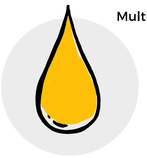
# WHAT IS MULTIPLE MYELOMA?



**Multiple myeloma - commonly referred to as myeloma - is a blood cancer that forms in plasma cells.**

Plasma cells are a type of white blood cells produced in the bone marrow. They are responsible for producing the antibodies needed to fight infections. Unusual behaviour and uncontrolled plasma cell growth – also called myeloma cells – interfere with the production of healthy blood cells in the bone marrow and can have a negative impact on various body parts such as the bones and kidneys.

# SYMPTOMS

Myeloma symptoms can manifest slowly, or not manifest at all, depending on the cancer stage. The main symptoms experienced by those affected by myeloma are back, hip or rib pain, extreme fatigue, anemia, recurrent infections, and kidney problems.

# PESTICIDES CAN CAUSE MYELOMA

Over the past several decades, an increased incidence of multiple myeloma has been consistently observed in studies of farmers and other agricultural workers. Several meta-analyses of scientific studies have found a strong indication of a link of pesticide exposure to multiple myeloma (Inserm, 2021, p. 58-62). Studies have also revealed a higher risk for those exposed to permethrin insecticides. This insecticide is used as a treatment against ectoparasites on animals, and as an insect repellent in the agricultural sector. Farmers, especially livestock farmers and pesticide applicators, face a higher risk (Inserm, 2021, p. 58-62). Permethrin exposure has been associated with an increased prevalence of a precursor condition of multiple myeloma called monoclonal gammopathy of undetermined significance (MGUS). Myeloma is nearly always preceded by MGUS. The risk of developing MGUS more than doubled among continued use permethrin pesticide applicators when compared to those who have never used this insecticide.



**While multiple myeloma and other forms of blood cancers are recognized in France as pesticide-related occupational diseases since 2015 (INRS), no Canadian province has recognized multiple myeloma as such.**

Each day, 11 Canadians are diagnosed with myeloma.
Despite its increasing prevalence, this cancer remains unknown to most. Since 2007, the incidence rate of myeloma in males has increased by approximately 2.5% per year, and since 2005, by 1.6% in females (Myeloma Canada, 2021).

**While there's no cure, patients are living a better and longer life thanks to new treatments (Myeloma Canada, 2022)**

# WHAT ARE PESTICIDES

Pesticides are substances designed to destroy and control organisms deemed undesirable or harmful. The most commonly used pesticides are herbicides (target weeds), insecticides (target harmful insects), and fungicides (target fungi causing diseases) (Quebec Government, 2023).



HERBICIDE INSECTICIDE FONGICIDE

**Contrary to popular belief, Canadian provinces are major pesticide users.**

In Canada, pesticide sales reached 116,6 million kilograms of active ingredients in 2019 (ARLA, 2023). The agricultural sector is the largest consumer of pesticides and accounts for 66.5% of pesticide sales (ARLA, 2023). 431 pesticides banned in 162 countries are still sold and used in Canada (PAN International, 2021). 23% of pesticides sold in Canada are found to be highly hazardous (PAN Europe, 2022).

# HOW ARE WE EXPOSED ?

**THROUGH THE RESPIRATORY SYSTEM**
i.e, pesticide fumes or coated seed dust, being near a recently sprayed field, working in a pesticide storage area, etc.

**THROUGH THE MOUTH**
i.e., bringing equipment that has been in contact with pesticides to your mouth, putting your hands in your mouth during or right after handling pesticides (smoking /drinking/eating), etc. (Quebec Government, 2023)



**THROUGH THE SKIN**
i.e., contact with a surface or material/equipment contaminated by pesticides, handling, splashes, etc.

**People at risk of developing myeloma or another pesticide-related cancer because of their work or where they live (i.e., near a farm using pesticides) are often unaware of the long-term toxic effects of pesticide exposure.**



When using pesticides, it is crucial to properly protect yourself, from head to toe. That said, recent evidence shows the limited effectiveness of some personal protective equipment (PPE) (Dedieu et Jouzel, 2015). But even when protected, there are still risks. The use of PPE should be a last resort. It is imperative that we limit the use of pesticides by promoting the use of alternative practices or non-toxic solutions where ever possible.

**As such, we must avoid blaming those exposed to pesticides who did not have access to this information.**

**Have you been exposed to pesticides at work and have been diagnosed with multiple myeloma?**
**If so, you could be entitled to compensation.**

**Are you the caregiver for a loved one who is, or has been exposed to pesticides?**
**If so, help them determine their exposure.**

**Are you a healthcare professional?**
**Knowing the etiology of a disease can help prevent risks as well as speed up a potential diagnosis.**

# TALK ABOUT IT!

If you or someone you know has been diagnosed with multiple myeloma linked to pesticide exposure, contact Victimes des Pesticides du Québec and Myeloma Canada.

Individuals with multiple myeloma patients linked to pesticide use and/or exposure have rights and may be eligible to receive workers' compensation.

**Victimes des pesticides du Québec**
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In collaboration with **Myeloma Canada**
www.myeloma.ca