



## Disability Income Protection – Chances for SEA and lessons from Germany

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Tim Eppert, Actuary (DAV)

# Agenda



What is disability insurance?

Focus on Germany



Checklist DI Introduction





Pictures:  
Josef Kirchmaier-Gilg-fotolia  
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# Agenda



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# What is Disability Income Insurance?



- Disability Income Insurance (DI) **protects the earned income** of the insured person.
- A **regular** benefit is paid – typically monthly – when the insured's **ability to work** (and therefore to earn a living) is restricted due to a disabling illness or injury.
- DI **is different** from Total and Permanent Disability (TPD) with one lump sum payment only.
- A **medical doctor** has to certify the claimant's inability to work.
  - The insurer should always reserve the right to render their own judgment by consulting medical experts on their behalf.
- Ways to measure disability: The insured must be unable to...

perform income producing duties

perform one important duty

work more than 10 hours per week

earn more than 25% of pre-disability income

perform a list of stated physical activities

perform any / own occupation

# Main differences between disability and life insurance



- In disability insurance
  - there are less objective measures to assess a claim
  - claimant receives the benefit alive
  - moral hazard is a big problem
- Hence main risks linked to disability insurance are
  - the subjective risk
  - antiselection
  - the economic cycle



Picture: © Josef Kirchmaier-Gilg-fotolia

# The main disability markets today are...



UK

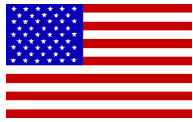


Netherlands



Maybe  
Singapore is the  
next candidate?

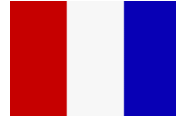
United States of America



Germany



France



South Africa



Australia



New Zealand

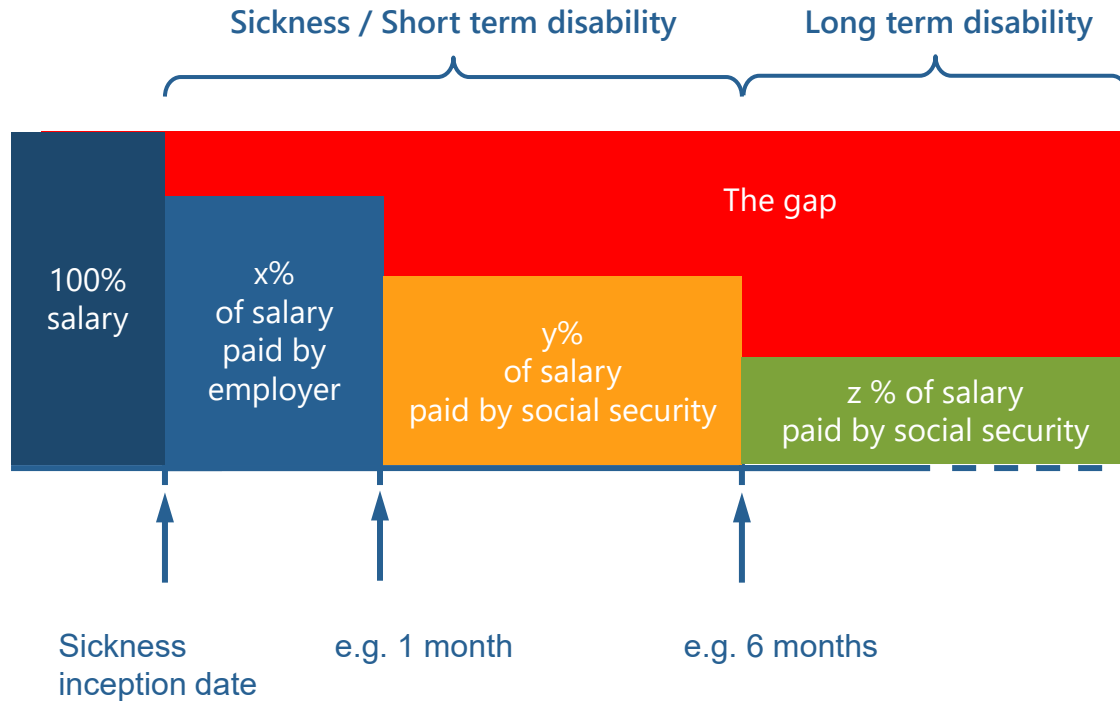


Pictures: © Microsoft

# The financial gap – to be cushioned by private DI



- In many countries the financial situation in case of disability may look like this:



Picture: © Getty/ppengcreative

# Claims management – for DI of special importance



- Early claims notification (esp. for longer deferred periods) to enable early intervention
- Direct contact to the claimant
- Assistance Service
  - informs and advises the disabled about his/her disability and about the right to benefit against third persons
  - rehabilitation measures
  - contacts present or future employers
  - determines validity of claim
- Regular reviews

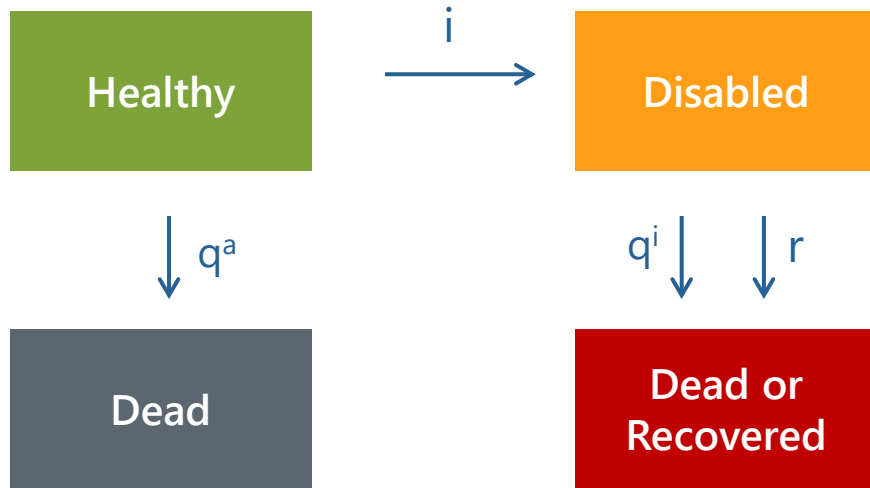


# Pricing



## Inception / Annuity Approach:

- incidence · present value of annuity
- recoveries and deaths of disabled are included in present value of annuity



Unlike Death or Dread Disease Insurance, Disability Income has more random variables involved.

# Actuarial basis: rates for premium calculation

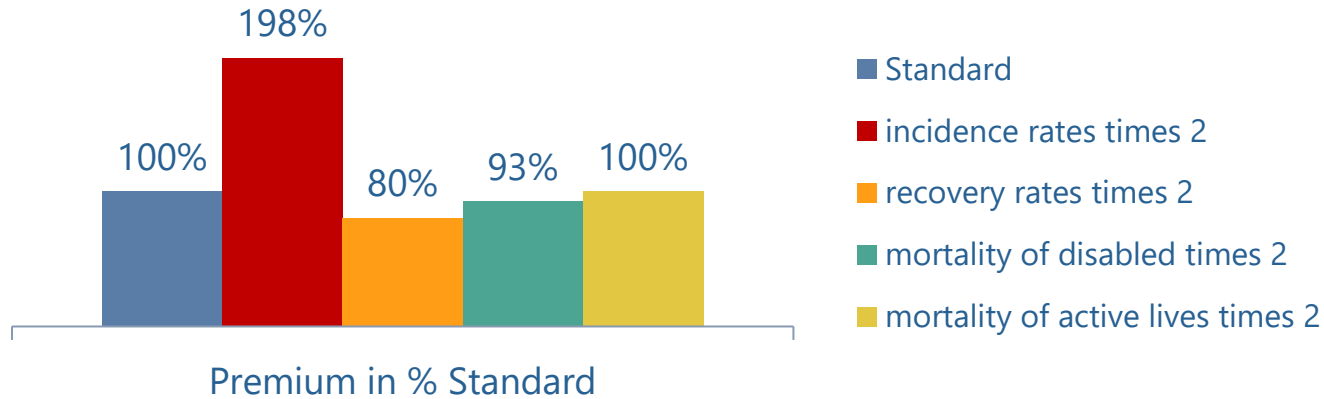


- Incidence rates  $i$  (reflect the number of claims) refer to (e.g.)
  - first day of sickness
  - beginning of disability
  - beginning of claim (after the deferred period)
- Termination rates (how long do disabled lives stay on claim):
  - Mortality rates  $q^i$
  - Recovery rates  $r$
  - usually select tables, i.e. mortality and recovery rates depend on
    - the age attained
    - the length of time since disablement
    - the deferred period if the deferred period is short
- Mortality of Active Lives  $q^a$

# Long term disability premiums are mainly determined by incidence rates



- Example from Germany: Age 25, benefit period 40, insured annuity 12,000 €/year

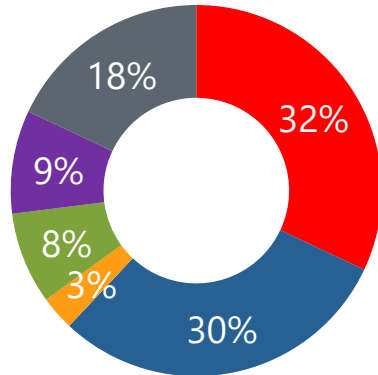


- Roughly speaking: Doubling the incidence rates means doubling the premiums
- But this is different in markets where also short term disability is covered, e.g. in Australia: Depending on the deferred period, a 10% decrease of termination rates can result in a up to 15% increase of the premiums

# Causes of disability

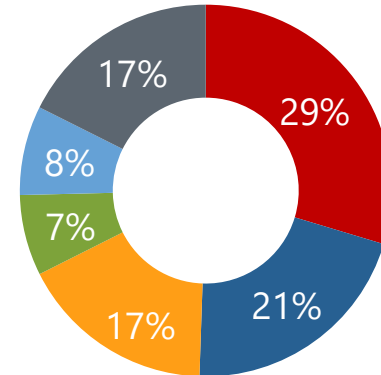


## US social security beneficiaries



The classic "dread diseases" make up only a small part of all illnesses that could cause inability to work.

## German Disability Income



- Mental disorders
- Cancer
- Nervous system

- Musculoskeletal system
- Circulatory system
- Other

- Mental + Nervous system
- Cancer
- Accidents

- Musculoskeletal system
- Circulatory system
- Other

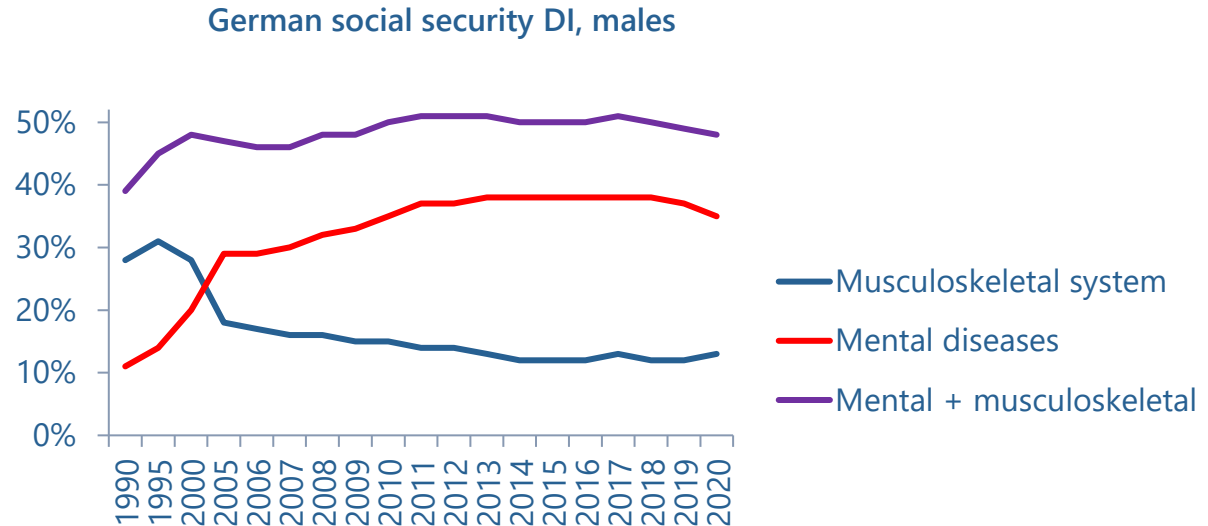
Source: Gen Re Disability Fact Book 2015-16, p. 32; Social Security Administration, Annual Statistical Report on the Social Security Disability Insurance Program, 2012

Source: Morgen & Morgen 04/2019

# Mental claims – just hidden in the past?



- Were psychological problems hidden among musculoskeletal problems (“back pain”) in the past?



Source: Deutsche Rentenversicherung (DRV)

# Mental diseases – take away tips



- The effect of increasing mental cases can also be observed in many countries.
- Possible reasons:
  - More stressful jobs
  - No more stigmatization of mental problems nowadays
  - More women combine work and family life.
  - Trend to more fraudulent claims?
- Possible consequences:
  - Product managers, underwriters, claims managers need to gain knowledge on mental illnesses.
  - Analyse which professions are especially exposed to these risks.
  - Adjust the pricing if necessary.
  - For very simple products exclusions of mental illnesses may be an option.



Picture: © Microsoft

# Agenda



What is disability insurance?

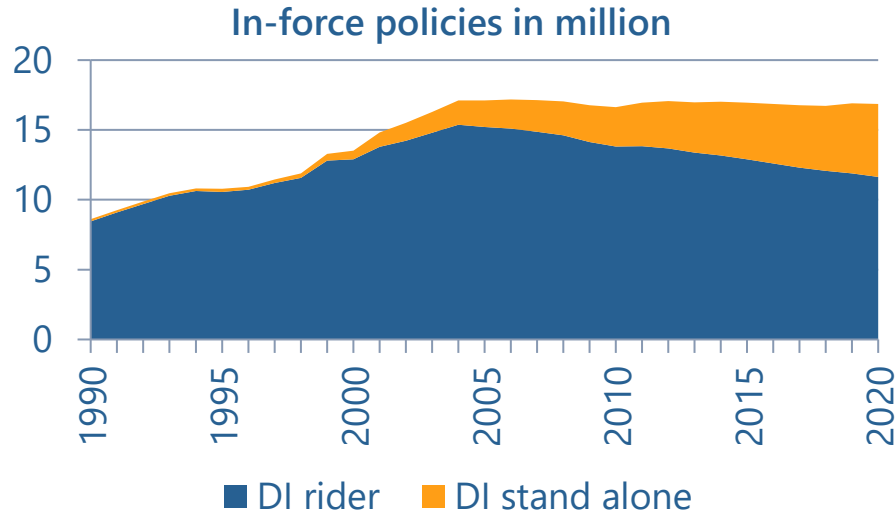
Focus on Germany



Checklist DI Introduction

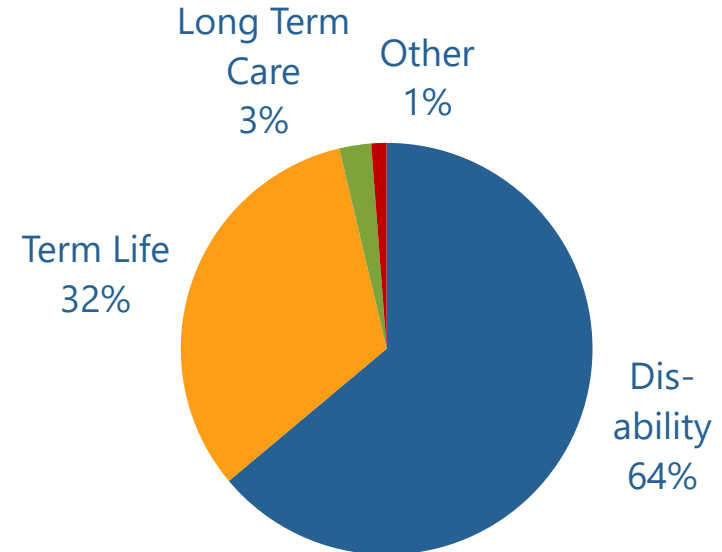
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# In-force DI business Germany



- Germany has a working population of about 45 million.
- Thus the market penetration for Long Term DI is higher than in most other markets.

## Product mix in new protection business in Germany



Source: GDV – German insurers' association, Gen Re analyses



# Some characteristics of the German DI

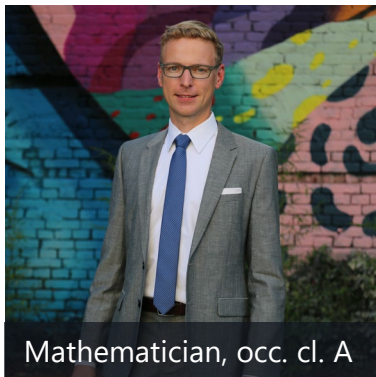


- Long term Disability Income Insurance
- Own occupation is protected
- Disability degree 50%
- No deferred period, i.e., benefits will be paid from day 1 of disability, but: medical doctor must certify that the claimant is presumably **unable to work for at least 6 months**
- Monthly benefit (average about 1,100 EUR  $\approx$  155,000 JPY) – as long as person stays disabled (and alive)
- Level premium
- Mostly individual business
- Occupation class differentiation: formerly typically 4 occ. classes – nowadays more (e.g. 12 classes)

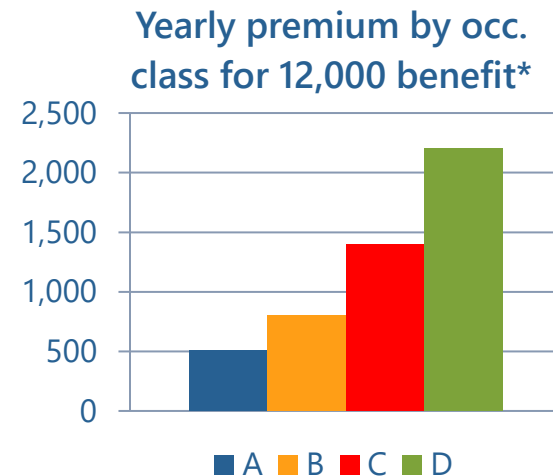
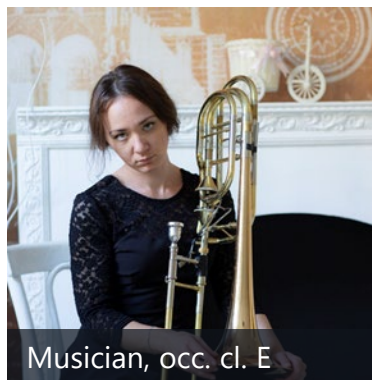
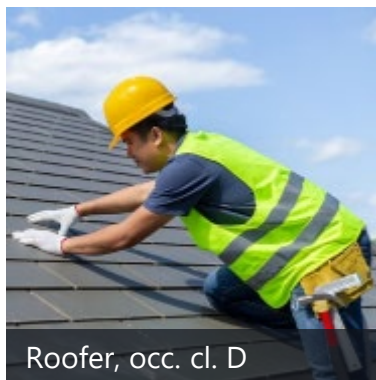
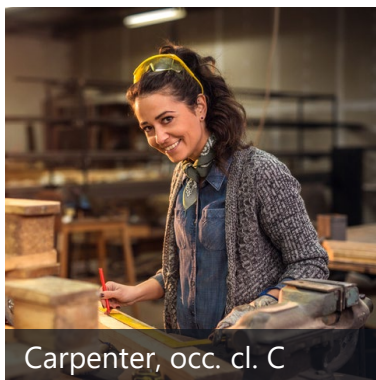


Picture: GettyImages-488576977

# Examples of occupation classes for DI



Class	Disability risk
A	low
B	mid
C	high
D	very high
E	uninsurable



\* Level gross premium indication for German DI, 12,000 yearly benefit, age 30, end age 60

Images: Andreas Heider; GettyImages-1059662522; GettyImages-1042054720; GettyImages (Pramote2015)), GettyImages-1062430288

# Background

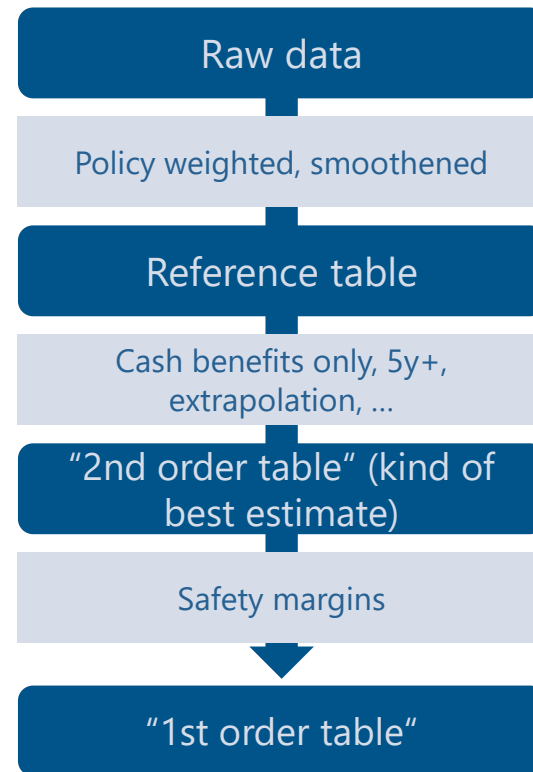


## 2018 – The mission

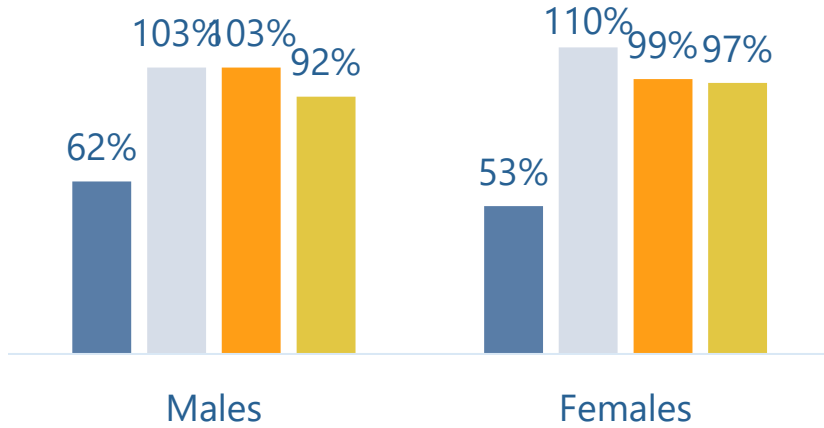
- Last official industry table: DAV 1997 I  
Last unofficial one: DAV 2011 I  
→ It's time for a new official table!
- Aggregate DI tables for reserving
  - Incidence rates
  - Recovery
  - Mortality of disabled
  - Mortality of active lives
- Also wanted:  
„something“ on occupations

## Data basis

- Pool data from Gen Re, Munich Re and Swiss Re
- Observation period 2011-2015
- ~59 million active life years with ~155 k new DI claims
- ~ 1 million disabled life years with ~40 k recoveries and ~17 k deaths of disabled
- 47 Companies
- Covering 85% of the whole market



# A/E\* by policy type and policy year



- Waiver of premium only (WoPo)
- Rider with term life, DI cash benefit
- Rider with other policies, DI cash benefit
- Stand alone DI

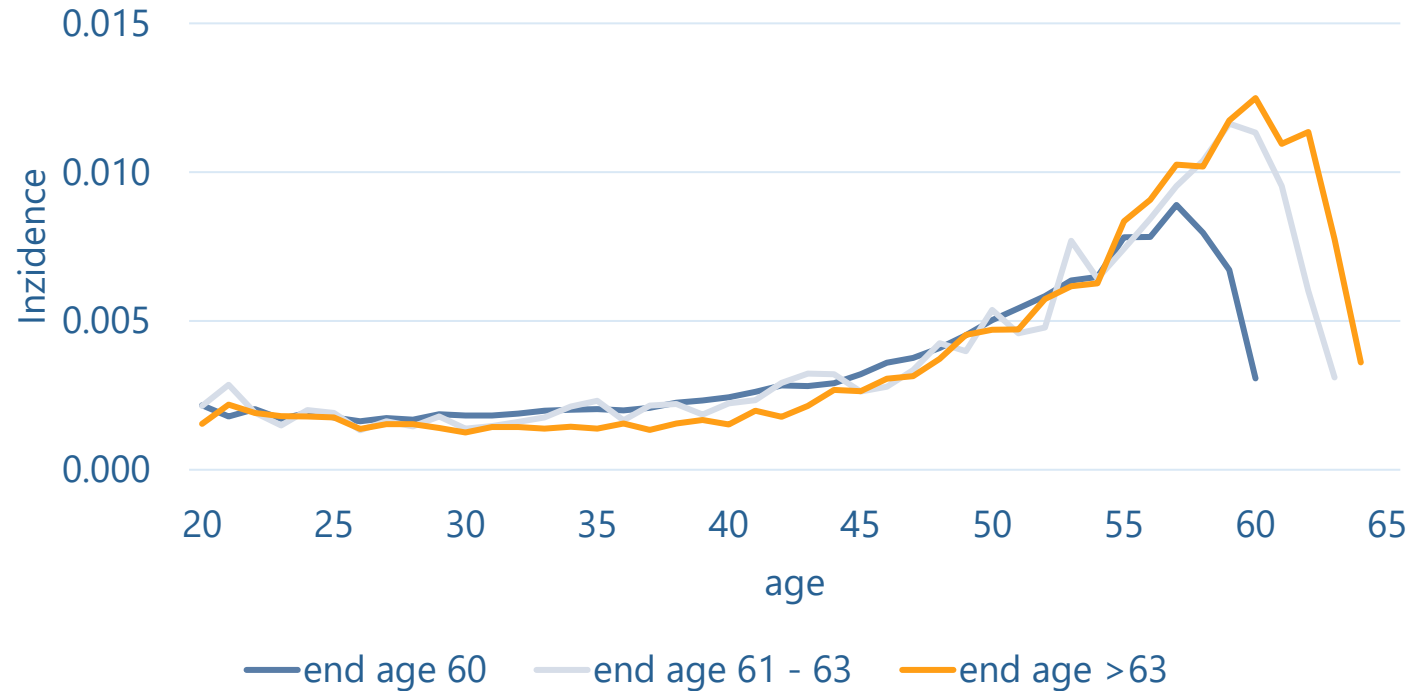


- 1
  - 2
  - 3
  - 4
  - 5
- Policy year (selection)

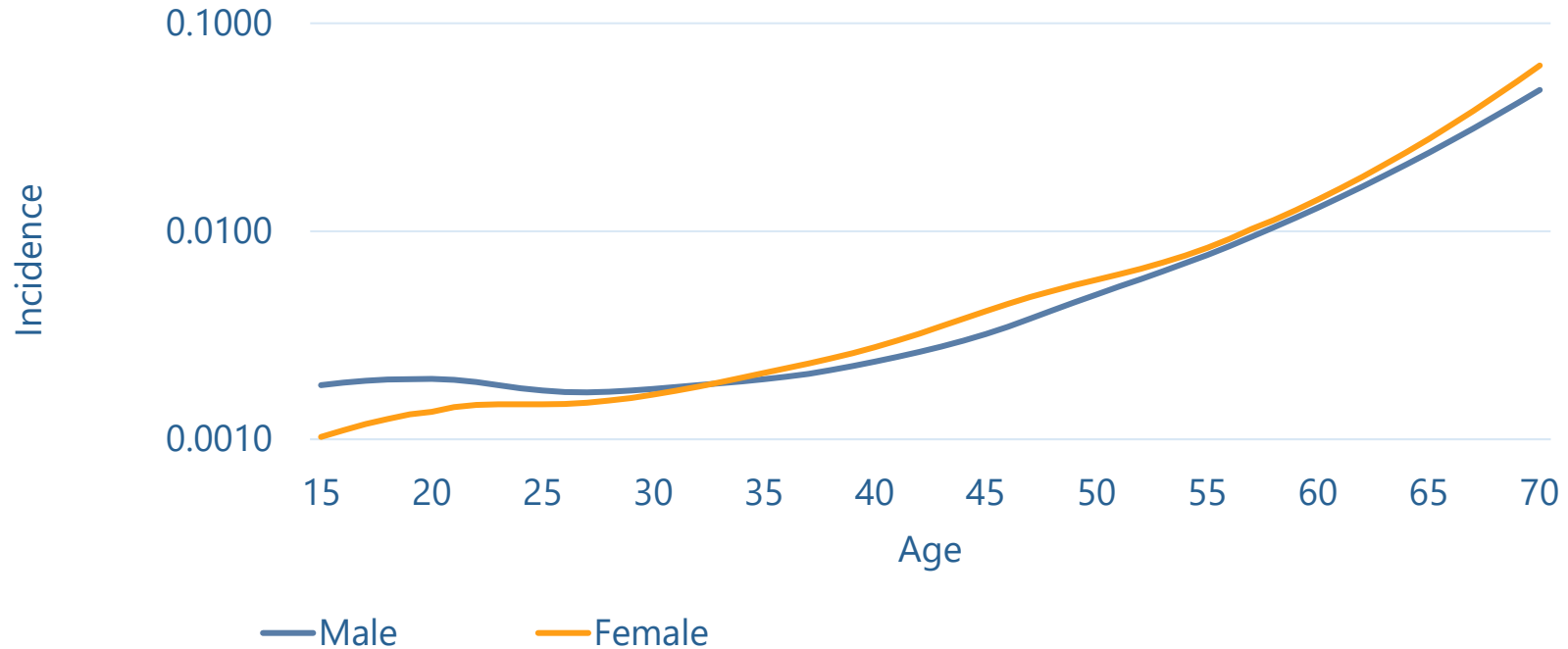
→ Exclude WoPo policies and first 4 policy years.

\* E: reference table based on raw data (ages 20-58)

# Incidences by end age – males



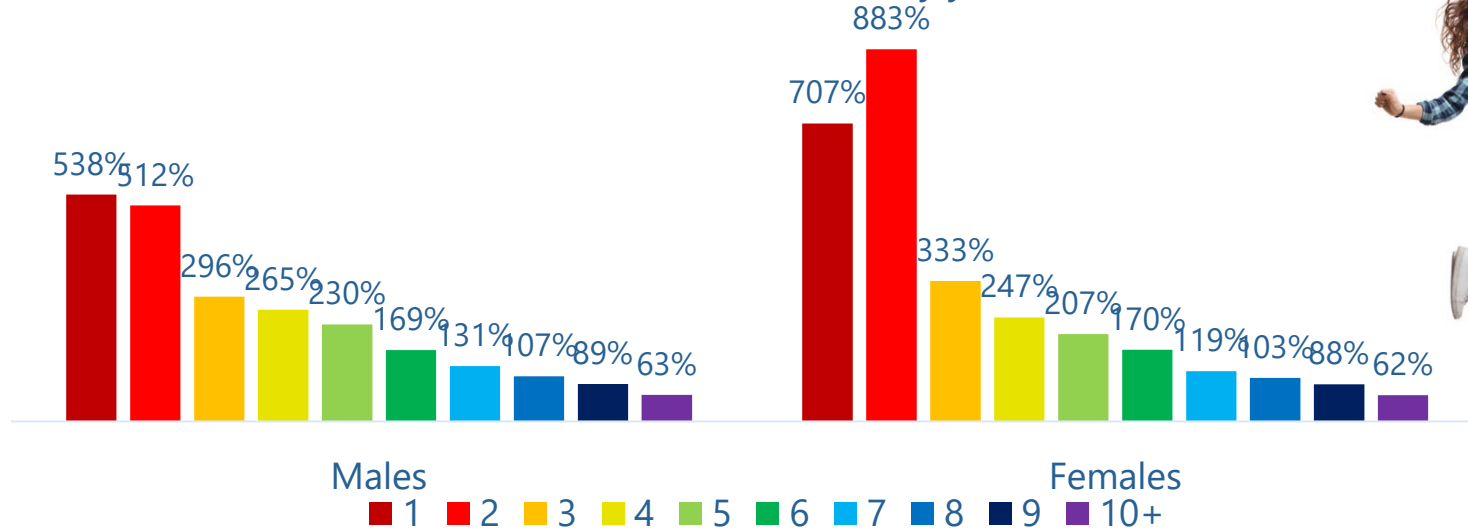
# Incidence rates "2<sup>nd</sup> order" (incl. 2% IBNR)



# Recovery by disability year



A/E for recovery by disability year  
(E: reference table for disability years 6+)



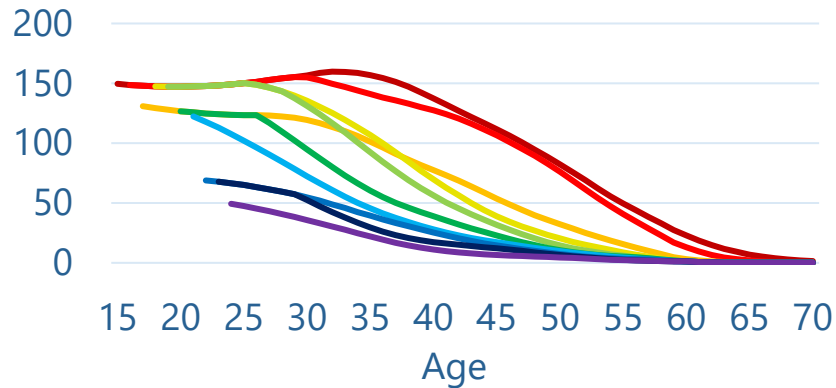
- Significant decrease even after 6th year of disability

Hence the new table will distinguish between the disability years 1, 2, ... , **10+** (instead of only **6+** as before).

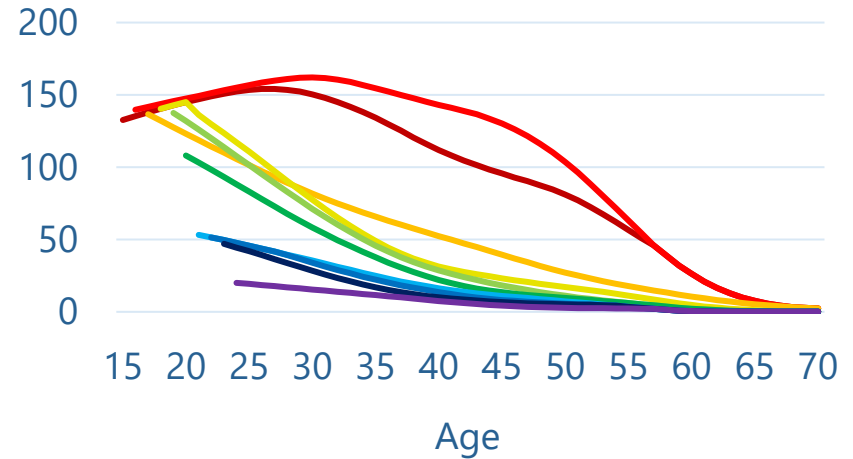
# Recovery tables "2<sup>nd</sup> order"



Recovery by disability year in %, DAV  
2021 RI  
Males



Recovery by disability year in %, DAV  
2021 RI Females

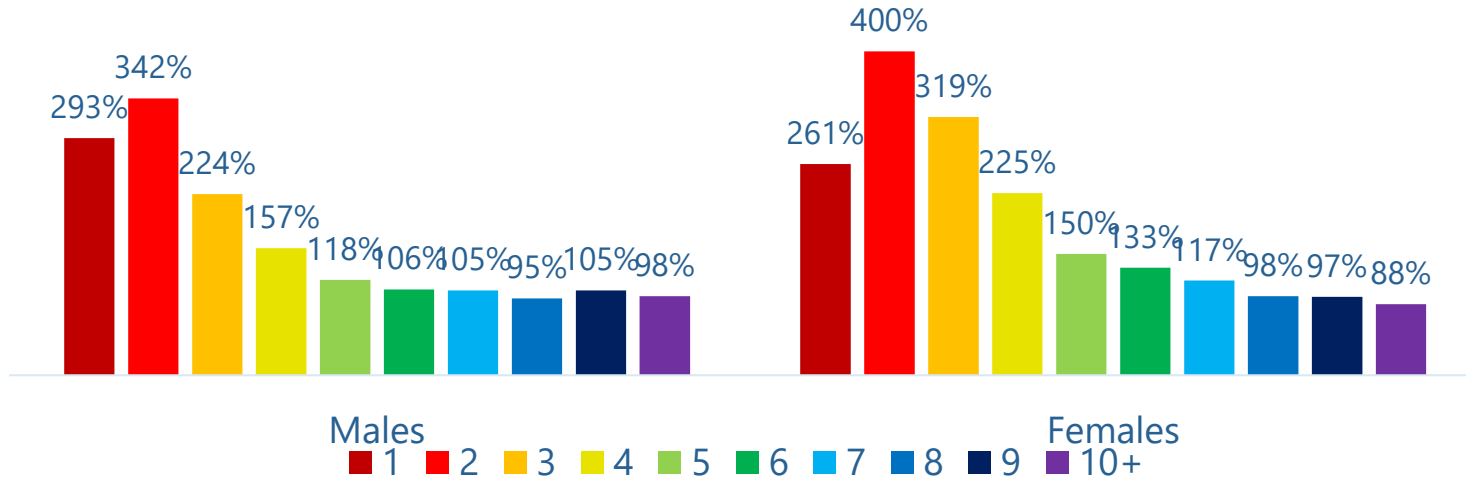




# Mortality of disabled by disability year



A/E for mortality of disabled by disability year  
(E: reference table for disability years 6+)



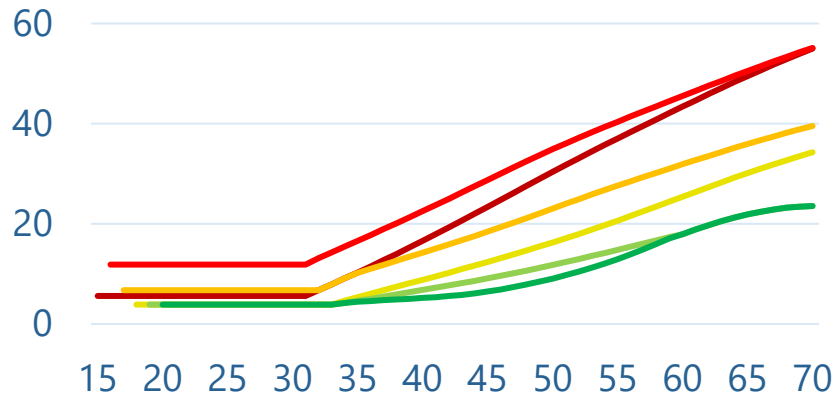
- No significant decrease after 6th year of disability

Hence the new table will distinguish between the disability years 1, 2, ... , 6+ (like the previous table).

# Mortality of disabled tables "2<sup>nd</sup> order"

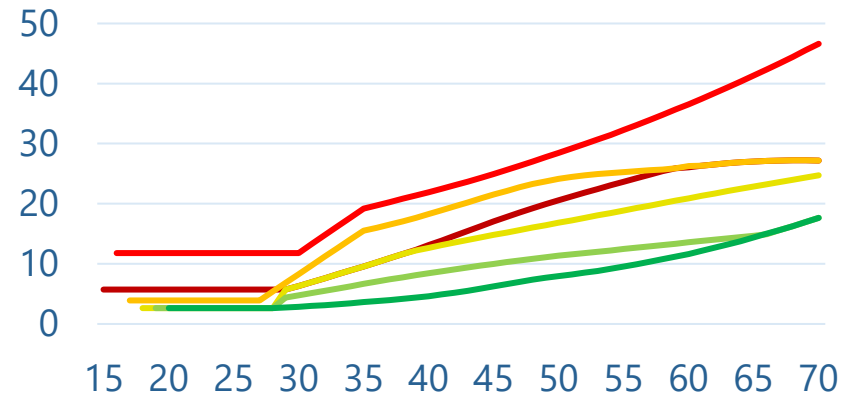


Mortality of disabled by disability year  
in ‰,  
DAV 2021 TI, Males



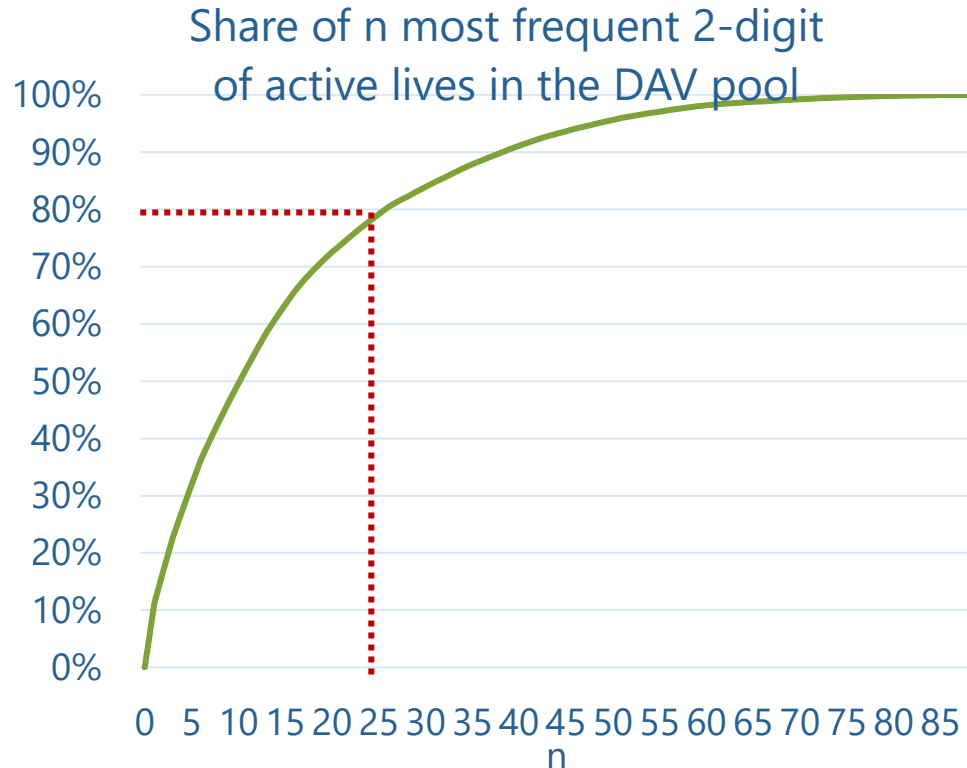
1 2 3 4 5 6+  
Age

Mortality of disabled by disability year  
in ‰,  
DAV 2021 TI, Females



1 2 3 4 5 6+  
Age

# The most frequent occupations on 2-digit level



- The 25 most frequent occupations were analysed in more detail.
- Sufficiently large data basis for each.
- These 25 occupations cover 79% of the sub-pool with occupational info

2-digit code	Occupation	Share	Average age
78	Office occupations, commercial employees, n.e.c.	11%	36
85	Other health service professions	6%	34
98	Workers with (as yet) undetermined profession	6%	26
67	Wholesale and retail salespersons, purchasing and sales spec.	5%	34
75	Professions in corporate management, consulting and auditing	5%	41
60	Engineers, n.e.c.	4%	40
69	Bank, building society, insurance professionals	4%	36
99	Workers without further job specification	3%	29
77	Accounting clerks, computer specialists	3%	37
31	Electrical professions	3%	33
62	Technicians, n.e.c.	3%	37
86	Social professions	3%	34
87	Teachers	3%	37
88	Humanities and natural sciences professions n.e.c.	2%	37
28	Driving, aircraft construction and maintenance professions	2%	33
84	Doctors, Pharmacists	2%	42
80	Security professions, not elsewhere specified	2%	33
27	Mechanical engineering and maintenance occupations	2%	32
25	Metal and plant construction professions	2%	36
70	Other service clerks and related professions	1%	35
66	Sales staff	1%	36
26	Sheet metal construction and installation occupations	1%	38
71	Land transport professions	1%	41
48	Extension professions	1%	36
50	Occupations in wood and plastics processing	1%	36
Total	Top 25	79%	35

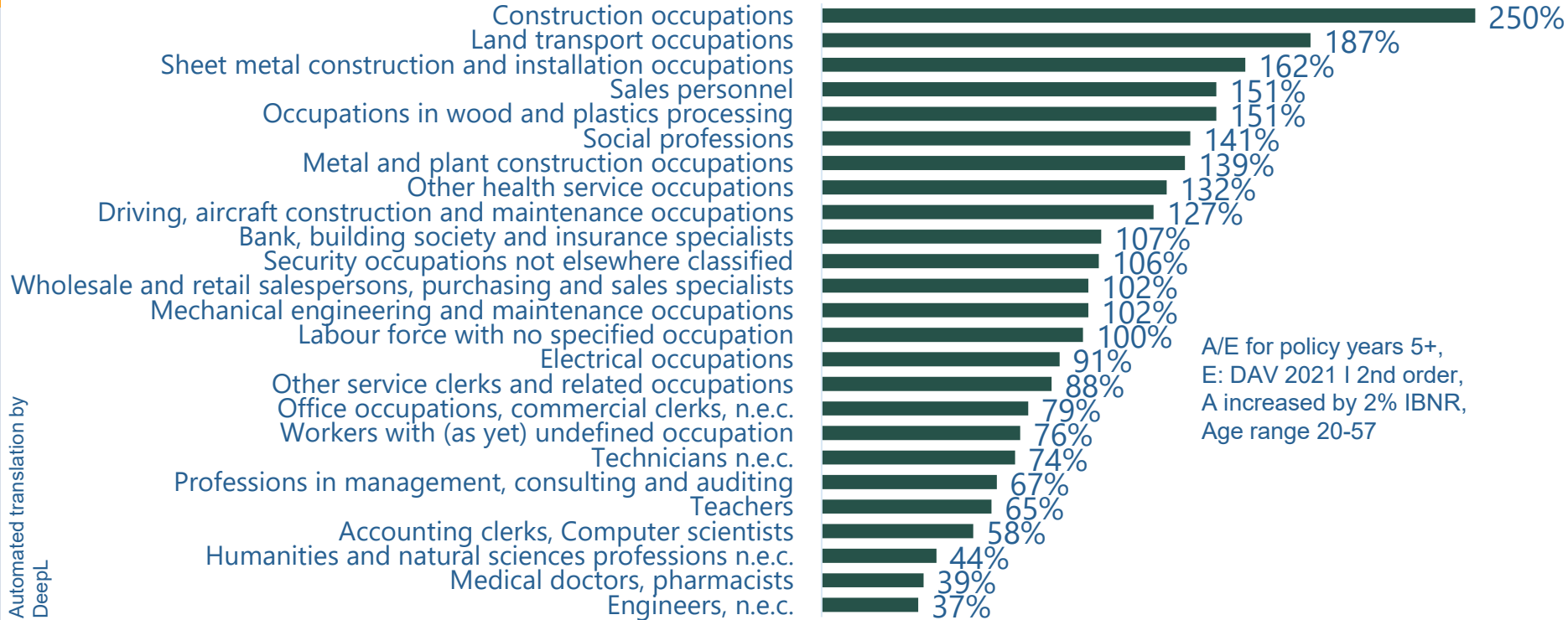


Top 25 occupations on 2-digit level.  
All policy years were taken into account.  
Share denotes the share of the sub-pool with occupational information by active life years.

# Claims experience for the Top 25



Automated translation by  
DeepL

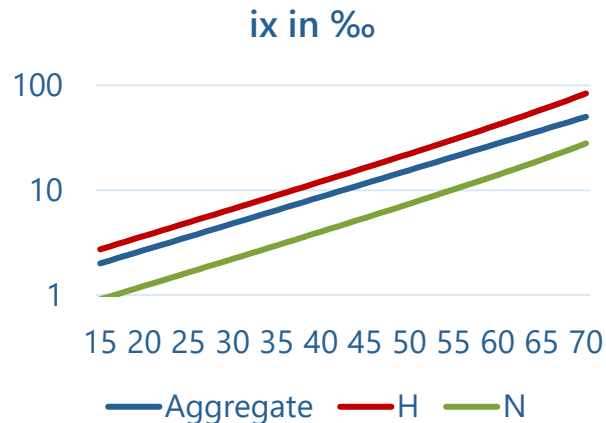


A/E for policy years 5+,  
E: DAV 2021 I 2nd order,  
A increased by 2% IBNR,  
Age range 20-57

# Impact of the purely biometric aspect on the age shape

- Let's look at the **the purely biometric aspect alone** under the following assumptions:

- Proportion H at age 15: 60%
- Aggregate table has exponential growth with  $i_{15} = 2 \text{ ‰}$  and  $i_{70} = 50 \text{ ‰}$
- Morbidity quotient H/N: 3



Using these assumptions, we split the aggregate table into one for low and one for high risks.

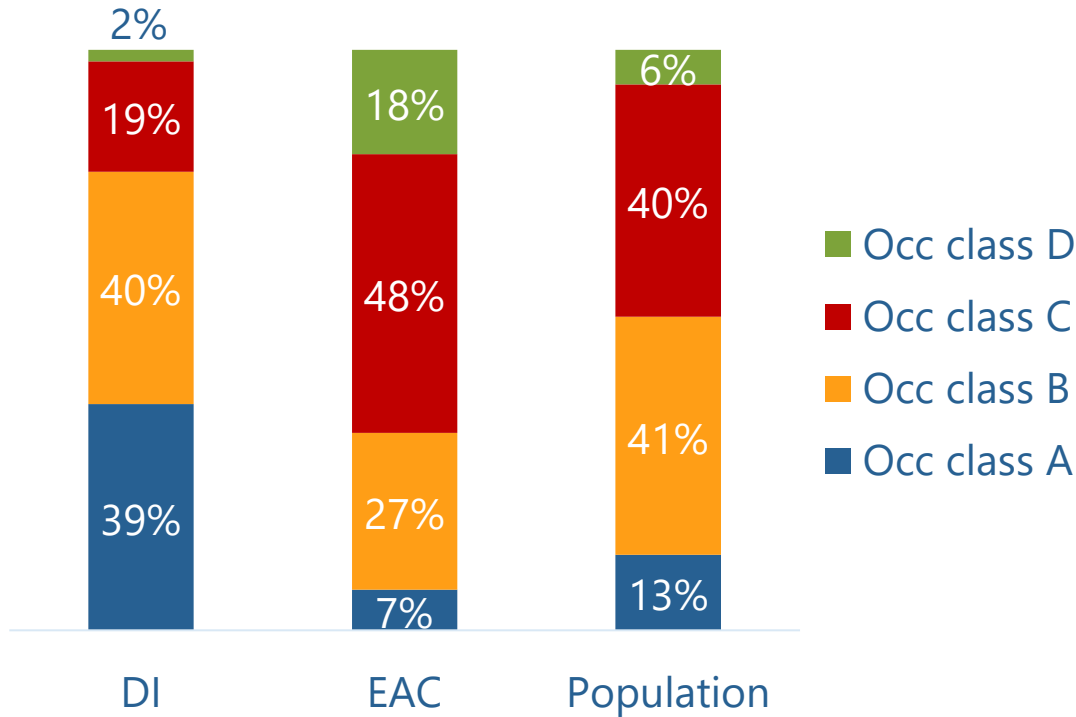
Both new tables, the one for H and the one for N, have a higher slope than the aggregate table:

table	$i_{15}$	$i_{70}$	$i_{70} / i_{15}$	Mean increase per year of life
Aggr.	2 ‰	50 ‰	25	6,0 %
H	2,73 ‰	83,43 ‰	30,6	6,4%
N	0,91 ‰	27,81 ‰	30,6	6,4%

This effect is further intensified by the other non-biometric differences between H and N (entry age, final age, lapsation...).

In particular, occ. class differentiated tables are all steeper than the aggregate table.

# New business by occupational classes in Germany



# Agenda



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# Checklist for introducing Disability Income Insurance to new markets



## Product design

- Consider a simpler product design:
  - Fixed payment period (no recovery to be considered) or
  - Functional Disability
- Use a deferred period (e.g. 6 months).
- Be aware of the role of mental diseases (think about exclusion).

## Careful UW

- Occupational UW is of great importance (use an appropriate occupational class system).
- Avoid over-insurance.

## Adequate premiums

- Include more safety margin than for Mortality.

# Checklist for introducing Disability Income Insurance to new markets



## Professional claims management

- Act early and in direct contact with the claimant.
- For products with recovery: regular check if claimants are still disabled.

## Close monitoring

- Keep control over as much policy information as possible.
- Detect problems in your portfolio early.
- Use up-to-date monitoring methods, e.g. GLMs.

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