



## KEY POINT SUMMARY

### OBJECTIVES

To summarize and critically evaluate evidence on the effect of bedrails on falls and injury

To provide a resource to inform clinical practice and to identify gaps for future research

### DESIGN IMPLICATIONS

Fatal bedrail entrapment is neither random nor inevitable but can be prevented by removing outdated equipment, ensuring that all bed, mattress and bedrail combinations are compatible, maintaining equipment, and training staff to fit and use bedrails safely and appropriately.

## The Effect of Bedrails on Falls and Injury: A Systematic Review of Clinical Studies

Healey, F., Oliver, D., Milne, A., Connelly, J.B.  
*2008 / Age and Ageing*  
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### Key Concepts/Context

Falls and injury are a significant concern in healthcare and are linked to the never events. Around 1/4th of the falls in healthcare settings are from the bed. However, the literature on the role of bedrails in fall prevention is controversial and the prevailing opinion is that bedrails can be harmful and ineffective. This paper looks into the controversial issue of the efficacy of bedrails via a systematic review of the literature.

### Methods

A systematic literature review on adult healthcare settings was conducted using the principles set out in the Quality of Reporting Meta-analyses. However criteria for inclusion were kept deliberately broad and not limited to randomized controlled trials in research design. Keywords used for the search included restraint, restraint-physical, bedrail, side rail, cot-side, safety rail and protective device. Articles were reviewed from 1980 to 2007, on direct injury from bedrails where falls, injury from falls or any other effects were related to bedrail use. Out of the 472 papers reviewed 24 met the inclusion criteria. Three bedrail reduction studies identified significant increases in falls or multiple falls, and one found that despite a significant decrease in falls in the discontinue-bedrails group, this group remained significantly more likely to fall than the continue-bedrails group; one case-control study found patients who had their bedrails raised significantly less likely to fall; one retrospective survey identified a significantly lower rate of injury and head injury in falls with bedrails up. Twelve papers described direct injury from bedrails.



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## Findings

Risks of bedrails were summarized as follows, and qualified within the context of design and policy:

1. Entrapment between bedrail bars, or between bedrail bars and bedframe  
*Fatal entrapments are unlikely if inter-rail and under-rail spaces are less than 12 cm, and gaps between the top of bedrail and head of the bed are less than 6 cm or more than 25 cm*
2. Poorly attached or broken bedrails leading to falls from bed  
*A result of poor installation or assembly*
3. Entrapment between mattress and the bedrail  
*More likely if mattress is not appropriate size for the bed or is a special type of pressure relieving mattress*
4. Entrapment through body restraints caught on bedrails  
*Caused by the body restraints and unlikely to occur without restraints*
5. Entrapment in the central gap between split bedrails  
*Rare. In only 4% of the cases death/injuries occur when patients slide head/feet first through gap between split bedrails*
6. Postural asphyxiation through collapsing with neck or chest over bedrails  
*Very rare. In less than 1% of cases death occurred when body was draped across top of bedrail and only with very weak or paralyzed patients. For such patients the risk would remain even with correctly maintained and fitted bedrails.*

Authors cautioned that methodological difficulties in performing conventional clinical trials of an intervention, such as bed-rails, which is already embedded in practice, and concluded that serious injury from bedrails is usually related to use of outmoded designs and incorrect assembly, rather than being inherent, and that bedrails do not increase the risk of falls or injury from falls.

## Limitations

Author identified limitations include the lack of any identified RCTs in the literature review which makes the level of evidence less robust than a Cochrane review or meta-analysis, and the general lack of robustness of study designs due to the nature of bed-rail use- a "low-tech" intervention already embedded in practice. Most studies were based on reports by front-line staff, which makes them limited by incomplete data and under-reporting.