



Infection Control Guidelines

Classic Creutzfeldt-Jakob Disease in Canada



Quick Reference Guide 2007

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INTRODUCTION

In December 2004, the Public Health Agency of Canada (PHAC) convened a special meeting of the Advisory Committee on Infection Prevention and Control for Creutzfeldt-Jakob Disease, to review and revise as necessary the « 2002 Infection Control Guideline for Classic Creutzfeldt-Jakob Disease in Canada ».

A PHAC International CJD Scientific meeting, where the most up-to-date scientific information on CJD and its iatrogenic transmission was reviewed, preceded this meeting. This document represents clarification and revision of components of the « 2002 CJD Infection Control Guideline » based on information available at the time of the 2004 PHAC International CJD Scientific Meeting. See the « 2002 CJD Infection Control Guideline » for complete recommendations.

The most effective, safe, and efficient means of preventing iatrogenic transmission of CJD are to identify high-risk patients before an invasive procedure, in order to implement the required infection prevention and control measures, and to have a system for instrument tracking (Section 3, page 6).

Note: Infection prevention and control measures to prevent or minimize exposure to variant CJD (vCJD) will not be addressed in this document. If a case of vCJD is clinically suspected or diagnosed, for specific infection prevention and control measures, the practitioner should consult with the Nosocomial and Occupational Infections Section, Blood Safety Surveillance and Health Care Acquired Infections Division, Centre for Infectious Diseases Prevention and Control, Infectious Diseases and Emergency Preparedness Branch, Public Health Agency of Canada, at the following number: (613) 952-9875.

1.0 IS THE PATIENT A POTENTIAL CJD TRANSMITTER?

1.1 High-risk Patients

Patients considered to be at high risk of transmitting CJD iatrogenically are those diagnosed, prospectively or retrospectively, with:

- CJD – confirmed, probable, or possible CJD, familial CJD, Gerstmann-Sträussler-Scheinker disease (GSS), or fatal familial insomnia (FFI) depending on pathological, laboratory, and clinical evidence and following the Surveillance definitions for Classic CJD¹.
- Suspected CJD – undiagnosed, rapidly progressive dementia and CJD not ruled out.
- Asymptomatic carrier of genetic transmissible spongiform encephalopathy (TSE) – a person who displays no symptoms or signs of TSE, but meets one or more of the following criteria :
 1. The person has been confirmed by genetic testing to carry a genetic mutation causative of familial CJD, GSS, or FFI;
 2. The person has at least one first-degree relative who has been confirmed by genetic testing to carry such a mutation, with or without pathologic confirmation of TSE;
 3. The person has two or more first-degree relatives who have been diagnosed with either confirmed or probable TSE, with or without confirmation by genetic testing.

Step 4 outlines appropriate procedures for managing instruments that have been in contact with high-risk patients, depending on the potential infectiousness of the tissue contacted.

To minimize the risk of transmitting CJD, elective procedures in high-risk patients (involving high-risk or low-risk tissues) should be well justified and carefully planned in advance.

1.2 At-risk Patients

The following patients are at risk of iatrogenic CJD:

- Recipients of human tissue derived pituitary hormone treatment (either growth hormone or gonadotrophin).
- Recipients of a dura mater graft (until 1992 for Lyodura grafts, until 1997 for Tutoplast Dura grafts).
- Recipients of a corneal graft originating in a jurisdiction that does not require graft donors to be screened for neurological disease.
- Patients who have been exposed, via contact with instruments, to high-infectivity tissue of a confirmed CJD patient.

¹See « 2002 CJD Infection Control Guideline », Appendix II, p. 59 for Surveillance definitions for Classic CJD.

The Working Group considers, after examining the available evidence, that the risk of transmission via instruments used on at-risk, asymptomatic patients is negligibly low, and therefore, recommends such instruments be routinely decontaminated and then reused. This represents a change from the « 2002 CJD Infection Control Guideline ».

Screening procedures should be performed to identify high-risk patients, and not to identify at-risk patients. A patient who self-identifies as being at-risk should be evaluated clinically for evidence of CJD.

2.0 WAS INFECTIOUS TISSUE CONTACTED?

The procedures recommended for managing instruments used on high-risk patients depend on the potential infectivity of the tissue contacted. Using evidence from animal studies and reports of infection through iatrogenic exposure, human tissue is classified into three categories, according to its risk of transmitting CJD. This information was updated based on the 2006 WHO Guidelines on tissue infectivity distribution in transmissible spongiform encephalopathies and is subject to change as further information becomes available.

High-infectivity	Low-infectivity
<ul style="list-style-type: none"> ▪ Brain ▪ Cerebrospinal fluid (CSF)² ▪ Dura mater ▪ Pituitary gland ▪ Posterior eye (optic nerve and retina) ▪ Spinal cord and spinal ganglia ▪ Trigeminal ganglia 	<ul style="list-style-type: none"> ▪ Cornea³ ▪ Kidney ▪ Liver ▪ Lung ▪ Lymph nodes ▪ Placenta ▪ Spleen
No detected infectivity	
<ul style="list-style-type: none"> ▪ Adipose tissue ▪ Adrenal gland ▪ Appendix⁴ ▪ Blood (including cord blood)⁴ ▪ Blood vessels⁵ ▪ Bone marrow ▪ Breast milk (including colostrum)⁴ ▪ Dental pulp ▪ Epididymis⁴ ▪ Esophagus⁴ ▪ Feces ▪ Gingival tissue⁴ ▪ Heart ▪ Ileum⁴ ▪ Jejunum⁴ ▪ Large intestine⁴ ▪ Nasal mucosa⁵ ▪ Nasal mucous ▪ Ovary⁴ 	<ul style="list-style-type: none"> ▪ Pancreas⁴ ▪ Pericardium⁴ ▪ Peripheral nerves⁵ ▪ Placental fluids⁴ ▪ Prostate ▪ Saliva ▪ Semen ▪ Seminal vesicle⁴ ▪ Skeletal muscle⁵ ▪ Skin ▪ Sweat ▪ Tears ▪ Testis ▪ Thymus⁴ ▪ Thyroid gland ▪ Tongue⁴ ▪ Tonsil⁴ ▪ Trachea⁴ ▪ Urine ▪ Uterus (non-gravid)⁴

For footnotes, see next page.

In this update of the « 2002 CJD Infection Control Guideline », infectivity for cornea, optic nerve, and retina has been differentiated. Trigeminal and spinal ganglia have been classified as high-infectivity tissues. Dental pulp has been moved from low-infectivity to no detected infectivity based on recent experiments that did not detect the abnormal prion protein in dental pulp of patients with human TSEs. Serous exudates have been removed.

² While CSF is a low-infectivity tissue, contact with CSF necessarily implies contact with high-infectivity tissue and should be managed as a high infectivity tissue/fluid for infection prevention and control purposes.

³ Other anterior chamber tissues (lens, aqueous humor, iris, conjunctiva) have been tested with a negative result in human TSEs, and there is no epidemiological evidence that they have been associated with iatrogenic transmission.

⁴ A number of tissues have been examined for infectivity and/or the presence of abnormal prion protein with negative results in classic CJD.

⁵ Recent research findings in human TSEs have demonstrated the presence of the abnormal prion protein (PrP^{TSE}) in several peripheral tissues (blood vessels, nasal mucosa, peripheral nerves, skeletal muscle). So far, no infectivity has been demonstrated with these tissues in classic CJD, and the precise relationship between the presence of PrP^{TSE} and infectivity is not certain (e.g., detection of small amounts of PrP^{TSE} in a tissue does not necessarily mean that it would transmit disease in all circumstances). For the purpose of infection control, they will be regarded as non-infectious.

3.0 WHICH INSTRUMENTS WERE USED?

It is recommended to:

- Limit as much as possible the number of instruments used for any procedure.
- Use disposable rather than reusable instruments whenever possible and especially when in contact with high-infectivity tissue.
- When using reusable instruments, choose, whenever possible, those that can tolerate the rigors of CJD decontamination.
- Track use of reusable instruments.

3.1 Instrument Identification

Without detailed information as to which reusable instruments were in contact with potentially infectious tissue, the only way to eliminate all risk of iatrogenic transmission is to discard all potentially contaminated instruments, creating considerable waste.

Without such information, the opportunity to reduce the risk of transmission by instruments already in circulation – a risk to which some patients have already been exposed – is lost.

To reduce or eliminate such risk without waste, it is strongly recommended that all reusable instruments be tracked. Technology is now available for tracking instruments, though not widely used, and more effective technology is being developed.

Some sample tracking measures are listed below in order, roughly, of increasing effectiveness and decreasing feasibility. Immediate adoption of the most effective feasible measures is recommended, with the addition of even more effective methods as soon as these become feasible. Facilities that have not yet established a full tracking system (measure 1) should, at a minimum, segregate those instruments used on high-infectivity tissue (measure 2).

1. Identify — for example, by means of a colour code or a bar code – those sets of reusable instruments used only on:
 - brain and neuro/ortho spine;
 - retina/posterior eye.Keep these sets separate from other sets.
2. Within a set of instruments, identify those used only on high-infectivity tissues; Keep these specific instruments separate from the others.
3. Identify — for example, by means of a bar code — each individual instrument and the set to which it belongs. Associate the records of the use of this individual instrument with the records of patients on whom it was used.

4.0 RECOMMENDED ACTIONS

We recommend some combination of the following measures to manage or reduce the risk of iatrogenically transmitting CJD infection through reused instruments.

4.1 Discard

To discard means to assure an instrument cannot possibly transmit infection to another patient. Incineration is the most unambiguous means of doing so. Note, however, there is evidence that prions can survive very high temperatures.

Where incineration is not available, an acceptable alternative is CJD decontamination (see below) followed by disposal in a landfill.

4.2 CJD Decontamination

We recommend, where appropriate, a combined method of CJD decontamination in four steps:

1. Clean thoroughly;
2. Soak in 1N sodium hydroxide (NaOH) for 1 hour;
3. Thoroughly rinse;
4. Sterilize in a prevacuum-method autoclave at 134°C for 60 minutes.

Acceptable substitutions for steps 2 and 4 include:

2. Substitute 2% NaOCl (20,000 ppm available chlorine) for 1N sodium hydroxide (NaOH);
4. Sterilize in a prevacuum-method autoclave at 134°C for 18 minutes rather than 60 minutes.

Notes:

- Instruments made of high-quality stainless steel can tolerate CJD decontamination using NaOH.
- Instruments that contain plastic or electronic devices, such as bronchoscopes, cannot tolerate CJD decontamination.
- Instruments that contain both steel and other metals, and particularly aluminum, should never be exposed to NaOH.

Ideally, decontamination procedures shown to deactivate prions would be used on all instruments no matter which patients they were used on or what tissues they contacted. Unfortunately, the only available procedures for which there is evidence of effective deactivation cannot be routinely used as they are potentially damaging to many instruments. We do not believe, based on the evidence, that autoclaving at 134°C for 18 minutes by itself suffices to deactivate prions, and hence do not recommend this as a routine procedure to prevent CJD transmission.

4.3 Routine Reprocessing

Routine decontamination and sterilization/disinfection in the recommended Canadian Standards Association (CSA) specified manner.

4.4 Quarantine

After routinely reprocessing separately from other instruments (see Decision algorithm, p. 13, store instruments in dry conditions. Do not reuse unless a diagnosis is made that eliminates the possibility that the patient on whom the instruments were used had CJD. A confirmed diagnosis other than CJD, either clinical or pathological, or a postmortem examination excluding CJD, is required to take instruments out of quarantine. A brain biopsy that is negative for CJD, in the absence of a confirmed alternate diagnosis, does not suffice to take instruments out of quarantine.

5.0 DECISION ALGORITHM (TEXTUAL VERSION)

5.1 High-risk CJD Patients Managed Prospectively

CJD*	
<i>Instruments that were in contact with: ***</i>	<i>Action to be taken: ****</i>
High-infectivity tissue**	Discard.
Low-infectivity tissue**	Can the instruments tolerate CJD decontamination? - if yes, CJD decontaminate & reuse; - if no, discard.
No detected infectivity tissue**	Routine reprocessing & reuse.
Suspected CJD*	
<i>Instruments that were in contact with: ***</i>	<i>Action to be taken: ****</i>
High-infectivity tissue**	Routine reprocessing separately & quarantine. Is diagnosis of CJD excluded? - if yes, reuse; - if no, discard.
Low-infectivity tissue**	Can the instruments tolerate CJD decontamination? - if yes, CJD decontaminate & reuse; - if no, routine reprocessing separately & quarantine. Is diagnosis of CJD excluded? - if yes, reuse; - if no, discard.
No detected infectivity tissue**	Routine reprocessing & reuse.
Asymptomatic carrier of genetic TSE*	
<i>Instruments that were in contact with: ***</i>	<i>Action to be taken: ****</i>
High-infectivity tissue**	Discard.
Low/No detected infectivity tissue**	Routine reprocessing and reuse.

* See 1 « Is the patient a potential CJD transmitter? », p. 2.

** See 2 « Was infectious tissue contacted? », p. 4.

*** See 3 « Which instruments were used? », p. 6.

**** See 4 « Recommended Actions », p. 8.

5.2 High-risk CJD Patients Managed Retrospectively

CJD*	
<i>Instruments that were in contact with: ***</i>	<i>Action to be taken:****</i>
High/Low-infectivity tissue**	<p>Can specific instruments or sets be identified?</p> <ul style="list-style-type: none"> - if yes, proceed as for prospectively managed CJD; - if no, were instruments reprocessed more than 9 times? - if yes, proceed as for prospectively managed CJD (option A) or reuse (option B); - if no, proceed as for prospectively managed CJD (option A). <p>The « CJD Incidents Panel (UK) Framework » document concluded that most instruments that have gone through ten cycles of use and decontamination are unlikely to pose a significant risk of cross-transmission. This is based on scenario modeling using the risk assessment for transmission of variant CJD endorsed by the «Spongiform Encephalopathy Advisory Committee ». There are, however, no experimental data to confirm these modeling conclusions. Given this information and the significant cost associated with discarding large numbers of surgical instruments, the PHAC Infection Control Guidelines Steering Committee believed that this guideline should reflect uncertainty in this area and allow health care facilities the choice of option A or B. This decision should consider whether the instruments have been adequately reprocessed⁶.</p>
No detected infectivity tissue**	Continue to reuse

* See 1 « Is the patient a potential CJD transmitter? », p. 2.

** See 2 « Was infectious tissue contacted? », p. 4.

*** See 3 « Which instruments were used? », p. 6.

**** See 4 « Recommended Actions », p. 8.

⁶ One premise underlying the scenario modeling is that a decontamination cycle for a surgical instrument involves two stages: physical cleaning, typically using a mechanical washer/dryer, followed by inactivation of any remaining infectious material, e.g. by high-pressure steam autoclaving. The criteria of more than 9 cycles of use and decontamination is based on this premise, and may not be applicable to instruments that have not been reprocessed accordingly.

5.3 At-risk Patients for CJD

Recipients of human tissue derived pituitary hormone treatment, dura mater graft, corneal graft, and patients exposed via contact with instruments to high infectivity tissue in a confirmed CJD patient *	
<i>Instruments that were in contact: ***</i>	<i>Action to be taken: ****</i>
Any tissue**	Routine reprocessing & reuse.

* See 1 « Is the patient a potential CJD transmitter? », p. 2.

** See 2 « Was infectious tissue contacted? », p. 4.

*** See 3 « Which instruments were used? », p. 6.

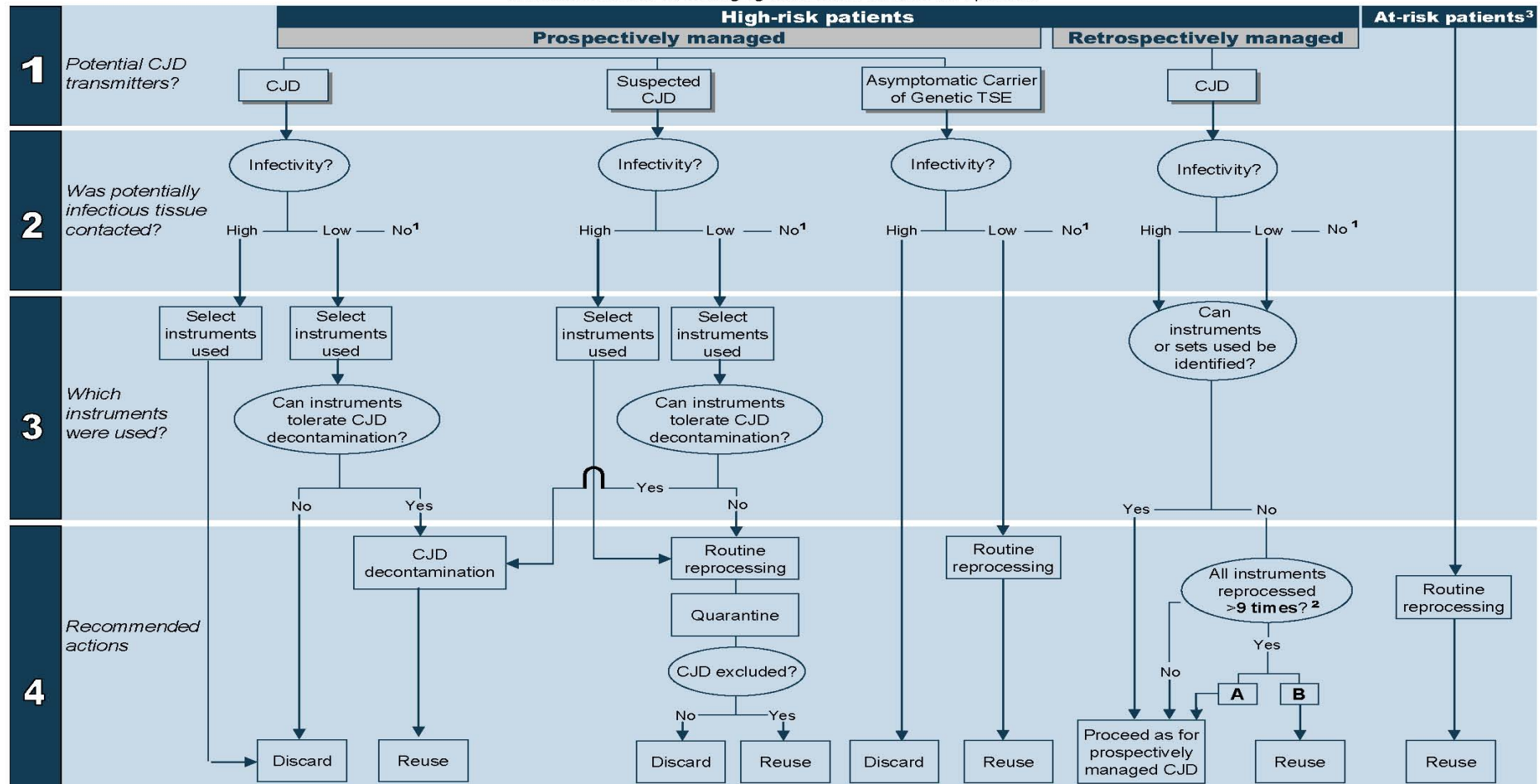
**** See 4 « Recommended Actions », p. 8.

In this update of the « 2002 CJD Infection Control Guideline », incineration or CJD decontamination is no longer recommended for the high-infectivity tissues of at-risk patients.

6.0 DECISION ALGORITHM (GRAPHIC VERSION)

Quick Reference Guide - CJD

Risk Assessment Tool – Decision algorithm-graphic version
Recommendations for managing instruments used on CJD patients



For explanations of each of the four steps in the above graphic, including definitions, see the corresponding numbered sections in the text below.

1 No detected infectivity tissue: No CJD precautions, reprocess as usual.

2 >9 times: no evidence that it removes all risk.

3 Recipients of human tissue derived pituitary hormone treatment, dura mater graft, corneal graft and patients exposed via contact with instruments to high-infectivity tissue in a confirmed CJD patient.

7.0 REFERENCES

1. Asher D. Infection control and decontamination of TSE agents: A US view. Presentation Public Health Agency of Canada International CJD Scientific Meeting. Ottawa. December 2004.
2. Boutoleau C, Guillon B, Martinez F, Vercelletto M, Faure A, Feve JR. Iatrogenic Creutzfeldt-Jakob disease subsequent to dural graft : persisting risk after 1987. *Eur J Neurol* 2003; 10:521-523.
3. Brooke FJ. Reviewing the Australian CJD infection control guidelines. Presentation Public Health Agency of Canada International CJD Scientific Meeting. Ottawa. December 2004.
4. Brooke FJ, Boyd A, Klug GM, Masters CL, Collins SJ. Lyodura use and the risk of iatrogenic Creutzfeldt-Jakob disease in Australia. *Med J Austral* 2004; 180:177-181.
5. Brown P, Preece M, Brandel J-P, Sato T, McShane L, Zerr I, et al. Iatrogenic Creutzfeldt-Jakob disease at the millennium. *Neurology* 2000; 55:1075-1081.
6. Bryant G. UK CJD incidence panel. Presentation Public Health Agency of Canada International CJD Scientific Meeting. Ottawa. December 2004.
7. Communicable Disease Network Australia. Infection control guidelines for the prevention of transmission of infectious diseases in the health care setting. 2004; 1-12. <http://www.health.gov.au/internet/wcms/publishing.nsf/content/icg-guidelines/index.htm>
8. de Pedro Cuesta J. Surgery and sporadic Creutzfeldt-Jakob disease. Presentation Public Health Agency of Canada International CJD Scientific Meeting. Ottawa. December 2004.
9. Fichet G, Comoy E, Duval C, Antloga K, Dehen C, Charbonnier A, et al. Novel methods for disinfection of prion- contaminated medical devices. *Lancet* 2004; 364:521-526.
10. Glatzel M, Abela E, Maissen M, Aguzzi A. Extraneural pathologic prion protein in sporadic Creutzfeldt-Jakob disease. *New Eng J Med* 2004; 349:1812-1820.
11. Hannah EL, Belay ED, Gambetti P, Krause G, Parchi P, Capellari S, et al. Creutzfeldt-Jakob disease after receipt of a previously unimplicated brand of dura mater graft. *Neurology* 2001; 56:1080-1083.
12. Health Canada. Infection control guidelines for classic Creutzfeldt - Jakob disease (CJD) in Canada. Part of the Infection Control Guidelines Series. Canada Communicable Disease Report. 2002; 1-84. <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/02vol28/28S5/index.html>
13. Rohwer RG. Assessment and management of risks from TSE contamination of blood and other tissues. Presentation Public Health Agency of Canada International CJD Scientific Meeting. Ottawa. December 2004.

14. Rutala WA, Weber DJ. Creutzfeldt-Jakob disease: recommendations for disinfection and sterilization. *Clin Infect Dis* 2001; 32:1348-1356.
15. Somerville D. Mechanisms of heat and chemical inactivation of TSE models. Presentation Public Health Agency of Canada International CJD Scientific Meeting. Ottawa. December 2004.
16. UK CJD Incidents Panel. Management of possible exposure to CJD through medical procedures: Framework document. 2001; 1-62. London, Department of Health Publications. Accessed on December 13 2006 at :
http://www.hpa.org.uk/infections/topics_az/cjd/framework_Aug%202005.pdf
17. UK guidelines. Distribution of TSE infectivity in human tissues and body fluids. 2003; Annex A.1, 1-2. Accessed on December 13 2006 at :
http://www.advisorybodies.doh.gov.uk/acdp/tseguidance/tseguidance_annexa1.pdf
18. Weber DJ, Rutala WA. Managing the risk of nosocomial transmission of prion diseases. *Curr Opin Infect Dis* 2002; 15:421-425.
19. Will RG. Iatrogenic Creutzfeldt - Jakob disease. Presentation Public Health Agency of Canada International CJD Scientific Meeting. Ottawa. December 2004.
20. Wilson K. Managing risk in the face of uncertainty : How useful is the precautionary principle. Presentation Public Health Agency of Canada International CJD Scientific Meeting. Ottawa. December 2004.
21. World Health Organization. WHO infection control guidelines for transmissible spongiform encephalopathies: Report of a WHO consultation, Geneva, Switzerland, 23-26 March 1999. 2000; 1-36. Accessed on December 13 2006 at :
http://whqlibdoc.who.int/hq/2000/WHO_CDS_CSR_APH_2000.3.pdf
22. World Health Organization. WHO guidelines on transmissible spongiform encephalopathies in relation to biological and pharmaceutical products. 2003. Accessed on December 13 2006 at :
http://www.who.int/bloodproducts/publications/en/WHO_TSE_2003.pdf
23. World Health Organization. WHO guidelines on tissue infectivity distribution in transmissible spongiform encephalopathies, Geneva, Switzerland. 2006 Accessed on December 13 2006 at :
<http://www.who.int/bloodproducts/cs/TSEPUBLISHEDREPORT.pdf>
24. Yan Z-X, Stitz L, Heeg P, Pfaff E, Roth K. Infectivity of prion protein bound to stainless steel wires: A model for testing decontamination procedures for transmissible spongiform encephalopathies. *Infect Control Hosp Epidemiol* 2006; 25:280-283.