Effects of shift schedule design on public transport drivers' disability for service over the working life

Anna Arlinghaus
Martina Bockelmann
Jana Greubel
Friedhelm Nachreiner

22nd International Symposium on Shiftwork and Working Time
June 8-12th 2015, Elsinore, Denmark

Background

Gesellschaft für GAWO Arbeits-, Wirtschafts- und Organisationspsychologische Forschung e.V.

- public transport drivers‘ working conditions show specific patterns of work load and strain, e.g.
  - social isolation (except for passengers)
  - long periods of sitting (akinesia)
  - irregular work schedules, with split shifts, without regular rest breaks etc.

- high risk of health problems in this population
  - comparatively high sickness absence
  - temporary disability for service (TDS)
  - permanent disability for service (PDS)

Research questions

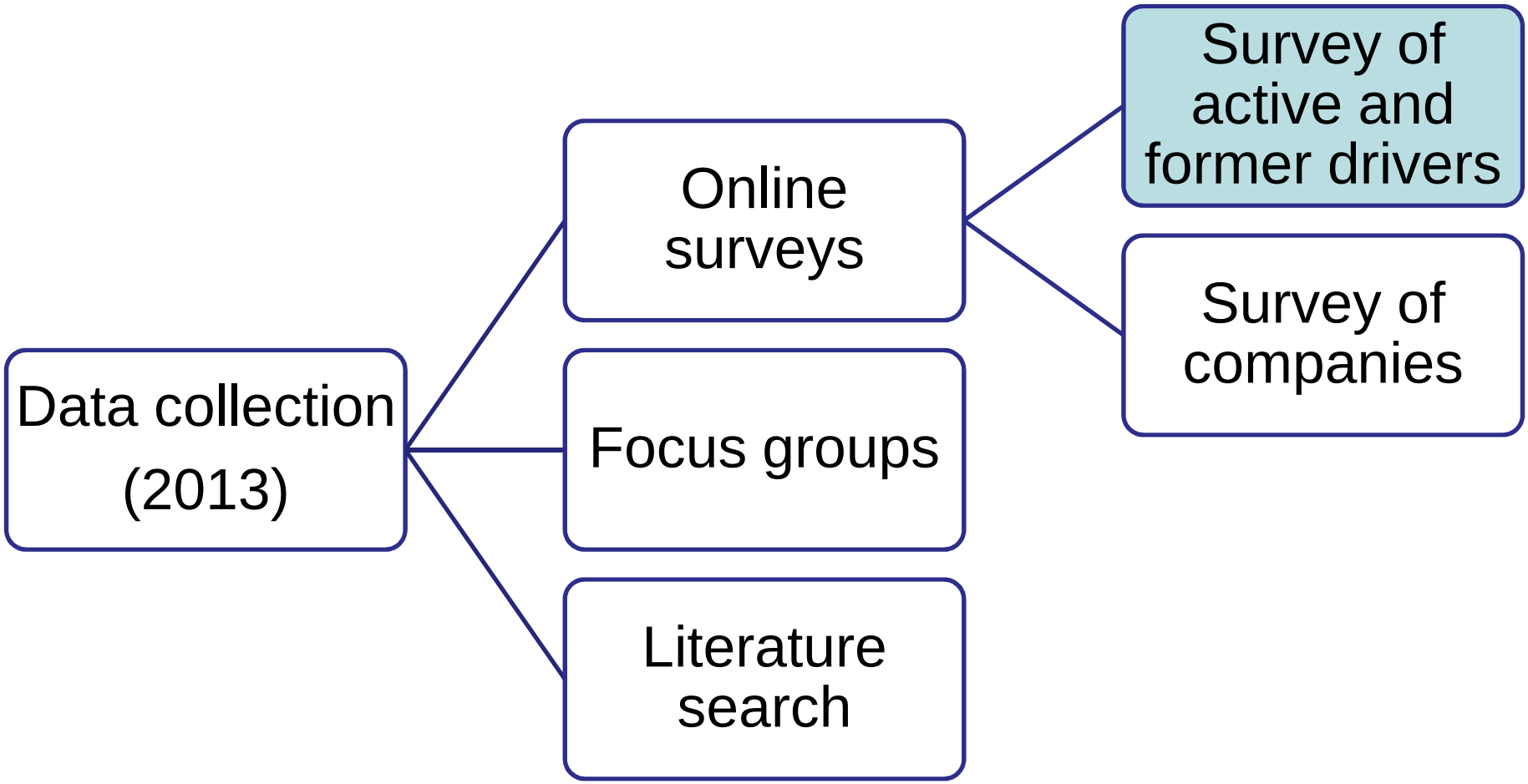
Gesellschaft für GAWO Arbeits-, Wirtschafts- und Organisationspsychologische Forschung e.V.

1. What is the prevalence of disability for service in public transport drivers in Germany?

2. Which aspects of the working conditions are associated with a higher risk of disability for service?

3. Over the course of the working life, which work schedule characteristics affect the risk of disability for service?
   a) mean time to failure, i.e. until disability is diagnosed
   b) pattern of disability occurrence over the working life

Study design



Driver survey - health outcomes

Gesellschaft für GAWO Arbeits-, Wirtschafts- und Organisationspsychologische Forschung e.V.

- Permanent disability for service (PDS)
  - yes / no
  - year of diagnosis
  - reason for PDS
- Temporary disability for service (TDS)
  - yes / no
  - number of diagnoses
  - year(s) and time spans of up to 3 temporary disabilities
  - reason for each TDS

Assessment of working hours

Gesellschaft für GAWO Arbeits-, Wirtschafts- und Organisationspsychologische Forschung e.V.

- usual, actual weekly and daily work hours
- speed of shift rotation (fast / slow / both / permanent shifts)
- direction of shift rotation (forward / backward / both / permanent shifts / no clear pattern)
- rest breaks (regular/irregular; type of breaks)
- frequency of split shifts (%)
- night work (usual frequency per month)
- Saturday/Sunday/evening work (usual frequency per month)
- control over working hours (yes / switching shifts / no)

Statistical methods

Gesellschaft für GAWO Arbeits-, Wirtschafts- und Organisationspsychologische Forschung e.V.

- descriptive analysis of PDS and TDS

- survival analyses
  - time (years) on the job until PDS / first TDS
  - comparison of different work hour conditions
  - Cox Regressions: inclusion of covariates, e.g.,
    - demographics
    - ergonomic workplace design

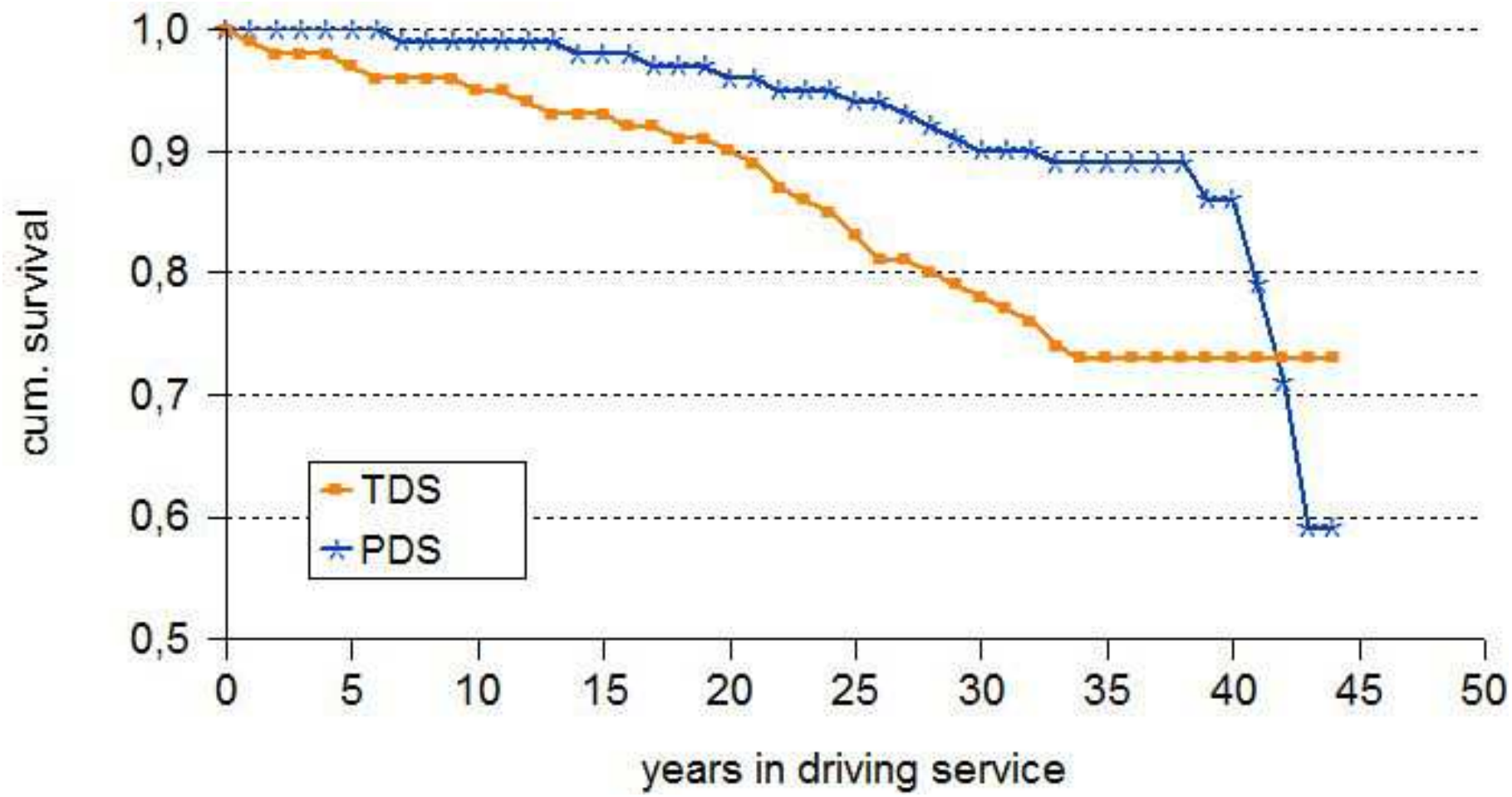
Sample description

Gesellschaft für GAWO Arbeits-, Wirtschafts- und Organisationspsychologische Forschung e.V.

- n = 1,419 participants
- 1,247 (87.9 %) male, 172 (12.1 %) female
- 179 (12.6 %) former drivers (retired or changed job)
- mean age: 48 years

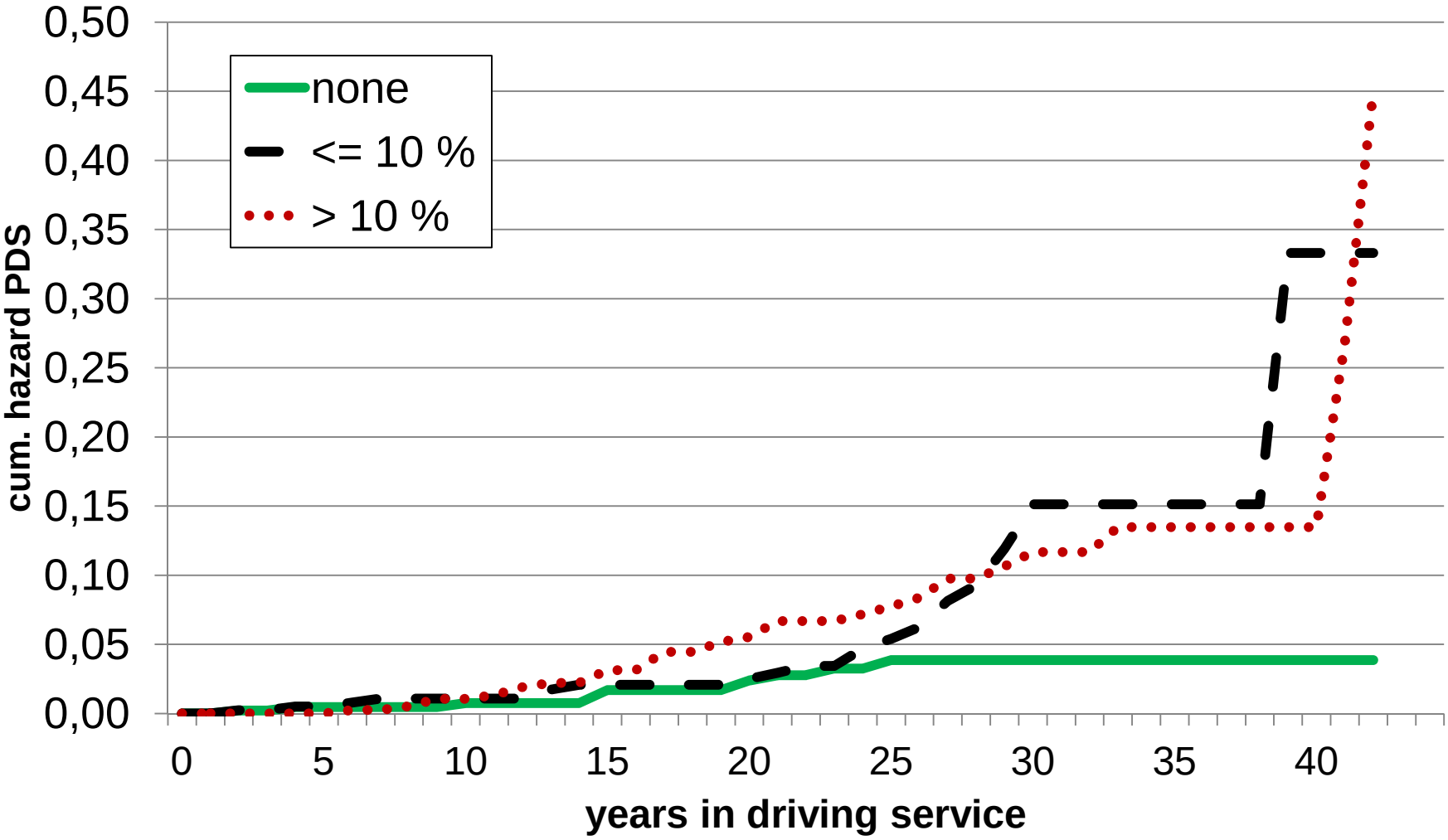
  (active drivers: 47.1 / former drivers: 53.6 years)
- 72 (5.1 %) cases with PDS
- 408 (28.7 %) cases with TDS

PDS and TDS over the working life

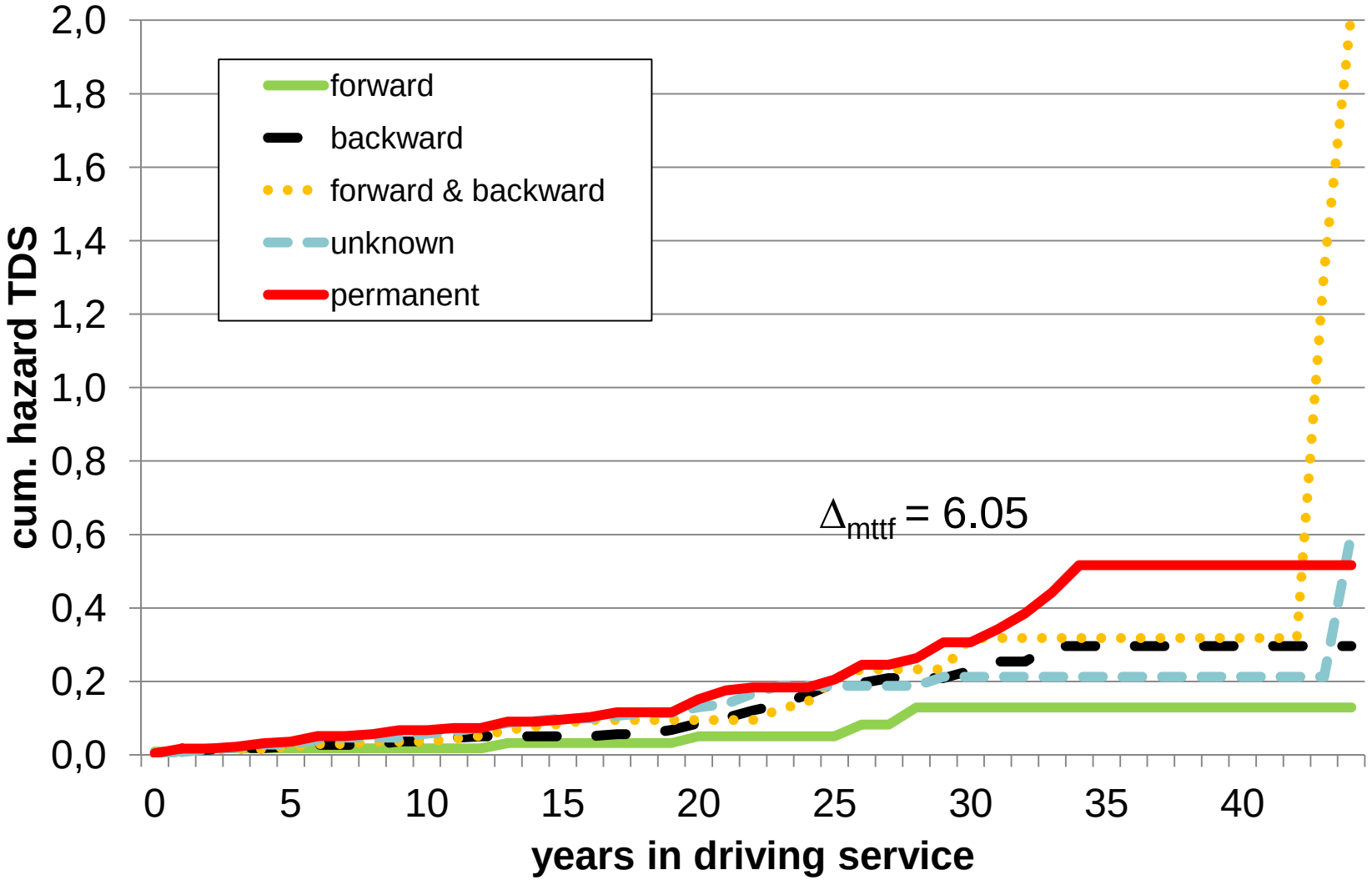


mean time to event: 41.2 years (PDS), 38 years (TDS)

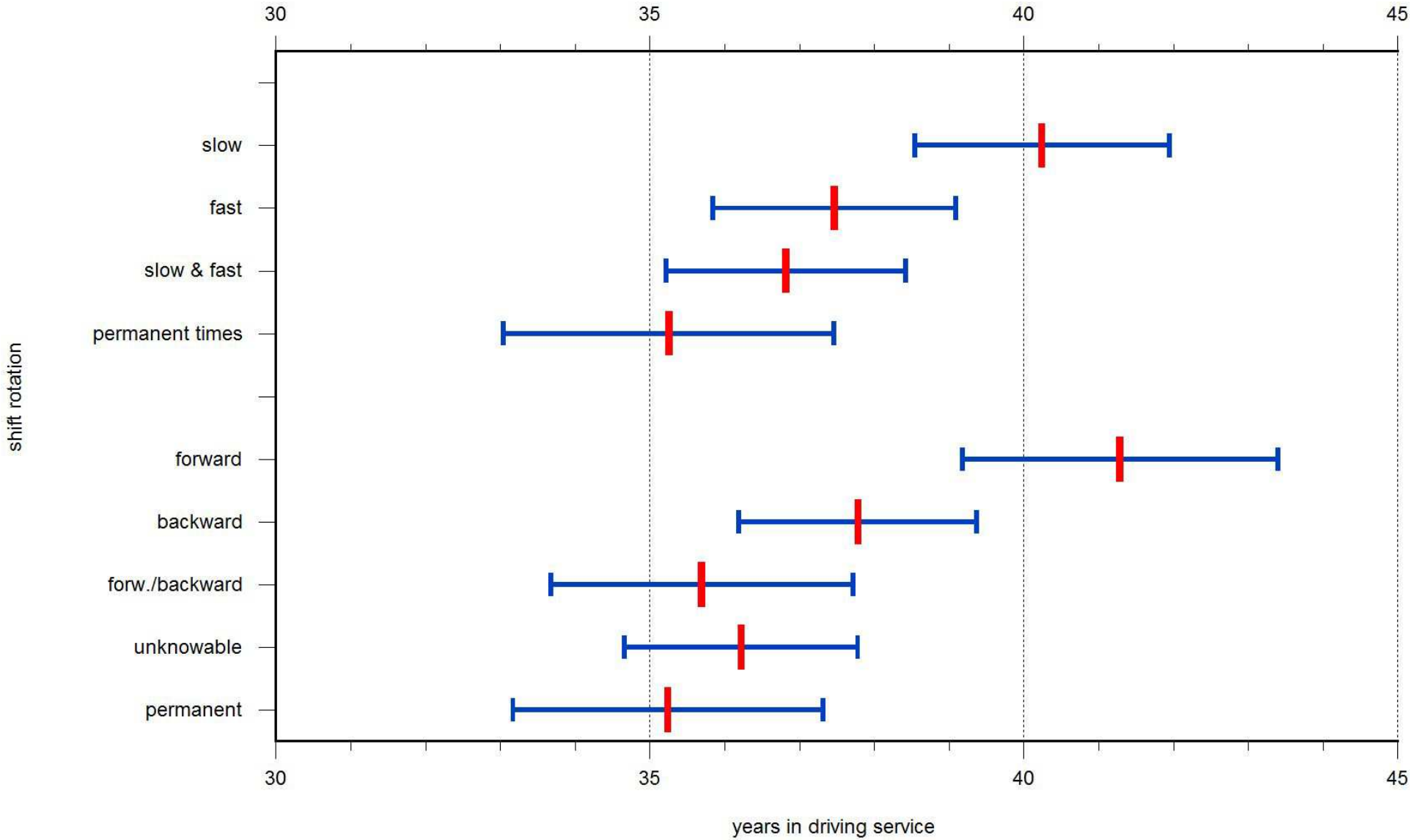
Split shifts and PDS



Direction of shift rotation and TDS

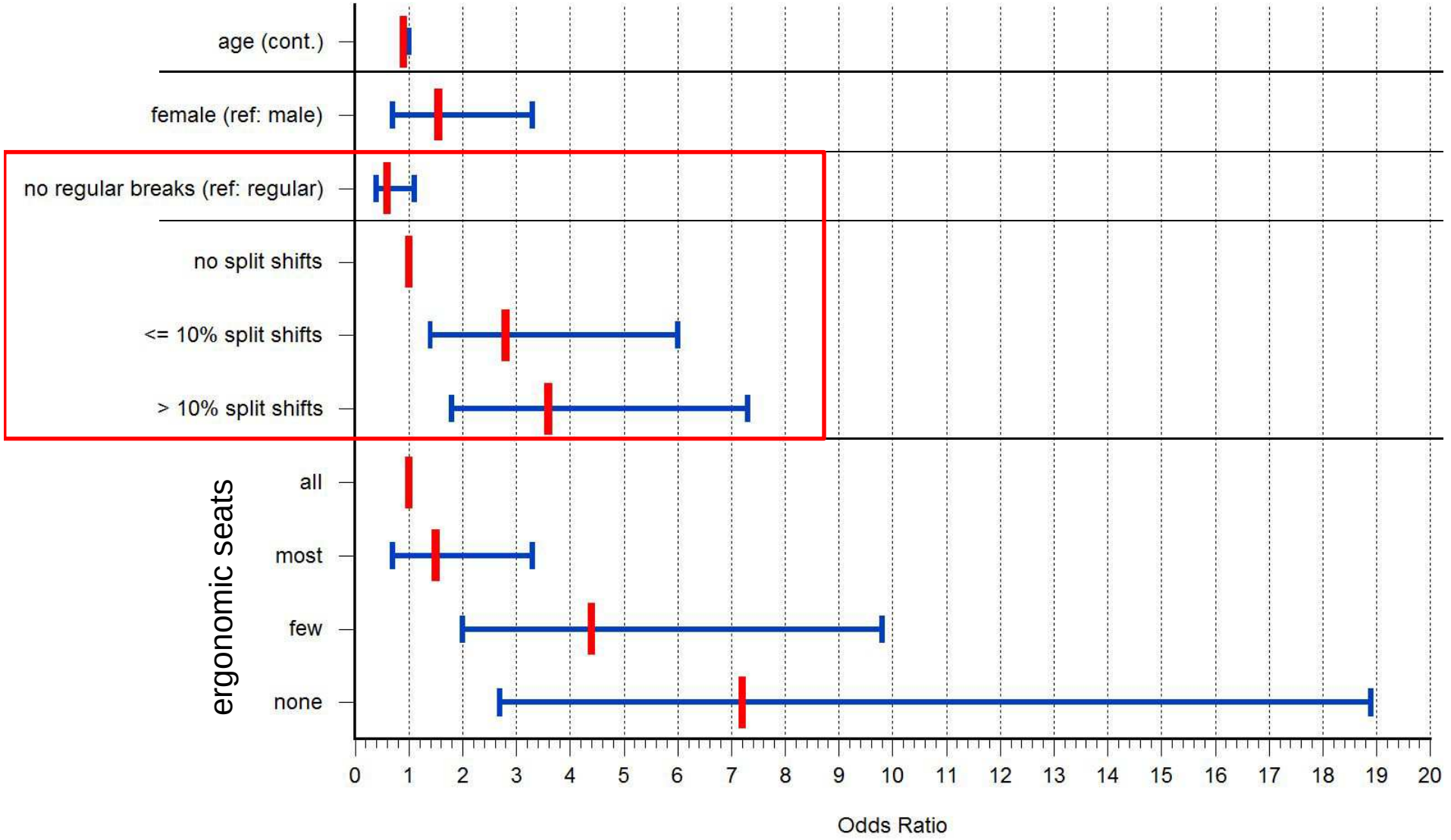


Mean survival times and 95%-CI for TDS



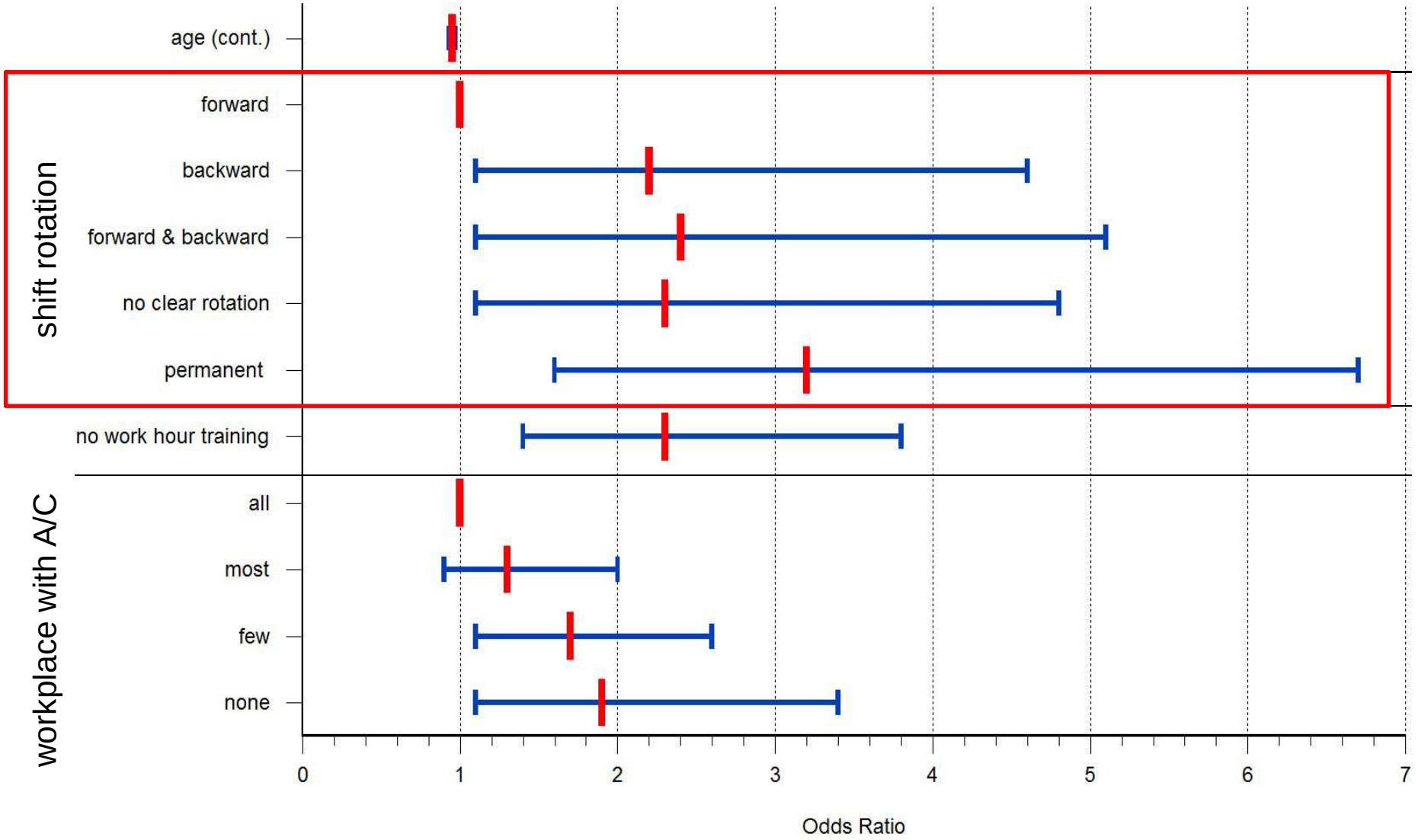
p<0.10

Cox Regression of PDS by year of service, ORs



p<0.10

Cox Regression of TDS by years of service, ORs



p<0.10

Summary

- rather low prevalence of PDS (5%)
- but high prevalence of TDS (29%)

- higher risk of PDS/TDS related to
  - lack of ergonomic workplace design (seats, A/C)
  - lack of ergonomic work schedule design, e.g.,
    - lack of ergonomic work shift schedules
    - split shifts
    - breaks (against hypothesis)
    - (also in univariate analyses: night work, long work hours, lack of control over working hours)

Discussion

Gesellschaft für GAWO Arbeits-, Wirtschafts- und Organisationspsychologische Forschung e.V.

- high number of sick days and TDS → preventive measures needed
- prevention should start with an ergonomic design of working conditions, including especially work hour characteristics
- no long-term effects were found for most behavioral interventions, such as trainings and behavior modification
- increasing problems due to ageing workforce, extended working life, increasing outsourcing

Gesellschaft für GAWO Arbeits-, Wirtschafts- und Organisationspsychologische Forschung e.V.

Thank you for your attention !

Contact:

anna.arlinghaus@gawo-ev.de

www.gawo-ev.de