

Severity in a Norwegian hospitalised injury material
(N=177,663) by two severity measures:
threat to life and threat of disability

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Background

- A study was made to investigate the association between socioeconomic status and injury severity for acute hospitalisations in a nationwide population-based cohort (Madsen, Gabbe, Holvik et al 2022).
- All individuals aged 25-64 years residing in Norway by 1st of January 2008 (N=2,535,213) were followed from 2008 through 2014 (seven years) in the Norwegian Patient Registry.
- By utilising the unique personal identification numbers, 177,663 hospitalised persons due to all-cause injuries were identified, giving an incidence rate of new cases of 102.1 pr 10,000 personyears at risk.
- The aim of this presentation is to show the distribution of the severity in this material of hospitalised persons.

Two measures of severity were utilised

1. **Threat to life**, using the International Classification of Disease-based Injury Severity Score (ICISS) (Stephenson et al 2004; Gedeborg et al 2014).

It uses survival risk ratios (SSRs) that are empirically derived for each ICD code to estimate an individual probability of survival. Two values were used: a) High and b) Lower threat to life.

2. **Threat of disability**, using long-term disability weights (DW) from the Injury Vibes project (Gabbe et al 2014), also based on the ICD-codes.

The DWs are based on self-reported health status 12 months after injury on the various ICD-codes. These DWs are assumed to be indicative of permanent health loss, where diagnoses with the highest weights are expected to coincide with increased risk of long-term disability. Three values were used: a) **High**, b) **Medium** and c) **Low** probability of long-term disability.

The distribution of severity in the hospitalised injures Norwegians during seven years due to threath to life and threath of long-term disability

Treath to life	Hospitalised injured persons	Percentages
High	4,186	2.4
Lower	173,477	97.6
Total	177,663	100.0

Probability of long-term disability	Hospitalised injured persons	Percentages
High (DW-score > 0.807)	36,573	20.6
Medium (DW-score: 0.807- 0.947)	97,560	54.9
Low (DW-score > 0.907)	43,530	24.5
Total	177,663	100.0

The correlation between the ICISS-scores and the Disability Weight scores was moderate: $r=0.418$, $p>0.001$

Another measure of threat to life is also utilised around the world: AIS: Abbreviated Injury Scale

- Abbreviated Injury Scale (AIS) is developed especially for measuring severity in traffic injuries.
- Six values: 1- Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Virtually unsurviable.
- AIS has been used in Norwegian hospitals in routine registrations for years by three values: AIS1 – minor, AIS 2 –moderate, AIS 3+ Serious (including AIS 4-6). If more than one injury, the injury with highest AIS is reported, called MAIS, maximum AIS.)

These two types of severity measures might be used for assessing the burden of injuries in routine registration

- There is a need for assessing severity of injuries that can be compared across countries, especially for the serious and moderate severity.
- Severity can be measured just before or after the first treatment in the Accident and Emergency department and in the hospitals by:
 - Threat to life by
 - Maximum AIS with three values: 1, 2, 3+, and/or
 - Injury Severity Score (ICSISS) with two or three values – ICD-based.
 - Threat of disability by using long-term disability weights (DWs) with the three values:
 - a) High, b) Medium and c) Low probability of long-term disability – ICD-based.
- A challenge with DWs is to include the patients treated in AEDs, the primary health system. Here injury diagnosis are classified by ICPC: International Classification of Primary Care. There have been some projects trying to transform ICPC-codes to ICD-10 codes. These should be further developed.

What now?

- During the last years there have been quite a few projects on injury severity by these to severity measures:
 - Threat to life and
 - Threat of disability.
- Could it be an idea to ask World Health Organisation to establish an international working group with mandate to create classifications of the injuries' threat to life and threat of disability that can be used in routine registration world-wide in the health system for comparing the burden of injuries across countries?