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Assessment of Prion Diseases Risk Perception in Canadian Medical Laboratories

Prion diseases, such as Creutzfeldt-Jakob Disease (CJD) are characterized in humans by rapidly progressive dementia that is untreatable and invariably fatal. These neuro-degenerative illnesses are attributed to an infectious protein agent known as a prion, which causes damage and death to nervous tissue and gives the tissue a sponge-like appearance.

Every year, 30 to 40 cases of human prion disease are confirmed by the Canadian CJD Surveillance System.[1] Diagnostic testing for prion diseases is performed by the National Microbiology Laboratory in Winnipeg. However, medical laboratories across Canada annually process hundreds of specimens from patients where prion disease is in the differential diagnosis and tests are requested to rule out other potentially treatable neurological illnesses.

Recommendations from the Public Health Agency of Canada outline precautions for managing the risks of prion transmission in clinical settings, however, detailed guidelines specific for medical laboratories do not currently exist.[2] The risk of prion transmission during specimen processing is low and to date no cases of classical CJD have been attributed to laboratory exposure. However, laboratory workers may perceive themselves at risk from prion disease and therefore may be reluctant to handle and process these specimens, resulting in testing delays.[3, 4]

To understand the prion disease risk perception of medical laboratory staff we developed a web survey that examined the knowledge, attitudes and behaviour of medical laboratory staff in relation to processing specimens from patients with potential prion disease. We analyze the results and make recommendations about the need for national laboratory specific guidelines on prion infection control.

With thanks *to the laboratory staff who participated in interviews and completed the surveys; the laboratory managers, the Canadian Society for Medical Laboratory Science; the Association of Medical Microbiology and Infectious Disease Canada; and the Community and Hospital Infection Control Association - Canada who distributed the link to the on-line survey and to Drs Petric and Doyle for their input.*
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Methods

- Interviews transcribed; coded under the Health Belief Model
- Draft survey developed & refined by 5 experts
- On-line survey pilot tested & finalized
- Survey link sent out by lab managers & national organizations
- Results analyzed

> “THE ANONYMITY ENSURED NO ONE PERSON INFLUENCED THE PROCESS.”

Interviews with 12 key informants explored current practice, perceived risks for laboratory staff, and barriers to implementation of best practices. Interviews were audio-taped, transcribed and coded under the constructs of the Health Belief Model.[5]

A draft survey was developed using the interview results. Questions were ordered to reflect the laboratory work flow (specimen receiving, processing, disposal etc) and knowledge questions were included.

Five experts refined the survey; they rated each question: Yes, Maybe, No and provided comments. The moderator circulated anonymous feedback to the group; this process was repeated until consensus was reached. The anonymity ensured no one person influenced the process.[6]

The on-line survey was pilot tested by four laboratory workers to assess understandability and validity. The web link to the survey was sent by three national organizations and laboratory managers to members and staff.

The Health Belief Model

Coded interview results

(examples)

Cues to action—
Follow protocol vs. extra steps
Challenges: post-hoc identification common

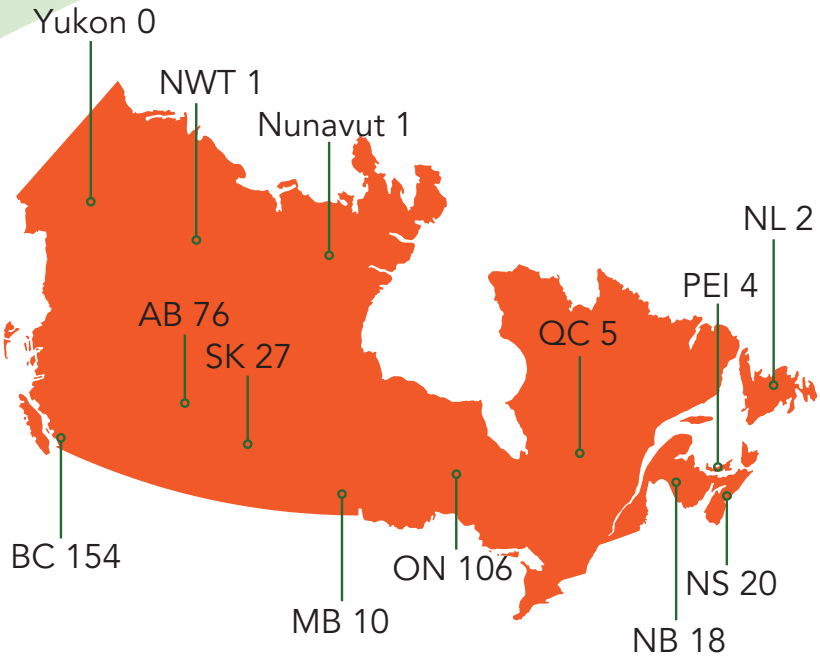
Perceived Severity—
‘there’s no treatment, there’s no prophylaxis’
‘its an “ugly disease”’

Perceived Susceptibility—
“no single set of rules”

Perceived Barriers—
lack of experience & lack of information relevant to medical labs

Perceived Benefits—
is a quick diagnosis worth the risk?
“Is the patient still alive?”

SURVEY RESULTS



Survey respondents

We received 426 usable responses from all provinces; 82% were female; about 2/3 were medical technologists.

Current laboratory position		Time in position	
Medical technologist	**65%**	≤5 years	**34%**
Medical technician/ assistant	**17%**	6-15 years	**25%**
Manager	**6%**	>15 years	**41%**
Physician	**5%**		

Practices and risk perceptions

155 respondents worked in laboratories where specimens are processed. They reported receiving specimens from patients with potential prion disease infrequently; 90% specified that they receive specimens less than once a month.

60% reported their laboratory had a special protocol, 25% followed routine practices.

Some laboratories determine the likelihood of CJD before deciding whether/or how to process specimens; 17% phoned the requesting physician, 10% wait for further test results or contact somebody in authority. However 90% stated they always processed the specimen.

Laboratory staff reported various ways they became aware the specimen was from a patient with potential prion disease:

25% specimens labeled

42% on requisition form

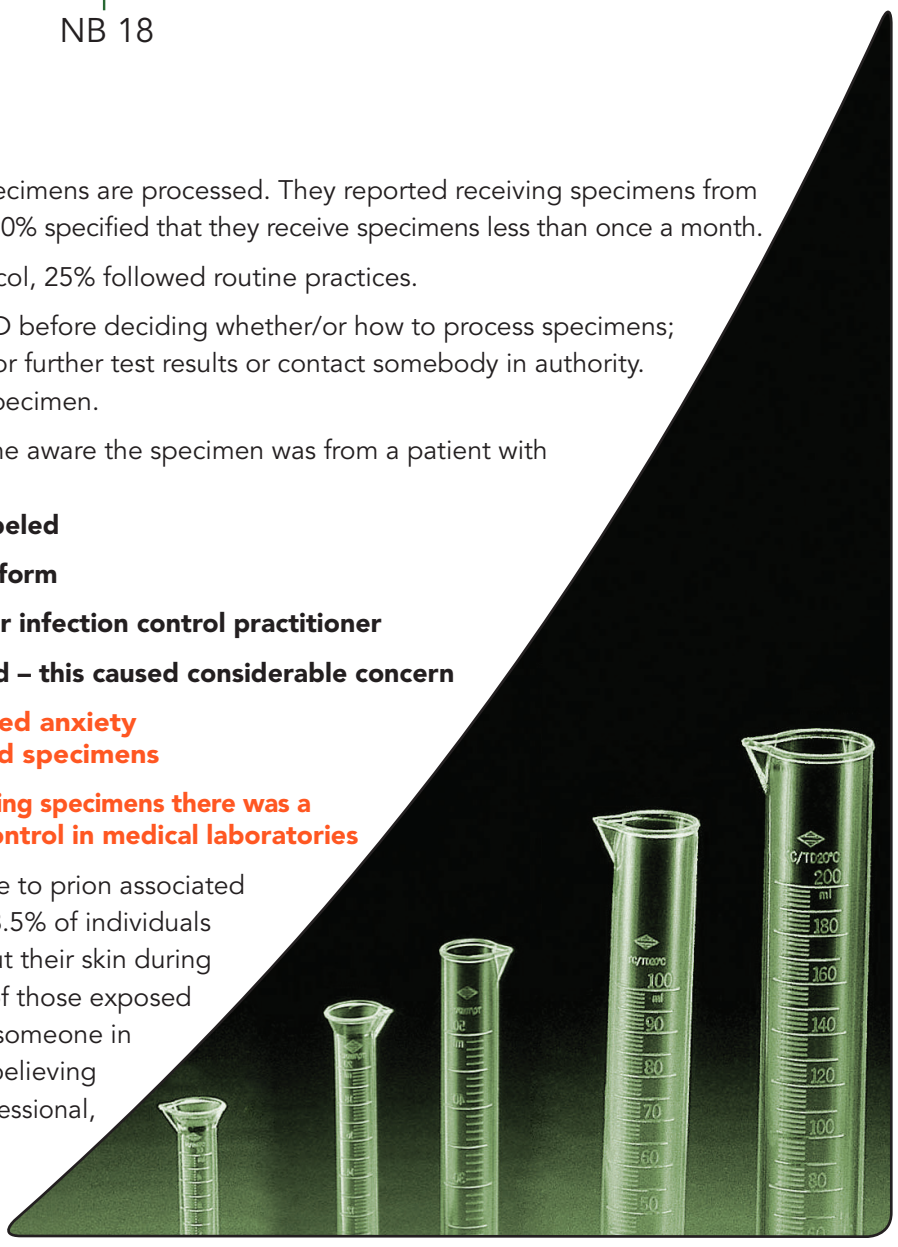
49% word of mouth from co-workers or infection control practitioner

Some were unaware until processing completed – this caused considerable concern

Half of respondents experienced anxiety when processing prion associated specimens

81% would be more comfortable processing specimens there was a national guideline specific to prion infection control in medical laboratories

Some respondents reported unprotected exposure to prion associated specimens during processing over the past year; 8.5% of individuals reported skin contact with specimen fluid, 2.5% cut their skin during processing, 2.5% inhaled aerosolized fluids. Half of those exposed did not report the incident to their supervisors or someone in authority. The reasons for not reporting included believing they were not at risk, worrying about looking unprofessional, not knowing who to tell and handling the issue on their own.



Precaution (best practices) n=155	% Report precaution outlined in their protocol
Double Gloving	39%
Safety Glasses	42%
Absorbent pads under specimens	50%
Labeling specimens for proper disposal	50%
Wearing face shield when risk of splashes	53%
Using disposable water resistant gowns	54%
Taking specific measures to avoid spills	54%
Taking specific measures to avoid aerosol/droplet production	56%
Taking specific measures to avoid injuries with sharps	57%
Using disposable instruments/ incineration after procedure	59%
Labeling specimen as potential prion risk before sending to other facilities	60%
Opening specimen in biosafety cabinet	69%

The proportion of respondents who report each best practice is in their protocol

Training

The mean correct score for the knowledge questions was 39% (9.25/24). Physicians and managers had significantly higher knowledge scores.

Only 36% of respondents who directly handled specimens agreed they had received adequate training. Those who report adequate training are more likely to label specimens appropriately before sending them for incineration or further processing, and attained higher knowledge scores.

	Knowledge scores		
	Mean score	Standard deviation	
Entire sample (n = 426)	**9.25**	**± 4.5**	
Position in laboratory			
Physician/managers	12.05	± 1.05	
Laboratory technologists	8.55	± 0.61	
Laboratory technicians/assistants	8.72	± 1.29	P=<0.01
Those who directly handle specimens n=83			
Adequately trained to handle specimens from patients with potential prion disease			
Agreed	10.93	± 2.95	
Neither agree nor disagree	10.31	± 5.11	
Disagree	6.27	± 4.66	P=<0.01

Recommendations

Training programs can impact knowledge and behavior and enable workers to take appropriate actions.[7]

We suggest training regarding prion infection control for medical laboratory staff is needed.

National guidelines for prion infection control in medical laboratories could provide medical laboratory workers with the tools to process these specimens efficiently and with confidence.

References

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