

Economic Burden of COVID-19-related Hospitalisations in Finland: A 4-year Longitudinal Analysis

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Introduction

COVID-19, caused by the SARS-CoV-2 virus, emerged in late 2019 and was declared a global pandemic by the World Health Organization in March 2020, leading to unprecedented health and economic challenges worldwide¹. The disease disproportionately affected elderly and high-risk populations, resulting in prolonged hospital stays and substantial resource demands².

Objectives

To quantify the economic burden of COVID-19-related hospitalisations across diverse patient populations in Finland from 2021 to 2024, focusing on variations by age and risk factors.

Methods

- A retrospective registry-based study in which data on COVID-19-related hospitalisations and length of stay (LoS) in primary care (PC) and specialty care (SC) from January 2021 to December 2024 were sourced from the Finnish Institute for Health and Welfare's registries.
- The cohort included adult patients (≥ 18 years) categorized by:
 - Age groups: 18–59 and ≥ 60 years.
 - Risk groups: Patients with no risk factors vs. those with ≥ 1 risk factors (chronic lung disease, chronic kidney disease, cardiovascular diseases, diabetes, neurological disorders, organ/ stem cell transplant).
- Unit costs from national price lists were inflated to 2024 values.
- Analyses were conducted separately for age and risk groups to assess differences in LoS and cost per hospitalisation (CPH).
- Hospitalisations were included only if COVID-19 was registered as the diagnosis for the hospitalisation.

Table 1. Number of hospital stays, hospital days, cost, LoS and CPH in primary care by risk and age groups

Year	Care facility	Hospital stays (n)	Hospital days (n)	Cost (€)	LoS (days)	CPH (€)
2021-2024	Primary Care	27 714	449 997	195 069 586	16,2	7 039
18-59		1 074	13 658	5 920 618	12,7	5 513
≥ 60		26 640	436 339	189 148 968	16,4	7 100
No risk factors		5 329	79 855	34 616 413	15,0	6 496
≥ 1 risk factors		22 385	370 142	160 453 174	16,5	7 168
Cancer		5 924	95 909	41 575 675	16,2	7 018
Chronic lung disease		5 190	75 915	32 908 459	14,6	6 341
Chronic kidney disease		2 073	33 805	14 654 158	16,3	7 069
Cardiovascular diseases		19 033	318 972	138 271 446	16,8	7 265
Diabetes		6 736	108 018	46 824 816	16,0	6 951
Neurological disorders		1 381	23 036	9 985 895	16,7	7 231
Organ or stem cell transplant		917	15 036	6 517 969	16,4	7 108
18-59 with ≥ 1 risk factors		611	9 033	3 915 723	14,8	6 409
18-59 with no risk factors		463	4 625	2 004 895	10,0	4 330
≥ 60 with ≥ 1 risk factors		21 774	361 109	156 537 451	16,6	7 189
≥ 60 with no risk factors		4 866	75 230	32 611 517	15,5	6 702

Table 2. Number of hospital stays, hospital days, cost, LoS and CPH in specialty care by risk and age groups

Year	Care facility	Hospital stays (n)	Hospital days (n)	Cost (€)	LoS (days)	CPH (€)
2021-2024	Specialty Care	41 473	315 061	294 151 754	7,6	7 093
18-59		11 534	80 639	75 287 336	7,0	6 527
≥ 60		29 939	234 422	218 864 418	7,8	7 310
No risk factors		12 683	90 699	84 679 697	7,2	6 677
≥ 1 risk factors		28 790	224 362	209 472 057	7,8	7 276
Cancer		7 932	60 676	56 649 194	7,6	7 142
Chronic lung disease		7 497	56 296	52 559 876	7,5	7 011
Chronic kidney disease		3 024	25 829	24 114 840	8,5	7 974
Cardiovascular diseases		22 708	179 249	167 353 014	7,9	7 370
Diabetes		8 685	69 566	64 949 203	8,0	7 478
Neurological disorders		1 199	8 996	8 398 974	7,5	7 005
Organ or stem cell transplant		2 288	21 487	20 061 090	9,4	8 768
18-59 with ≥ 1 risk factors		4 377	36 089	33 693 928	8,2	7 698
18-59 with no risk factors		7 157	44 550	41 993 408	6,2	5 812
≥ 60 with ≥ 1 risk factors		24 413	188 273	175 778 129	7,7	7 200
≥ 60 with no risk factors		5 526	46 149	43 086 289	8,4	7 797

Table 3. Hospitalisations, days, costs, and shares of totals in primary and specialty care by age and risk groups

2021-2024	Hospital stays (n)	Hospital days (n)	Costs (€)	Share (% of Total)
TOTAL Primary Care & Specialty Care	69 187	765 058	489 221 340	Stays Days Costs
18-59	12 608	94 297	81 207 954	18,2 % 12,3 % 16,6 %
≥ 60	56 579	670 761	408 013 386	81,8 % 87,7 % 83,4 %
No risk factors	18 012	170 554	119 296 109	26,0 % 22,3 % 24,4 %
≥ 1 risk factors	51 175	594 504	369 925 231	74,0 % 77,7 % 75,6 %
18-59 with ≥ 1 risk factors	4 988	45 122	37 609 651	7,2 % 5,9 % 7,7 %
18-59 with no risk factors	7 620	49 175	43 598 303	11,0 % 6,4 % 8,9 %
≥ 60 with ≥ 1 risk factors	46 187	549 382	332 315 580	66,8 % 71,8 % 67,9 %
≥ 60 with no risk factors	10 392	121 379	75 697 806	15,0 % 15,9 % 15,5 %

Results

- A total of 69,187 hospitalisations and 765,058 hospital days were analyzed, with cumulative hospitalisation costs of €489.2 million (annual range: €34.6–€180.9 million) over 2021–2024. Key findings include:
 - Specialty Care (SC) accounted for 60.1% of total costs.
 - Patients aged ≥ 60 years contributed 83.4% of costs.
 - Patients with ≥ 1 risk factors accounted for 75.6% of costs.
 - Mean (annual range) LoS and CPH:
 - SC: 7.6 days (6.8–9.6); €7,089 (€6,334–€8,979).
 - PC: 16.2 days (14.5–20.6); €7,089 (€6,286–€8,937).
 - Risk Group Comparison:
 - Patients with ≥ 1 risk factors had higher LoS and CPH:
 - PC: 16.5 days vs. 15.0 days; €7,168 vs. €6,496.
 - SC: 7.8 days vs. 7.2 days; €7,276 vs. €6,677.
 - Patients with cardiovascular diseases had the highest LoS and CPH in PC (16.8 days; €7,265).
 - Patients with organ/stem cell transplants had the highest in SC (9.4 days; €8,768).
 - Age Group Comparison:
 - Patients aged ≥ 60 years had longer LoS and higher CPH:
 - PC: 16.4 days vs. 12.7 days; €7,100 vs. €5,513.
 - SC: 7.8 days vs. 7.0 days; €7,310 vs. €6,527.

Figure 1. Mean LoS 2024 in SC (adults)

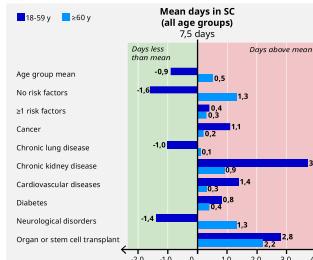


Figure 2. Mean LoS 2024 in PC (adults)

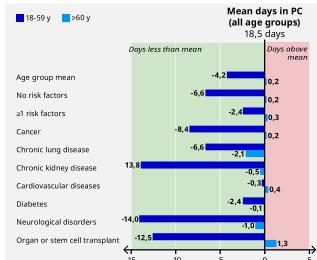


Figure 3. Mean CPH (€) 2024 in SC (adults)

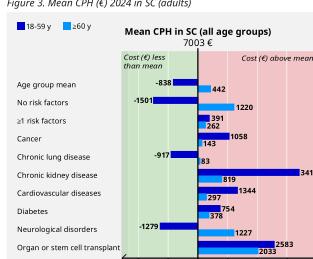
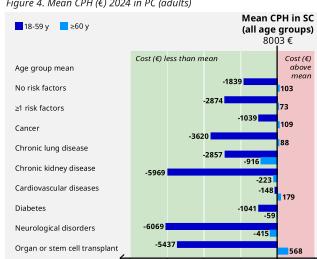


Figure 4. Mean CPH (€) 2024 in PC (adults)



SC = Specialty care, PC = Primary care, LoS = Length of Stay, CPH = Cost per hospitalisation

The risk groups are not mutually exclusive: a patient can belong to multiple risk groups.

Conclusions

COVID-19 imposed a substantial economic burden on Finland's healthcare system, totaling at least €489.2 million over 2021–2024, with the true impact likely higher due to the exclusion of patients <18 years and the aggregation of intensive care within SC data. Elderly patients (≥ 60 years) and those with risk factors, particularly cardiovascular diseases and organ/stem cell transplants, drove the majority of costs due to extended hospital stays and higher per-hospitalisation expenses. Prolonged hospitalisations for high-risk groups continue to strain hospital resources, highlighting the need for targeted resource allocation and proactive management strategies during COVID-19 peaks to enhance healthcare system efficiency and resilience.

Disclosures

- The study was sponsored by Pfizer.
- Ol and ML are employees of Nordic Healthcare Group, which received funding from Pfizer Oy in connection with the development of this abstract/poster.

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