Traces of COVID-19 on primary healthcare consultations and medically certified sick leave in 2023

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Study

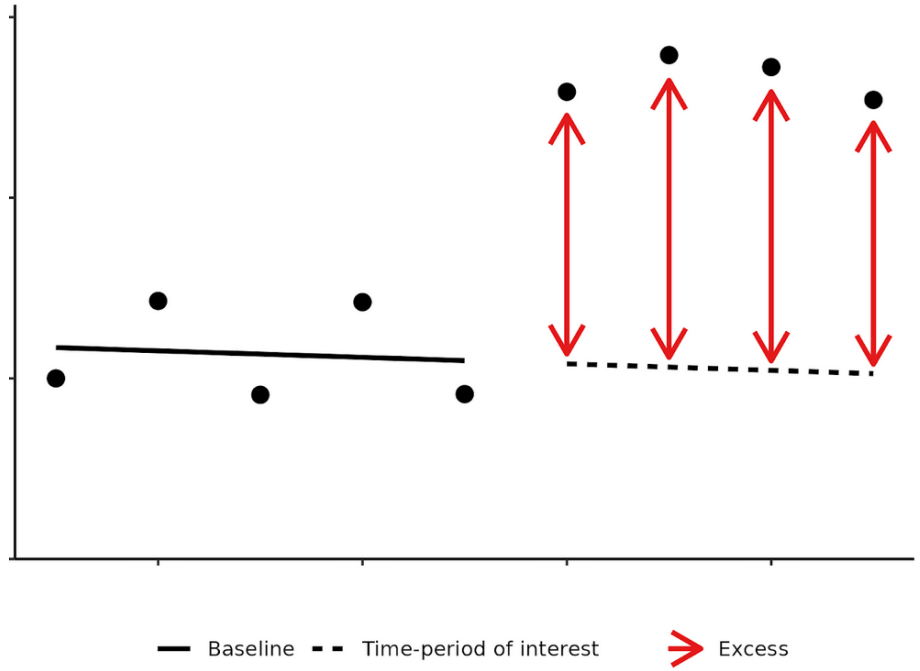
- “Aberrations in medically certified sick leave and primary healthcare consultations in Norway in 2023 compared to pre-COVID-19-pandemic trends”
  - Published in *Archives of Public Health*, October 2024
  - Researchers from FHI, NAV, UiO, NTNU
- Opinions are my own and do not represent those of my employer (FHI)

Question

- Many studies at the individual level show that COVID-19 causes considerable long-term consequences, even with “mild” infection.
- Norway implemented comprehensive measures from 2020-2021, but since 2022 has employed a “vaccine-only” strategy
  - *Without recommending annual vaccine updates to people <65 years old*
- With frequent reinfections (4 million/year in Norway?), logically this *should* have an impact on the societal level:
  - 4 million infections per year * 1% risk of long covid = 40.000 per year
  - 4 million infections per year * 3% risk of long covid = 120.000 per year
  - 4 million infections per year * 5% risk of long covid = 200.000 per year
- Can we see this impact on the societal level?
  - Medically certified sick leave
  - Primary healthcare consultations

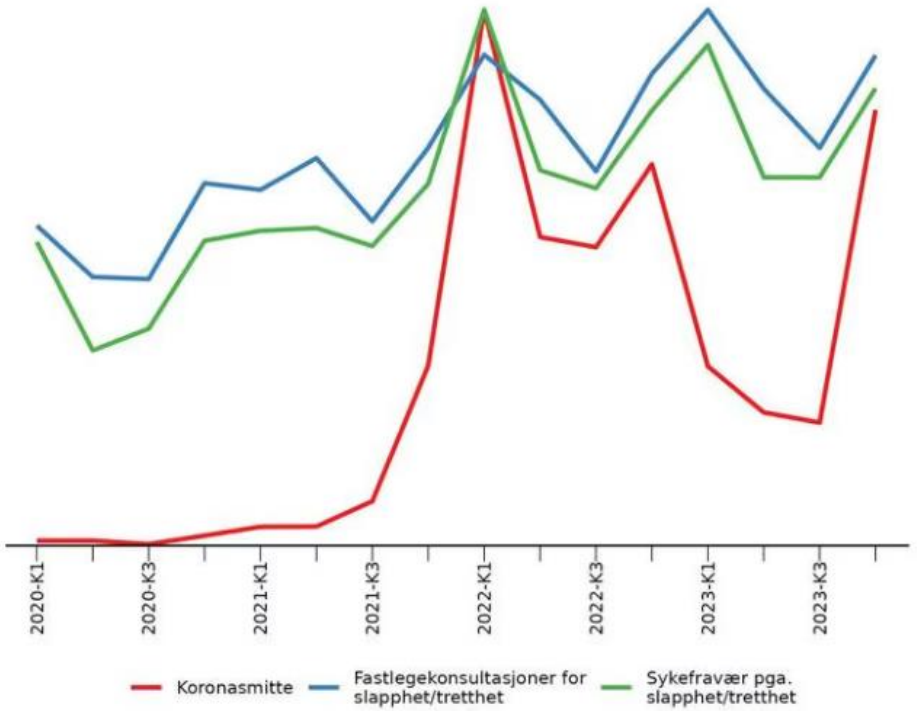
Basic premise (part 1)

- 556 ICPC-2 code combinations from NAV's sick leave register
  - Workdays lost to medically certified sick leave
- 85 ICPC-2 code combinations from FHI's Norwegian Syndromic Surveillance System
  - Number of primary healthcare consultations
- Data from 2010-2019 used to establish a trend and predict an expected baseline for 2023
  - Numbers rescaled to 2023 population
  - Linear regression with spline
  - Excess calculated (observed minus baseline)
  - False discovery rate applied to correct for multiple testing
- Obvious limitations regarding causal claims for aggregated data at the national level



Basic premise (part 2)

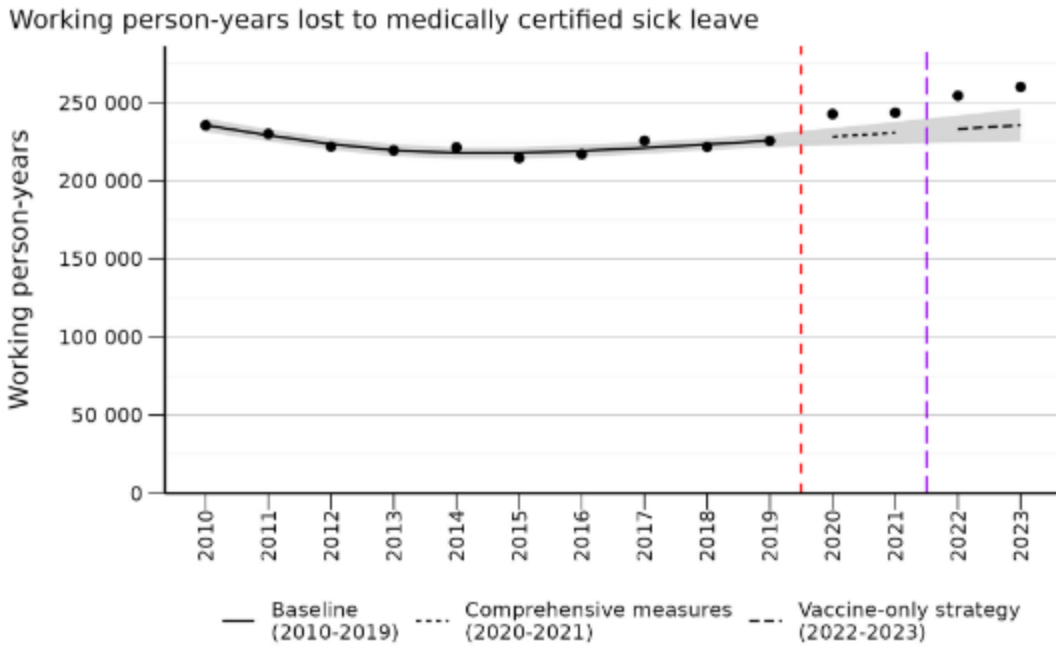
- Quarterly data
- Check for correlations against a proxy for community spread of COVID-19
- Proxy is based on a combination of vaccination coverage and number of people hospitalized with COVID-19

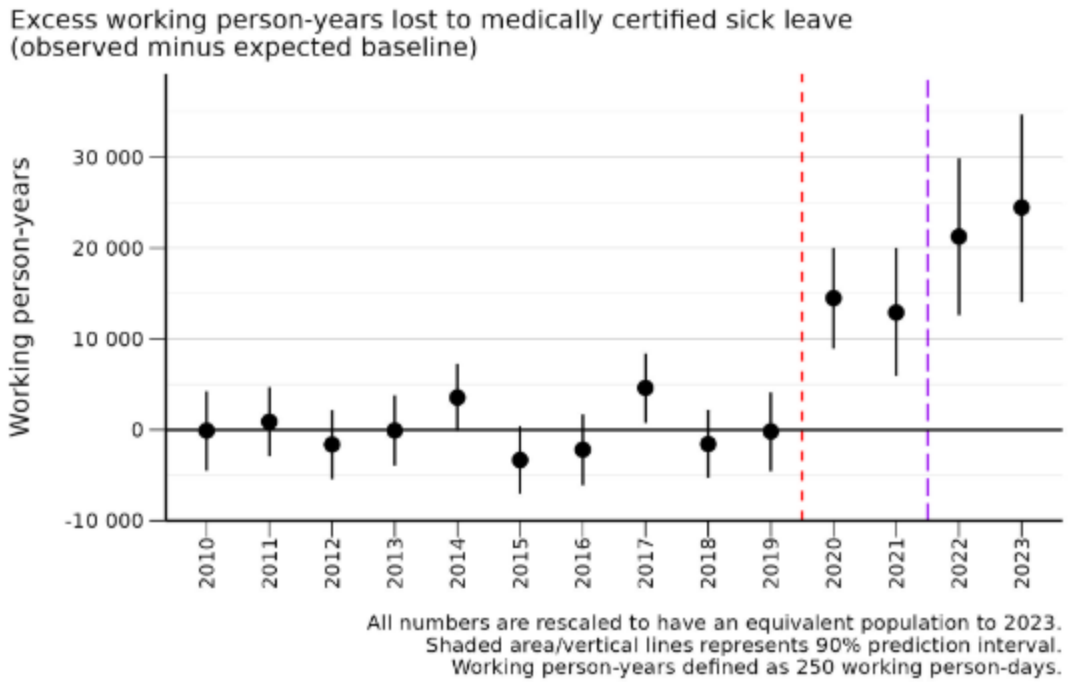


Two datasets → Two sets of results

- The results from NAV (sick leave) and NorSySS (GP consultations) were very similar, so I will only be focusing on NAV

Results (all-cause working **person-years** lost)





- 10% excess in 2023
- Economic loss of 16,5 billion NOK due to the 10% excess

Results

- 46% of the excess is due to ICPC-2 codes that are associated with acute COVID-19 and long COVID
  - Economic loss of 7.6 billion NOK
  - Does not mean that 100% of the excess is due to COVID
  - Obvious limitations regarding causal claims for aggregated data at the national level
- 5% of the excess is due to depression
- 10% of the excess is due to muscle/skeletal issues
- ~39% of the excess is unexplained

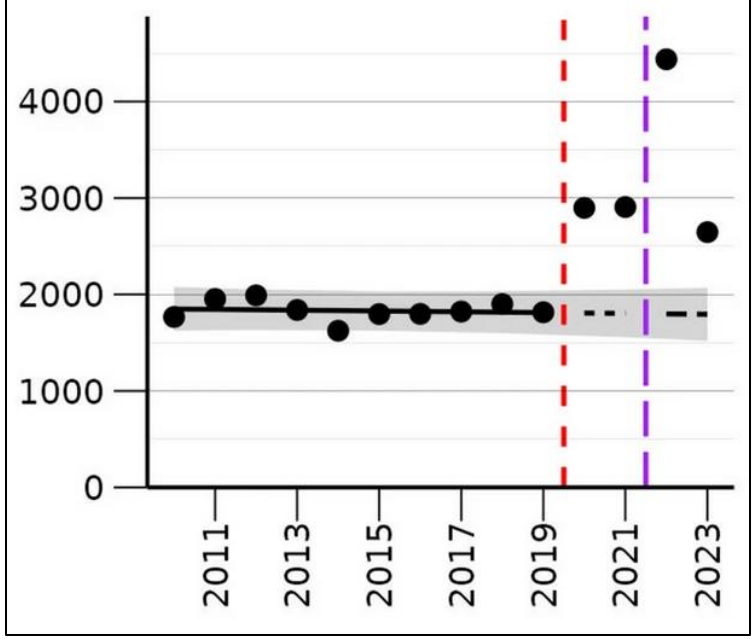
Table 1 Excess working person-days lost to medically certified sick leave in 2023 for all sexes combined

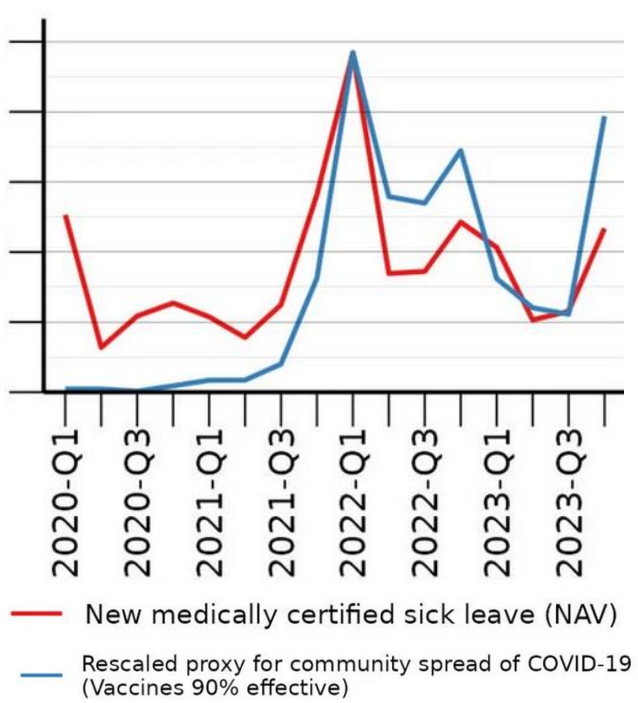
ICPC-2	Observed	Excess				
	Value in 1000s	Value (90% PI) in 1000s	Ratio (90% PI)	Proportion explained of "Everything"[a]		Economic loss in million USD[b]
				Point	Cumulative	
Everything	65,015	6,116 (3,506 to 8,676)[d]	1.10 (1.06 to 1.15)[d]	-	-	1,489
A* General and unspecified	2,523	1,034 (898 to 1,170)[d]	1.69 (1.55 to 1.86)[d]	17%	17%	252
R* Respiratory	2,646	852 (577 to 1,127)[d]	1.47 (1.28 to 1.74)[d]	14%	31%	207
↳R991/R992 COVID-19[c]	498	-	-	8%	-	121
P29 Psychological symptom/complaint other	1,707	727 (607 to 847)[d]	1.74 (1.55 to 1.98)[d]	12%	43%	177
A04 Weakness/tiredness general	1,484	660 (518 to 804)[d]	1.80 (1.54 to 2.18)[d]	11%	-	161
P02 Acute stress reaction	1,896	519 (269 to 774)[d]	1.38 (1.17 to 1.69)[d]	8%	51%	126
P03 Feeling depressed	406	277 (222 to 331)[d]	3.14 (2.20 to 5.40)[d]	5%	56%	67
L02 Back symptom/complaint	744	264 (116 to 410)	1.55 (1.18 to 2.23)	4%	60%	64
L08 Shoulder symptom/complaint	674	257 (199 to 315)[d]	1.62 (1.42 to 1.88)[d]	4%	64%	63
L01 Neck symptom/complain	329	143 (110 to 176)[d]	1.77 (1.51 to 2.15)[d]	2%	67%	35
R74 Upper respiratory infection acute	739	140 (66 to 213)	1.23 (1.1 to 1.41)	2%	69%	34
N01 Headache	298	71 (54 to 88)[d]	1.31 (1.22 to 1.42)[d]	1%	70%	17
A99 General disease NOS	135	65 (40 to 90)[d]	1.94 (1.43 to 3.03)[d]	1%	71%	16
P81 Hyperkinetic disorder	123	58 (40 to 78)[d]	1.91 (1.48 to 2.72)[d]	< 1%	72%	14

→ 46% of the excess from these codes

R* Respiratory

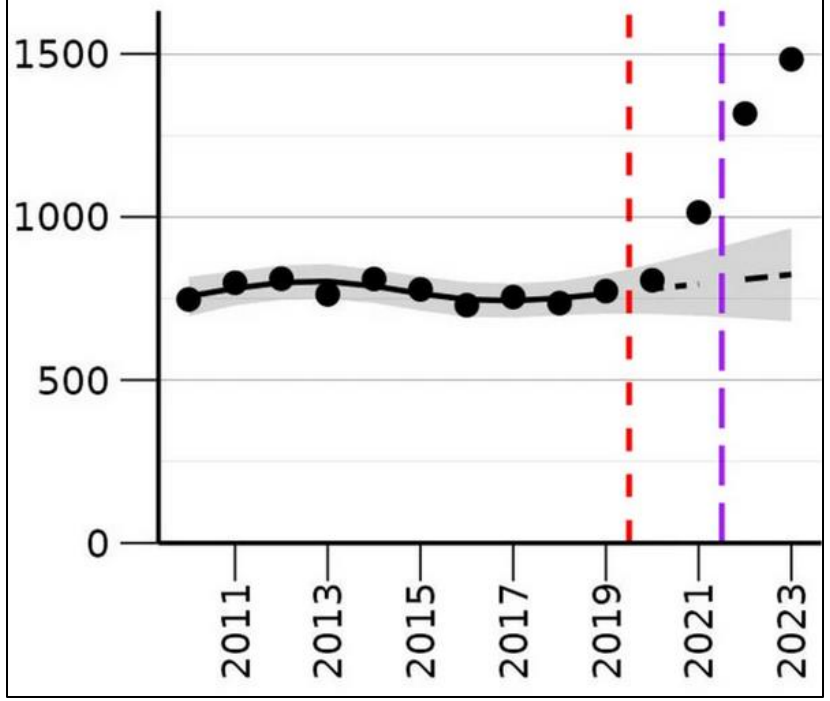
- 47% higher than expected
- Explains 14% of the increase in sick leave
  - 8% COVID-19 (acute)
    - Remember that FHI discourages people from testing COVID-19, and hence barely anyone tests anymore
  - 6% Not COVID-19
- Correlation = 0.74 with COVID-19 spread
- COVID-19 is associated with increased risk of other diseases:
  - RSV (USA study)
    - "[The findings] suggest that COVID-19 contributed to the 2022 surge of RSV cases in young children through the large buildup of COVID-19-infected children and **the potential long-term adverse effects of COVID-19 on the immune and respiratory system**"
  - Tuberculosis (Thai study)

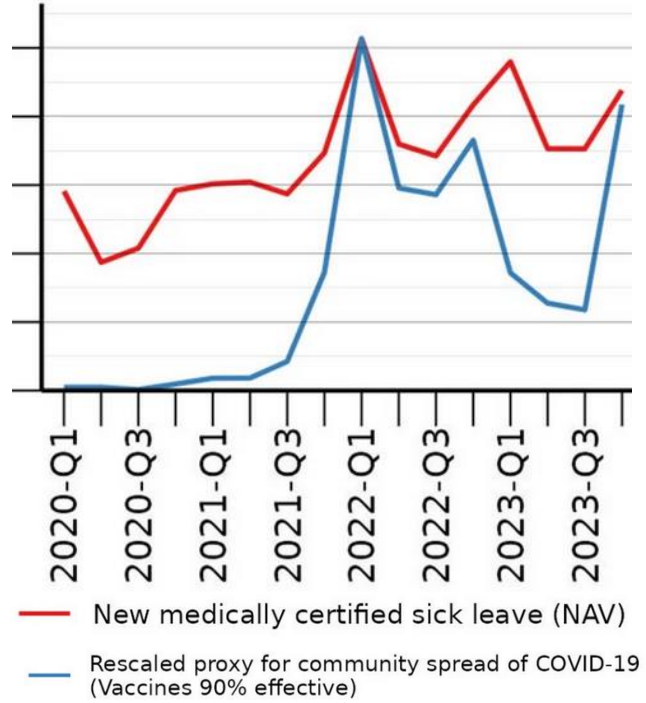




A04 Weakness/tiredness

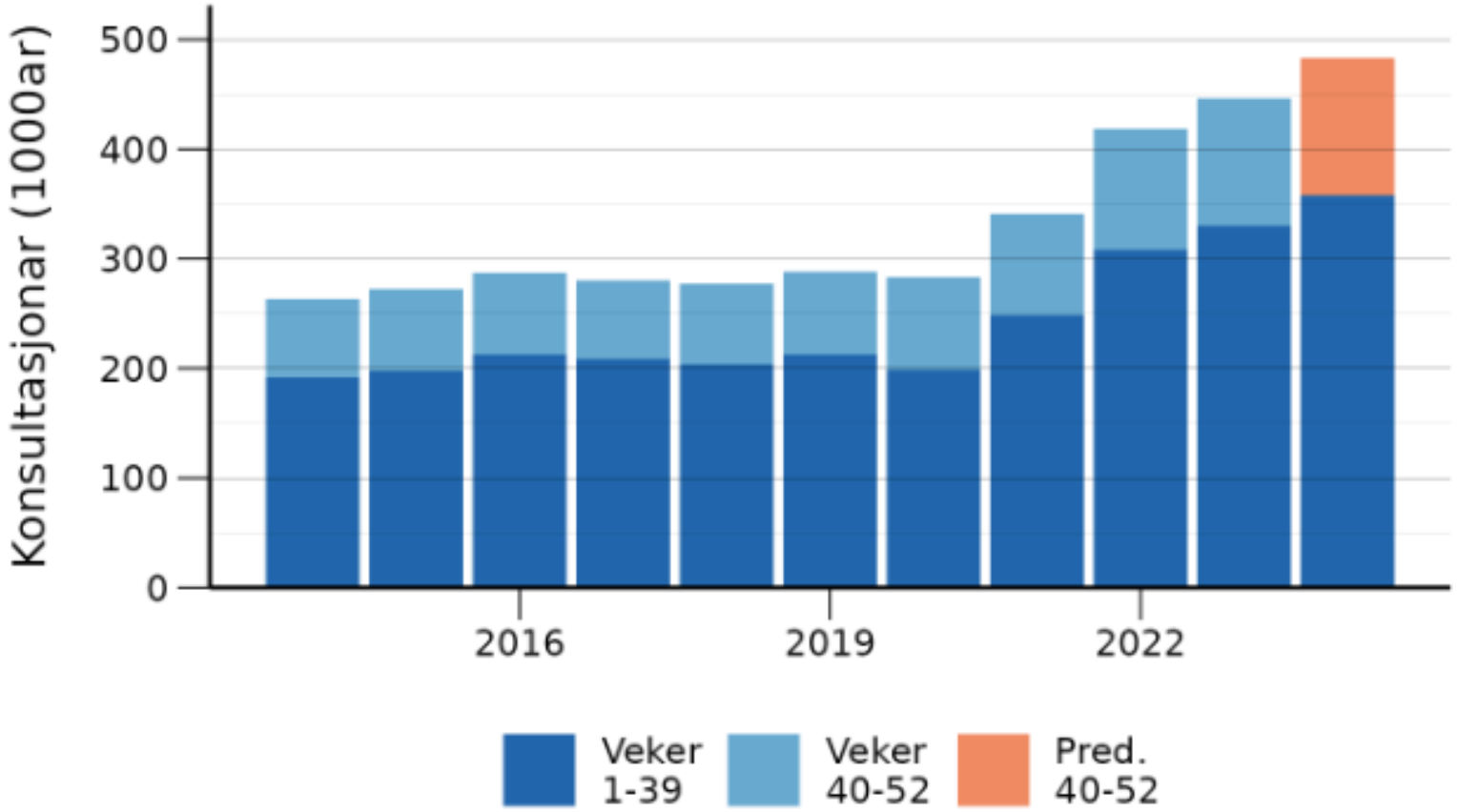
- 80% higher than expected
- Explains 11% of the increase in sick leave
- Correlation = 0.82 with COVID-19 spread
- Fatigue is one of the most well-known sequelae of COVID-19
- NAV paper (Moberg and Kabashi):
  - Sick leave due to COVID-19 was associated with 182% increased risk of sick leave for A04 in the following 12 weeks





A04 Weakness/tiredness (preliminary surveillance data/GP consultations)

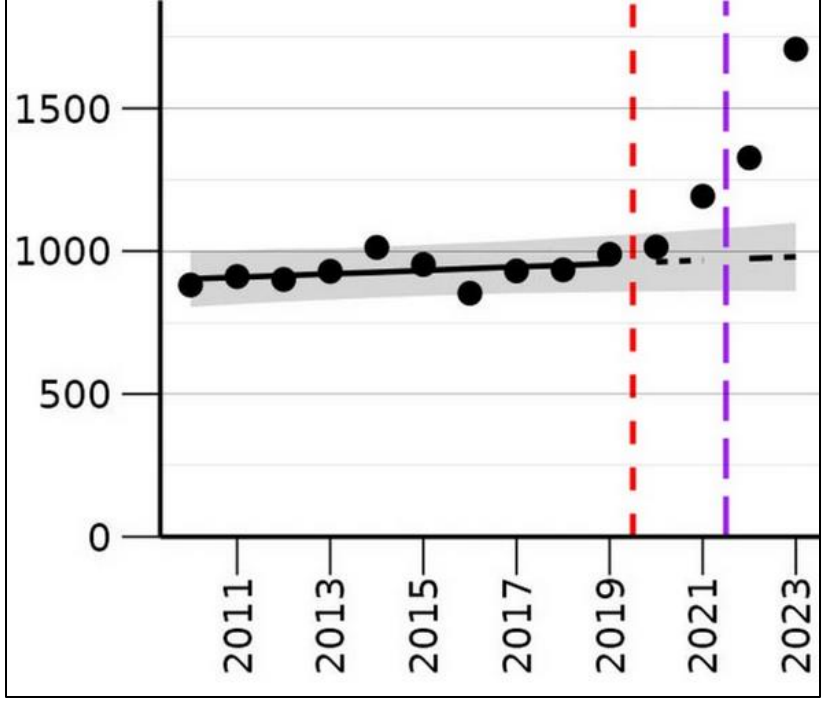
- GP consultations for A04 are even worse in 2024
- Remember that GP consultations show **incidence,** not **prevalence**, because people stop going to the GP when they pay 300 kroner per visit and don't get treatments that work

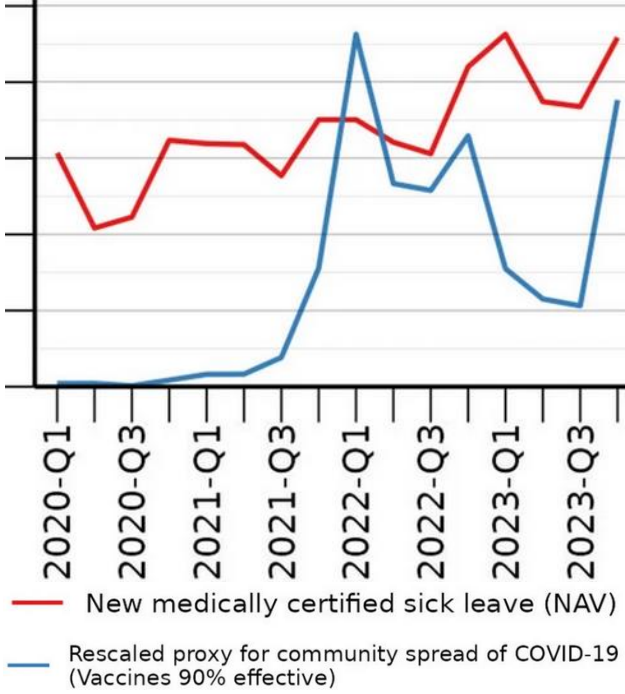


P29 psychological symptom/complaint other

- 74% higher than expected
- Explains 12% of the increase in sick leave
- Correlation = 0.58 with COVID-19 spread

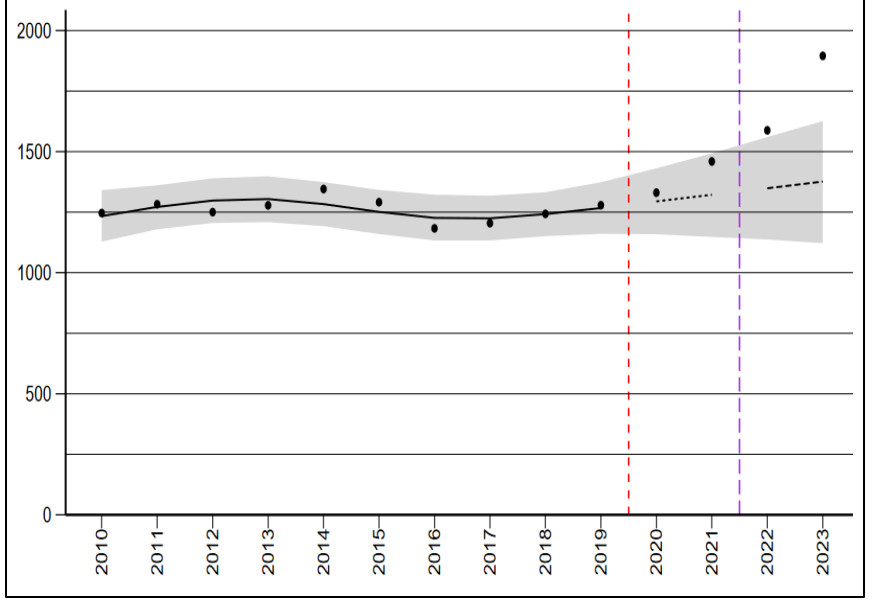
- Includes “burnout” and “slitenhet”
- Numerous studies showing that COVID-19 affects the brain and has psychological/neurological sequelae
- NAV paper (Moberg and Kabashi):
  - Sick leave due to COVID-19 was associated with 18% increased risk of sick leave for P29 in the following 12 weeks

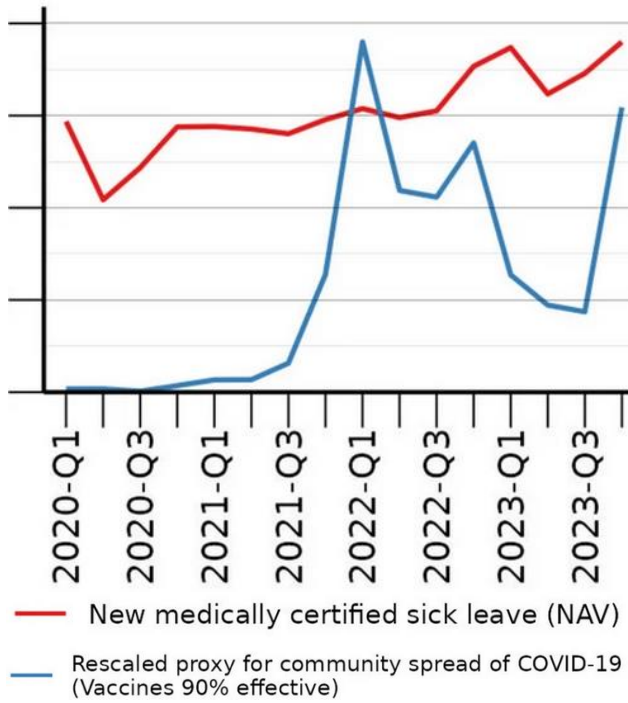




P02 Acute stress reaction

- 38% higher than expected
- Explains 8% of the increase in sick leave
- Correlation = 0.58 with COVID-19 spread



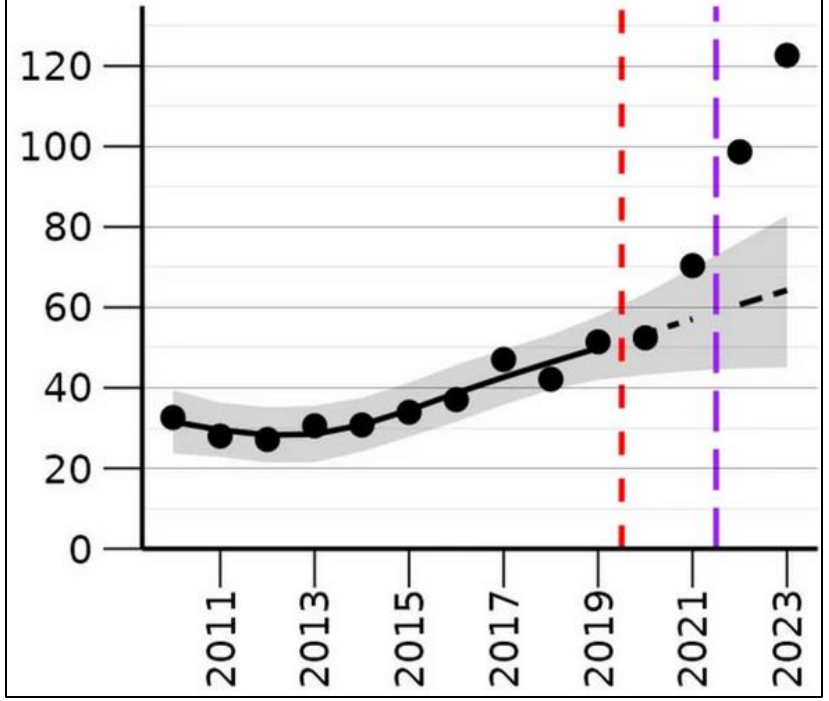


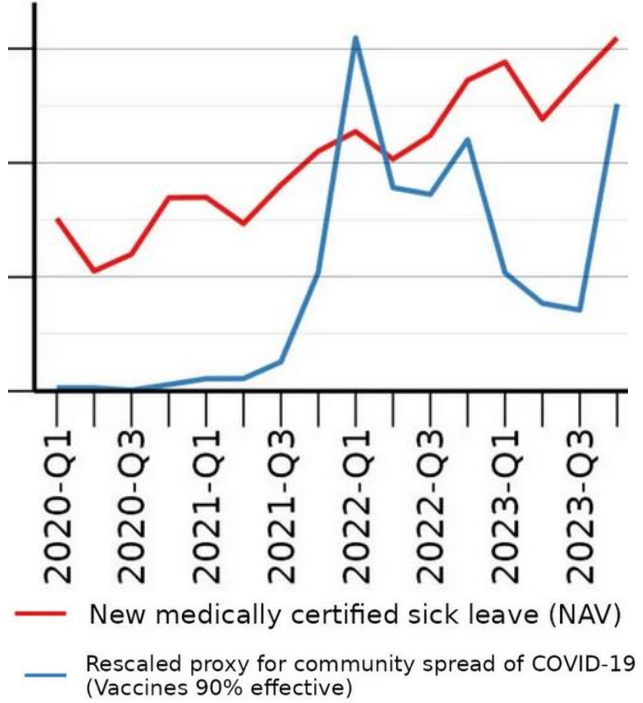
- Numerous studies showing that COVID-19 affects the brain and has psychological/neurological sequelae
- NAV paper (Moberg and Kabashi):
  - Sick leave due to COVID-19 was associated with 25% increased risk of sick leave for P02 in the following 12 weeks

P81 Hyperkinetic disorder

- 91% higher than expected
- Explains ~1% of the increase in sick leave
- Correlation = 0.70 with COVID-19 spread

- No evidence for a link between COVID-19 and ADHD/ADD
- Strong evidence of neurological and psychological sequelae caused by COVID-19
- Persistent memory problems and cognition problems may lead to healthcare seeking behavior for P81
- NAV paper (Nossen and Delalic):
  - *Slike plager kan også være klassifisert som senfølger av covid-19, jf. at studier har funnet at oppmerksomhets-vansker, som redusert hukommelse og hjernetåke, er blant de vanligste senfølgene.*





Conclusions

- Obvious limitations regarding causal claims for aggregated data at the national level
- Frequency of reinfection is a crucial driver of the incidence of post-viral illnesses
  - Typically infected with influenza once every five years
  - Infected with covid every year?
- “Lowered threshold for staying at home while ill due to the legacy of pandemic recommendations”
  - If true, we would see a uniform increase in all ICPC-2 codes
  - Instead, we see a large increase in ICPC-2 codes associated with acute and post-acute sequelae of COVID-19, and no increase or less of an increase in other ICPC-2 codes
  - The trend is getting worse, as we would expect from repeated reinfections and longer time since the last vaccinations in 2021