

HEALTH EFFECTS OF ENVIRONMENTAL CONTAMINATION

Presented to the New Brunswick Environmental
Network

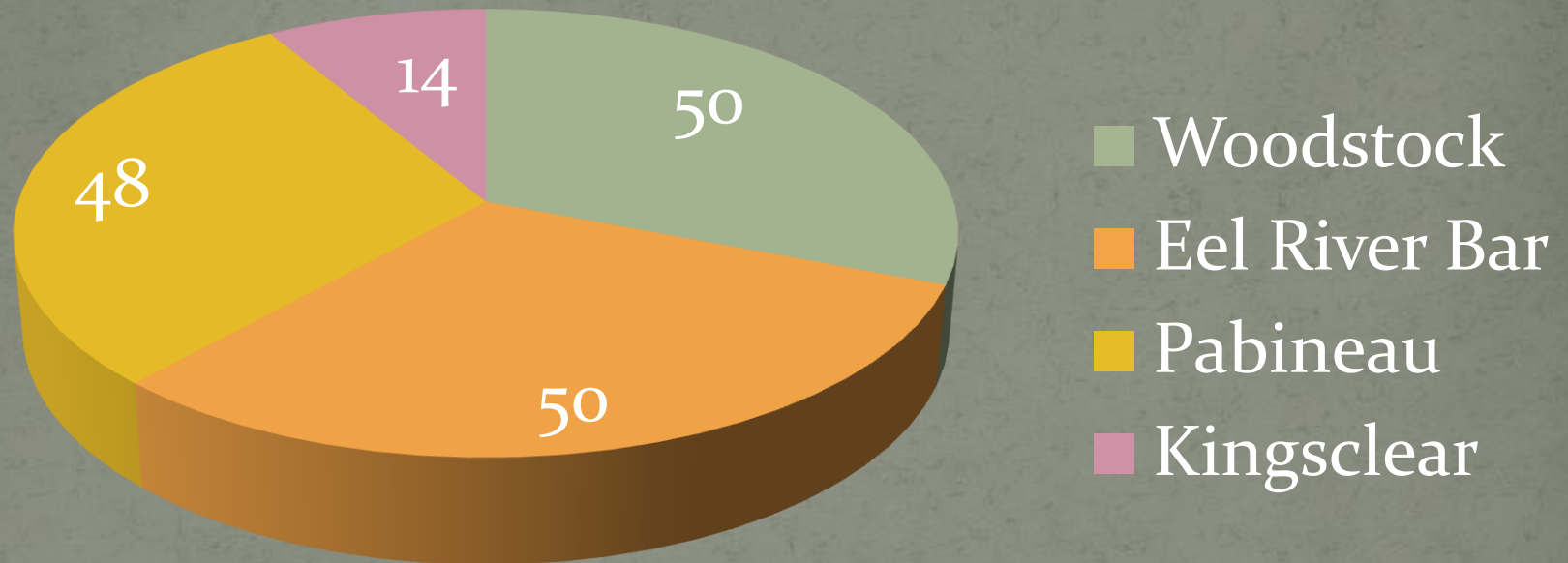
Fredericton, NB

November 28, 2013

Objectives:

- To determine whether the health of First Nations people who live on reserves where environmental contaminants, particularly lead, mercury, cadmium and dioxins have been detected is significantly worse than the health of First Nations people who live on reserves where there has been less evidence of environmental contamination.

First Nations Sample:



Data collection:

- The nurse working in the community or nursing student from the community gathered a health history using the Behavioural Risk Surveillance Survey

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- Questions were added to identify symptoms that would indicate health effects of contaminants e.g. History of stillbirths or miscarriages.

Data:

- Blood pressure
- Blood glucose
- HDL Cholesterol
- Weight and height = BMI

Traditional foods

- Moose
- Fiddleheads
- Berries
- Trout
- Lobster
- Salmon
- Smelts

Measurement of trace metals

Measured in mg/kg

Minimum risk levels > mg/kg/day

Amount commonly eaten at a time = $\frac{1}{4}$ kg

Amount in food intake by an 80 kg person in $\frac{1}{4}$ kg of food item = $80 \times \text{number of mg/kg of element} \times \frac{1}{4} \text{ kg}$

Woodstock daily intake of metals for 80 kg. Person with 3 traditional foods

Element	MRL	Fiddleheads	Trout	Liver	Sum of metal	Interpretation
Cadmium	.008	.007	.0005	.0005	.008	Max.
Chromium	0.08	0.05	0.05	0.05	0.15	2 x MRL
Copper	0.80	0.775	0.150	0.550	1.475	Almost 2 x MRL
Nickel	0.016	0.05	0.05	0.05	0.15	10 x MRL

Pabineau daily intake of metals for 80 kg. person with 3 traditional foods

Element	MRL	Fiddle heads	Cranb erries	Moose steak	Sum	Inter p.
Cadmium	.008	.06425	.00425	.00375	.07225	9x MRL
Chrom.	0.08	0.05	0.05	0.05	0.15	2 x MRL
Copper	0.89	1.6	0.15	0.35	2.1	3 x MRL
Nickel	0.016	0.525	0.05	0.05	0.625	39 x MRL

Eel River Bar daily intake of metals for 80 kg. person with 3 traditional foods

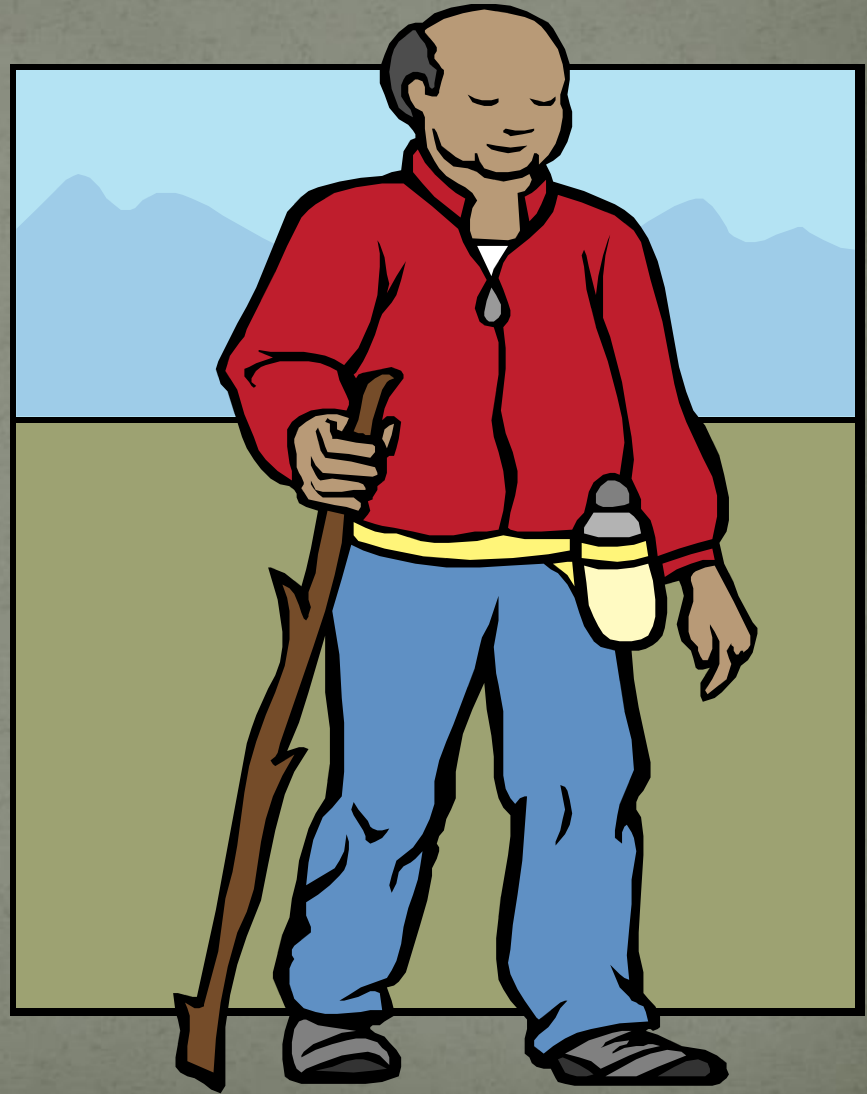
Element	MRL	Fiddleheads	Strawberries	Lobster	Sum of metal	Interpretation
Cadmium	.008	.00375	.0005	.13750	.14175	17.7 x MRL
Chromium	0.08	0.05	0.05	0.05	0.15	2 x MRL
Copper	0.80	.05	.05	4.675	4.775	Almost 6 x MRL
Nickel	0.016	0.05	0.05	0.05	0.15	9 x MRL

Significant differences:

- Obesity: More than 50% of the known contaminant group had a BMI in > 29 category – i.e. Obese level
- Significantly more of the known contaminants group were obese than the unknown contaminant group.

Significant differences:

- Those in the known contaminants group were significantly more likely to be physically active, more often, for longer periods of time than those in the unknown contaminant group.



Environmental links to obesity:

- Cadmium has endocrine disrupting effects and is obesogenic – i.e. causes increased obesity.
- Many of the heavy metals, e.g. Cadmium attach to fat cells and are stored in the body for long periods of time.
- The only way Cadmium is expended by the body is when a mother breastfeeds her baby.

Significant differences:

- Known contaminants group were more likely to have a family history of cholesterol problems and to have had their cholesterol checked.



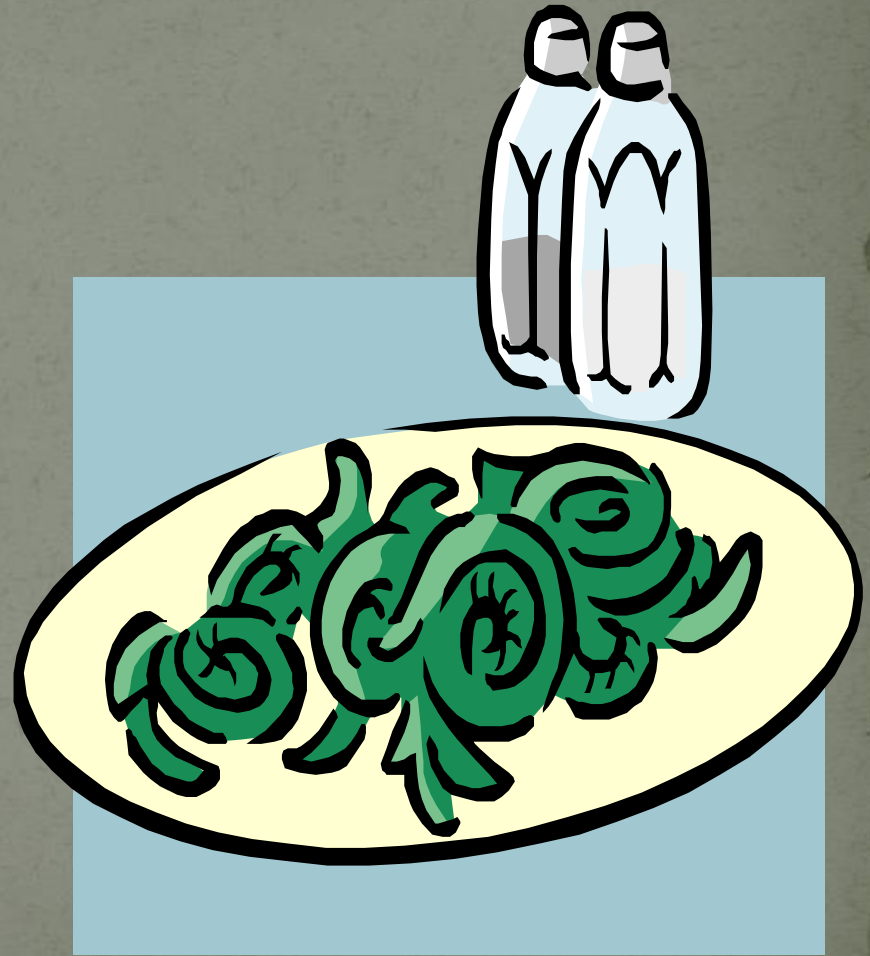
Significant differences:

- Known contaminant group had more gastrointestinal problems in their family and more suffered from pain in their stomach or gas after eating fried foods.



Significant differences:

- Those in known contaminant group were more concerned about their environment and its effects on their health and less likely to donate fiddleheads or see them as important.



Health variable	Ever dx'd with cancer	N	Mean	T	df	Sig.
Allergy	No	132	1.6667	-2.668	145	.008
	Yes	15	2.8667			
Health Perception	No	138	15.9493	2.433	151	.016
	Yes	15	13.1333			
Cholesterol	No	134	4.7463	-3.043	147	.003
	Yes	15	7.2000			
Spiritual practices	No	135	1.6000	-3.226	148	.002
	Yes	15	2.2667			
Children born with anomalies	No	68	.1912	-2.104	80	.039
	Yes	14	.5000			
Concerned about Environment	No	138	5.3986	-1.900	150	.059
	Yes	14	6.4286			

Health issues for the whole sample:

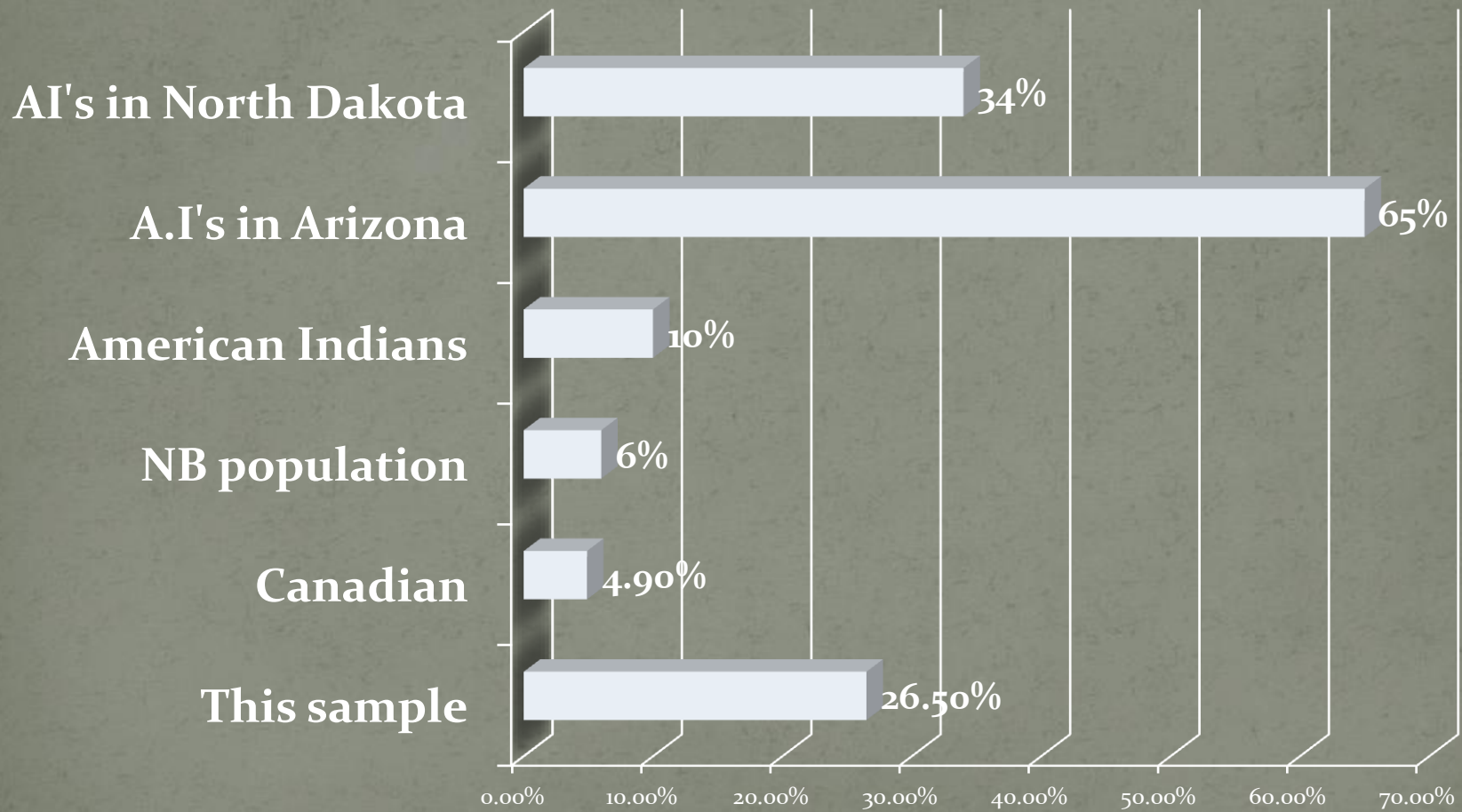
- Cancer:



The link between Environmental contaminants and Cancer

- Cadmium, dioxins, PCBs, lead, Arsenic,
- Disrupt the endocrine system increasing obesity
- Stimulate the development of an enzyme that activates carcinogens

Diabetes:



Diabetes:

- Majority diagnosed before 31 years of age
- 51% of Diabetics in this sample had numbness in toes
- 31% had a blood glucose that would cause long term complications if not addressed.
- Significantly related to obesity, hypertension, cardiovascular disease, and gastrointestinal disease.

Chronic illness	Other health scale	Pearson correlation	Sig.	
Cardiovascular disease	Perception of health status	-.170	.031	
	Allergies	.253	.001	
	Diabetes	.311	.000	
	Gastro-intestinal problems	.346	.000	
	Cholesterol	.225	.005	
	Hypertension	.344	.000	
	Women's health	.302	.004	

Chronic illness	Other health scale	Pearson correlation	Sig.
Gastro-intestinal disease	Perception of health status	-.159	.043
	Depression	.174	.033
	Child development	.243	.024
	Cardiovascular disease	.346	.000
	Cholesterol	.195	.014
	Hypertension	.283	.000
	Nutrition	.083	.296

Women's health:

- **Sample:**

- 44% had at least one miscarriage or stillbirth
- 8% had 3-5 miscarriages
- 15% had a baby with abnormalities at birth

- **General population of women**

- 10-20% miscarriages or stillbirths
- 1-2% have repeated miscarriages

Abnormalities are more common among women with Gestational Diabetes.

Recommendations:

1. Findings of the study be reported in each community.
2. A study be conducted in which people are tested for the presence of heavy and other trace metals in their bodies; blood tests, hair samples; urine tests.
3. A health program be developed to teach people how to manage their diet in order to decrease the effects of environmental contaminants.

Recommendations:

- Smoking cessation programs be made more accessible.
- A project that gathers and documents the ecological knowledge of the Mi'kmaq and Maliseet elders about how to care for the land be undertaken.
- A program that focuses on maternal health, especially a diet that minimizes exposure to environmental contaminants and smoking be developed.

Recommendations:

- A data base of persons with documented heavy metals and Dioxins and PCBs contamination of their bodies needs to be developed.
- Consultation with government, industry and First Nations peoples needs to be focused on the health effects of environmental contamination and approaches to decreasing such contamination. The NB Government with its Mercury Strategy has decreased the levels of mercury to within normal ranges throughout the province. This success needs to be used as a model.