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Young drivers Analysis of data from Arriva Memo 08 Version 04 (EN) Date: 15-03-2022 Class: -

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Version 04 (EN) Class - Date 15-03-2022

Client	Transportföretagen (The Swedish
	Confederation of Transport Enterprises)
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Project number	TF6115
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x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x
n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n

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n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	$\overline{\mathbf{x}}$	n

1 INTRODUCTION

At the request of Transportföretagen (the Swedish Confederation of Transport Enterprises), Statisticon has examined the statistics that are available on bus drivers concerning the risk of accident in relation to the driver's age. As part of this, we met representatives of the bus company Arriva. They were extremely helpful in trying to obtain relevant accident statistics from their records. This document presents the data supplied by Arriva.

2 DATA

Appendix 1 contains a list of the areas included in the input data.

Accidents: For each year the number of accidents was reported by bus driver age. The statistics cover the period from 2018 to 2021

Our aim, if possible, was to include some form of grading of accident severity. However, it was not possible to retrieve such information from the systems used. We included all loss or injury, even minor incidents.

Age: The age of the driver at the time of the accident was recorded using the following ranges: 18-20, 21-23, 24-26, 27+

Gender: Man/woman

Years employed: When the driver began (his/her most recent) employment with Arriva.

Percentage of full-time employment: Broken down into three categories: *employed on an hourly basis, 1-74 per cent* or 75+ *per cent*

Annual work units (AWU): The number of annual work units (AWU) was calculated for each year (2018-2021) and broken down by gender.

3 RESULTS

The number of recorded accidents per year is presented in Table 1.

	Number of
Year	accidents
2018	1,854
2019	1,526
2020	924
2021	1,174
Total	5,478

x

Table 1. Number of recorded accidents per year.

				Analy	sis of	f data	from	Arriv	а															4 (11)					
n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x
%	σ	λ	μ	x	n	%	σ	λ	μ	$\overline{\mathbf{x}}$	n	%	σ	λ	μ	x	n	%	σ	λ	μ	$\overline{\mathbf{x}}$	n	%	σ	λ	μ	x	n

Date 15-03-2022

In Table 2 these accidents are broken down based on the driver's age at the time of the accident.

Table 2. The driver's age at the time of the accident.

	Number of recorded
Age	accidents
18-20	1
21-23	20
24-26	28
27+	5,429
Total	5,478

Of these 5,478 accidents, 431 (7.9 %) involved a female driver and 5,047 (92.1 %) a male driver. If we relate that to the number of AWU, we arrive at female drivers having 0.48 accidents per AWU and male drivers having 0.47 accidents per AWU. In other words, there is nothing to indicate a difference in the risk of accident between men and women.

If we examine how many years the bus driver had been employed at the time of the accident, a large spread can be observed. A very few cases have negative times, i.e. the accident occurred prior to employment. This is probably due to these individuals being employed on an hourly basis and the employment date we received being the most recent contract, with the accident occurring during hourly employment on an earlier occasion.

					Analy	sis of	data	from	Arriva	a															5 (11))				
x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x
n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n

Project	Document type	Version	Class	Date
Young drivers	Memo 08	04 (EN)	-	15-03-2022

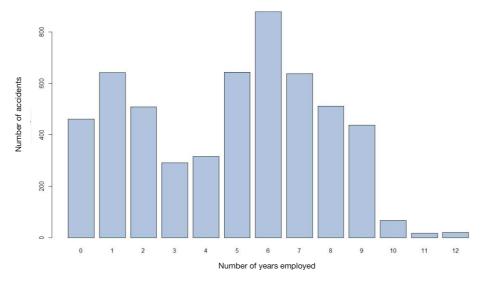


Figure 1. Number of years employed at the time of the accident (excluding those with negative values).

Table 3 shows the accidents broken down by the bus driver's percentage of full-time employment at the time of the accident.

Table 3. The number of accidents broken down by the driver's percentage of full-time employment at
the time of the accident.

Percentage of full-time employment	Number of accidents (%)
1-74 %	132 (2.4 %)
75-100 %	3,364 (61.4 %)
Paid by the hour	1,982 (36.2 %)
Total	5,478 (100 %)

Table 4 shows the total number of AWU for each age group for the period 2018-2021.

Table 4. Number of AWU during the period 2018-2021

		Number of
	Number of	recorded
Age group	AWU	accidents
18-20	38	1
21-23	38	20
24-26	109	28
27+	11,479	5,429
Total	11,664	

We can see that virtually all AWU are accounted for by bus drivers aged 27 years or older, while less than two per cent of AWU are accounted for by drivers less than 27 years old.

				А	nalys	sis of	data	from	Arriva	ı															6 (11)					
x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x
n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n

If we now relate the number of recorded accidents in each age group to the number of AWU, we arrive at a risk measure, i.e. how many accidents occur per AWU in each age group.

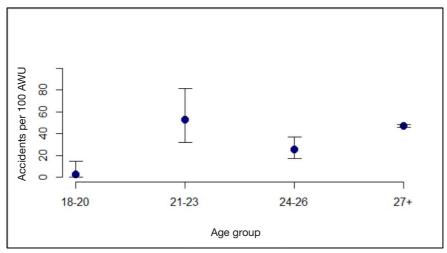


Figure 2. Expected number of accidents per 100 AWU. The lines represent a 95 % confidence interval.

In the two youngest age groups, there are just 38 AWU per age group. To produce more stable estimates, we are combining these two groups.

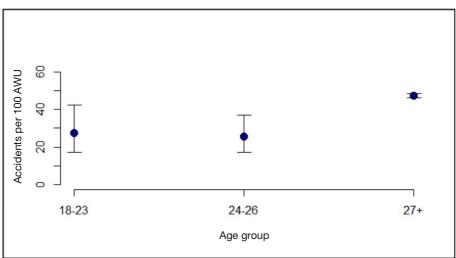


Figure 3. Expected number of accidents per 100 AWU. The lines represent a 95 % confidence interval.

Figure 3 indicates that there is no greater risk of accident among young drivers compared to older ones.

					Analy	sis of	f data	from	Arriva	a															7 (11))				
x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x
n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n

4 CONCLUSION – WHERE WE GO FROM HERE

Data from Arriva does not indicate that younger bus drivers are at greater risk of accident than older bus drivers. However, we do not know whether there are other factors that affect the risk of accident, e.g., whether there is a difference in the routes assigned to younger and older bus drivers.

A weak point in the analysis is that there is very little data material for the young bus drivers. If the other large bus companies were willing to provide corresponding information, there would be more input data and the results would be more reliable.

A potential follow-up could also compare bus drivers with lorry drivers. In this case, a corresponding request for data could be submitted to some of the large haulage companies.

The age requirement for the different driving licence categories varies. A summary of the various age requirements for the different driving licence categories for heavy vehicles is provided in Appendix 2 at the end of this document. In addition to the formal age requirements for driving licences, there is a restriction for those taking a bus driving licence (D) at the age of 18 or 21 years, which states that persons under the age of 24 years are only permitted to drive buses on routes of less than 50 km.

				,	Analy	sis of	f data	from	Arriva	а															8 (11)					
x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x
n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n

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APPENDIX 1 SCOPE OF INPUT DATA

Bus drivers in the following areas are included in the input data:

- Ekerö
- Halmstad
- Helsingborg
- Kristianstad
- Lunda
- Märsta
- Råsta
- Täby

				/	Analy	sis of	data	from	Arriva	a															9 (11)					
x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x
n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n

APPENDIX 2 OVERVIEW OF THE DIFFERENT DRIVING LICENCE CATEGORIES FOR HEAVY VEHICLES

Category	Entitles the license holder to drive	Age requirements
	Heavy lorry with a maximum authorized mass of 7.5 tonnes and passenger car with a maximum authorized mass above 3.5 tonnes, but not exceeding 7.5 tonnes. A trailer with a maximum weight of 750 kg may be attached to such vehicles.	18 years
C1E	Cars included in categories C1 or B and one or more trailers that are attached to such a car, if the combined maximum authorized mass does not exceed 12 tonnes.	18 years
c	Heavy lorry with a maximum authorized mass above 3.5 tonnes. A trailer with a maximum weight of 750 kg may be attached to such a vehicle.	21 years*
CE	Cars included in category C and one or more trailers, regardless of weight, attached to such a car	21 years*
	Buses that are designed and constructed for a maximum of 16 passengers in addition to the driver, with a length that does not exceed 8 metres. A trailer with a maximum authorized mass of 750 kg may be attached to such a vehicle.	21 years*
D1E	Buses included in category D1 and one or more trailers, regardless of weight, attached to such a bus.	21 years*
D	Bus of any length and passenger capacity. A trailer with a maximum authorized mass of 750 kg may be attached to such a vehicle.	24 years*
DE	Buses included in category D and one or more trailers, regardless of weight, attached to such a bus.	24 years*

* Age requirements are lower for people who have obtained basic skills from basic training as defined in the Swedish Act on Professional Driving Competence.

Source: Transportstyrelsen (The Swedish Transport Agency) https://www.transportstyrelsen.se

x n

			/	Analys	sis of	data	from	Arriva	а															10 (11)					
n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x
%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n

Age requirements for driver's license for bus:

You must be

- 1. 18 years if the training for driving passenger transports takes place in Upper Secondary School
- 2. 21 years if the training takes for driving passenger transports takes place in Municipal Adult Education or at another approved training provider
- 3. 24 years

There is a restriction for those taking a bus driving licence (D) at the age of 18 or 21 years, which states that persons under the age of 24 years are only permitted to drive buses on routes of less than 50 km.

To practice driving for D license you need a learner's permit (group 3).

					Analy	sis of	f data	from	Arriv	a															11 (11))				
x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x
n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n	%	σ	λ	μ	x	n