

## Research In Focus: A Weekly Digest of New Research from the NIDILRR Community

### For People with Recent Spinal Cord Injuries, Pneumonia and Pressure Ulcers May Be Connected

A spinal cord injury (SCI) is lasting damage to the spinal cord, usually from an accident or other trauma. SCI causes a loss of feeling and movement below the point of injury, which can be either complete (no feeling or movement) or incomplete (some feeling, movement, or both). Some people with SCI require a ventilator for breathing if their injury is in the upper part of the spine. People with SCI usually receive initial medical treatment in a hospital, and then transfer to a rehabilitation unit where they learn strategies for the skills needed to return home and to the community. Health complications may occur during the initial hospital stay or in the inpatient rehabilitation unit, which can make healing more difficult. Two of the most common complications are pressure ulcers (PUs) and pneumonia. PUs, also known as pressure injuries, pressure sores, or bedsores, are a type of skin problem that may result from lying or sitting in the same position for extended periods of time, thus causing damage to the skin and underlying tissues. Pneumonia is a lung infection that may result from breathing problems after SCI. In a recent NIDILRR-funded study, researchers looked at the connection between pneumonia and PUs in people with a new SCI. They wanted to find out whether people who develop pneumonia during hospital treatment or rehabilitation were more likely to develop PUs than people without pneumonia. They also looked at other factors that might be related to a higher risk of developing PUs.

Researchers at the [Rehabilitation Engineering Research Center on Spinal Cord Injury](#) analyzed data from 4,866 individuals enrolled in the NIDILRR-funded National SCI Statistical Database, which houses data on individuals with SCI treated at the NIDILRR-funded SCI Model System Centers. Specifically, the researchers looked at data collected from 3,098 individuals with SCI during their initial hospital stay, and 1,768 individuals with SCI during their rehabilitation stay. These data were collected between 1993 and 2006. The researchers reviewed the data to determine whether each individual developed a PU, and whether the individual had pneumonia anytime, during their hospital or inpatient rehabilitation stay. They also looked at the severity of the SCI, including whether it was complete or incomplete, and whether or not the individual needed to use a ventilator for breathing.

The researchers found that about 20% of the individuals in the hospital setting developed at least one PU, and about 29% had pneumonia. In comparison, about 21% of the individuals in the inpatient rehabilitation setting had at least one PU, and about 4% had pneumonia.

They also found that the individuals who had pneumonia were more than twice as likely to develop a PU as the individuals who did not have pneumonia, both in the

hospital and in the rehabilitation unit. When they looked at other factors related to PUs, the researchers found that the individuals who used ventilators were also more than twice as likely to develop a PU during hospitalization, and 54% more likely to develop a PU during inpatient rehabilitation than those who did not use ventilators. In addition, the individuals with complete SCI were more likely to develop PUs than the individuals with incomplete SCI in both settings. However, even after accounting for SCI severity and ventilator use, there was still a strong connection between having pneumonia and developing PUs in both settings.

According to the authors, having pneumonia may increase the risk of PUs for at least three reasons. First, pneumonia can weaken the immune system, making skin more susceptible to pressure damage or infection. Second, pneumonia may make efficient breathing more difficult, reducing the oxygen supply to the skin. Finally, people may have limited mobility and spend a lot of time lying down while recovering from pneumonia, which can increase the risk of a PU. More research may be useful in identifying these and other reasons for the link between pneumonia and PUs.

The authors noted that health and rehabilitation providers working with people with SCI in inpatient hospital and rehabilitation settings may want to focus on preventing PUs, particularly for individuals who have developed pneumonia, who use ventilators to breathe, or who have complete injuries. Prevention efforts may include checking the skin frequently for changes, as well as helping the person change positions frequently to relieve pressure. Preventing PUs may help people with SCI to participate more actively in rehabilitation and return more quickly to their communities.

#### [To Learn More](#)

The authors of this study continue to investigate pneumonia and pressure ulcer incidence in people with SCI. The most recent study on [inflammatory mediators associated with pressure ulcer development in individuals with pneumonia after SCI](#) (abstract) is available from the Archives of Physical Medicine and Rehabilitation.

The Model Systems Knowledge Translation Center (MKSTC) offers a wide selection of factsheets, slideshows, and hot topic modules developed with researchers from the SCI Model System Centers. Among them you'll find:

- Skin Care and Pressure Sores – a six-part series with important information regarding pressure ulcers including prevention, risk factors, and treatment options: <http://www.msktc.org/sci/factsheets/skincare>
- Respiratory Health and SCI: <http://www.msktc.org/sci/factsheets/respiratory>
- The Archives of Physical Medicine published an educational factsheet Evaluating Your Pressure Ulcer Prevention Plan: [https://ac.els-cdn.com/S0003999315002178/1-s2.0-S0003999315002178-main.pdf?\\_tid=7a78d68e-af96-11e7-b68c-00000aab0f27&acdnat=1507844829\\_3efe25391a089195ce6aa32f4c1962f4](https://ac.els-cdn.com/S0003999315002178/1-s2.0-S0003999315002178-main.pdf?_tid=7a78d68e-af96-11e7-b68c-00000aab0f27&acdnat=1507844829_3efe25391a089195ce6aa32f4c1962f4)  
Available from the NARIC Collection under J72696.

The NIDILRR-funded project on Promoting Independence and Self-Management Using mHealth is developing and testing iMHere, an app which will engage users with conditions like SCI to engage in self-management of their health, including regular skin checks. Learn more about the app and how to participate in testing at <http://www.imhere.pitt.edu/>

The National Pressure Ulcer Advisory Panel has updated their guidelines using the term 'pressure injury' in place of 'pressure ulcer' for this type of damage to the skin and underlying tissue, as not all pressure injuries may result in an open ulcer or sore. Learn more about pressure injuries at <http://www.npuap.org/resources/educational-and-clinical-resources/npuap-pressure-injury-stages/>

[To Learn More About this Study](#)

Krishnan, S., Karg, P.E., Boninger, M.L., and Brienza, D.M. (2017) [Association between presence of pneumonia and pressure ulcer formation following traumatic spinal cord injury](#). The Journal of Spinal Cord Medicine, 40(4), 415-422. This article is available from the NARIC collection under Accession Number J77092.

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