

Source and selection

- Time period 20 years, 2006 – 2025.
- Emergency hospitals in Sweden (gradually increasing number of hospitals during the period).
- Patients as a result of a road traffic accident with injuries classified according to AIS.
- The patient was a surviving passenger (inside) a passenger car.
- AIS-codes Chapter 5 Abdomen ... (Internal organs **54XXXX.X**)

Results

Number of
injured patients

Men 40 %

Woman 60 %

6-7 % suffer injury
to the abdomen

Year	Abdominal injury	Non-abdominal injury	Total sum	Proportion of abdominal injuries
2006	175	2 515	2 690	6,5%
2007	189	2 930	3 119	6,1%
2008	185	3 080	3 265	5,7%
2009	205	2 940	3 145	6,5%
2010	165	3 136	3 301	5,0%
2011	152	2 534	2 686	5,7%
2012	234	2 834	3 068	7,6%
2013	241	2 857	3 098	7,8%
2014	216	2 917	3 133	6,9%
2015	136	2 341	2 477	5,5%
2016	172	2 308	2 480	6,9%
2017	160	2 221	2 381	6,7%
2018	119	1 744	1 863	6,4%
2019	98	1 485	1 583	6,2%
2020	82	1 121	1 203	6,8%
2021	92	1 443	1 535	6,0%
2022	103	1 623	1 726	6,0%
2023	104	1 733	1 837	5,7%
2024	132	1 599	1 731	7,6%
2025	112	1 342	1 454	7,7%
Total sum	3 072	44 703	47 775	6,4%

Type of accident and abdominal injuries

- S (single) 7 %
- U (same direction) 4 %
- M (head on) 14 %
- K (crossing course) 7 %
- A (turning) 6 %
- Other 6 %

83 % used seat belt, 7 % unknown, 8-9 % didn't use seat belt

(14 percent of the injured with abdominal injury was involved in a head on collision)

Results, injured with abdominal injuries

Number of passengers

Sex	At least one (1) abdominal injury	No abdominal injury	Total sum
Men	1 298 (7%)	17 684 (93%)	19 036 (100 %)
Woman	1 774 (6%)	27 018 (94%)	28 792 (100 %)
Total sum	3 072 (6%)	44 702 (94%)	47 774 (100%)

A majority of passengers is woman.

Same percentage of men and women suffer from abdominal injuries.

Results, the passenger's location

Passenger seat	Men	Woman	Total sum	Percent
Front	583	886	1 469	48%
Rear				
Right	147	160	307	10%
Center	42	67	109	4%
Left	151	173	324	11%
Unknown	94	149	243	8%
Unknown	281	339	620	20%
Total sum	1 298	1 774	3 072	100%

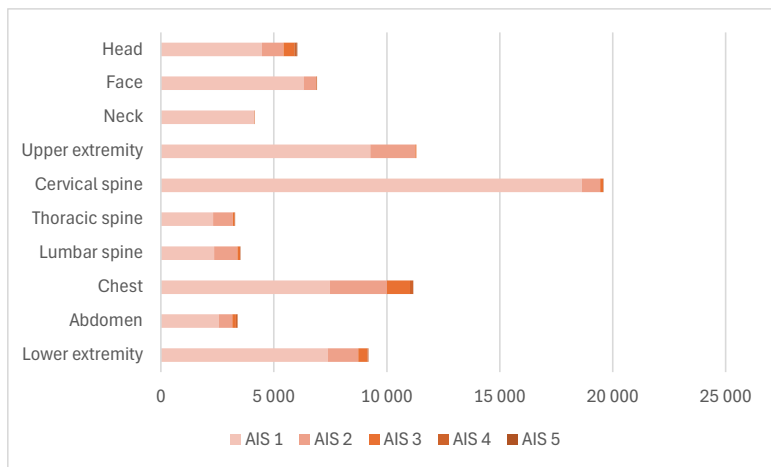
A majority of the patients are in the front seat.

A majority of the patients are women, both in the front and back seats.

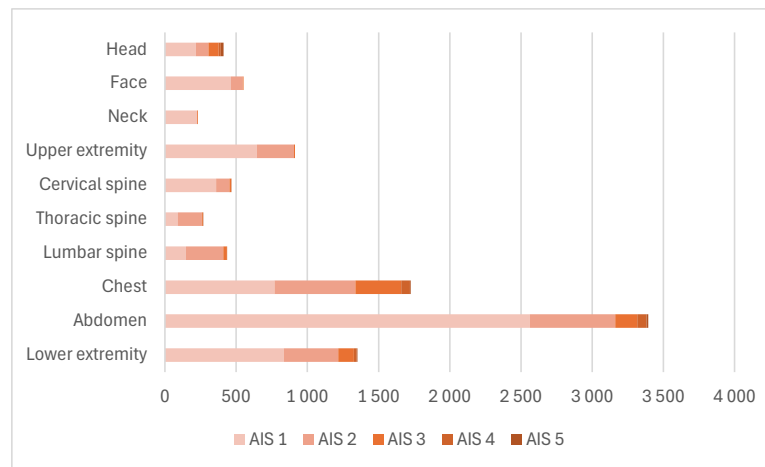
Sex	Front	Back	Unknown	Total sum
Men	39%	44%	54%	44%
Woman	61%	56%	46%	56%
Total sum	100%	100%	100%	100%

Results, distribution of injuries

All injured patients (nr patients=47 775)



Patients with abdominal injuries (nr patients=3 072)



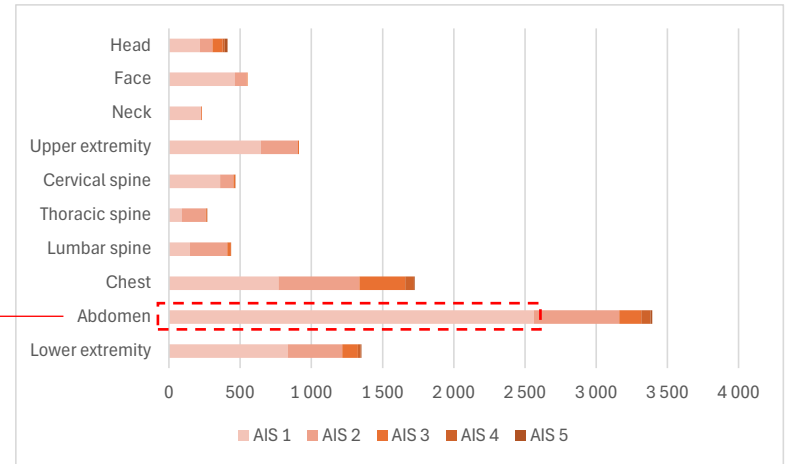
The diagrams shows the distribution of the number of injuries.

Of all patients, neck injuries predominate.

For patients with abdominal injuries, it is the dominant injury.

Results, distribution of injuries

Passengers with abdominal injuries (n=3 072)



Abdomen AIS 1 mostly
510402.1 contusion, hematoma
510202.1 abrasion

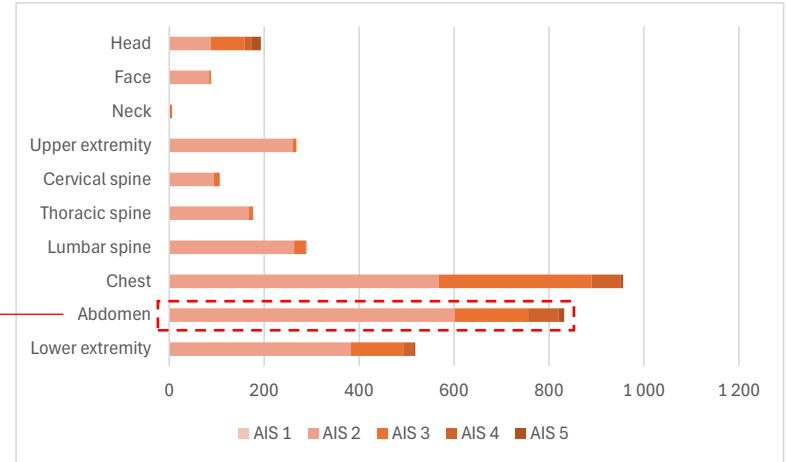
Results, distribution of injuries

Passengers with AIS2+ abdominal injuries (n=874)

Abdomen AIS 2+ mostly

- Spleen
- Liver
- Kidney
- Small intestine

(note the number of injuries to the thorax)



Results, abdominal injuries AIS 2+ (n=874)

Men (n=265 patients)

Number of injuries, AIS2+

Abdominal organ	AIS 2	AIS 3	AIS 4	AIS 5	Total sum
Spleen	55	30	13	4	102
Liver	77	8	4		89
Kidney	43	6	2		51
Small intestine	19	14	3		36
Other*	88	20	7	1	116
Total sum	282	78	29	5	394

Woman (n=298 patients)

Number of injuries, AIS2+

Abdominal organ	AIS 2	AIS 3	AIS 4	AIS 5	Total sum
Liver	91	11	8	1	111
Spleen	61	18	5	4	88
Small intestine	32	16	7		55
Kidney	36	5	4		45
Other*	99	27	11	2	139
Total sum	319	77	35	7	438

The sorting order above is independent of age group
(Men 13% > 54 year, Woman 36% > 54 year).

*Duodenum, retroperitoneal hematoma, large intestine, mesentery, blood vessels, pancreas, organ unspecified bleeding, omentum, abdominal muscle (rare: gallbladder, appendix, bladder, uterus, penetrating injury)

Summary

- Of all patients, neck injuries predominate.
- A majority of women with abdominal injuries in both the front and back seats.
- 6-7 percent of injured patients have an abdominal injury.
- For patients with abdominal injuries, it is the dominant injury.
- Patients with abdominal injuries often also have injuries to the thorax.

Summary

- The material shows a gender-specific pattern in the distribution of severe abdominal injuries (AIS \geq 2).
- In men, spleen damage predominates, followed by liver and kidney damage, while women more often show liver damage, then spleen and small intestine.
- This pattern persists in the younger age categories.

Further exploration

- A similar pattern should be observed among injured drivers?
- Research: sitting position, posture and belt geometry (gender-specific, age-independent).
- TBD: Pelvic fractures, gender and possible overlap with injuries to abdominal organs.

Further exploration

- What do we know about mortality and injured organs?
- The damaged organs cause different mortality rates.
- We should research how to reduce injuries to abdominal organs based on the mortality of the injury.

Typically

-the liver

-small intestine

-spleen/kidney

- Injuries to the thorax and pelvic fractures