# Drug use

in people who have intensive care or died as a result of covid-19

### The National Board of Health and Welfare continuously monitors the disease covid-19. This fact sheet presents an initial analysis of drug use in people who have been intensively intensively or died as a result of covid-19. The results show that the use of most druggroups is significantly higher in these people compared to the population. The pattern of use, especially in people aged 70 years or over, primarily reflects a more enveloping underlying morbidity in these patients. For some druggroups, however, the differences are strikingly large, including loop-diuretics.

**Method**

This compilation is based on data from the National Board of Health and Welfare's drug register. The register contains information on all medicines collected against prescription sat in pharmacies since 1 July 2005, and provides the basis for the official statistics on medicines in Sweden.

The compilation is based on data on 6,001 patients (3,543 men and 2,458 women) who were intensively intensively or died due to covid-19, between 6 March and 2 June 2020. The patients who were intensive ly treated have been identified through data from the Swedish Intensive Care Register (SIR), and those who have

death as a result of covid-19 are identified by the received cause of death certificate where covid-19 is identified as the underlying cause of death.

Statistics on the use of medicinal products come from the Pharmaceutical Register and describe which prescription drugs the persons were assessed as being prescribed on 31 December 2019, i.e. 31 December 2019. before the first cases of infection with SARS-CoV-2 were detected. Socialstyrelshas estimated drug use by combining data on the time of drug withdrawal, amount of withdrawal drugs and prescribed dosage, for medicinal products dispensed within a three-month interval before the measurement date, according to a previously described method [1]. For equal employment, the corresponding measurement has been made for the Swedish population aged 18 years and over

6,619,364 persons (3,378,172 men and 3,241,192 women) aged 18-69 and 1,537

915 people (700,449 men and 837,466 women) ≥70 years of age. A total of 200 of themost experienced drug groups, at pharmacological (4-digit) ATC level, have been analy-serated.

To determine whether the use of the drug in people who have been intensively intensively or deceased as a result of covid-19, differs from the use of medicines in the population gsoiled a chi-two (χ2) test. As a total of 200 pharmaceutical groups

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tested, a correction of the p-values was made to a new significance level (p<0.00025) according to Bonferroni.

**The population studied**

Table 1 describes the population studied by gender, form of housing and comorbidity, as well as the number of medicinal products at the time of measurement on 31 December 2019. Results are presented as total and stratified for age groups 18-69 and ≥70 years.

**Table 1. Thedeath of persons aged 18 and over, intensive care or deceased in covid-19, 6 March to 2 June 2020.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables** | **Total number (%)** | **Age 18-69 number (%)** | **Age ≥70**  **number (%)** |
| Total | 6 001 (100) | 1 733 (100) | 4 268 (100) |
| Men | 3 543 (59) | 1 277 (74) | 2 266 (53) |
| Women | 2 458 (41) | 456 (26) | 2 002 (47) |
| Number of medicines |  |  |  |
| Average (min-max) | 5,1 (0-23) | 3,2 (0-21) | 5,9 (0-23) |
| 0 | 1 412 (24) | 606 (35) | 806 (19) |
| 1-4 | 1 717 (29) | 665 (38) | 1 052 (25) |
| 5-9 | 1 723 (29) | 306 (18) | 1 417 (33) |
| 10 + | 1 149 (19) | 156 (9) | 993 (23) |
| Form of accommodation |  |  |  |
| Special accommodation | 2 092 (35) | 36 (2) | 2 056 (48) |
| Home Care | 1 157 (19) | 85 (5) | 1 072 (25) |
| Comorbidity |  |  |  |
| Cardiovascular disease | 2 189 (37) | 164 (9) | 2 025 (47) |
| High blood pressure | 4 095 (68) | 735 (42) | 3 360 (78) |
| Diabetes | 1 563 (26) | 406 (24) | 1 157 (27) |
| Lung disease | 662 (11) | 113 (7) | 549 (13) |

Sources: The Medical Records Register, The Register of Interventions to the Elderly and Persons with Functional Impairment, Patient Register, National Board of Health and Welfare.

In the 18-69 age group, men were clearly over-represented, while gender distribution was more even in the ≥70 yearsgroup. The average number of medicines per person in both age groups was significantly higher (3.2 and 5.9 medicines respectively) compared to the population (1.1 and 4.2 medicines respectively). Nearly half of the ≥70-year-olds lived in special accommodation. This age groupalso founda high degree of comorbidity, but the diagnoses of high blood pressure and diabetes were also common

age group 18-69 years.

## Drug use in the 18-69 age group

The use of the 25 most common drug groups in persons who have not been treated or died as a result of covid-19, in the 18-69 age group, is presented in Table 2. For all drug groups studied, a significantly higher use was seen compared to the corresponding age group in the population. The drug groups among the 25 most common, which showed the greatest differences, were *loop-diuretics*  (of which 97% of users had furosemide); *diabetes medicines*

(both the group *of insulins and analogues*, as well as blood glucose lowering *agents, excl. in-sulins),*and *vitamins A and D, including combinations of the two*  (100% vitamin D and analogues).

The use of *loop diuretics*, which showed the greatest difference, was 8.1 times higher in whom they had been intensively intensively or died as a result of covid-

19. In addition, the proportion of *loop diuretics*  of all cardiovascular medicines (ATC code

C) 2.8 times higher, which can be compared to ACE *inhibitors*  and *angiotensin II receptor blockers (ARB),*where this proportion was not different from that of the population.

**Table 2. The 25 most common drug groups in people aged 18-69 years, intensive care or deceased as a result of covid-19, 6 March to 2 June 2020.**

Number and proportion (%) (N=1,733), compared to the population (N=6,619,364).

|  |  |  |  |
| --- | --- | --- | --- |
| **Atc** | **Medicines** | **IVA/dead number (%)** | **Population number (%)** |
| C10A | Agents affecting serum lipid levels | 295 (17,0) | 329 219 (5,0) |
| C08C | Calcium antagonists with predominantly vascular-selective effect | 244 (14,1) | 260 630 (3,9) |
| A10B | Blood glucose lowering agents, excl. insulins | 242 (14,0) | 161 622 (2,4) |
| A02B | Agents for stomach ulcers and gastroesophageal reflux disease | 232 (13,4) | 259 911 (3,9) |
| C07A | Beta receptor blocking agents | 231 (13,3) | 284 245 (4,3) |
| B01A | Anticoagulants | 205 (11,8) | 214 489 (3,2) |
| N02B | Other analgesics and antipyretics | 172 (9,9) | 177 469 (2,7) |
| C09C | Angiotensin II receptor blocker (ARBs) | 171 (9,9) | 232 589 (3,5) |
| N06A | Antidepressants | 169 (9,8) | 466 985 (7,1) |
| C09A | ACE inhibitors | 168 (9,7) | 191 817 (2,9) |
| N05C | Hypnotics and sedatives | 160 (9,2) | 237 957 (3,6) |
| A10A | Insulins and analogues | 127 (7,3) | 83 969 (1,3) |
| R03A | Adrenergika, inhalations | 124 (7,2) | 189 288 (2,9) |
| B03B | Vitamin B12 and folic acid | 119 (6,9) | 149 328 (2,3) |
| M01A | Anti-inflammatory and antirheumatic agents, non-steroidal | 97 (5,6) | 160 517 (2,4) |
| R06A | Antihistamines for systemic use | 92 (5,3) | 160 228 (2,4) |
| N03A | Aeds | 90 (5,2) | 105 588 (1,6) |
| H03A | Thyroide preparations | 84 (4,8) | 207 930 (3,1) |
| N05B | Sedatives, atheists | 84 (4,8) | 111 992 (1,7) |
| N02A | Opioids | 84 (4,8) | 98 002 (1,5) |
| A11C | Vitamins A and D, incl. vitamins A and D combinations of the two | 78 (4,5) | 62 698 (0,9) |
| D02A | Skin-protective and emollients | 74 (4,3) | 72 145 (1,1) |
| C03C | Loop diuretics | 74 (4,3) | 35 108 (0,5) |
| N05A | Neuroleptika | 72 (4,2) | 72 645 (1,1) |
| A06A | Means for constipation | 71 (4,1) | 81 729 (1,2) |

Source: Medical Records, National Board of Health and Welfare

## Drug use in the age group 70 years and older

Table 3 shows the 25 most common drug groups in people who have been intensively cared for or died as a result of covid-19, in the ≥70 age group. The drug turnaround here was significantly more concerningthan in the 18-69 age group. Some drug groups were also relatively more common, such as *anticoagulants*  (of which 56% of users had platelet inhibitors, 35% NOAK and 10% warfarin), beta receptor blocking *agents;*; *loop-diuretics*  (99% furosemid);

*vitamin B12 and folic acid* and *agents in dementias*; while some were comparatively more unusual, such as agents affecting serum lipid *levels*  (98% statins – blood fat/cholesterol-lowering drugs) and diabetes *drugs*  (both *insulins and analogues,*suchas blood glucose lowering *agents, excl. insulins).*).

**Table 3. The 25 most common drug groups in people aged 70 years**

**and elderly, intensive care or deceased in covid-19, 6 March to 2 June 2020.**

Number and proportion (%) (N=4,268), compared to the population (N=1,537,915).

|  |  |  |  |
| --- | --- | --- | --- |
| **Atc** | **Medicines** | **IVA/dead number (%)** | **Population number (%)** |
| B01A | Anticoagulants | 1 661 (38,9) | 493 463 (32,1) |
| C07A | Beta receptor blocking agents | 1 340 (31,4) | 431 638 (28,1) |
| N02B | Other analgesics and antipyretics | 1 233 (28,9) | 210 253 (13,7) |
| B03B | Vitamin B12 and folic acid | 1 079 (25,3) | 209 416 (13,6) |
| N06A | Antidepressants | 1 001 (23,5) | 173 616 (11,3) |
| A02B | Agents for stomach ulcers and gastroesophageal reflux disease | 968 (22,7) | 233 703 (15,2) |
| C03C | Loop diuretics | 938 (22,0) | 127 639 (8,3) |
| C10A | Agents affecting serum lipid levels | 932 (21,8) | 427 733 (27,8) |
| N05C | Hypnotics and sedatives | 828 (19,4) | 183 510 (11,9) |
| A06A | Means for constipation | 723 (16,9) | 111 343 (7,2) |
| C08C | Calcium antagonists with predominantly vascular-selective effect | 692 (16,2) | 309 140 (20,1) |
| C09A | ACE inhibitors | 576 (13,5) | 205 802 (13,4) |
| C09C | Angiotensin II receptor blocker (ARBs) | 556 (13,0) | 246 325 (16,0) |
| N02A | Opioids | 537 (12,6) | 78 053 (5,1) |
| N05B | Sedatives, atheists | 526 (12,3) | 69 585 (4,5) |
| D02A | Skin-protective and emollients | 464 (10,9) | 68 349 (4,4) |
| A12A | Calcium | 443 (10,4) | 123 467 (8,0) |
| A10B | Blood glucose lowering agents, excl. insulins | 399 (9,3) | 146 561 (9,5) |
| N06D | Agents in dementia | 399 (9,3) | 36 991 (2,4) |
| H03A | Thyroide preparations | 385 (9,0) | 131 396 (8,5) |
| R03A | Adrenergika, inhalations | 381 (8,9) | 106 058 (6,9) |
| A10A | Insulins and analogues | 381 (8,9) | 68 048 (4,4) |
| G04C | Agents in benign prostate hyperplasia | 365 (8,6) | 101 302 (6,6) |
| S01E | Agents in glaucoma and miotics | 318 (7,5) | 99 585 (6,5) |
| N05A | Neuroleptika | 308 (7,2) | 25 229 (1,6) |

Source: Medical Records, National Board of Health and Welfare

For the majority of these 25 drug groups, a higher use was seen among those in intensive care or died as a result of covid-19, compared to the ≥70-year age group in the population. Among these drugs, the difference was greatest for *neuroleptics*; *agents*  *in dementia*; *sedatives, athergics*  and *loop diuretics*. However, some drug groups showed a lower use compared to the population; mainly *agents that affect serum lipid levels*

*calcium antagonists with predominantly vascular-selective effect*. For *beta-receptor blocking agents*; *ACE inhibitors*; *ARB*; *blood glucose lowering agents, excl. insulins;* *thyroid preparations*; *agents in benign prostate hyperplasia*  and *agents*

*glaucoma and miotics,* no significant differences were observed.

The use of *loop-diuretics*, in this age group was 2.6 times higher, and the proportion of all cardiovascular medicines 2.8 times higher, in those who have intensively cared for or died as a result of covid-19, while the corresponding proportion of ACE *inhibitors*  and *ARB*  sat out not different from that in the population.

## Summary comments and conclusions

The purpose of this broad survey was primarily to continue socialstyrel-sen's reporting in order to describe in different ways those affected by covid-19, but also to share data that can feed ideas or create hypotheses for comitology studies.

The results show that there are significant differences in drug use between those who have intensive careor died as a result of covid-19, and the population; in both the 18-69 age group and the ≥70 age group. For the majority of the drug groups, the use was more extensive in those who had been intensively intensively or died as a result of covid-19. This was most striking for loop diuretics which showed multiple higher use, even expressed as a percentage of all

cardiovascular medicines. However, for some medicines, in the ≥70 years age group, a lower use was seen in those who have been intensively or deceased, mainly blood fat/ cholesterol-lowering preparations.

We chose to measure drug use at a time before the first cases of infection with SARS-CoV-2 were detected. The number of drug withdrawals has decreased during the pandemic – probably as a result of a decline in the number ofcare contacts and pharmacy visits. A measurement time closer to the time of intensive care or death would thus lead to an underestimation of the use of medicines.

It is important to note that this fact sheet only presents descriptive data. Adjustments have not been made for other factors that may be associated with drug use and risk of confounding factors ( covid-19), primarily comorbidity. The figures presented cannot therefore be taken as a source of causation between drug useand covid-19.

It is reasonable to assume that the differences in drug use observed mainly reflect differences in morbidity; for example, a higher incidence of hypertension and diabetes in those who fall ill with covid-19. In the group

≥70 years of age – where 48 ofthose under intensive care or died as a result of covid-19 lived in special accommodation, and nearly one in ten people used dementia medicines – it is reasonable to assume that the differences in drug use are largely due to a higher incidence of multimorbidity and dementia, mainly at the higher ages [2].

The results do not support the previously presented hypothesis that agents affecting the renin-angiotensin system, i.e. the resolate system, are not used to improve the quality of the product. ace inhibitors and ARB, increases the risk of covid-19. This is consistent with the findingsof, among other things, a recent case-con- troll study in Italian Lombardy [3]. On the other hand, there is a need to study more closely, among other things, the significantly higher use of loop-diuretics in those who have been intensively intensively or died as a result of covid-19. Thisfinding is also in line with the results of the said Italian study, which found a significant link between the use of this type of medicine and an increased likelihood of covid-19; an observation that was not investigated in more detail in the study [3]. Continued, more in-depth studies – taking into account comorbidity and other

confounding factors – therefore needed, in order to clarify the possible role of the drug as risk or protective factors in SARS-CoV-2 infection.

## References

1. Wallerstedt SM, Fastbom J, Johnell K, Sjöberg C, Landahl S, Sundström

A. Drug treatment in older people before and after the transition to a multi-dose drug dispensing system--a longitudinal analysis. PLoS One. 2013 Jun 24;8( 6):e67088. doi: 10.1371/journal. pone.0067088.

1. Gurner U. Outside the hospital. Qualitative follow-up of multi-sick elderly in ordinary housing. Swedish Municipalities and County Councils. 2012.
2. Mancia G, Rea F, Ludergnani M, Apolone G, Corrao G. Renin-Angioten- sin-Aldosterone System Blockers and the Risk of Covid-19. N Engl J Med. 2020 Jun18;382(25):2431-2440. doi: 10.1056/NEJMoa2006923.

**More information**

Here you will find statistics about Covid-19:

[https://www.socialstyrelsen.se/statistik-och-data/statistik/statistik-om-covid-19](https://www.socialstyrelsen.se/statistik-och-data/statistik/statistik-om-covid-19/)

For those who want to do their own searches in thestatistics database: [www.socialstyrelsen.se/statistik-och-data/statistik/statistikdatabasen](http://www.socialstyrelsen.se/statistik-och-data/statistik/statistikdatabasen)

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