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. 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. 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.

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 online survey and to Drs. Petric and Doyle for their input. Thanks also to Andrew Tu for statistical support.

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This project was made possible through a high impact grant from PrioNet Canada.
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.6

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**

**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 Health Belief Model**

**CUES TO ACTION**
Perceived susceptibility PLUS Perceived severity

**LIKELIHOOD OF ACTION**
Perceived benefits MINUS Perceived barriers

**PERCEIVED THREAT**
Perceived susceptibility AND Perceived severity

**PERCEIVED BENEFITS**
A quick diagnosis worth the risk?

"Is the patient still alive?"

**PERCEIVED SEVERITY**
There’s no treatment, there’s no prophylaxis; it’s an “ugly disease”.

**PERCEIVED SUSCEPTIBILITY**
No single set of rules

**PERCEIVED BARRIERS**
Lack of experience & lack of information relevant to medical labs

**Coded interview results**

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<thead>
<tr>
<th>Cues to Action —</th>
<th>Follow protocol vs. extra steps</th>
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<tr>
<td>Challenges post hoc identification common</td>
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<tr>
<th>Perceived Severity —</th>
<th>There’s no treatment, there’s no prophylaxis; it’s an “ugly disease.”</th>
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<th>Perceived Susceptibility —</th>
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<th>Perceived Benefits —</th>
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<td>&quot;Is the patient still alive?&quot;</td>
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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.
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.

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