## Appendix 4: Inclusion and Exclusion criteria

***Population***

Included:

* Adults or children with possible cervical spinal injury due to non-penetrating trauma.
* Studies in healthy volunteers.
* Studies in human cadavers.

Excluded:

* Adults or children with penetrating trauma.

***Intervention***

Included:

Spinal motion restriction was defined as ‘attempting to maintain the spine in anatomic alignment and minimizing gross movement, with or without adjuncts or devices’.

* Studies were included if they met all of the following criteria (a, b and c):
  + - 1. Motion restriction was performed at the level of the cervical spine, with or without restriction at the level of the lower (i.e. thoracic, lumbar and sacral) spine;
      2. Devices used for motion restriction are commonly and readily available to (trained) first aiders. Discussions within the Task Force revealed that the types of devices that first aiders are trained to use vary largely between countries and between settings within countries, on top of the varying availability of those devices themselves. For instance, in the US, ski patrollers are trained in the use of a long backboard and many use vacuum mattresses. As a result, a wide range of devices was considered relevant for inclusion in this scoping review:
         * Any type of improvised or commercially available cervical collar (soft, semi-rigid or rigid);
         * Long backboard;
         * Head blocks;
         * Straps;
         * Vacuum mattress;
         * Scoop stretcher.
      3. Techniques used for motion restriction do not require extensive amounts of specialized training.
* Extrication studies were included if they allowed evaluation of the effect of a technique/device for spinal motion restriction and if this technique/device was relevant to first aid. As such, the following comparisons were included, and analyzed separately:
  + - Uninstructed self-extrication with no cervical collar versus uninstructed self-extrication with a cervical collar;
    - Uninstructed self-extrication (with or without a cervical collar) versus instructed self-extrication (with or without a cervical collar).
* Studies assessing the impact of implementing a more restrictive spinal motion  
  restriction protocol were also included and analyzed separately.

Excluded:

* Studies that did not concern motion restriction at the level of the cervical spine (e.g. thoracic spinal motion restriction).
* Studies using devices that are not commonly and readily available to (trained) first aiders, such as:
  + - The Kendrick extrication device;
    - The Pediatric Immobilization and Extrication System (SIPE) Baby Rescuer device;
    - The Halo vest;
    - The Minerva jacket.
* Studies looking at the effect of lifts, transfers and/or carries in combination with cervical spinal motion restriction, as they provide information on the effectiveness of the method of the lifting/transfer/carry techniques, rather than on the effectiveness of the restriction method.

***Outcomes***

Included:  
Any clinical outcome related to the patient, including:

* Incidence of (secondary) spinal injury;
* Cervical (range of) motion;
* Functional outcomes and/or survival;
* Length of hospital stay;
* Adverse effects of spinal motion restriction occurring within 24 hours after the injury (i.e. on the way to the emergency department or inside the emergency department), including effects on:
  + Intracranial, cerebrospinal fluid or cerebral perfusion pressure;
  + Respiratory function;
  + Cardiovascular function;
  + Pain and discomfort.

Excluded:

* Adverse effects of spinal motion restriction that were delayed or occurred after admission to a hospital associated with prolonged immobilization (e.g. skin breakdown, formation of pressure ulcers after days in the Intensive Care Unit or hospital ward).
* Studies reviewing the effect of spinal motion restriction on ease of intubation with different airway devices or laryngoscopes, or on the ease of performing vertebroplasty, laminectomy or other surgical interventions.