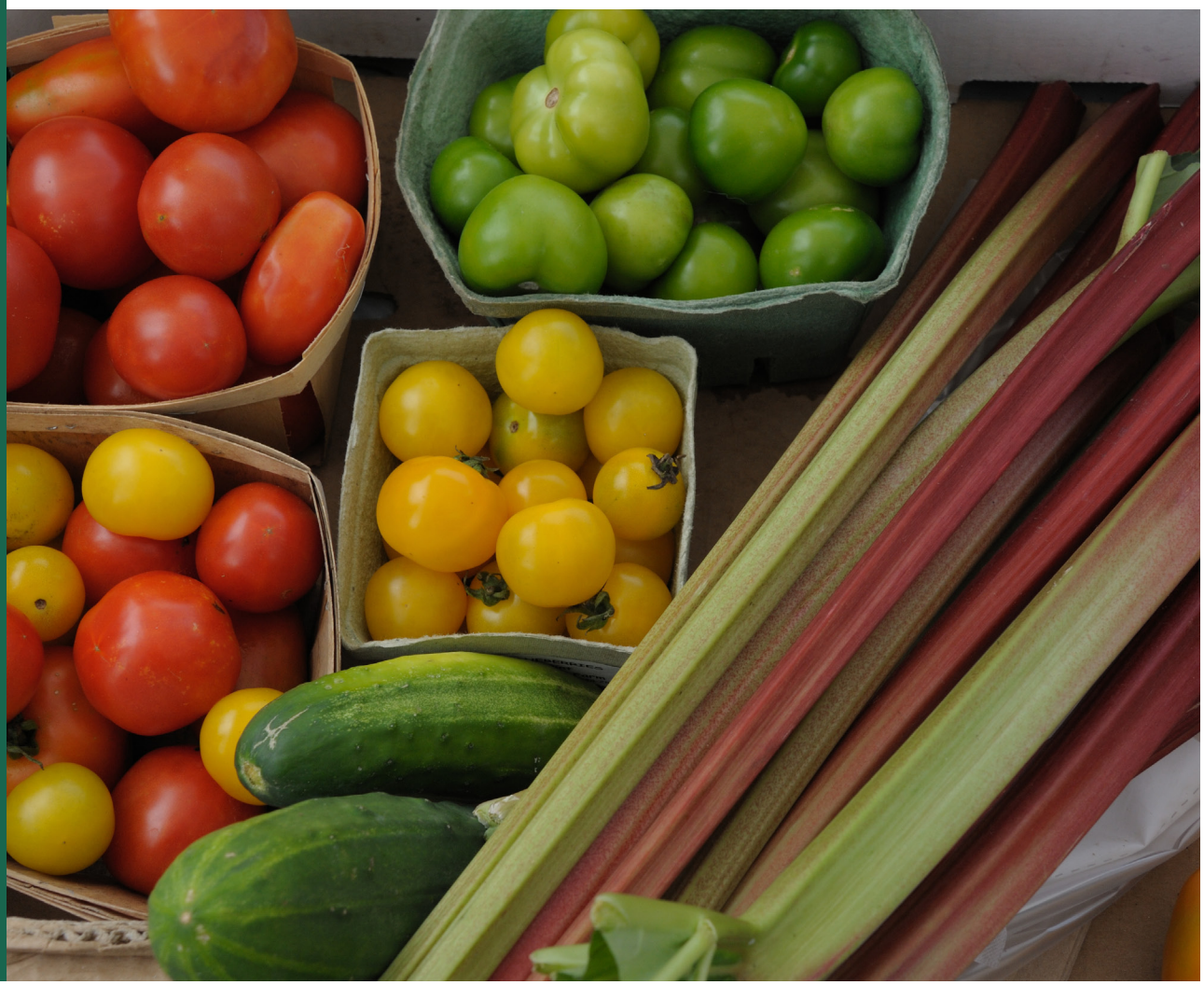
Healthy Food in Health Care

Healthy Sustainable Food Procurement: Making the case for health care engagement

An initiative of the Canadian Coalition for Green Health Care



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Abstract: Our food system is inextricably linked to both environmental and human health – the way we produce and distribute food has a profound impact on our health as individuals and as communities. Despite decades of improving agricultural production practices, there is much concern regarding practices that impose serious environmental and health risks such as heightened antibiotic resistance, hormone, pesticide and persistent toxicant exposure, polluted air and waterways, and unsafe working conditions. These are of serious concern to the health care community which is uniquely placed to lead changes in practices and policies. By making a commitment to purchase local and sustainable food, health care facilities will be encouraging food offerings that are consistent with a preventative health agenda. Doing so not only provides patients and staff with the healthiest food, but supports a food production system that fosters and enhances public health more broadly.

Key Words: greening, health care, sustainable food, local food, procurement, supply chain management, sustainability, toxic, pesticide, pesticide exposure, livestock antibiotics, antimicrobial resistance, hospital food

The Canadian Coalition for Green Health Care is Canada's premier integrated green health care resource network; a national voice and catalyst for environmental change. www.greenhealthcare.ca

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The Canadian Coalition for Green Health Care
Coalition canadienne pour un système de santé écologique

Healthy Sustainable Food Procurement: Making the case for health care engagement

Our food system is inextricably linked to both environmental and human health – the way we produce and distribute food has a profound impact on our health as individuals and as communities. Unfortunately, over the past several decades our global food system has developed to favour practices that pose serious environmental and human health risks. Impacts such as heightened antibiotic resistance, hormone, pesticide and persistent toxicant exposure, polluted air and waterways, and unsafe working conditions are of particular concern to the health care community.

As they have in the past, health care institutions are uniquely placed to be leaders in supporting practices and policies that support a healthier and more sustainable food system. Most importantly, committing to local sustainable food procurement ensures that health care food offerings are consistent with a preventative health agenda. Doing so not only provides patients and staff with the healthiest food, but supports a food production system that fosters and enhances public health more broadly.

KEY ISSUES

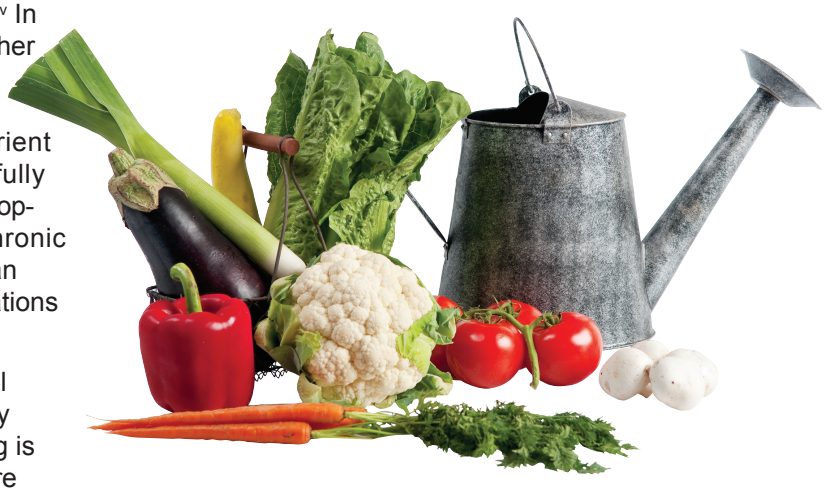
PESTICIDES

Our current food system stems from an era of rapid farm consolidation and industrialization that began in North America in the 1950s. Today most farms in developed countries rely extensively on mono-crop cultivation and intensive livestock production at an industrial scale. Producing food crops in such a manner has been facilitated by the availability of chemicals pesticides and fertilizers and now depends on such inputs to continue. Despite their widespread use, many pesticides used in industrial agricultural production pose significant health risks to the environment and to humans.

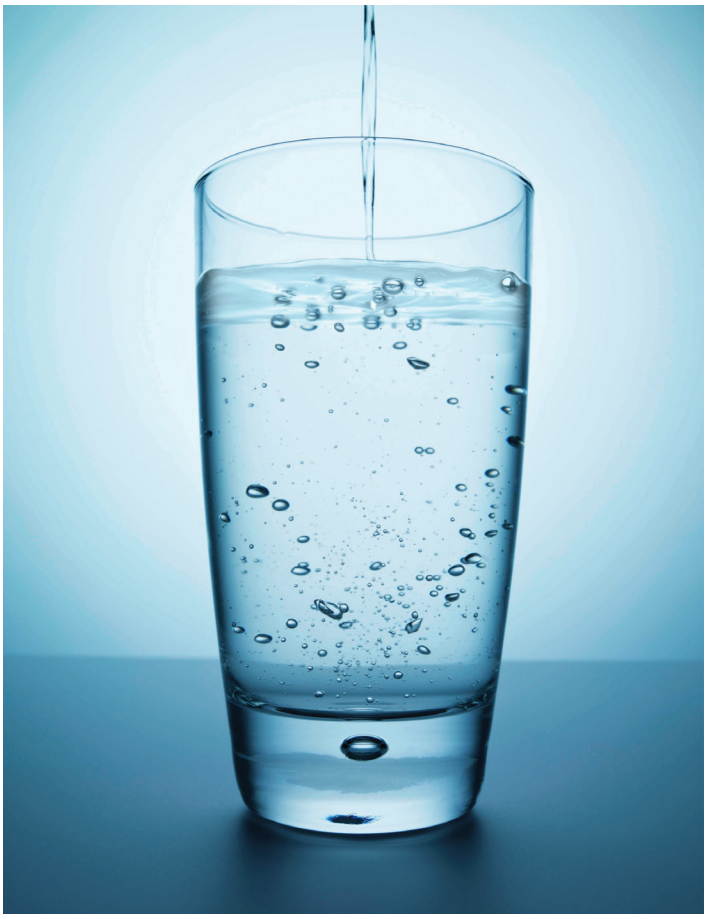
Based on their second comprehensive literature review, the Ontario College of Family Physicians has put forward strong recommendations to lower pesticide exposure. The College raises concerns associated with links between prenatal exposure to pesticides and low birth-weight, hypospadias, neural tube defects, and congenital diaphragmatic hernia[i]. They also point to consistent links between prenatal and childhood pesticide exposure and neurodevelopmental deficits in children and adolescents, such as ADHD, reduced IQ, and autism spectrum disorder.[ii]

The review also presents positive associations between pesticide exposure and adverse respiratory outcomes, including asthma, obstructive lung disease, and decreased lung function, particularly in the case of occupational chronic exposure.[iii] Such associations form the basis of the College's strong recommendation, particularly for pregnant women, to reduce exposure to commonly used pesticides. Other studies have identified pesticide exposure as a risk factor for diseases, such as Parkinson's disease.[iv]

Children and infants may be especially susceptible to the potential health risks posed by agricultural pesticide residues because their internal organs are still in development.[v] In addition, because children and infants consume a higher amount of food than adults proportionately to their body weight, they are susceptible to more concentrated exposure.[vi] Pesticides may block essential nutrient absorption in children, or in some cases, may not be fully excreted by the body when organs are still in development.[vii] Importantly, these risks are also present with chronic low-level exposure to pesticides. Thus the American Academy of Pediatrics has voiced strong recommendations to lower pesticide exposure especially in children.[viii]



Also at heightened risk are the millions of agricultural workers worldwide due to their increased susceptibility to acute pesticide exposure. Acute pesticide poisoning is a complex public health problem, and is made far more difficult to assess given inadequate or absent systems for tracking and monitoring acute poisonings in most countries (including Canada).[ixx] This makes reliable estimates of the number of people affected by acute pesticide poisoning practically impossible. In the U.S., where, by exception, a robust monitoring and tracking system does exist, the Environmental Protection Agency estimates that 10,000-20,000 physician-diagnosed pesticide poisonings occur each year among the approximately two million U.S. agricultural workers.[xi]



WATER POLLUTION

Beyond these important human health repercussions, agricultural pesticide use has important environmental impacts. Applied to crops and soil, pesticides are transported though surface runoff, and leach, or "spray drift," beyond the farmland into surface and groundwater aquifers from where they can travel long-distances and pose lethal and sub-lethal health risks to aquatic life, as well as pose serious risk of drinking water contamination in rural areas.[xii, xiii] Moreover, some pesticides are persistent: because they do not break down, are highly mobile, and can bio-accumulate in plant and animal tissue through the food chain, their effects can last decades.

Changes in livestock production have also created major human health risks and environmental damage. The industrial production of livestock now typically involves confining large groups of single animal types in controlled housing, with nutrient-dense industrial feed replacing foraging crops. The enormous quantities of animal waste produced in such facilities in most cases are funneled into large waste lagoons. This waste contains concentrated levels of nutrients (potassium, phosphorus, and nitrogen), as well as heavy metals, drug residues, and pathogens. In most cases, animal waste is spread or sprayed on the adjacent land; because this land is often insufficient to absorb all the nutrients from such great amounts of manure, this practice can result in over-fertilization in areas of intensive animal production and pose a serious risk of contaminating groundwater.[xiv, xv]

In the U.S., an estimated 20% of nitrogen fertilizer leaches into surface and ground water.[xvi] In Canada, over one quarter of the population relies on groundwater for domestic water supply, and nitrate contamination has been recorded in every province.[xvii]

Water pollution associated with intensive livestock production can also be a source of food-borne pathogens, as animal waste contains pathogens, such as *Salmonella*, *E. coli*, and *Cryptosporidium*. (See Antimicrobial Resistance below)

AIR POLLUTION

Concentrated livestock production is also the source of important air pollution, responsible for emitting hundreds of identified volatile organic compounds (VOCs), some of which pose serious human health risks.[xviii] Globally, livestock production is estimated to be responsible for approximately 18% of all greenhouse gas emissions measured in CO_2 equivalents, 65% of anthropogenic nitrous oxide, 37% of anthropogenic methane, and 64% of anthropogenic ammonia.[xix]

These emissions cause environmental damage by contributing to climate change and to acid rain formation, smog, and ozone depletion.[xx] Air pollution from industrial livestock facilities can also cause major health risks to agricultural workers and residents of neighbouring communities. Air pollutants of particular concern from a human health perspective include hydrogen sulfide, ammonia, particulate matter, and endotoxins.[xxi]

- **Hydrogen sulfide** is a highly toxic colourless emission associated with large-scale hog manure decomposition. At high concentration, even brief exposure to H_2S can have lethal asphyxiating effects;[xxii] at low levels, H_2S is a respiratory irritant, and with chronic exposure has been reported to cause low blood pressure, headache, nausea, loss of appetite, weight loss, ataxia, eye-membrane inflammation, and chronic cough.[xxiii]

- **Ammonia**, another a common gas emitted in confined livestock operations, is also a respiratory irritant and can cause upper airway irritation, sinusitis, chronic obstructive pulmonary conditions, and mucous membrane inflammation syndrome.[xxiv]

- **Particulate matter** (PM) is produced by agricultural practices in a number of ways. Animal-feeding operations, wind erosion, land preparation, crop harvest, fertilizer application, and grain handling, produce primary PM (e.g. soil dust).[xxv] Gases such as ammonia, nitrous oxide and sulfur dioxide emitted from livestock production are major precursors to secondary PM.[1, xxvi] Particulate matter is associated with adverse respiratory effects, including chronic bronchitis, aggravated asthma, and premature death among populations suffering from lung and heart disease.[xxvii]

- **Endotoxins** are bacterial particles ubiquitous in livestock and other agricultural production facilities, such as grain elevators, potato processing, and the animal feed industry.[xxviii] They are particularly hazardous for health or agricultural workers in confined areas as, even at very low levels of exposure, they can produce serious respiratory and inflammatory conditions.[xxix, xxx]

- In addition to the above, there are many other gases emitted from livestock operations for which the health and environmental impacts are not known.[xxxi]

[1] *Agricultural production contributes between 9-11% of primary particulate matter in Canada; contributions to secondary PM are not known, and less well understood globally.*

An estimated 80% of antibiotics administered to livestock in the United States are used for sub-therapeutic purposes.

Because they are administered in a prolonged, low-dose manner, they create ideal conditions for the development of resistant bacterial strains.

ANTIMICROBIAL RESISTANCE

The sub-therapeutic use of antimicrobials in livestock is a significant contributor to worldwide increases in antimicrobial resistant (AMR) bacteria which pose a threat to human health. Worldwide, vast quantities of antibiotics are administered to livestock (with lesser, although equally concerning amounts, administered in aquaculture).[xxxii]

Some antibiotics are administered on a mass scale as prophylaxis, to prevent disease from arising in large groups of confined animals or in aquaculture; others are used to promote growth, and are typically administered through feed to entire herds or flocks, for long periods of time.[xxxiii,xxxiv] An estimated 80% of antibiotics administered to livestock in the United States are used for such sub-therapeutic purposes.[xxxv]

Because they are administered in a prolonged, low-dose manner, they create ideal conditions for the development of resistant bacterial strains.[xxxvi] Moreover, as these antibiotics are typically the same, or in the same class, as those used as antimicrobial agents for humans, antibiotic resistance can easily spread from animals to human populations. As in other cases, farm workers and their families are especially at risk from the threats of AMR derived from food animals, and are also far more likely to carry multi-drug resistant bacteria, because of their heightened exposure.[xxxvii, xxxviii, xxxix]

Exposure may occur through other avenues: handling and consumption of food, for example.[xl] Agricultural antibiotics also enter the environment through residues in animal manure and urine, which, when applied to land, can leach into nearby water sources and soil, where they can persist for long periods of time depending on the conditions.[xli, xlii] In fact, it is estimated that up to 90% of the antibiotics administered to food animals are excreted into the environment;[xliii] the impacts of the resulting residual antibiotics on environmental bacteria and their ecosystems, while potentially enormous, has not thus far been examined in any concluding manner.[xliv] Regardless of their route to exposure, resistant strains can spread quickly through communities and hospital environments, and with growing international trade, throughout the world.

The impacts of AMR have already been felt: the use of fluoroquinolones in livestock fostered the development of ciprofloxacin-resistant *Salmonella*, *Campylobacter*, and *E. coli* - strains which caused human infections and extended across the globe through travel and food trade.[xlv] The non-therapeutic use of antimicrobials in livestock also contributes to the development of multi-drug resistant strains, including resistance against antimicrobials not used in livestock production.[xlvi] Antimicrobial resistance contributes to the burden of infectious disease by reducing the effectiveness of treatments, thus prolonging the duration of illness and contributing to enhanced severity of symptoms. Overall, it is estimated that AMR at least doubles the cost of treating a bacterial infection, and adds between $40 and $52 million per year to indirect and direct health care costs in Canada.[xlvii]

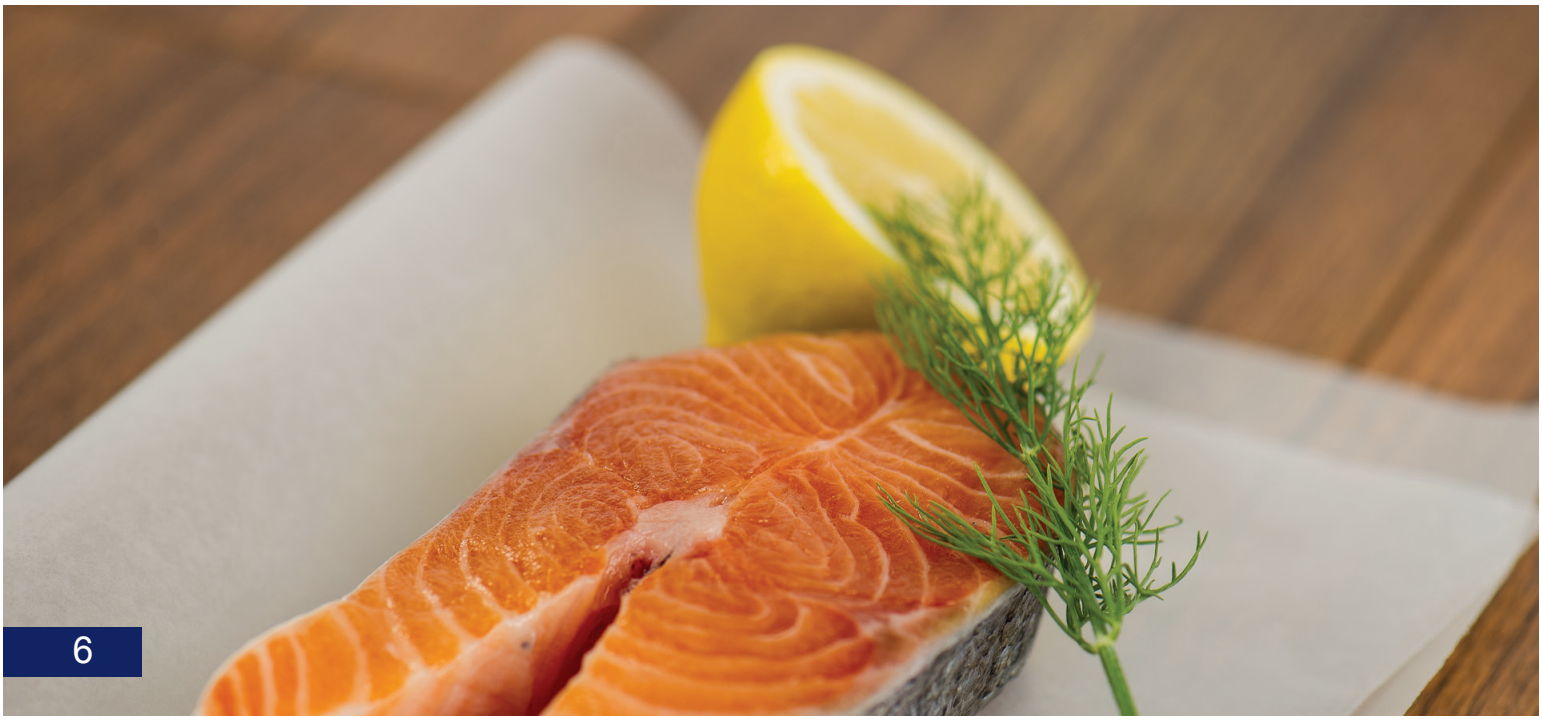
SUSTAINABLE PURCHASING

Fortunately, by pledging to the procurement of sustainable foods, health care facilities can help address many of the concerns discussed above. Where children are concerned, evidence points to dietary intake as the most important source of pesticide exposure.[xlviii] This means that conscientious food choices can reduce pesticide exposure in children significantly.

Studies have shown that over the short and long term, a diet which substitutes organic food products for conventional ones reduces the detectable levels of pesticides in children's urine samples; in fact, when only organic fruits and vegetables are consumed, organophosphate (OP) pesticides have been shown to drop below detectable levels.[xlix]

Research is beginning to show that producing crops and livestock more sustainably can also mitigate air and water pollution: nutrient loss from organic dairies in Ontario, for example, have been shown to be significantly lower than losses from conventional dairy farms in Eastern North America[l] and similar results have been shown when comparing organic and conventional potato cultivation in Prince Edward Island and New Brunswick.[li]

By reducing the concentration of nitrogen in the soil, organic production practices also reduce the nitrous oxide emissions commonly produced from agricultural practices.[lii] Finally, in Australia, where fluoroquinolones are not used in livestock production, bacteria resistance is very low in comparison with other countries,[liii] thus by supporting sustainable food production, through the procurement of meat from livestock raised without sub-therapeutic antibiotics, we can also work towards lowering antimicrobial resistance.



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Additional Resources

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