CLEARANCE OF A SUSPECTED CERVICAL SPINE INJURY

| Cross references (including NSW Health/ SESIAHS policy directives) | Clinical Business Rule CHN CLIN035: CARE OF A PATIENT REQUIRING A CERVICAL COLLAR  
Clinical Business Rule Spinal Clearance Management- Intensive Care Unit  
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What it is</td>
<td>Guide to the ‘Clinical Flowchart for the Clearance of a Suspected Cervical Spine Injury’</td>
</tr>
<tr>
<td>2. Employees it applies to</td>
<td>Medical staff assessing patients with a potential cervical spine injury in the Emergency Department</td>
</tr>
<tr>
<td>3. When to use it</td>
<td>When patients present to the ED with neck pain or potential injury following trauma</td>
</tr>
<tr>
<td>4. Why the rule is necessary</td>
<td>To facilitate the safe and efficient assessment and management of suspected cervical spine injury</td>
</tr>
<tr>
<td>5. Who is responsible</td>
<td>Dr Donovan Dwyer, Senior Emergency Staff Specialist</td>
</tr>
</tbody>
</table>

1. The five NEXUS criteria that must all be met to classify a patient as low probability for a cervical spine injury and allow an attempt at clinical clearance without cervical spine radiological investigation are
   - Normal alertness
   - No intoxication with medications, etoh, illicit drugs
   - No painful distracting injury
   - No midline cervical tenderness
   - No neurological deficit or symptoms (paraesthesias)

2. Even if the patient fulfils all of the NEXUS criteria that would allow assessment of the cervical spine without radiology, it does not mean that the cervical spine can automatically be clinically cleared. Patients with complaints of neck pain, non-midline tenderness, movement difficulty or high risk mechanisms may still warrant cervical spine radiology to further assess areas of interest.

3. Routine CT scanning utilizes a limited resource and exposes a large number of low risk patients to radiation without benefit. However, if likelihood of injury is high and likely to proceed to a CT cervical spine in the event of normal cervical spine Xrays, it is better to proceed to CT in the first instance. High risk clinical features include
   - Age >65 (Higher incidence degenerative disease)
   - Axial load to head (e.g diving)
   - High speed MVC/MBC (> 60km/hr)
   - High risk MVC/MBC (Rollover, ejection)

4. Patients deemed to require radiological imaging of the cervical spine, who have an indication to undergo a CT scan of another body region, should have a cervical spine CT C1-T1 as their investigation, and not undergo any plain cervical spine Xrays.

5. Cervical spine Xrays are still the 1st choice investigation for the vast majority of patients who are low risk for bony cervical spine injury. Adequate Cspine Xray series consists of a lateral...
(with vertebrae C1 – C7, the C7 – T1 junction as well as all spinous processes visible), AP (C2 – C7 visible) and an odontoid peg view (with the entire peg as well as the articulation between the lateral masses and body of C2 visible).

6. Spinous processes may be easier to visualise if the patient is on a mattress; C7 – T1 view aided by a controlled pull on the shoulders or a ‘Swimmer’s view’; ‘Peg Views’ improved by maximising pt mouth opening, but ensuring spinal immobilisation.

7. CT scanning of areas of injury, abnormality, inadequate plain ray visualisation as well as areas of clinical and/or radiological suspicion should be performed after discussion and consultation with Senior ED or Radiology Staff. This should be coordinated with the scanning of other areas of interest in the trauma patient.

8. CT scans of the cervical spine must be interpreted by either the Radiology Registrar/SS or Neurosurgical Registrar/SS/VMO.

9. CT scanning is insensitive for the detection of ligamentous injury.

10. Patients with midline cervical tenderness, significant pain with neck movement or reluctance to move their necks are suspicious for significant ligament injury and should undergo flexion/extension radiology, after review by an EDSS/Registrar or neurosurgical registrar.

11. Patients with abnormal C-spine plain Xrays, abnormal CT scans or with neurological deficit should not undergo flexion/extension radiology.

12. Flexion/extension views should be performed in the radiology department, with the patient in the sitting position. The x-ray request form should specify ‘static flexion/extension C-spine x-ray’. The patient should have their collar removed, before leaving the ED, by the ED Staff Specialist or Registrar. The patient controls the flexion and extension, limiting the degree of excursion by the onset of increasing pain or neurological symptoms. Flexion/extension views are considered adequate if C1 – C7/ T1 is adequately visualised and the patient achieves a minimum of 30 degrees movement in both flexion and extension. Medical supervision is not routinely indicated.

13. Subluxation may be evident even if flexion/extension views are deemed inadequate. Physiological variations may occur in teenagers and children. Seek Senior ED / Radiological / Neurosurgical advice in interpretation.

14. Patients whose cervical spines cannot be cleared within 4hrs of rigid collar application because of the need for further investigation, awaiting interpretation of investigations or the need for senior advice/consultation, may be placed in a ‘Philadelphia’ Collar, by staff familiar with application.

15. If clinical or radiological concerns continue, despite consultation by Registrars from ED, Neurosurgery, Trauma or Radiology, then the issue should be escalated to the Consultant responsible for that Registrar, for final resolution.

(Flow chart at end of document)

7. Compliance evaluation

| Q1: When is it appropriate to use the nexus criteria? |
Clinical Business Rule SGSHHS CLIN_ED

| Q2: At what time point should a Philadelphia Collar be applied? | A: Within 4 hours |
| Q3: What is the appropriate course of action if a patient has a normal CT scan but ongoing cervical midline tenderness? | A: Flexion extension views +/- neurosurgical consult. |

8. Keywords
Cervical Spine, Clearance, Trauma

9. External references

10. Relevant committee approval
St George Hospital Trauma Committee

11. Patient information brochure (or related material)
Not applicable

I, Andrew Bridgeman, Co-Director Division of Critical Care and Surgery of St George Hospital attest that this clinical business rule is not in contravention of any legislation, industrial award or policy directive.

Revision and approval history

<table>
<thead>
<tr>
<th>Date</th>
<th>Revision number</th>
<th>Contact Officer (Position)</th>
<th>Date for revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct 2002</td>
<td>0</td>
<td></td>
<td>Oct 2007</td>
</tr>
<tr>
<td>Oct 2007</td>
<td>1</td>
<td></td>
<td>Oct 2010</td>
</tr>
<tr>
<td>Aug 2013</td>
<td>2</td>
<td>Dr Donovan Dwyer (ED SS)</td>
<td>Aug 2016</td>
</tr>
</tbody>
</table>
Clinical Flowchart For the Clearance of a Suspected Cervical Spine Injury in the ED

1. Assessment by ED Registrar / Surgical Registrar / ED Staff Specialist
2. Passes NEXUS criteria for clinical assessment
   - Clinically clear Cspine?
     - Yes: Cspine cleared Document in notes
     - No: Spinal precautions/protection
3. Injury suspicion high and/or PAN/Head CT Scan indicated?
   - Yes: Radiology as indicated Neurosurgical consultation
   - No: CANNOT clear Cspine clinically Spinal precautions / protection
4. Neurodeficit, unconscious, intubated
5. CANNOT clear Cspine clinically Spinal precautions / protection
   - Neurosurgical consultation
6. Spinal precautions/protection
   - Spinal precautions / protection
   - Injury suspicion high and/or PAN/Head CT Scan indicated?
7. Cspine cleared Document in notes
8. CT normal?
   - Yes: Continue spinal precautions Neurosurgical consultation
   - No: Perform further views
9. CT scan C1 – T1
   - Adequate views?
     - Yes: Able to improve with further plain radiology?
     - No: Perform flexion and extension views. Adequate?
10. Clinical assessment suspicious for significant ligament injury?
11. Evidence of subluxation?
   - Yes: Neurosurgical consultation
   - No: Performing extension views. Adequate?
12. Performing flexion and extension views. Adequate?
13. Evidence of subluxation?
   - Yes: Neurosurgical consultation
   - No: Clinical assessment suspicious for significant ligament injury?
14. Neurosurgical consultation
   - Evidence of subluxation?
     - Yes: Neurosurgical consultation
     - No: Clinically clear Cspine?