## **Management of Prion Exposure in the Hospital Setting**

### **1. Background**

* Prion diseases (transmissible spongiform encephalopathies – TSEs) include **sporadic, familial, iatrogenic, and variant CJD (vCJD)**.
* **Iatrogenic transmission** arises from contaminated surgical instruments, grafts, hormones, or blood.
* **Prions resist conventional sterilisation**: unaffected by standard autoclaving, formalin, or routine chlorine concentrations.
* Therefore, specialised **identification, instrument management, and decontamination protocols** are required to prevent secondary transmission.

### **2. Identification of At-Risk Patients**

**All surgical or endoscopic patients** must be asked:

“Have you ever been notified that you are at increased risk of CJD or vCJD?”

**High-risk categories**

* **Genetic/familial risk:** ≥ 2 affected relatives, or known *PRNP* mutation.
* **Iatrogenic exposures:**
  + Recipients of human pituitary-derived hormones (pre-1985).
  + Recipients of cadaveric dura mater grafts (pre-1992).
  + Recipients of **UK-sourced plasma products 1990–2001**.
  + Recipients of blood or components from ≥ 300 donors since 1990.
  + Recipients of blood/organs from donors who later developed vCJD.
* **Clinical suspicion:** progressive, unexplained neurodegenerative illness where CJD cannot be excluded.

If patient cannot be categorised with certainty, **consult IPC** and treat as “increased risk.”

### **3. Tissue and Procedure Risk Stratification**

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| --- | --- | --- |
| **Risk level** | **Examples of tissues** | **Key notes** |
| **High** | Brain, spinal cord, cranial ganglia, posterior eye, pituitary | All CJD types |
| **Medium** | Spinal ganglia, olfactory epithelium; in vCJD also lymphoid tissues (tonsil, spleen, thymus, appendix, Peyer’s patches) | vCJD adds lymphoid sites |
| **Low** | Blood, CSF, urine, saliva, other viscera | No special precautions |

**Procedures:** any invasive or tissue-vaporising procedure (biopsy, diathermy) breaching mucosa in these sites.

### **4. Instrument and Equipment Management**

#### **Single-Use Instruments**

* **Preferred** for any procedure involving high/medium-risk tissue.
* Must be **incinerated after use** (never reprocessed).

#### **Reusable Instruments**

* **Tracking/traceability systems** mandatory (link sets ↔ patient).
* **Immediate handling:**
  + Keep moist (within 3 h) to avoid prion fixation; prevent pooling water.
  + Transport in sealed, labelled containers (“Used medical device – CJD risk”).
* **Quarantine procedure:**
  + Remove gross soil at point of use under running water (avoid splashes).
  + Reprocess through sterile services, then **seal in rigid, labelled container**.
  + Store securely pending diagnostic confirmation.
  + If CJD excluded → reprocess and return.
  + If confirmed → **incinerate** or retain for **dedicated reuse on the same patient only** (after specialist advice).
* **Complex instruments** (e.g. drills, microscopes): use disposable sheaths; destroy bits/tips that contact tissue.
* **Loan equipment:** must enter tracking system before use.

#### **Waste Disposal**

* All waste from high/medium-risk tissues (filters, tissues, fluids) → **incineration**.

### **5. Decontamination Procedures**

**Key principles:**

* **Manual cleaning** before sterilisation is essential.
* **Never use fixative disinfectants** (alcohol, aldehydes, OPA, glutaraldehyde) – these bind prions to surfaces.

**Validated inactivation options:**

|  |  |  |
| --- | --- | --- |
| **Method** | **Parameters** | **Notes** |
| Autoclave (porous load) | ≥ 134 °C for 18–20 min | Standard UK/WHO method |
| Autoclave (gravity displacement) | 132 °C for 1 h | Acceptable alternative |
| Chemical | 1 M NaOH or 20 000 ppm available chlorine for 1 h | For soaking, surface cleaning |
| Combination | NaOH soak → autoclave 121–134 °C | Most effective |
| Surfaces | Clean with NaOH/hypochlorite → rinse thoroughly | Protects metalwork |

### **6. Endoscopy and Flexible Instrument Guidance**

* **Routine GI endoscopy** → low risk; standard HTM 01-06 reprocessing.
* **Higher-risk procedures:** tonsillar or rectal biopsies, invasive lymphoid sampling in “increased-risk” or “suspected vCJD” patients.
  + Use **dedicated/dedicated-pool endoscopes**.
  + If exposure occurs, **quarantine or destroy** endoscope.
  + Once a patient has had a high-risk procedure, they remain assigned to that high-risk pool for future use.
* **Endoscope washer–disinfectors (EWDs):**
  + Process suspected/confirmed CJD devices **separately** with single-use disinfectant.
  + Run additional rinse cycle before next routine use.
* **Neuroendoscopy:** maintain separate instrument pools for those born ≥ 1 Jan 1997 who have not had previous high-risk procedures.

### **7. Special Protocols**

**Brain Biopsy / Neurosurgery**

* Use single-use instruments where possible.
* Otherwise, wash immediately and quarantine the set.
* Send unfixed tissue to neuropathology.
* If CJD confirmed → destroy set; if excluded → release.

**Research Use**

* Quarantined sets may be transferred for authorised research under DHSC arrangements.

### **8. Laboratory Safety**

* **Containment level:**
  + CL 3 for brain, spinal cord, posterior eye, pituitary, cranial ganglia, and lymphoid tissues (vCJD).
  + CL 2 for blood, CSF, urine, saliva, and other low-risk material.
* **PPE:** gloves, face/eye protection; cut-resistant gloves for sharps.
* **Spill management:** absorb → treat with NaOH/hypochlorite → incinerate waste.
* **Record-keeping:** exposure records ≥ 30–40 years.

### **9. Staff Safety, Training, and Facility Design**

* Dedicated dirty → clean workflow areas; ideally physically separate.
* Staff trained in prion-safe procedures; occupational-health files retained ≥ 30 years.
* Never process CJD-exposed items in general EWD cycles.

### **10. Governance and Documentation**

* Trusts must have protocols for:
  + Pre-operative screening and patient flagging.
  + Instrument/endoscope tracking and quarantine.
  + Notification of Sterile Services Dept (SSD) for quarantine actions.
  + Staff training, counselling, and psychological support post-exposure.
* Comprehensive traceability logs: patient ID, instrument ID, decontamination cycle, operator, EWD details.

### **11. Key Exam Take-Home Points**

* Always assess **patient risk + tissue risk**.
* **Single-use, incinerate** if possible.
* If reuse unavoidable: **keep moist, label, quarantine, and track.**
* **Validated inactivation:** 134 °C ≥ 18 min, or NaOH + autoclave; never use aldehydes.
* **Endoscopes:** dedicated pool or quarantine; destroy if exposed to lymphoid tissue in “at-risk” patient.
* **CNS/lymphoid lab work = CL 3;** blood/CSF = CL 2.
* **Documentation, governance, and staff training** are as vital as decontamination itself.

✅ **Summary**

For any patient at increased or uncertain risk of CJD/vCJD, minimise exposure of high- and medium-infectivity tissues, use single-use instruments wherever possible, and incinerate after use.  
 Reusable instruments must be quarantined, tracked, and either destroyed or subjected to validated prion-inactivation (autoclave ≥ 134 °C or NaOH + heat).  
 Endoscopes and complex devices require dedicated pools and strict separation.  
 Effective governance, traceability, and trained staff underpin safe practice and are core to FRCPath Part 2 understanding.