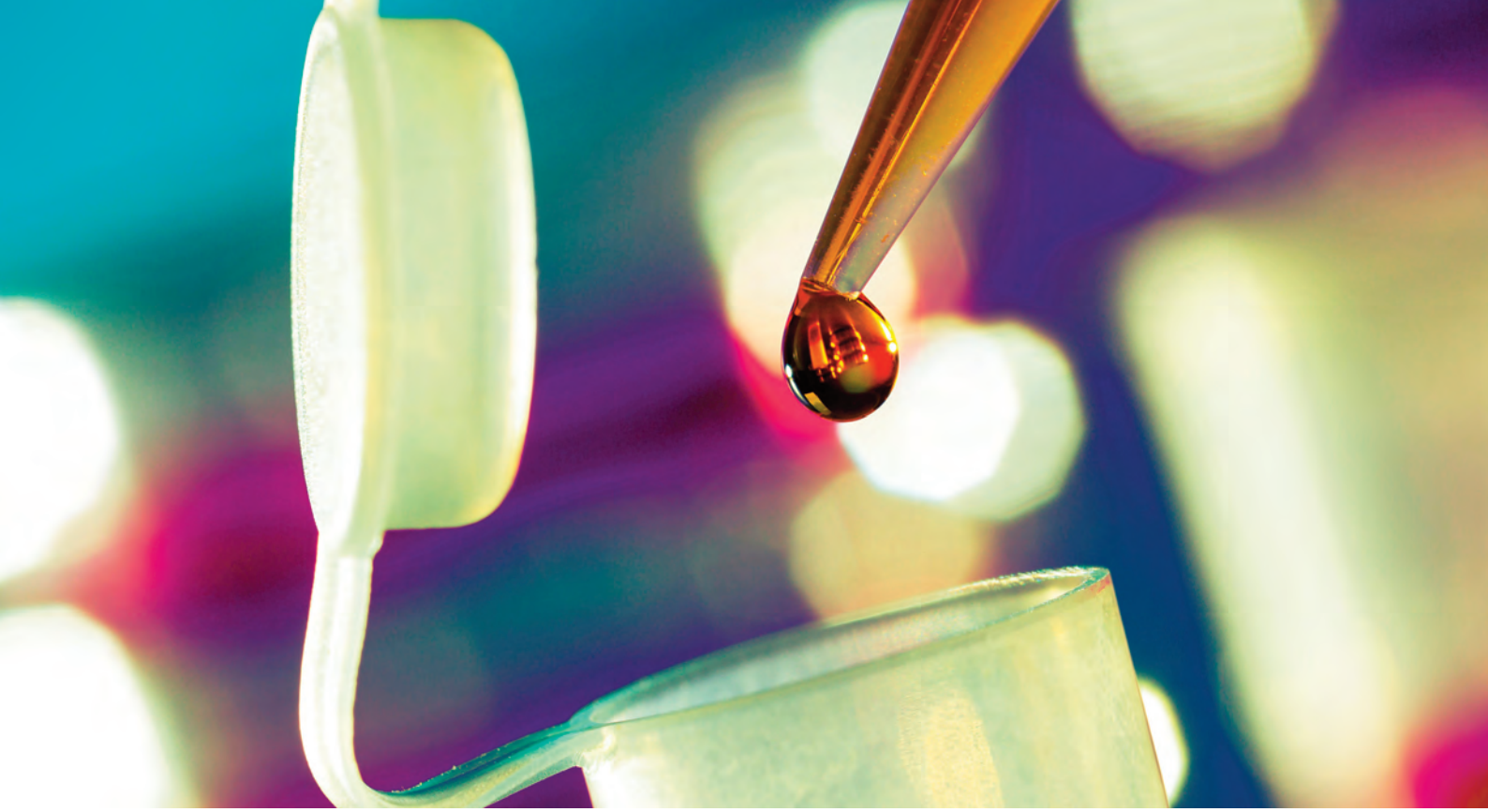
this negatively affected their adherence to treatment recommendations and their satisfaction with the encounter. In one of the sites in which the studies were performed, this led to improvements in the manner in which medical information was dispensed.

Thus, psychosocial factors that contribute to, result from, or complicate disease and its treatment are important targets for prevention and intervention. Evidence is emerging that complementary psychological interventions, for example, that target stress or hostility, can further reduce morbidity and mortality in those that have suffered a myocardial infarct. We are currently conducting two pilot studies to evaluate whether yoga and mindfulness meditation, two increasingly popular stress management approaches in the community, are effective in improving psychological and physical health in individuals suffering from congestive heart failure (yoga) or metabolic syndrome (mindfulness).

However, treating the psychological and psychophysiological correlates of disease in men can be difficult. Diagnostic tools may not be sufficiently sensitive to recognize the specific symptoms in men, which may differ in several respects from that of women. Moreover, societal expectations of what it is to be "a man" can impede men from recognizing, admitting, and seeking care for psychological distress. For this reason, I have aligned myself with a pan-Canadian group of researchers and clinicians in MIND THE HEART, led by Jalila Jbilou, in efforts to prevent, detect early and treat mood disorders, anxiety, and post-traumatic stress, among men living with heart disease.

The research presented in this document represents but a tiny part of the tremendous and important work currently being performed across the globe by researchers and health professionals who not only adhere to the World Health Organisation's definition of health as physical, mental, and social well-being, but also seek to contribute to health reforms that will make global health possible. This also entails consecrating much more attention and funds to prevention efforts aimed at improving life conditions, psychological health, and resiliency in the young and old alike. Why wait until disease has taken hold?

Such changes are not without challenges. For one, despite decades of quality research, policy makers, health professionals, and to a certain extent, the general population are still sceptical of the importance of psychosocial issues. This is reflected in the fact that only a small fraction of national health budgets in most countries are invested in mental health (and prevention efforts). Yet, according to the WHO, up to ¼ of the



population suffers from a diagnosable mental health condition, and even greater numbers suffer from subclinical levels of distress, particularly among those suffering from physical health problems. Psychological distress is one of the most important causes of invalidity and loss of productivity, all the more so in individuals already suffering from another health condition.

It is imperative that we continue to work towards acquiring and refining knowledge into the psychosocial correlates of health so as to inform effective and readily applicable cost-effective interventions.

However, public opinion and political agendas drive public policies into funding of health research and health programs. In the past decade, some politicians have publicly questioned the usefulness of psychosocial research in health. This research has become increasingly difficult as a result of the dramatic cuts in funding observed across the globe and changing priorities about what type of research to fund. This is all the more surprising considering that this research has consistently been of extremely high quality, and more importantly, has generally shown that addressing the psychosocial issues with which the population is faced can be cost- and life-saving in the short- to long-term. Unfortunately few of these interventions make their way into hospitals and other medical centres. It is therefore essential that researchers (and patients) become more involved in knowledge transfer activities, so as to render our findings more accessible and useable by the general population (including politicians and other decision makers).

I take this opportunity to thank the multiple agencies, and in particular, CIHR and the Montreal Heart Institution Foundation, for their continued support of this important work.

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Cardiovascular Prevention at the Montreal Heart Institute:

Leading the Way in Non-Pharmacological Research

The Montreal Heart Institute is the largest heart hospital in Canada and enjoys a worldwide reputation for both its excellence in clinical care and in research. Many revolutionary advances in the prevention and treatment of heart diseases have been made at the MHI through the hard work and devotion of both basic science and clinical researchers. While pharmacological therapy has played and continues to play a major role in improving outcomes in individuals with heart disease, the MHI also continues to play a leadership role in non-pharmacological preventive cardiology. At its core is the Centre EPIC, the largest cardiovascular prevention centre in Canada, with an annual membership of over 5000 individuals in primary, secondary and tertiary prevention. Here, using a multidisciplinary approach, subjects are offered the latest advice regarding heart-healthy lifestyle strategies combined with ongoing medical care. Furthermore, Centre EPIC has contributed to advancing research in preventive cardiology, particularly with respect to optimizing cardiac rehabilitation programs and understanding the cardioprotective effects of the Mediterranean diet and its nutritional components. In addition, under development is a new clinical and research program aimed at understanding and treating cognitive impairment in individuals with heart disease or its risk factors. Clinical, basic science, biomedical imaging, biomarker and personalized medicine research platforms are planned. Some of these projects have been funded in part or in whole by CIHR. Finally, as the environmental impact of climate change is only beginning to be understood at this time, there is increasing recognition that this global phenomenon will also have health consequences. As a response to this challenge, new scientific recruitments are planned in the short-term, with a specific goal of better understanding the impact of excessive heat and cold on human physiology in health and disease.

Another major investment in non-pharmacological preventive research at the MHI is the creation of the MHI Hospital Biobank. The Biobank is currently collecting DNA, plasma, and red blood cells through a simple blood draw, as well as medical, lifestyle, nutritional, and psychosocial information from 30,000 individuals. In February 2015, the 20,000th participant was recruited. With the update of participants' information every four years for the rest of their life, the Biobank will be one of the largest hospital cohorts of its kind in the world.

The Biobank has and continues to enable researchers, doctors, and professionals to investigate the genetic basis of cardiovascular disease, risk factors and related diseases. These research efforts could eventually lead to the

development of better diagnostic and prevention tools as well as more effective treatments. Thanks to this innovation, the MHI is able to contribute to the advancement of knowledge and help develop more personalized and precise medical treatments specific to one's genetic makeup.

THE IMPORTANCE OF BEHAVIOURAL MEDICINE RESEARCH

Not only is it vital to develop safe and effective lifestyle strategies to prevent the development of heart disease and its risk factors, it is equally important to understand the underlying determinants of adherence to these strategies. While these preventive approaches are often highly efficacious in optimal and conditioned settings, real-world results are often disappointing. This care "gap" is the subject of a large and growing body of scientific literature and research devoted to understanding the psychosocial and psychophysiological factors influencing behavior in health and disease. In this respect, the MHI continues to play a leadership role. Under the direction of Dr. Bianca D'Antono, the Heart & Mind Research Unit in Behavioural and Complementary Medicine at the MHI, has as its primary focus, to better understand as well as to develop tailored treatment strategies which take into account these psychological and behavioral factors allowing individuals to succeed in attaining their heath targets.

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