



## **BRAIN FACTS**

### **The Brain and Nervous System**

The brain is an extremely complex organ, made up of 100 billion neurons that communicate with each other primarily through biochemical signals (neurotransmitters) traveling at speeds up to 220 mph [360 km/hour] along a network that involves trillions of synaptic connections.

A typical brain weighs about three pounds, just two percent of the total body weight of a 150-pound person. But the brain uses between 20 percent and 25 percent of the body's oxygen and a substantial amount of the calories we consume in the form of the blood sugar glucose.

The brain consumes approximately the same amount of energy over time as an energy-saving light bulb. In terms of what it is able to do, it is far more efficient.

The human brain is approximately 75% water.

The Nervous System can be divided into two parts – the Central Nervous System (CNS)—made up of the brain and spinal cord, and the Peripheral Nervous System (PNS)—made up of the nerves and neurons that reside or extend outside the central nervous system to serve the limbs and organs.

### **Neurological and Psychiatric Disorders**

There are more than 1,000 diseases, disorders and injuries affecting the brain, spinal cord and nervous system: neurological diseases and disorders such as brain tumours, brain and spinal cord injuries, chronic pain, epilepsy and Multiple Sclerosis; and psychiatric disorders such as anxiety, autism, depression and schizophrenia.

Most recent estimates state that 10 million (1 in 3) Canadians of all ages will be affected by a disease, disorder or injury of the brain or nervous system at some point in their life.

50% of all Canadians – about 15 million people – have had a brain disorder impact their family.

The common root causes across these diseases, disorders and injuries are cell loss, loss of cell function and chemical imbalances.

Neurological and psychiatric diseases and disorders are the leading cause of disability. About 30% of the total disability insurance and self-insurance claims experience in Canada relate to “mental and nervous” conditions. The Canada pension plan estimates its payout for these conditions is nearing one-in-four.

Approximately 20% of individuals will experience a mental illness in their lifetime, and the remaining 80% will be affected by an illness in family members, friends or colleagues.

Advances in neuroscience and behavioural medicine have shown that, like many physical illnesses, mental and behavioural disorders are a result of a complex interaction between biological, psychological and social factors.

Based on Health Canada data, the economic burden of neurological and psychiatric diseases, disorders and injuries is conservatively estimated at 14% of the total burden of disease, or \$22.7 billion annually. However, current estimates of the economic cost fail to take into consideration suffering and disability that do not result in death and hospitalization. When disability is included, the burden reaches 38% or more, according to the World Health Organization.

With the aging population, the costs of neurological and psychiatric-related conditions will increase dramatically in the next decade.

### **Neuroscience Research**

Canadian neuroscience research is world class but underfunded by international standards.

Recent innovations in imaging, molecular biology and genomics have led to many advances in the past few years, however the brain still represents one of the last frontiers of science. It is the most critical organ and yet still the least understood. Ninety per cent of what we have learned about the brain has been in the past fifteen years, but researchers still have far to go toward fully understanding brain function.