



Spolufinancováno
Evropskou unií

NATIONAL SOCIAL INFORMATION SYSTEM (NSIS)



Presentation of results: 4 Oct 2024



MINISTERSTVO PRÁCE
A SOCIÁLNÍCH VĚCÍ



MINISTERSTVO ZDRAVOTNICTVÍ
ČESKÉ REPUBLIKY



Ústav zdravotnických informací a statistiky ČR
Institute of Health Information and Statistics of the Czech Republic

*Analytical studies of the Health 2030
programme:*

Building the National Social Information System (NSIS)

Introduction

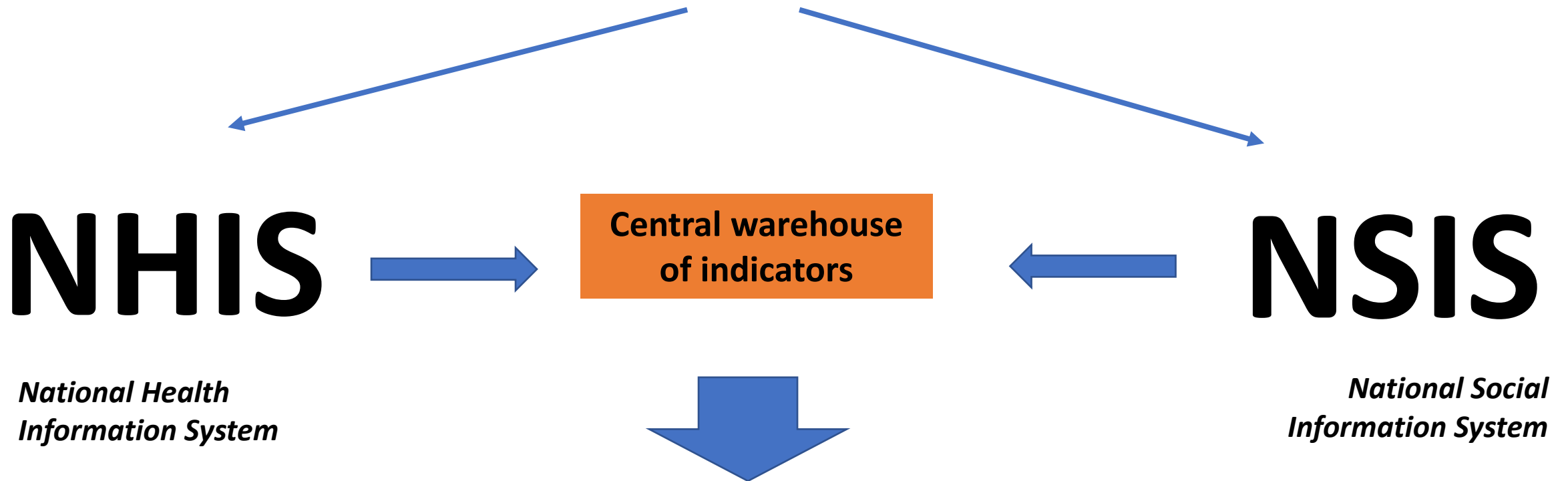
Current state of the data warehouse and data linking

**Transmitted and forwarded data
+
A joint data warehouse is being built**

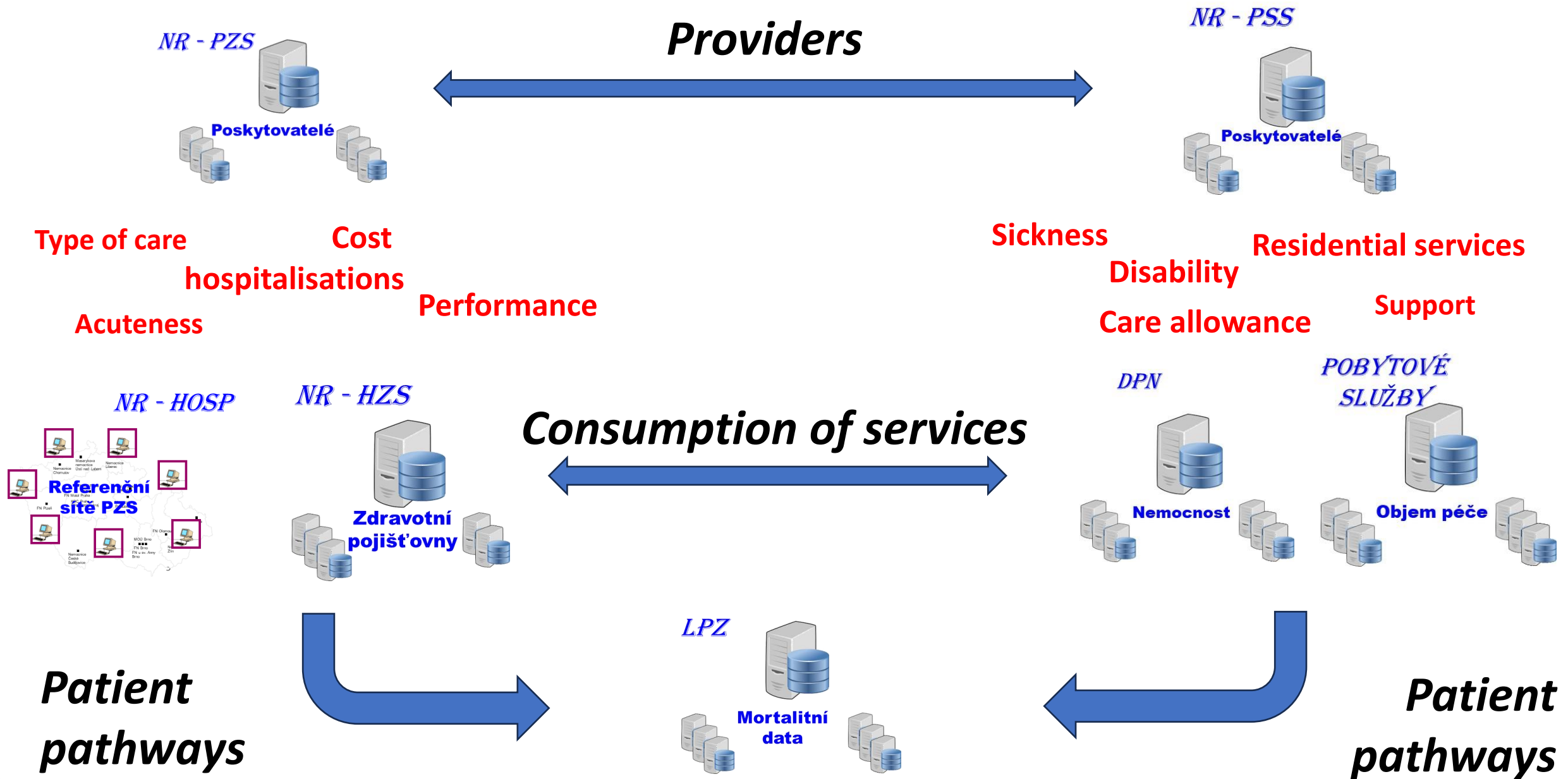
**A joint project funded by the Operational Programme
Employment launched**

The analyses are based on a newly built inter-ministerial information system linking data from the Ministry of health and the Ministry of labour and social affairs

INFORMATION AND ANALYTICAL SUPPORT FOR SOCIAL AND HEALTH SERVICES



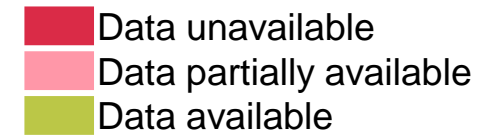
Current opportunities for joint inter-ministerial analysis are not small



Building the National Social Information System (NSIS)

**Overview and structure of available data:
state as of 19 Sep 2024**

Content and time availability of data as of 19 September 2024



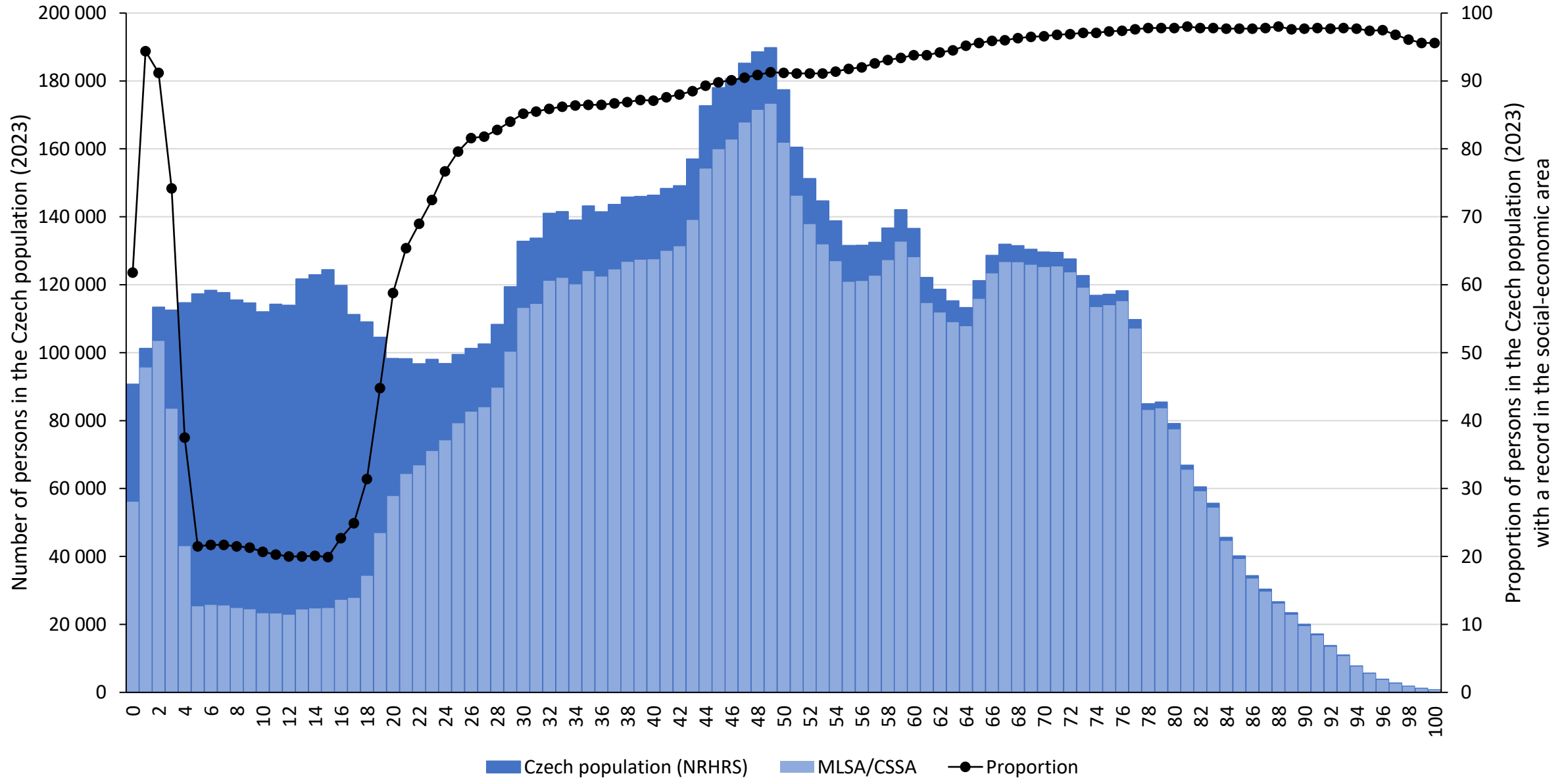
Data	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Time scale
Temporary incapacity for work*	Red	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Date from-to Month
Pensions	Red	Red	Red	Pink	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Date from-to Month
Social resid. and outpatient services	Pink	Pink	Pink	Pink	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Date from-to Month
Employment	Pink	Pink	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Date from-to Month
Self-employed	Pink	Pink	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Date from-to Year
Calculation basis**	Red	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Pink	Year
Material distress	Red	Red	Red	Red	Pink	Green	Green	Green	Green	Green	Green	Green	Green	Green	Month
Care allowance + degree of dependency	Red	Red	Red	Red	Pink	Green	Green	Green	Green	Green	Green	Green	Green	Green	Month
Sickness insurance benefits	Red	Red	Red	Red	Red	Red	Red	Red	Red	Green	Green	Green	Green	Green	Date from-to Month
Employment office records	Red	Red	Red	Pink	Pink	Green	Green	Green	Green	Green	Green	Green	Green	Green	Date from-to Month
State social assistance benefits	Red	Red	Pink	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Date from-to Month
Health disability card	Red	Red	Red	Red	Pink	Green	Green	Green	Green	Green	Green	Green	Green	Green	Date from-to Month
Unemployment benefits	Red	Red	Red	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Month
Execution	Pink	Pink	Pink	Pink	Pink	Pink	Green	Green	Green	Green	Green	Green	Green	Green	Date from-xx

*No records are yet available for TIWs initiated in 2023 that continued into 2024.

**The tax bases for 2023 are not yet fully available, as tax returns are not due until 2024.

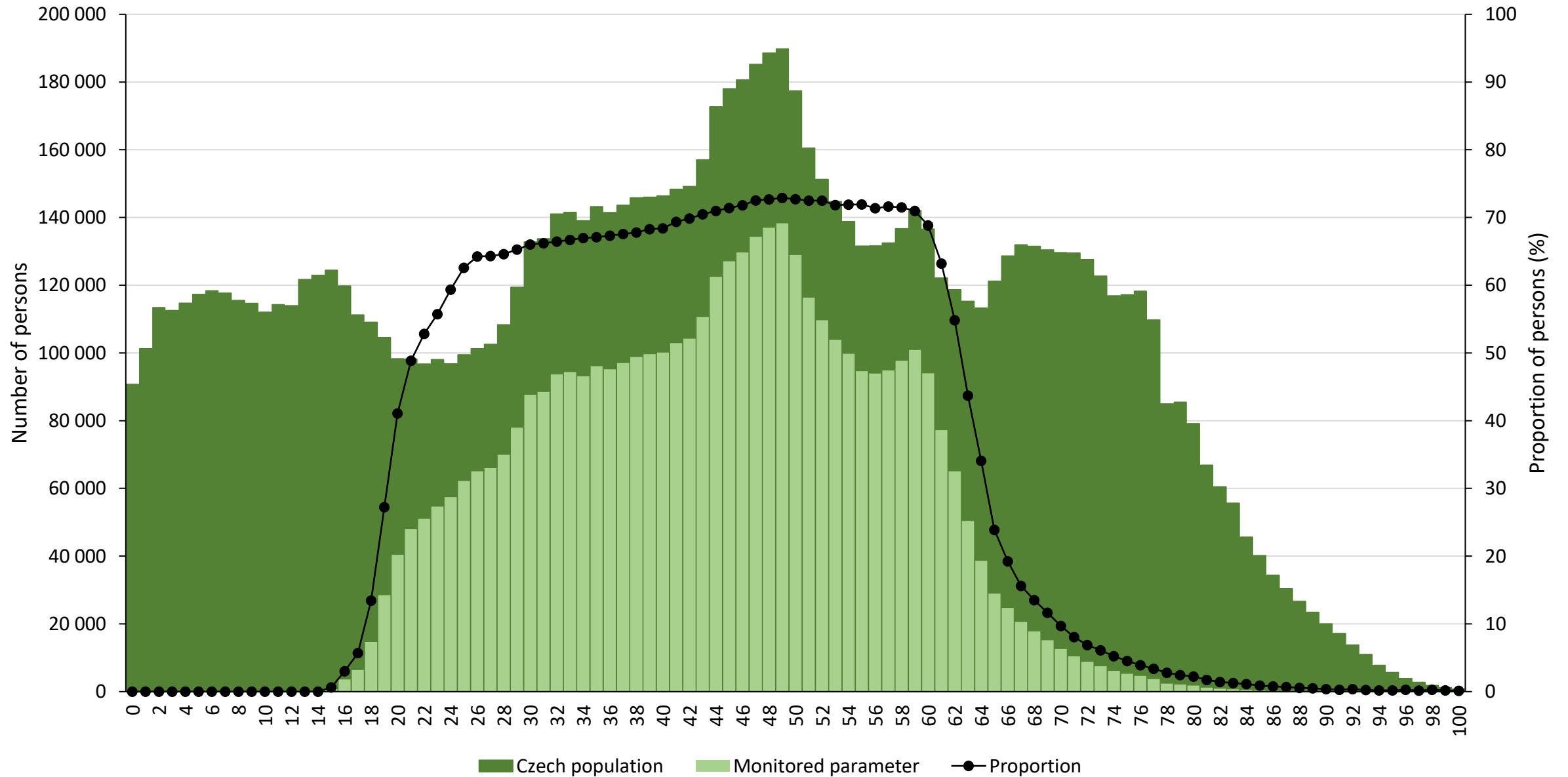
What part of the population (insured persons, NRRHS) has records at MLSA/CSSA in 2023?

Persons in MLSA/CSSA data only: 337 918 (+3,1 % compared to the total population in NRRHS)



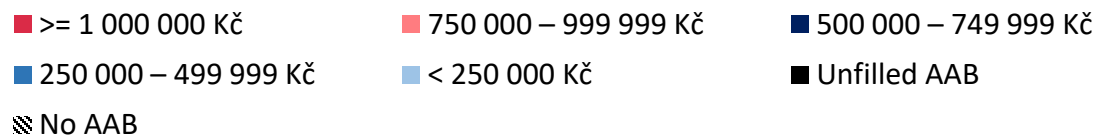
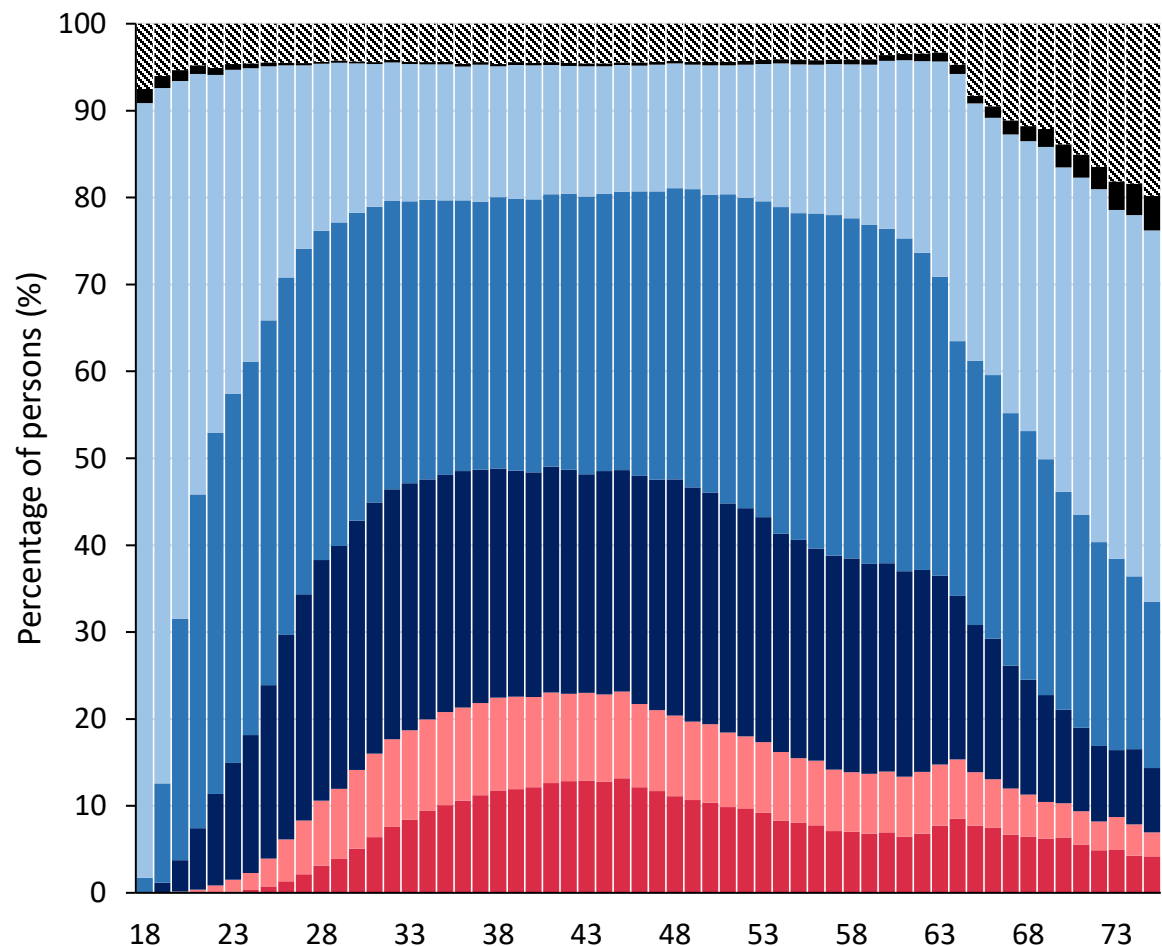
Employment (2023)

Persons in MLSA/CSSA data only : 141 670 (+1,3 % compared to the total population in NRRHS)

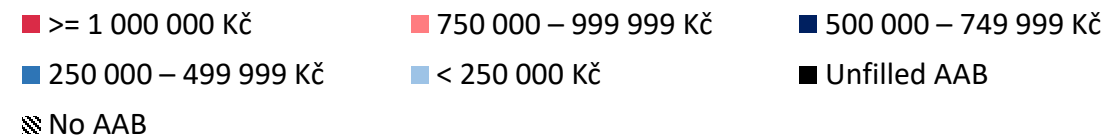
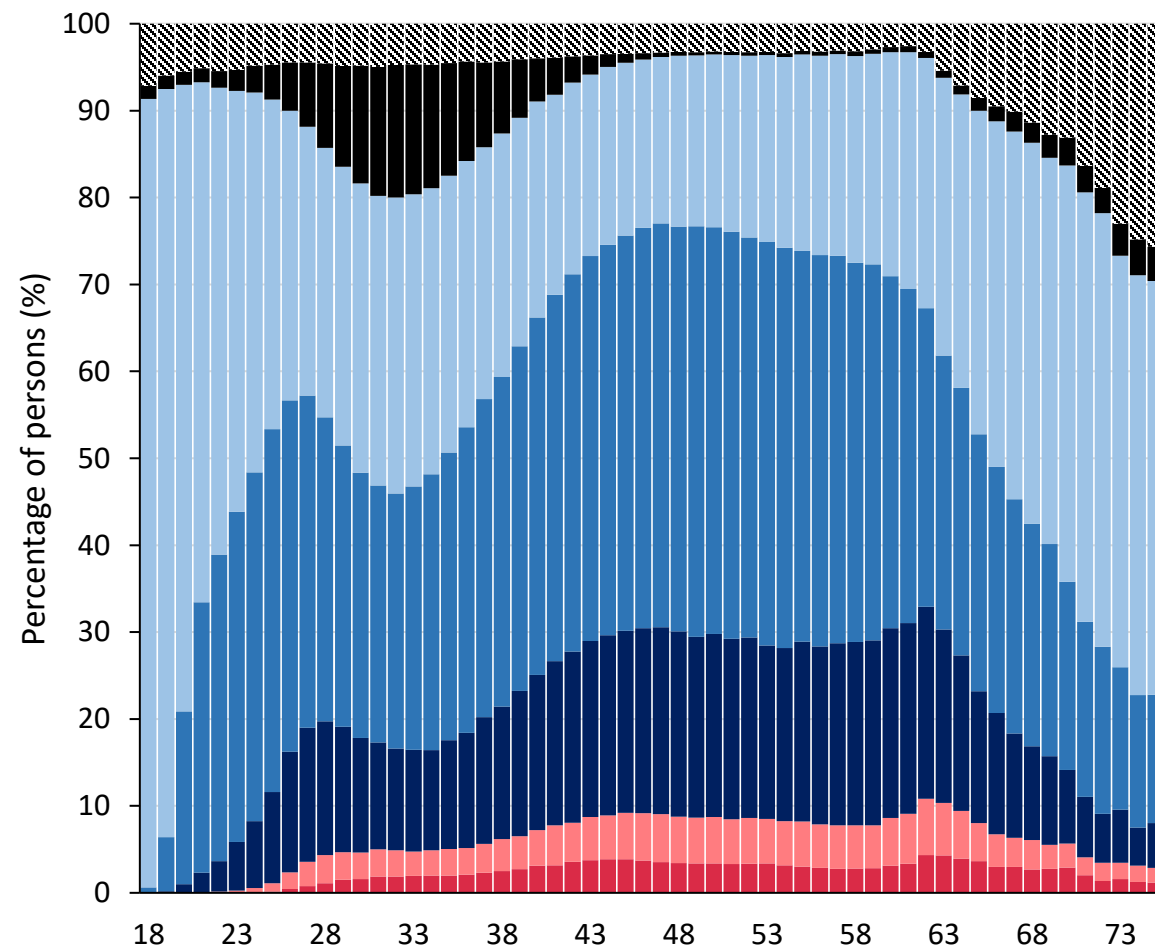


Employment (2023): annual assessment base

Men:



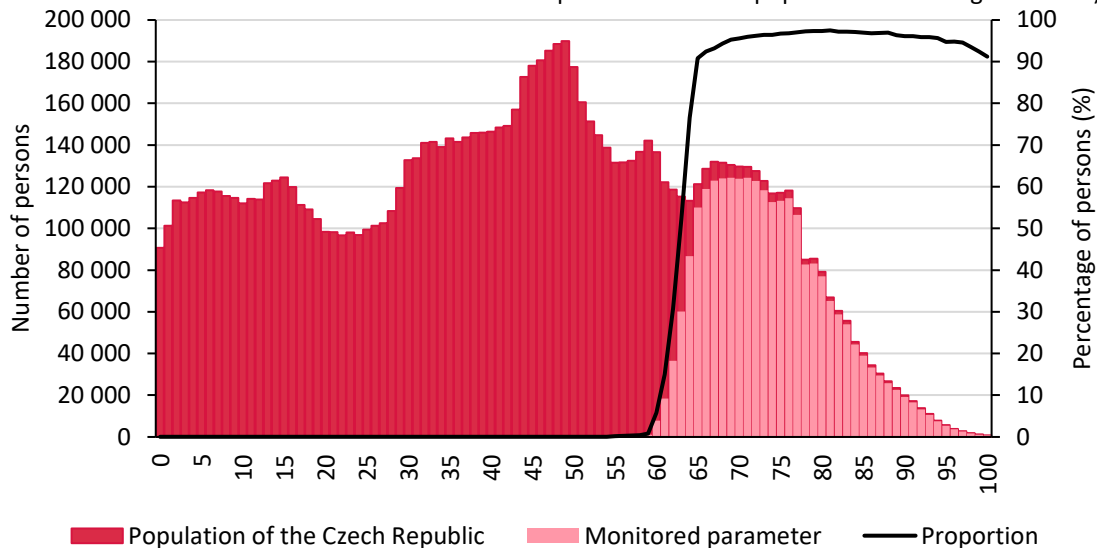
Women:



Pensions (2023) - individual

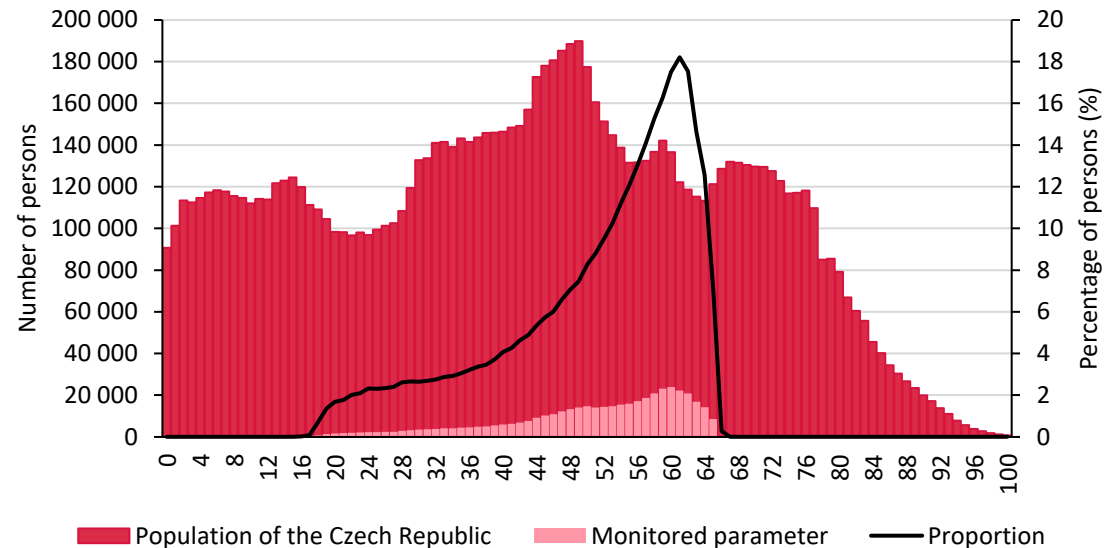
Old-age pension

Persons only in the data of the MLSA/CSSA: 38,011 (+0.4% compared to the total population according to NRRHS)



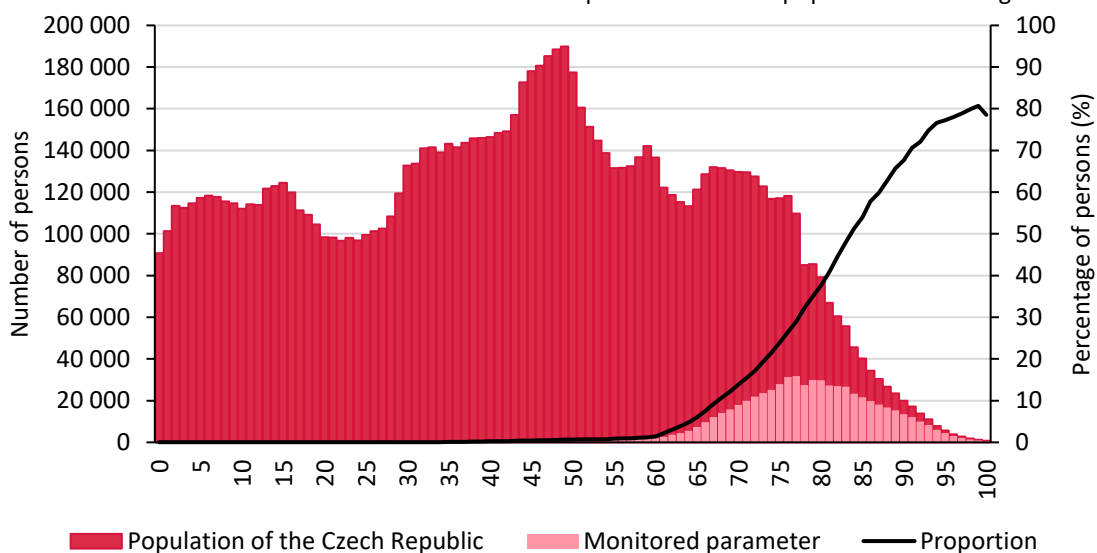
Invalidity pension

Persons only in the data of the MLSA/CSSA: 5,173 (+0.05% compared to the total population according to NRRHS)



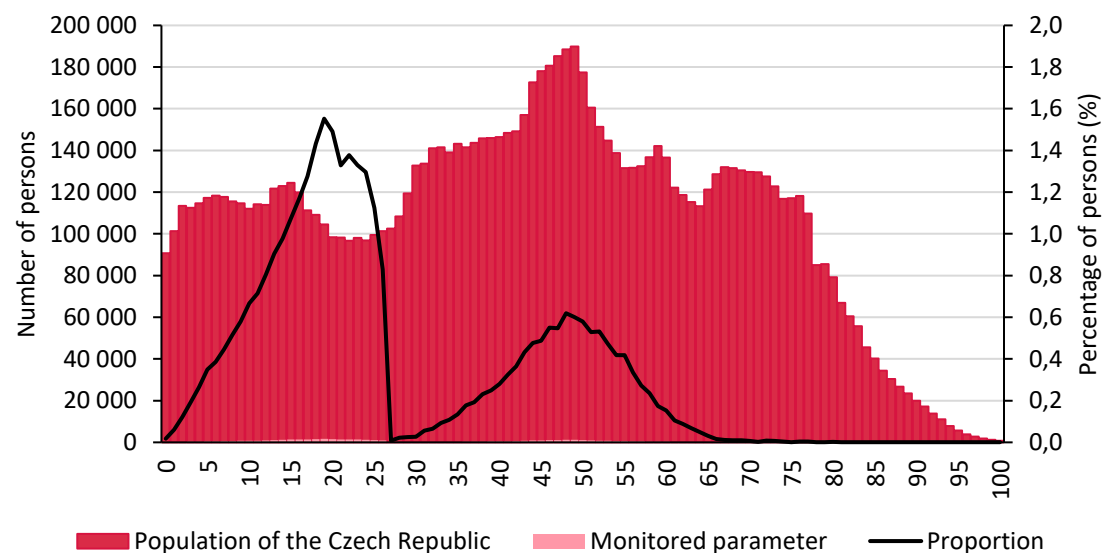
Widow's/widower's pension

Persons only in the data of the MLSA/CSSA: 7,980 (+0.1% compared to the total population according to the NRRHS)



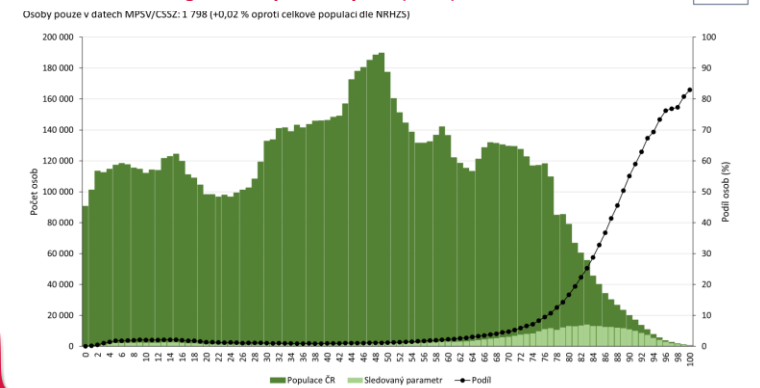
Orphan's pension

Persons only in the data of the MLSA/CSSA: 1,019 (+0.01% compared to the total population according to NRRHS)

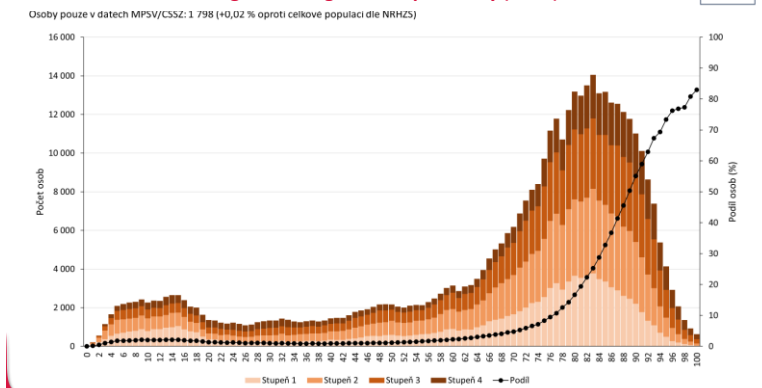


Care allowance, disability, material need, social assistance benefits

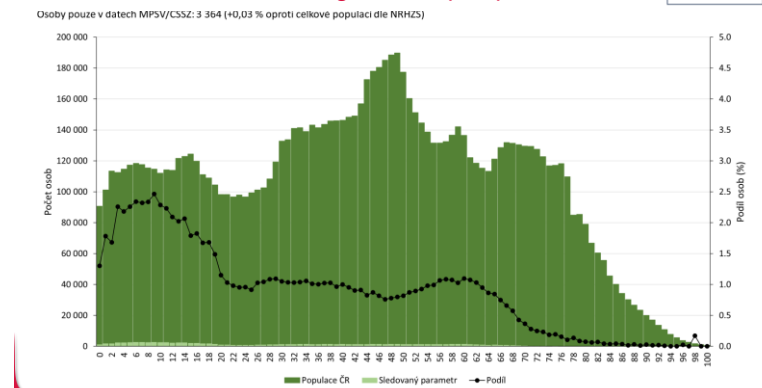
Care allowance – degree of dependency 1–4 (2023)



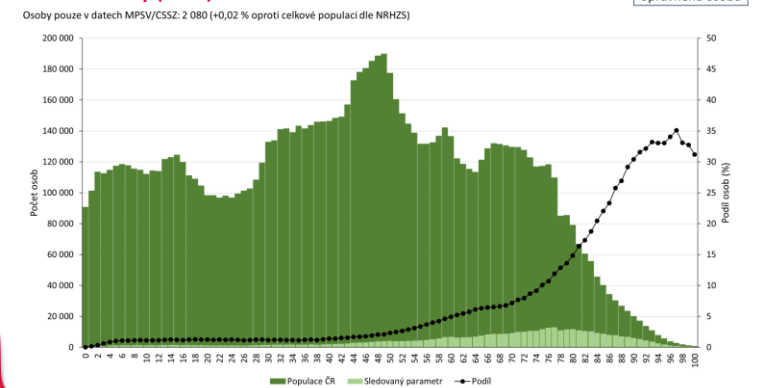
Care allowance according to the degree of dependency (2023)



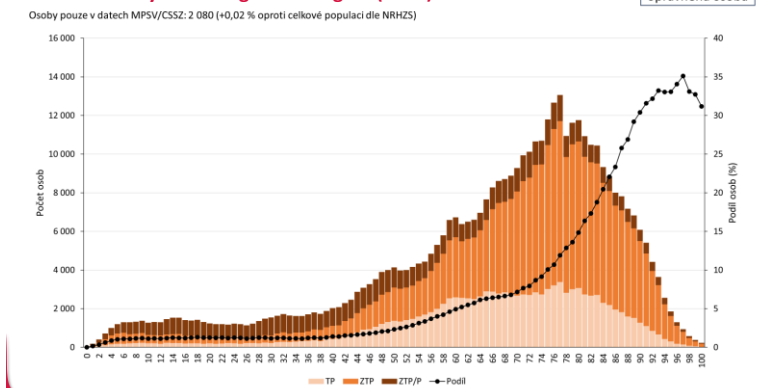
Material distress: additional housing allowance (2023)



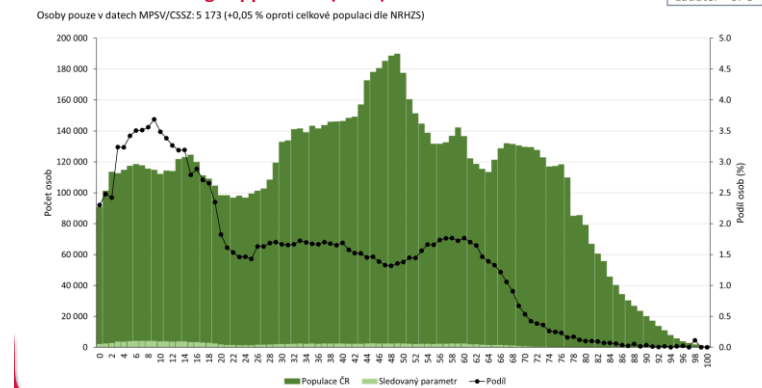
Health disability (2023)



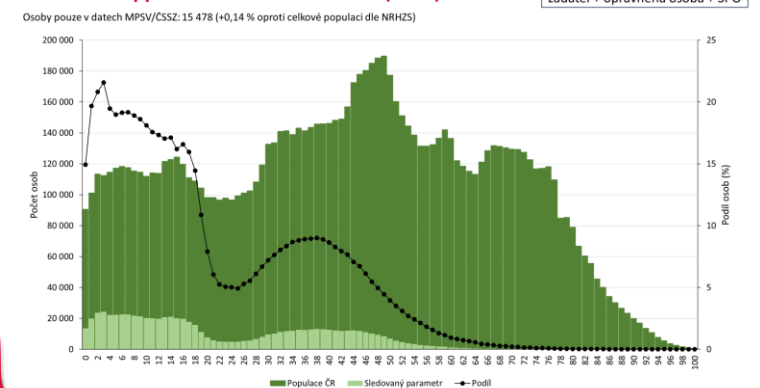
Health disability according to the degree (2023)



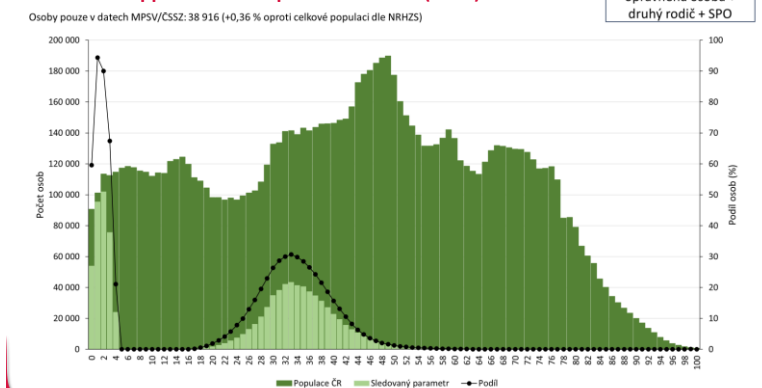
Material distress: living supplement (2023)



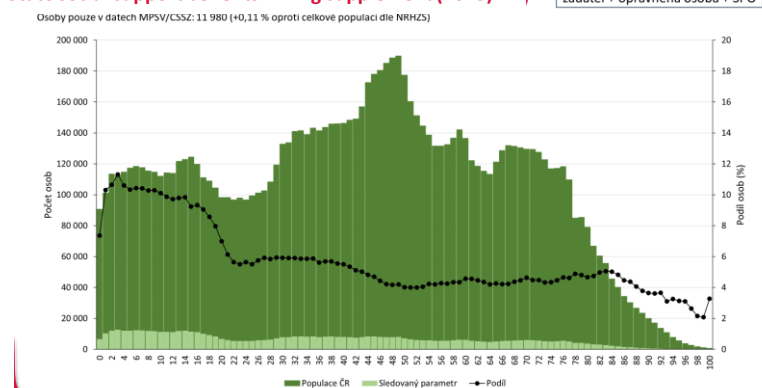
State social support benefits: child benefit (2023)



State social support benefits: parental benefit (2023)



State social support benefits: living supplement (2023)



*Analytical studies of the Health 2030
programme:*

Building the National Social Information System (NSIS)

NHIS and NSIS: Data linkage

Data linkage

Our key capability is to interlink the NHIS and NSIS databases based on pseudonymous identification of individuals, health and social care facilities, dates and care provided, or geographical location.

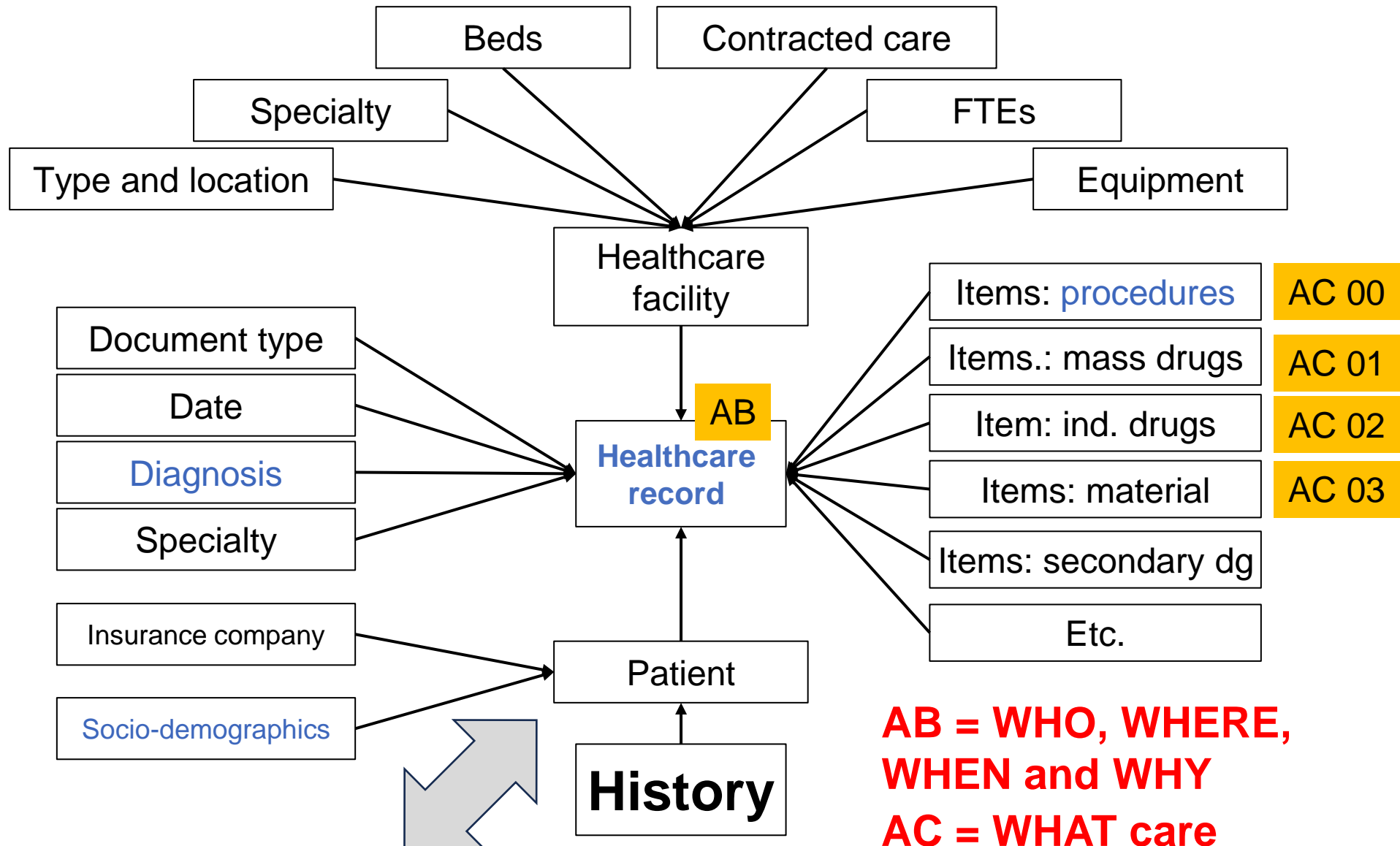
Completely new information or completely new contexts are created in which we observe the new information.



What the NHIS (and NSIS) data tell us about healthcare over the life course



The National Registry of Reimbursed Health Services as a key component of the NHIS



Years 2010-2023

Several terabytes of data

Billions of records

**DERIVED
COMPLEX
DATA**

**AB = WHO, WHERE,
WHEN and WHY
AC = WHAT care**

Linking to other NHIS registries via patient identifiers, time sequencing and healthcare provider identifiers

NHIS and NSIS: data linkage

Linking people

Linking facilities

Linking geography

Healthcare facilities and staff

NRPZS

NRZP

Social facilities and staff

Register of healthcare providers

Stat. record V 1-01

Public health insurance patients
(almost 100% of the Czech population)

ISIN

NDR

NRRHS

TBC

NRU

NRHOSP

RPN

NRIP

NOR

NRLUD

NRKN

NRC

NRPATV

NRNP

NRKI

NRVODK

LPZ

NRC

Unemployment benefits

Sickness insurance benefits

State social support benefits

Care allowance + dg. of dependency

Social residential and outpatient services

Health disab. card

Aid in material distress

Temporary incapacity for work

Employment office records

Self-employed

Pensions

Execution

Calculation basis

Employment

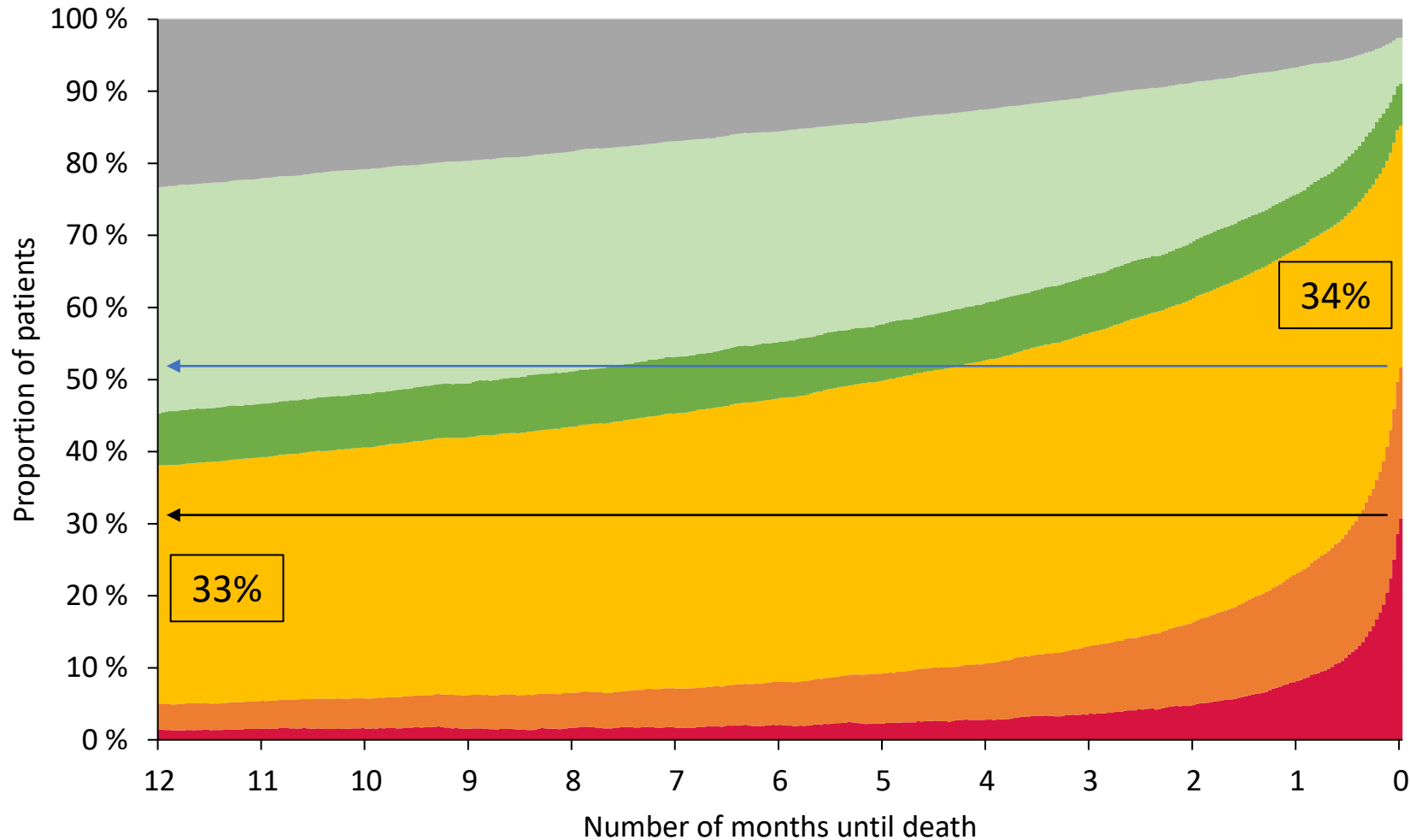
Individual clinical and administrative data

Individual social data of the MSLS/CSSA

Example of NHIS and NSIS linkage data: end-of-life care for Alzheimer's disease patients (2023)

16,097 Alzheimer's disease patients who died in 2023 were analysed.

Proportion of patients by place of residence and care provided in the days before death:



- Without care allowance, without health and social residential care
- Care allowance only, no health and social residential care
- Health care at home*, regardless of the care allowance
- Social residential service, regardless of care allowance
- Follow-up/long-term inpatient care
- Acute inpatient care (standard + ICU)

*At least 1 contact with 925 or 926 in a given week.

In the last year of life of patients with Alzheimer's disease, 56% of the social residential services are special care homes, 39% are homes for the elderly and 5% are other residential services.

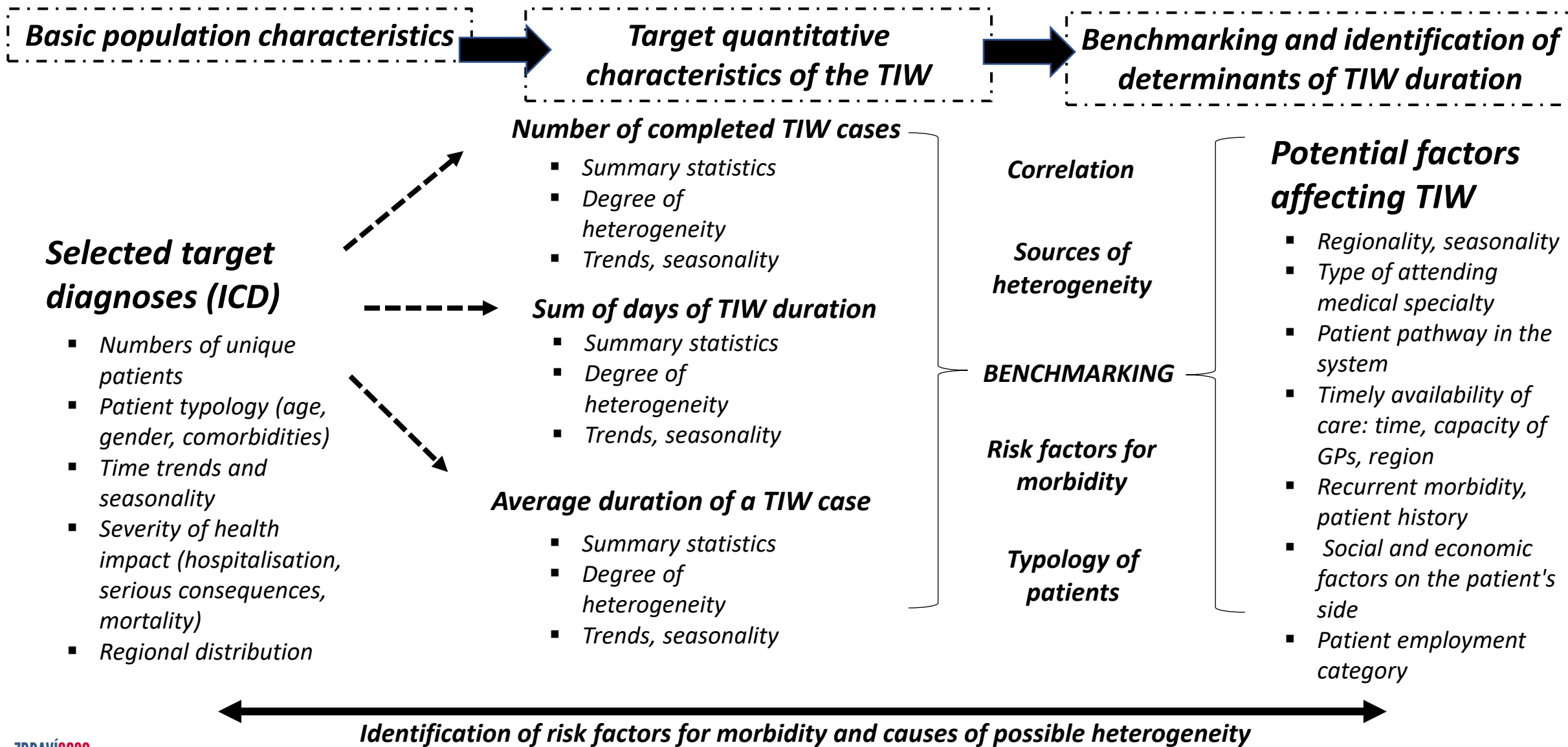
*Analytical studies of the Health 2030
programme:*

**Analysis and benchmarking of
temporary incapacity for work**

**Data sources, methodology
and analysis design**

Benchmarking of temporary incapacity for work: a conceptual model

SCHEMATIC REPRESENTATION OF THE DESIGN OF PLANNED STATISTICAL ANALYSES



Benchmarking of TIW - a basic source of data: Sick leave / e-sick leave information system data

The data base of the sick leave system will allow full parameterisation of the TIW with 100% population coverage

- month and year of birth (of the client)
- gender (of the client)
- Person ID: client identifier
- type of clearing agent
- the district of the incapacitated person's address (according to the postcode of the address on the incapacity certificate)
- the employer's district (according to the CSSA Office responsible for deciding whether to pay the benefit)
- the district of the doctor's practice (according to the district of the doctor's practice listed in the register of doctors)
- Postcode of permanent residence (of the client)
- name of the municipality of residence (client)
- the date of the start of the incapacity for work
- date of termination of sick leave
- diagnosis of TIW (ICD-10)
- type of employment
- type of injury
- method of termination of TIW
- Daily assessment base used for calculation
- Gross amount / Sum of all benefit values (per case)
- Net amount / Sum of all benefit values (per case)

Although the sick leave information system is fully representative for describing and assessing the variability of TIWs, only inter-departmental linked data provide a real data base for benchmarking.

NHIS



Connected data
base



NSIS

*National Health
Information System*

*National Social
Information System*

Is there adequate
diagnosis and treatment
before / during TIW?

Is there a normative
standard for the length
of the TIW?

Is TIW influenced by the
complexity of the
patient's condition?

What factors determine the
characteristics, especially
the length of the TIW?

Benchmarking TIW: data model and target parameters evaluated

Data of the e-Sick Leave Information System in connection with the NHIS data

INTER-MINISTERIAL LINKED DATA BASE FOR BENCHMARKING

Patient characteristics

- Age, sex, region/district of residence
- Morbidity, serious diseases in OA, disability

Socio-economic status of the patient, employment category

- Employee / self-employed, benefit / support recipient, degree of dependency
- Income category, DAB used for calculation
- Job Category: administrative work / manual work / not specified

TIW by diagnosis and (severity of) treatment

- TIW is associated with appropriate diagnosis and treatment (Yes/No)
- Severity of treatment: outpatient, hospitalisation without surgery / with surgery
- Injury: severity and type of injury (from minor injury to polytrauma)
- Complications of treatment specific to the diagnosis in question

Characteristics of the TIW

- Prescribing specialty, month or season
- Ranking for a given patient over a 6- / 12-month period
- Method of termination of the TIW
- Employer's district (according to the CSSA Office responsible for deciding whether to pay the benefit); Doctor's district (according to the NRHCP)

Qualitative analysis by logistic regression - evaluation of predictors:

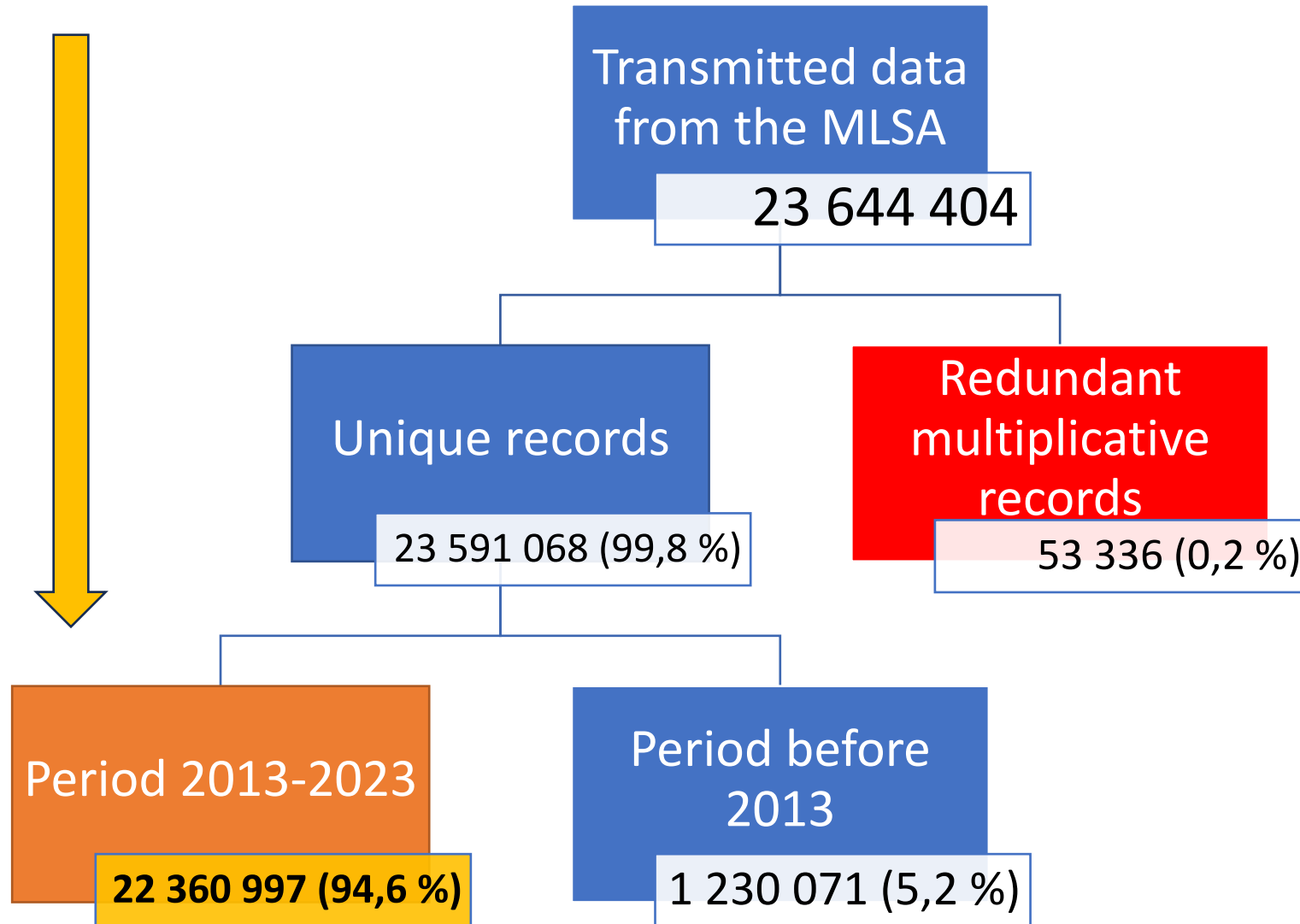
- Multiple TIWs
- TIW of 1 to 3 days
- TIW > 30 days

Quantitative analysis - benchmarking of TIW length:

- Mean, median
- Inter-quartile range
- 5th-95th percentile range

Size of the analysed set of incapacity for work

(one record = one incapacity for work)



Most duplicates are recorded in 2023; multiple records fully repeating other TIWs, including the start and end dates of the TIW

*Analytical studies of the Health 2030
programme:*

**Analysis and benchmarking of
temporary incapacity for work**

**Pilot benchmarking of TIW on model
diagnosis K64 (haemorrhoids and perianal venous thrombosis)**

Diagnosis K64 (haemorrhoids) as a model

- ❑ Relatively frequent problem allowing also quantitative benchmarking
- ❑ Specific diagnosis and treatment
- ❑ Wide range of treatment modalities from outpatient treatment to critical care hospitalisation
- ❑ Large variance in the duration of the TIW

- ❖ The problem is the incompleteness of the data to determine the socio-economic categorization of patients
- ❖ **The problem is the very problematic categorization of patients' occupation (profession)**

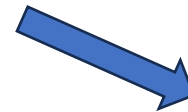


Diagnosis K64 (haemorrhoids) as a model

Number of people with a reported diagnosis of K64 in 2023: **110,267**



Working and/or SE in 2023: **68 830 (62.4%)**



Number of days on TIW for K64 working man-years in 2023: **570**

Total number of TIWs for K64 in 2023: **4 529**



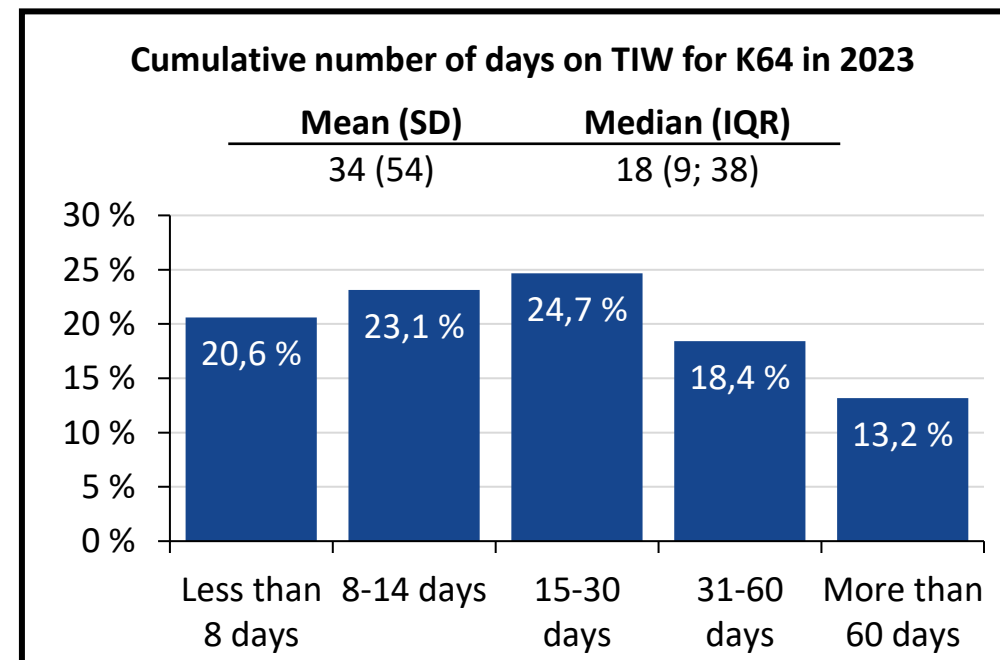
Total number of days spent on TIW for K64 in 2023: **142 565**



TIW for K64 in 2013: **1 587**
Change 2013 → 2023: **+185.4%**



Total number of days spent on TIW for K64 in 2013: **64 802**
Change 2013 → 2023: **+120.0%**



Summary statistics of TIW for diagnosis K64 (haemorrhoids) over time

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Number of completed TIW cases										
Absolute numbers in the Czech Republic	1 306 042	1 559 802	1 612 030	1 722 247	1 839 959	1 905 197	2 341 675	2 748 295	3 471 170	2 565 814
Czech Republic per 100,000 insured*	30 173	35 275	35 916	37 427	39 712	41 184	51 164	59 595	74 670	54 933
Absolute numbers K64	2 676	3 090	3 213	3 273	3 260	3 664	3 314	3 502	4 301	4 529
K64 per 100,000 patients K64	2 964	3 232	3 286	3 407	3 363	3 603	3 557	3 523	4 056	4 106
Share of K64 in the total number of TIWs	0,20%	0,20%	0,20%	0,19%	0,18%	0,19%	0,14%	0,13%	0,12%	0,18%
Sum of days of TIW duration										
Absolute numbers in the Czech Republic	58 254 792	64 524 790	67 751 902	70 834 994	72 434 415	77 160 270	88 291 348	94 793 172	92 154 651	79 532 343
Czech Republic per 100,000 insured*	1 345 824	1 459 214	1 509 521	1 539 360	1 563 368	1 667 930	1 929 120	2 055 541	1 982 380	1 702 747
Absolute numbers K64	93 385	107 670	108 433	115 754	115 110	127 013	130 895	121 271	139 980	142 688
K64 per 100,000 patients K64	103 451	2 435	2 416	2 516	2 484	2 746	2 860	2 630	3 011	3 055
Share of K64 in total days	0,16%	0,17%	0,16%	0,16%	0,16%	0,16%	0,15%	0,13%	0,15%	0,18%
Average duration of a TIW case										
Average length of TIW in the Czech Republic	44,6	41,4	42,0	41,1	39,4	40,5	37,7	34,5	26,5	31,0
Average length of TIW K64	34,9	34,8	33,7	35,4	35,3	34,7	39,5	34,6	32,5	31,5
Number of individual persons with TIW										
Absolute numbers in the Czech Republic	997 680	1 158 746	1 178 314	1 242 768	1 312 528	1 339 417	1 607 948	1 806 029	2 076 651	1 610 532
Czech Republic per 100,000 insured*	23 049	26 205	26 253	27 007	28 329	28 953	35 133	39 163	44 672	34 481
Absolute numbers K64	2 575	2 951	3 042	3 127	3 098	3 466	3 123	3 245	4 021	4 187
K64 per 100,000 patients K64	2 853	3 087	3 111	3 255	3 195	3 408	3 352	3 264	3 792	3 796

*CSSZ data - number of insured persons as of 31 December of the given year (<https://data.cssz.cz/web/otvarena-data/graf-pocet-zamestnavatelu-pojistencu-a-pojistnych-vztahu-v-cr>)

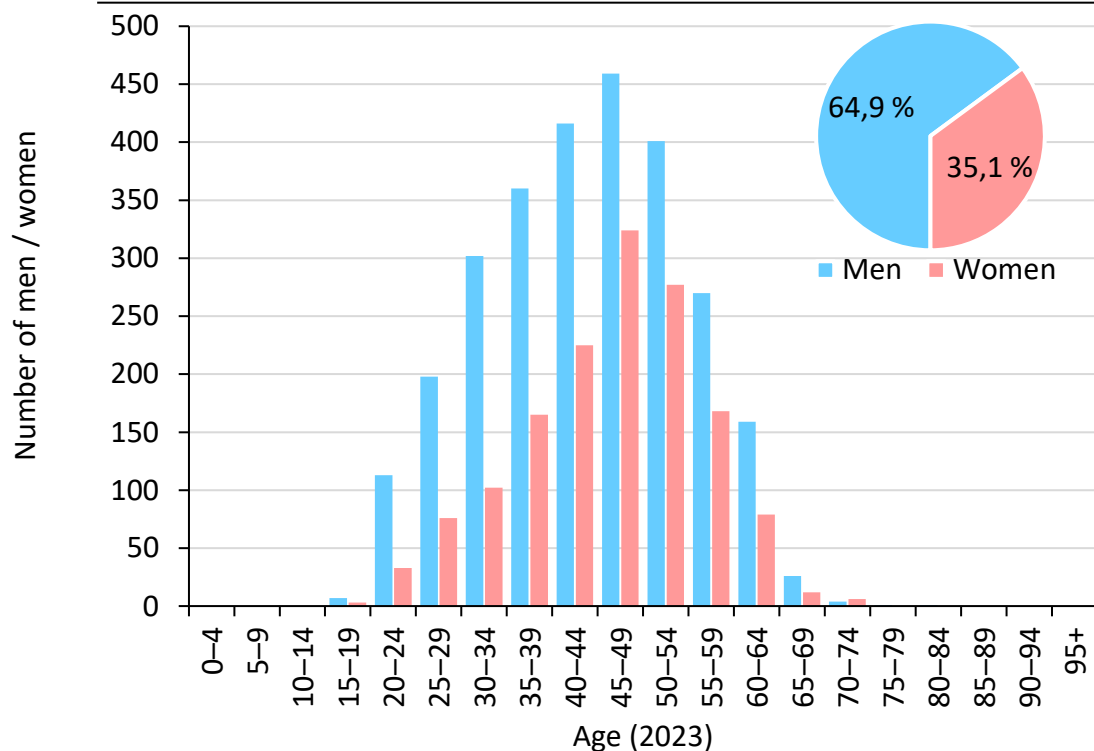
In 2013, a change was made in ICD-10: for haemorrhoids, the code K64 (diseases of the digestive system) should be used instead of the original code I84 (diseases of the circulatory system); however, both codes were considered for the analysis, as both coding variants still persist in the next few years.

Demographic characteristics of people with TIW for K64 (2023)

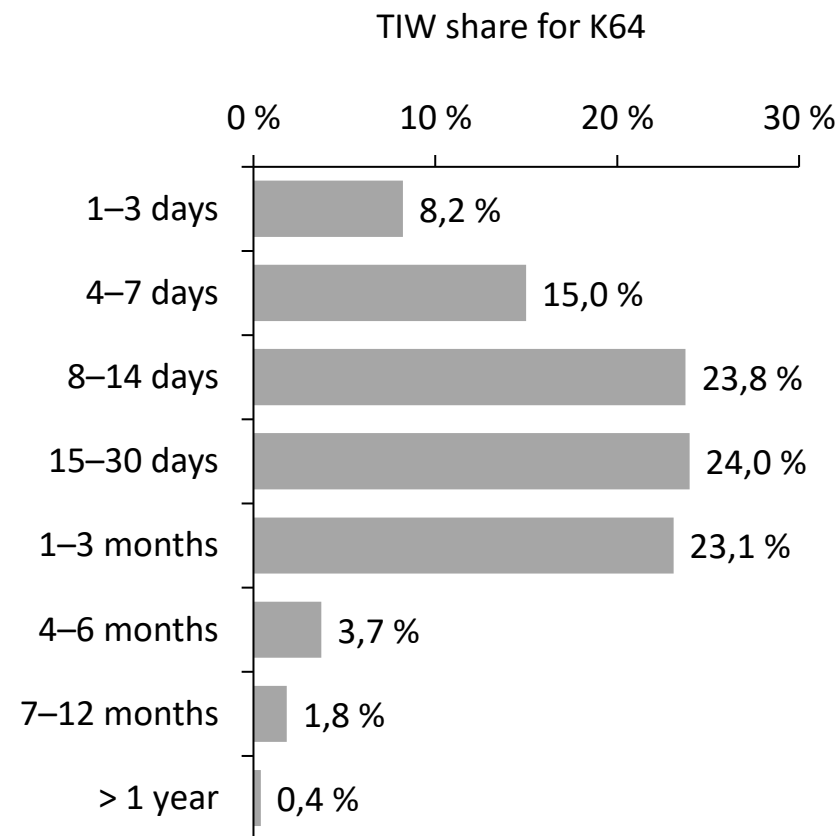
N = 4 187, persons with at least 1 TIW for K64 in 2023

Sex and age of persons:

	Number of persons	Age - mean (SD)	Age - median (IQR)
Men	2 717	44 (11)	44 (36; 52)
Women	1 470	46 (10)	47 (39; 52)
Total	4 187	44 (11)	45 (37; 52)



TIW for K64 in 2023
- according to the duration of each case:

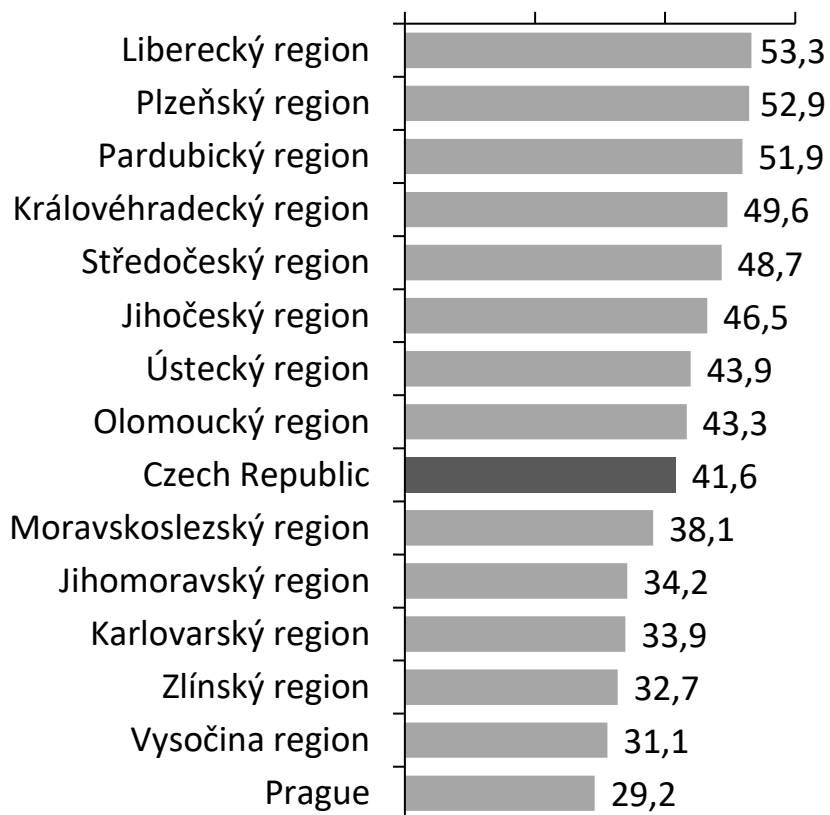


TIW for K64 (2023): regional comparison

N = 4 529, TIW cases terminated in 2023

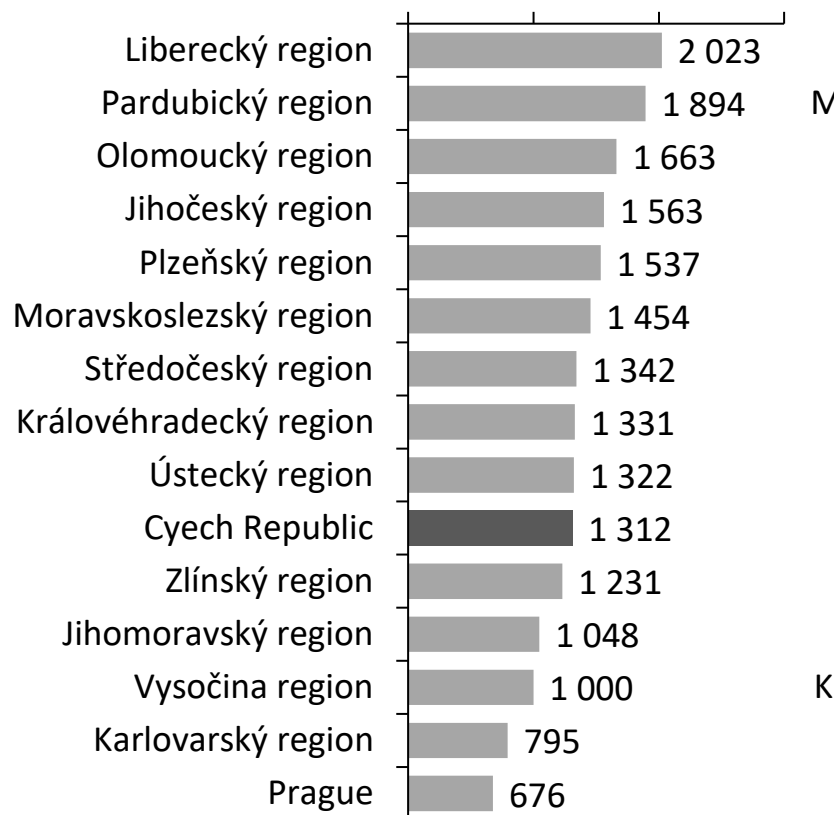
Number of cases per 100 000 inhabitants

0 20 40 60



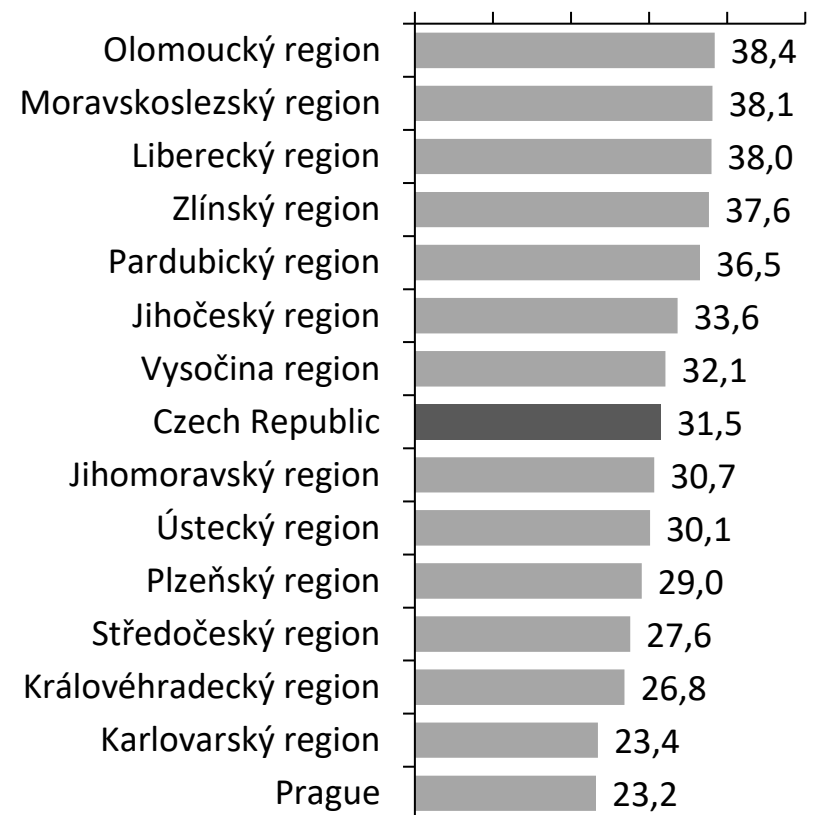
Number of TIW days per 100 000 inhabitants

0 1 000 2 000 3 000



Average case length

0 10 20 30 40 50



Diagnosis K64 (haemorrhoids) as a model

Link to NHIS data

For Czech citizens with TIW for K64 (N = 3,753), there is almost 100% linkage to NRRHS data and of this cohort 89.3% have a reported diagnosis of K64 at the time of TIW (N = 3 350)

There are 54 (1.4%) patients with TIWs for K64 without reported care in the NRRHS.

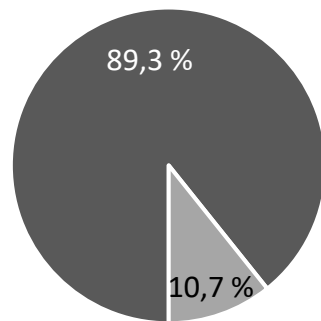


TIW for K64 (2023): patient status according to NRRHS

N = 4 187, persons with at least 1 TIW for K64 in 2023

Persons with TIW
for K64
in 2023:
N = 4 187 (100 %)

Without connection to the
NRRHS
(especially foreigners)
N = 434 (10,4 %)
With a link to the NRRHS
N = 3 753 (89,6 %)



- Dg. K64 reported in NRRHS*
- Dg. K64 not reported in NRRHS*

Overview of care received during the duration of the TIW: Number and percentage (% z 3 753)

• hospitalisation care:	1 415 (37,7 %)
- hospitalisation for K64	1 221 (32,5 %)
- hospitalisation for another diagnosis	248 (6,6 %)
• Outpatient care:	3 619 (96,4 %)
- general practitioner (sp. 001)	2 736 (72,9 %)
- gastroenterologist (sp. 105)	294 (7,8 %)
- surgeon (sp. 501)	2 593 (69,1 %)
• No reported care:	54 (1,4 %)

***Definitions:** documents with the main or secondary diagnosis K64, reported by a department with specialty 001 (general practitioner), 105 (gastroenterologist), 501 (surgeon) or a department providing inpatient care, were considered. Particularly in the outpatient setting, diagnosis codes are not always reported accurately and consistently, so the diagnosis K64 may not appear in all patients receiving TIW-related care for K64.

Diagnosis K64 (haemorrhoids) as a model

Link to NHIS data

Total cohort of patients treated in any way for K64 in
2023: 110,267.

Of which 3 350 (3.5%) with TIW for K64



Persons with a reported diagnosis of K64 in NRRHS data in 2023: Socio-economic model

**Persons treated
for K64 aged
20-64 years**
77 993 (100 %)

**Working
employment
and/or
self-employment**
63 903 (82,1 %)

**Not working
without (self-)
employment**
13 890 (17,9 %)

(1) Without disability and old-age pension, incapacity for work < 30 days/year

50 052 (64,3 %)

(2) Without disability and old-age pension, incapacity for work ≥ 30 days/year

8 740 (11,2 %)

(3) Disability pension, sick leave < 30 days/year

2 472 (3,2 %)

(4) Disability pension, incapacity for work ≥ 30 days/year

1 410 (1,8 %)

(5) Old-age pension

1 229 (1,6 %)

(6) Without invalidity and old-age pensions

9 486 (12,2 %)

- Under 26 years old

1 195 (1,5 %)

(7) Invalidity pension

2 486 (3,9 %)

(8) Old-age pension

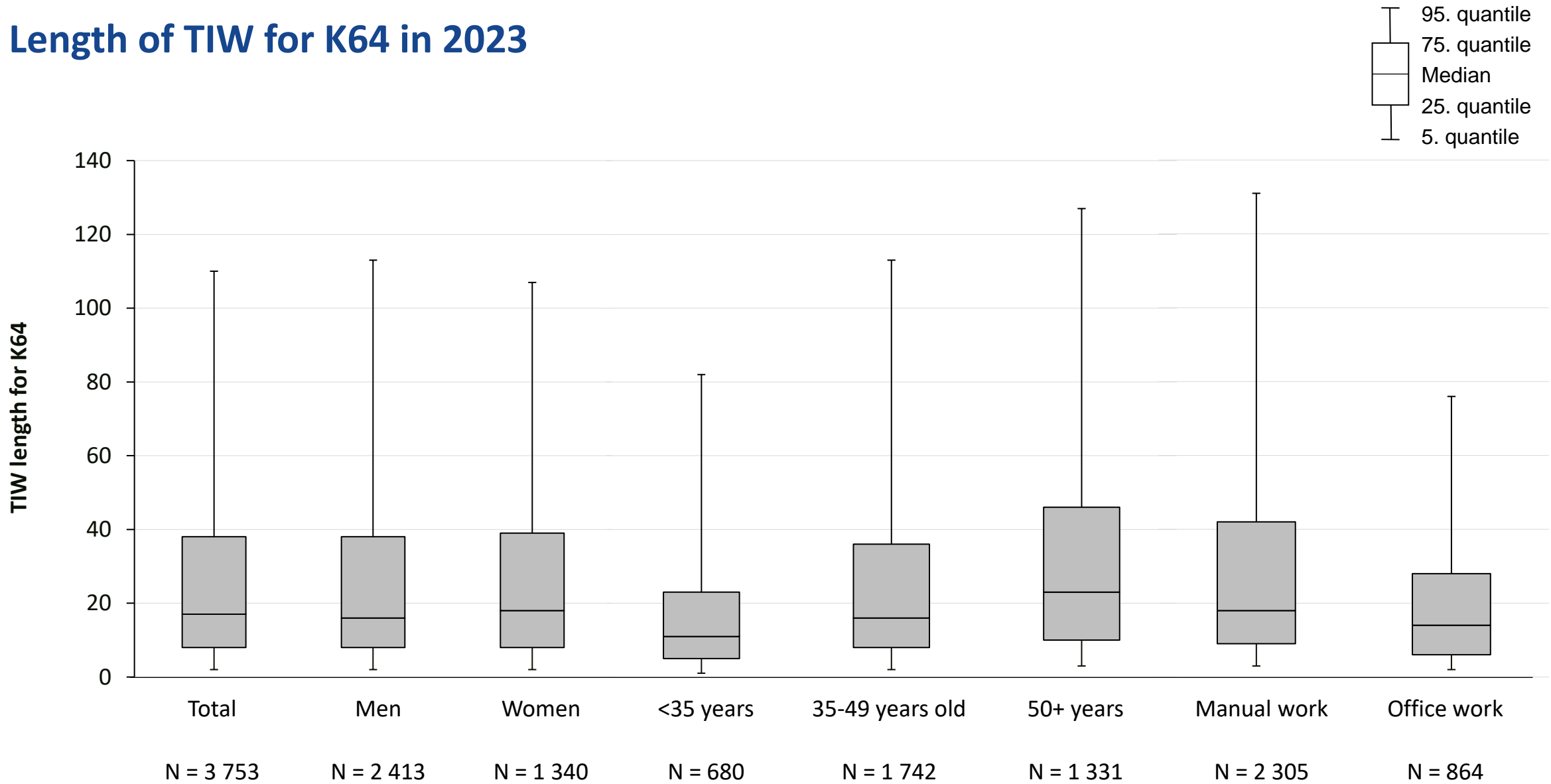
1 918 (2,5 %)

Demographic characteristics of people with TIW for K64 in 2023

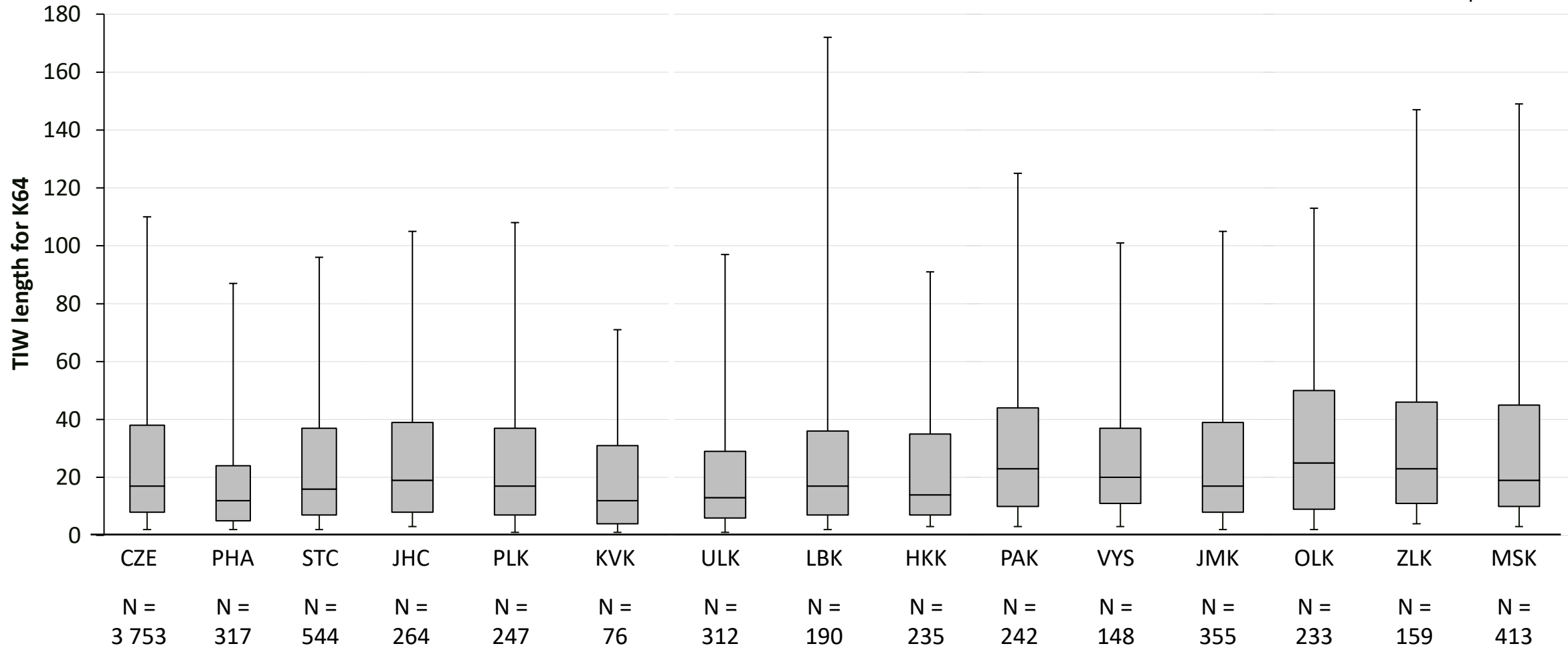
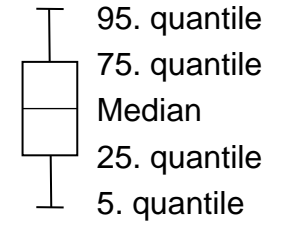
Individuals with a TIW for K64 and linkage to the NRHHS were included in the analysis (N = 3,753, or 89.6% of the total number of individuals with a TIW for K64 (N = 4,187)).

		Total	Office work	Manual work	Undetermined
Total		3 753 (100,0 %)	847 (100,0 %)	2 293 (100,0 %)	611 (100,0 %)
Sex	Men	2 413 (64,3 %)	366 (43,2 %)	1 657 (72,3 %)	388 (63,5 %)
	Women	1 340 (35,7 %)	481 (56,8 %)	636 (27,7 %)	223 (36,5 %)
Age	< 35 years	680 (18,1 %)	111 (13,1 %)	443 (19,3 %)	124 (20,3 %)
	35-49 years	1 742 (46,4 %)	441 (52,1 %)	1 041 (45,4 %)	260 (42,6 %)
	50+ years	1 331 (35,5 %)	295 (34,8 %)	809 (35,3 %)	227 (37,2 %)
	Mean age (SD)	45 (10)	46 (10)	45 (11)	45 (11)
	Median age (IQR)	46 (37;52)	46 (39;53)	46 (37;52)	37 (52;0)

Length of TIW for K64 in 2023



Length of TIW for K64 in 2023: region of residence



Example of a model: Effect of selected factors on the duration of TIW for K64

4			Celkový počet osob s DPN pro K64 v roce 2023 zahrnutých do analýzy	Délka DPN pro K64 > 30 dní		
				N (%)*	OR (95% IS)	p
5						
6	Celkem		3 753	1 183 (31,5 %)		
7	Pohlaví	Muži	2 413	757 (31,4 %)	reference	
8		Ženy	1 340	426 (31,8 %)	1,020 (0,883; 1,177)	0,791
9	Věkové kategorie	<35 let	680	129 (19,0 %)	reference	
10		35–49 let	1 742	528 (30,3 %)	1,858 (1,495; 2,308)	<0,001
11		50+ let	1 331	526 (39,5 %)	2,791 (2,238; 3,481)	<0,001
12	DCCI	DCCI 0	2 393	723 (30,2 %)	reference	
13		DCCI 1–2	1 187	398 (33,5 %)	1,165 (1,004; 1,352)	0,044
14		DCCI 3–4	142	50 (35,2 %)	1,255 (0,880; 1,791)	0,210
15		DCCI 5+	31	12 (38,7 %)	1,459 (0,704; 3,021)	0,309
16	Typologie 1	Bez ID a PnP	3 548	1 103 (31,1 %)	reference	
17		ID 1 / PnP 1	136	47 (34,6 %)	1,171 (0,816; 1,679)	0,392
18		ID 2-3 / PnP 2-4	69	33 (47,8 %)	2,032 (1,260; 3,276)	0,004
19	Typologie 2	Bez ID a PnP	3 548	1 103 (31,1 %)	reference	
20		ID 1-2 / PnP 1-2	183	69 (37,7 %)	1,342 (0,987; 1,824)	0,061
21		ID 3 / PnP 3-4	22	11 (50,0 %)	2,217 (0,958; 5,128)	0,063
22	Vyměřovací základ	< 250 000 Kč	782	347 (44,4 %)	reference	
23		250 000 – 499 999 Kč	1 864	581 (31,2 %)	0,568 (0,478; 0,674)	<0,001
24		500 000 – 749 999 Kč	707	145 (20,5 %)	0,323 (0,257; 0,407)	<0,001
25		750 000 – 999 999 Kč	152	17 (11,2 %)	0,158 (0,093; 0,267)	<0,001
26		>= 1 000 000 Kč	67	8 (11,9 %)	0,170 (0,080; 0,360)	<0,001
27	Nízký vyměřovací základ (< 250 000 Kč)	Ne	2 971	836 (28,1 %)	reference	
28		Ano	782	347 (44,4 %)	2,037 (1,732; 2,396)	<0,001
29	Vysoký vyměřovací základ > 750 000 Kč	Ne	3 534	1 158 (32,8 %)	reference	
30		Ano	219	25 (11,4 %)	0,264 (0,173; 0,403)	<0,001
31	Alespoň 1 DPN spojená s hospitalizací	Ne	2 338	423 (18,1 %)	reference	
32		Ano	1 414	759 (53,7 %)	5,246 (4,523; 6,085)	<0,001
33	Tíže léčby	Pouze ambulantní	2 266	415 (18,3 %)	reference	
34		Hospitalizace bez operace	187	91 (48,7 %)	4,228 (3,114; 5,741)	<0,001
35		Hospitalizace s operací	1 227	668 (54,4 %)	5,330 (4,566; 6,222)	<0,001
36	DCCI >= 2 a/nebo PnP stupně III.+ a/nebo ID stupně II.+	Ne	3 231	994 (30,8 %)	reference	
37		Ano	522	189 (36,2 %)	1,277 (1,053; 1,550)	0,013

NHIS and NSIS data are linked and available for complex analyses

The NHIS and NSIS data linkage adds an order of magnitude to the complexity of the available data and presents challenges both in terms of data processing and interpretation

Using the NHIS and NSIS data linkage, completely new information or completely new contexts are created in which the information is observed



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Ústav zdravotnických informací a statistiky ČR
Institute of Health Information and Statistics of the Czech Republic

*Analytical studies of the Health 2030
programme:*

**Analysis and benchmarking of
temporary incapacity for work**



THANK YOU FOR YOUR ATTENTION