Boys at Risk

The health of all children living in Canada is at risk from exposure to environmental hazards. Hundreds of toxic substances, such as air pollutants and pesticides are known, or suspected of contributing to adverse child health outcomes. Much remains to be understood about environmental links to adverse health impacts. In the meantime, it is better to be safe than sorry. Much can be done to reduce or prevent exposures.

For a number of these health outcomes, boys seem to be particularly at risk. Whether we look at cancer, asthma, birth defects, or learning and behavioural disorders, the boys are often faring worse than the girls.

The reasons that boys appear to be at greater risk for these conditions are largely unknown, but several reasons have been suggested, including increased exposure and genetic, hormonal and physiological differences between the sexes.

Male vulnerability to environmental hazards is an emerging area of scientific research and public education. This Father’s Day report summarizes the information currently available on the rates of diseases and disabilities of boys compared to girls and what is known about the environmental links to these health impacts. We need to know more about the reasons why boys appear to be more vulnerable. In the meantime, both parents, and all members of society, can take action to prevent exposure to toxic chemicals.

Cancer

Although cancer is rare among all children, more boys get cancer than girls. Among young adults (age 20–44) several cancers are on the rise, including testicular cancer. Concern arises over parents’ exposures before conception or during pregnancy. Childhood cancers are associated with exposures to pesticides, solvents, petroleum products, motor vehicle exhaust, benzene and other pollutants. Much remains unknown. Since cancer involves problems with cell division, it is logical that exposures during times of rapid cell division (especially in the womb) likely pose the greatest risk.

Asthma

In the past 20 years there has been a dramatic rise in asthma in children. Less well known is that boys are worse off. More boys have asthma than girls and more are hospitalized for it. Boys are born with smaller airways, relative to their lung size, than girls. They also tend to have more allergies which can contribute to their developing asthma. Asthma is a complex disease. Evidence shows that it results from interactions between genetics and environmental triggers. Such triggers include indoor and outdoor air pollution and may also include some pesticides and chemicals in household cleaning products.

Learning and Developmental Disorders and Disabilities

Very large numbers of children in Canada have learning and behavioural disorders or disabilities. The apparent increase in autism in recent years is of concern. For unknown reasons, boys are at greater risk. More boys than girls have autism, Attention Deficit Hyperactivity Disorder (ADHD), learning disabilities, Tourette’s syndrome, cerebral palsy, and dyslexia. For autism and ADHD, boys outnumber the girls by up to four to one.

We know that children’s brains can be damaged by lead, mercury, arsenic, radiation, dioxins, PCBs, solvents and some pesticides. Many more chemicals may be toxic to the brain but much is unknown. Of special concern are chemicals that
are similar to dioxin and PCBs including the fire
proofing chemicals or flame retardants known as
PBDEs. Boys’ brains may be more vulnerable for
several reasons. There are genetic differences,
slower rates of maturity and greater vulnerability
to physical injury. Brain development and the
pattern of hormone production in the womb are
different for boys than girls. Recent studies of
adults reveal gender differences in brain structure,
function and chemistry. These differences may
make boys more vulnerable to chemical
exposures. As well, there are a larger number of
cell divisions in males during fetal development
which increases the chances of
genetic errors occurring.

**Birth Defects**

Birth defects occur in about two to
three per cent of births in Canada
with boys affected more often than
girls. About half of birth defects
affecting boys include
cryptorchidism (undescended
testicles) and hypospadias (a
defect of the male urinary tract).
Stillbirths and miscarriages —
which often can be due to birth
defects — also seem to be more
common in male babies.

Many factors can contribute to birth defects
including genetics, infection during pregnancy,
and environmental factors. Much remains
completely unknown. Interaction of multiple
factors is likely. We know that certain chemicals
can impact development, including lead,
mercury, radiation, and PCBs contaminated by
dioxins and furans. Scientists suspect many more
including some pesticides, organic solvents, and
some air pollutants.

Development of the male reproductive system
has more steps and is more complex than for the
female system. As a result there are more chances
for error. Rapid cell growth creates a higher risk of
incorporating errors during development than
cells growing more slowly. Where defects
originate in an X chromosome, females have a
chance to “neutralize” this defect with another X
chromosome, while males have only one X
chromosome.

**Testicular Dysgenesis Syndrome**

Scientists describe a group of impacts on the
male reproductive system under the term
Testicular Dysgenesis Syndrome (TDS). TDS
includes the birth defects cryptorchidism and
hypospadias, as well as poor semen quality (i.e.
reduced sperm count, more abnormal sperm),
lower fertility and perhaps also testicular cancer.
Scientists suspect chemical exposures during
pregnancy, specifically during the time when the
male reproductive system is developing may be
causing these related impacts.

Hormones of the
endocrine system play an
important role in
development of the fetus.
Scientists suspect that TDS
results from chemicals
that can disrupt these
hormones. Called
“endocrine disruptors,”
scientists have shown
these effects (mostly
through animal studies
but also in some human
studies) for a few
chemicals including PCBs,
dioxins and some
organochlorine pesticides
such as DDT. Evidence is growing about other
chemicals found in everyday consumer products
such as: phthalates (found in many personal care
products, food packaging and other products),
Bisphenol A (also in food packaging and many
other plastic products), brominated flame
retardants or PBDEs (used in many different
products containing foam or fabric as well as
numerous electronic products) and surfactants
such as nonylphenols (used in detergents,
degreasers, paints, etc.).

Endocrine disruptors may also have played a role
in the declining male to female sex ratio in many
industrialized nations — that is, fewer male
children are born every year. Between 1970 and
1990, there was a decline of 2.2 males per 1,000
live births in Canada.
Fathers’ Exposures and their Children’s Health

Many studies show links between fathers’ exposures to chemicals and health problems in their children. These include low birth weight, spontaneous abortion, birth defects, cancer and developmental delays. Chemical exposures for men may directly affect sperm quality. Chemicals can also be carried in seminal fluid. Workplace chemicals may be brought home by the father exposing mother, fetus or child. Occupations of particular concern include those that involve the use of pesticides, solvents, petroleum products, paints, anesthetics, metals or radiation.

Playing It Safe: Childproofing Tips for Fathers

As a father, you can take steps to minimize the toxic substances that you, your partner and your children may be exposed to. You can do this at work, at home and in your community. Remember that these tips are just as important for mothers.

At work, become aware of possible environmental and occupational hazards. If you work with chemicals, or in construction or renovation, make sure you take all necessary precautions to protect yourself and your family:

• Wear protective clothing and equipment (e.g., masks, gloves, or other protections)
• Wash your hands when possible, especially before eating
• Change your clothes and shower when you get home if facilities are not available at your workplace
• Wash work clothes separately from other clothes
• Keep work equipment outside if possible (in the tool shed or garage for example)

For more information on the chemicals you may be exposed to on the job, and what you can do about them, contact the Canadian Centre for Occupational Health and Safety at 1-800-668-4284 or visit www.ccohs.ca.

At home, it is important to:

• Remove shoes at the door
• Wet dust, vacuum and ventilate your home regularly
• Minimize your use of toxic chemicals: buy personal care products and cleaning products that are less toxic. See www.lesstoxicguide.ca for a list of safe alternatives
• If your hobbies involve the use of hazardous substances make sure these are not practiced in the living areas of the house, that your workspace is kept well ventilated, and that you wear protective clothing

For many more useful tips, see Child Health and the Environment — A Primer and the Playing It Safe brochure available at www.healthyenvironmentforkids.ca.

And in the community, as fathers you can:

• Become aware of the chemicals your children may be exposed to in childcare facilities, schools, playgrounds, parks, libraries, sports fields and arenas. Ask what products are being used — particularly cleaning products and pesticides — and whether they have been evaluated for health impacts. Find out if alternative products or approaches have been considered.
• Start or support campaigns to reduce pesticide use, promote energy efficiency, and reduce greenhouse gas emissions, etc.
• Voice your concerns to your elected officials — many issues require policy change at the municipal, provincial or federal level.

For more information on ways you can get involved and steps that you can take to ensure a healthy future for you and your children visit the Canadian Partnership for Children’s Health and Environment at www.healthyenvironmentforkids.ca.