

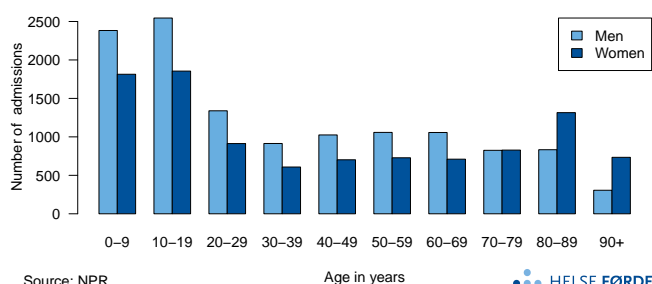
## Concussion

Common causes of concussion include road traffic accidents, sports, assault and falls. As the name indicates, the symptoms of concussion are caused by the brain being shaken. In addition to loss of consciousness, the patient can experience memory loss, problems concentrating, headache, dizziness, nausea, retching or vomiting. The symptoms are usually temporary. Intracranial bleeding (bleeding inside the skull) can occur in rare cases, and entails a risk of permanent brain damage. Patients deemed to be at risk of such an injury may be given a CT scan or admitted to hospital for observation. Scandinavian guidelines state how long patients should be kept under observation, whether they should be admitted to hospital for observation, and when CT scans should be used. For the majority of patients, it is sufficient to have some physical and cognitive rest and then return gradually to their normal level of activity. Symptoms will normally disappear in between one week and one month, but 15 % of patients may experience long-term symptoms known as post-concussion syndrome.

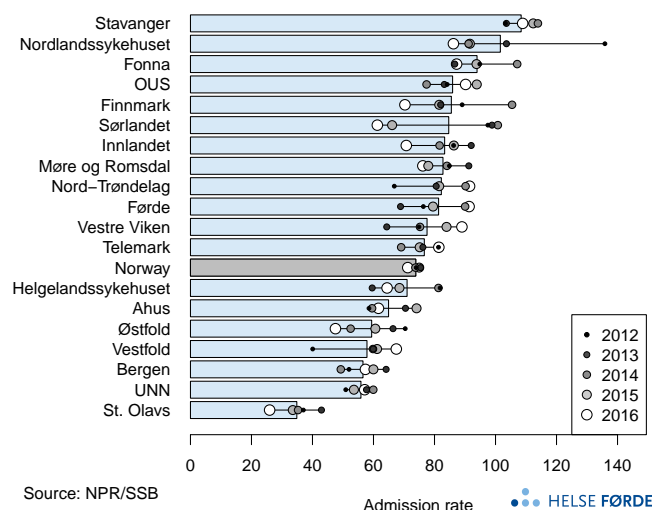
### Background

Concussion is defined by a primary diagnosis of S06.0 (ICD-10). Patients aged 18 years or older are included in the sample, except in the figure that shows the gender and age distribution of patients of all ages who have been admitted with concussion.

Each year on average 3,000 adults are admitted to hospital for concussion in Norway.



Total number of admissions of patients with concussion during the period 2012–2016, for Norway as a whole. The patients have been broken down by gender and age group.



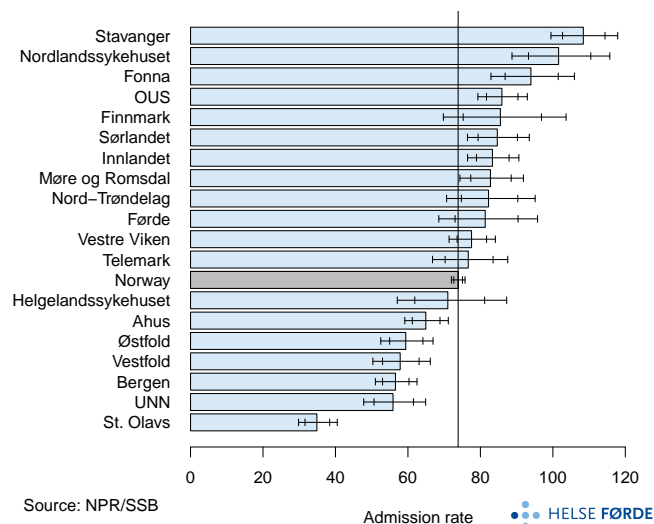
Admission rate: Number of admissions for concussion per 100,000 population (18 years and older), broken down by hospital referral area and for Norway as a whole. Bars show the average value per year during the period 2012–2016, and dots represent rates for each year. Rates have been adjusted for gender and age.

### Results

Admission of adult patients with concussion is three times as common in Stavanger as in St. Olavs hospital referral area. For patients 18-66 years the rate is highest in Nordlandssykehuset, and for patients 67 years and older in OUS hospital referral areas. The St. Olavs area has the lowest rate in both age groups.

Patients 67 years or older were admitted for concussion more often than patients 18-66 years (156 vs 56 admissions per 100,000 population), and the variation between areas is clear in both groups.

For some areas admission rates change significantly from one year to another, but on a national level the rate is stable.



Admission rate: Number of admissions for concussion per 100,000 population (18 years and older), broken down by hospital referral area. Bars show average value per year for the period 2012–2016, with pertaining 95 % and 99.8 % confidence intervals. Vertical line indicates the average for Norway as a whole. Rates have been adjusted for gender and age.

### Comments

There is considerable variation in the admission rate for adult patients with concussion.

Differences in organising the provision of health services and variations in access to municipal and intermunicipal observation beds can explain some of the observed variation in admission rates. It is difficult to assess to what extent the observed variation is due to actual differences in the treatment of adults patients with concussion, but unwarranted variation cannot be ruled out.