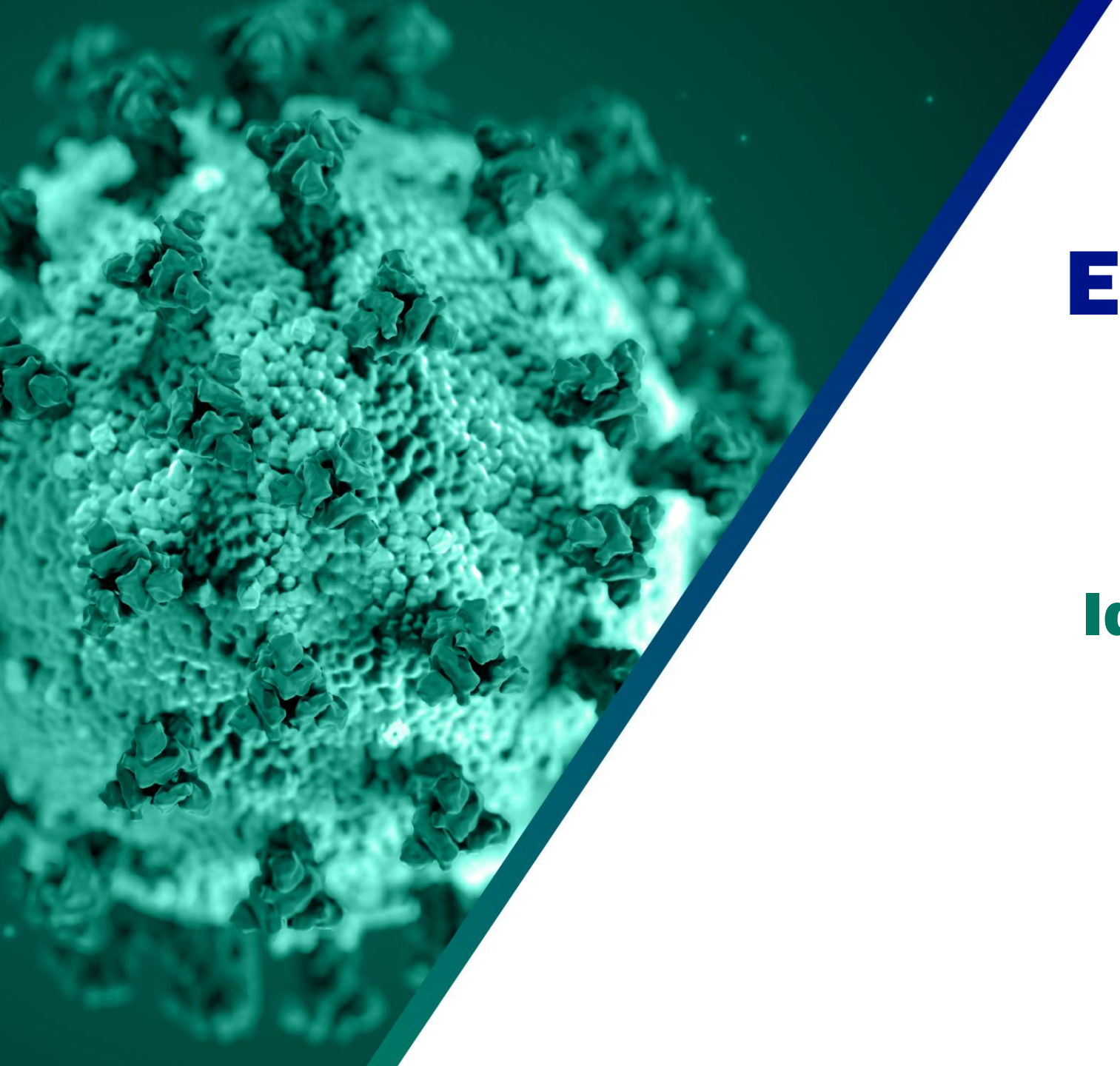

# Epidemiology of SARS-CoV-2 Infections

## Idaho COVID-19 Vaccine Advisory Committee

## January 8, 2021


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IDAHO DEPARTMENT OF HEALTH & WELFARE

# Considerations

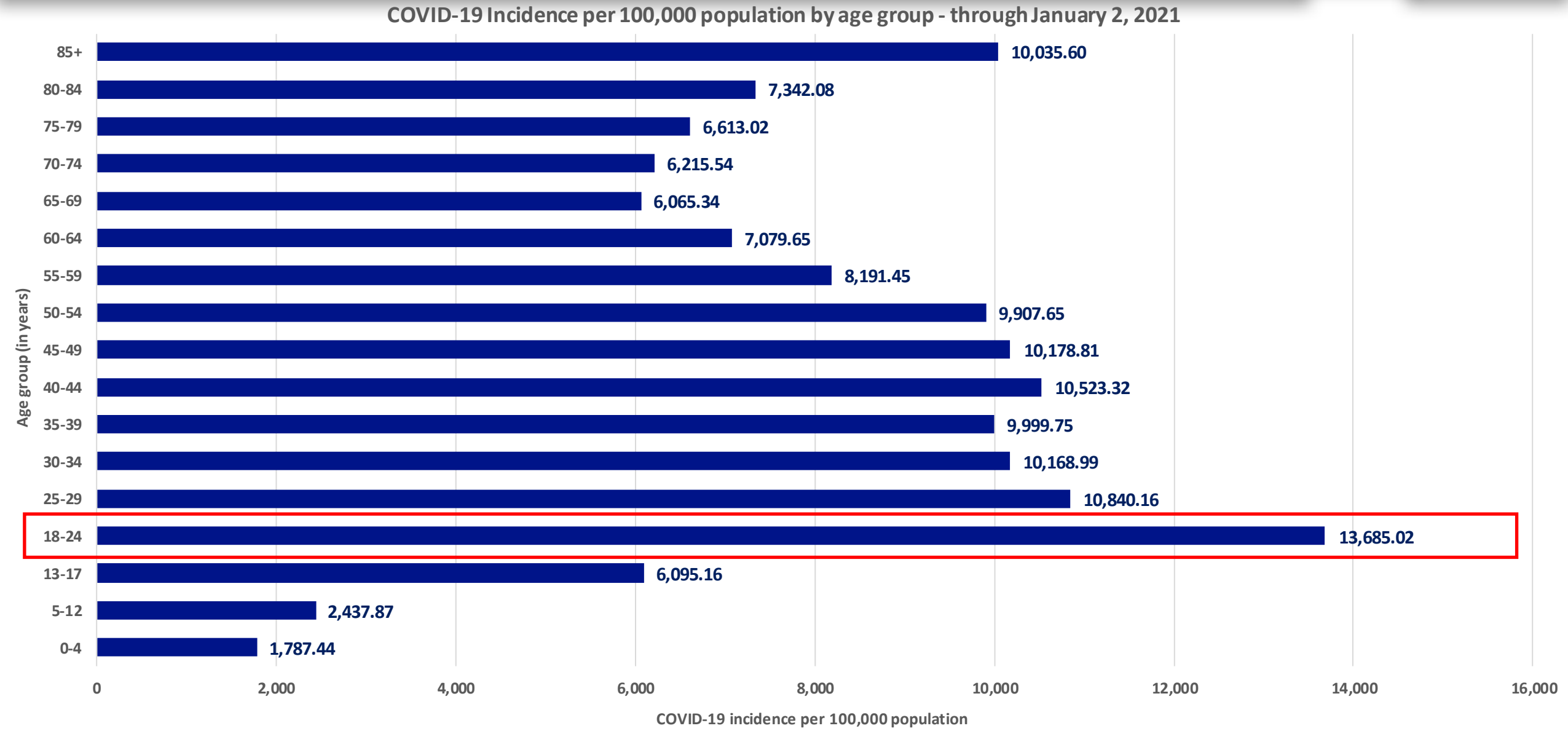


- Age
- Risk of exposure
- Health status

- Confounding factors
  - Race and ethnicity
  - Lower socioeconomic status
  - Access to care
  - Paid leave policies

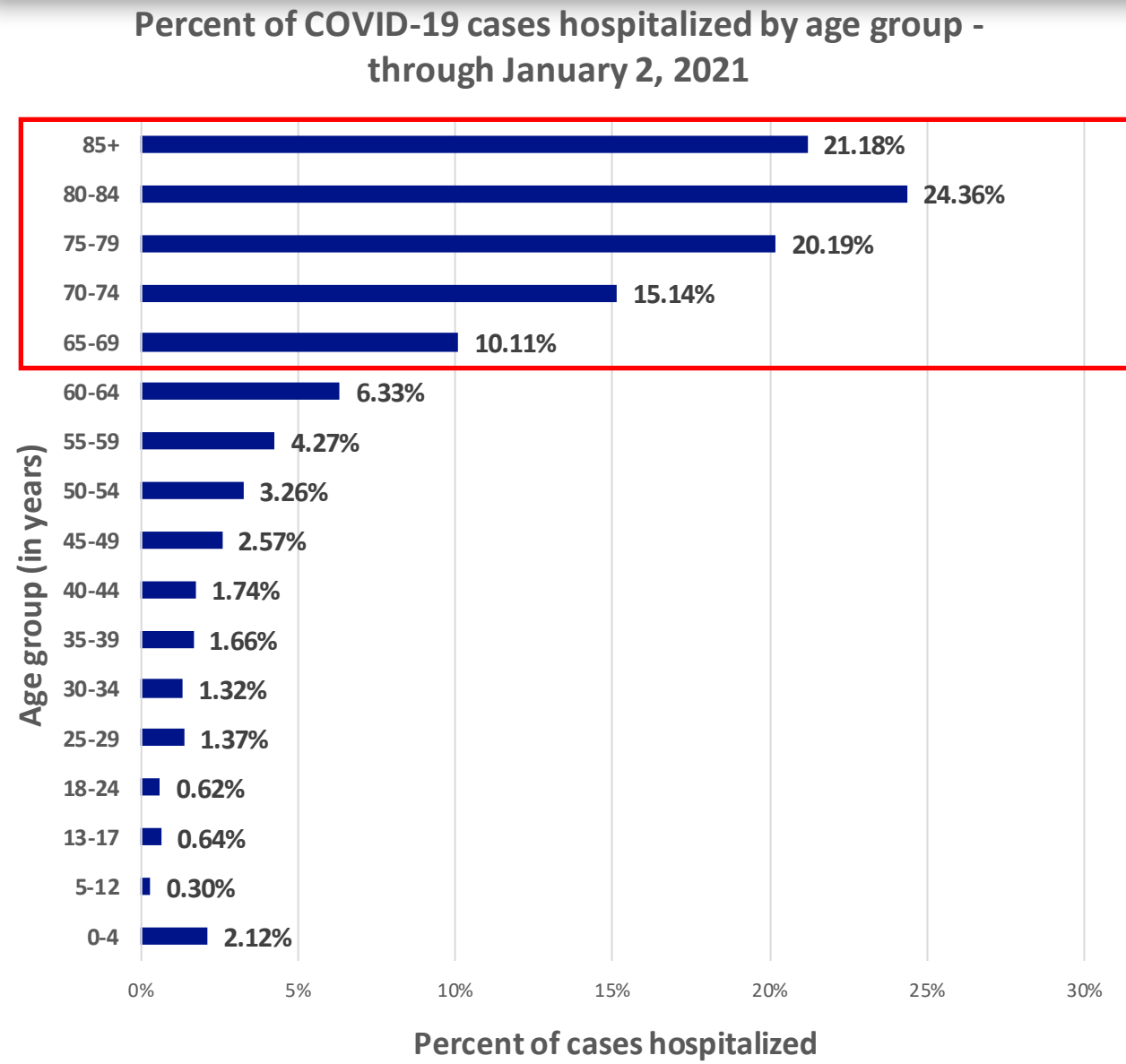
# Age-specific incidence in Idaho

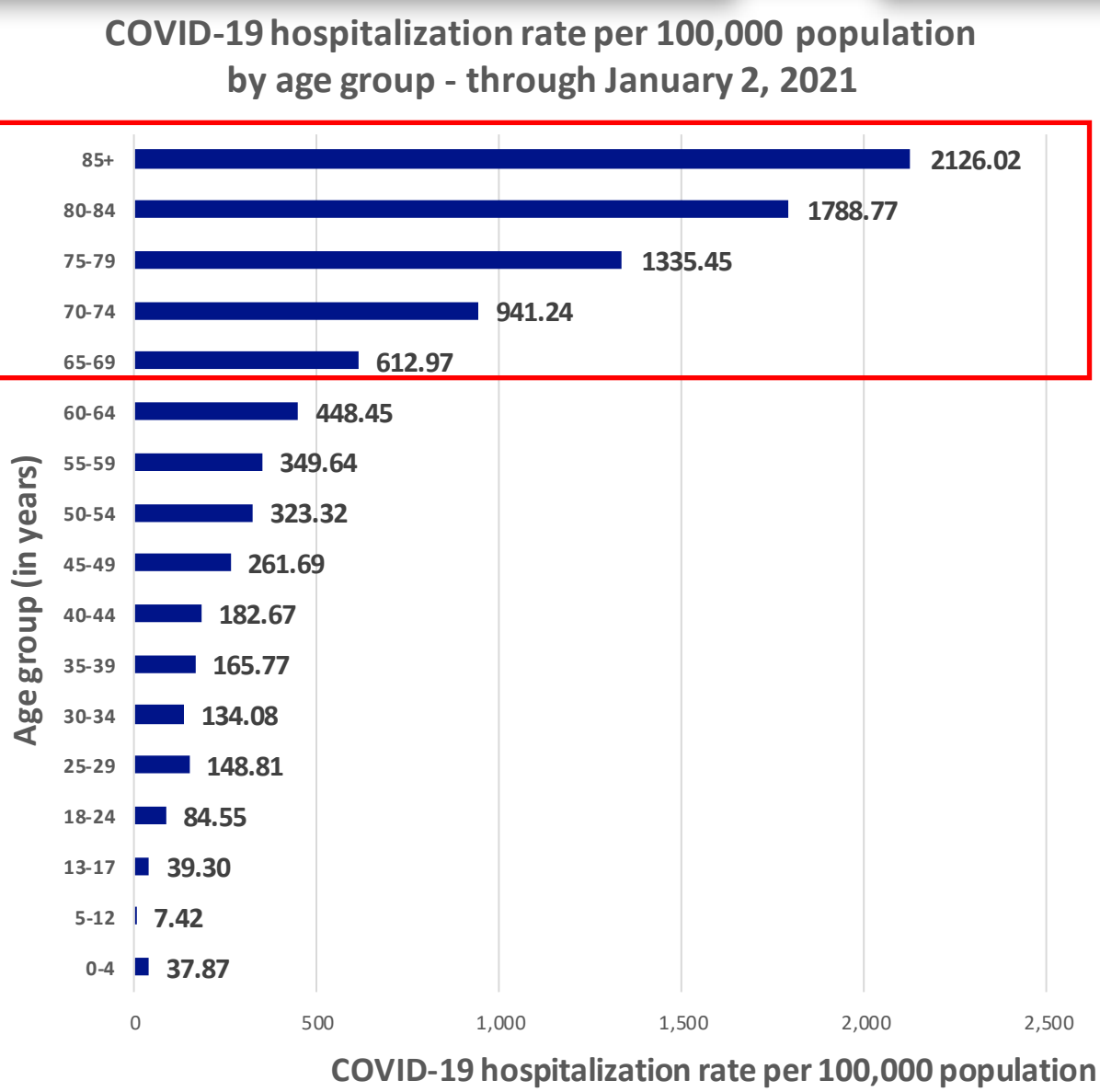




# Age-specific hospitalizations in Idaho

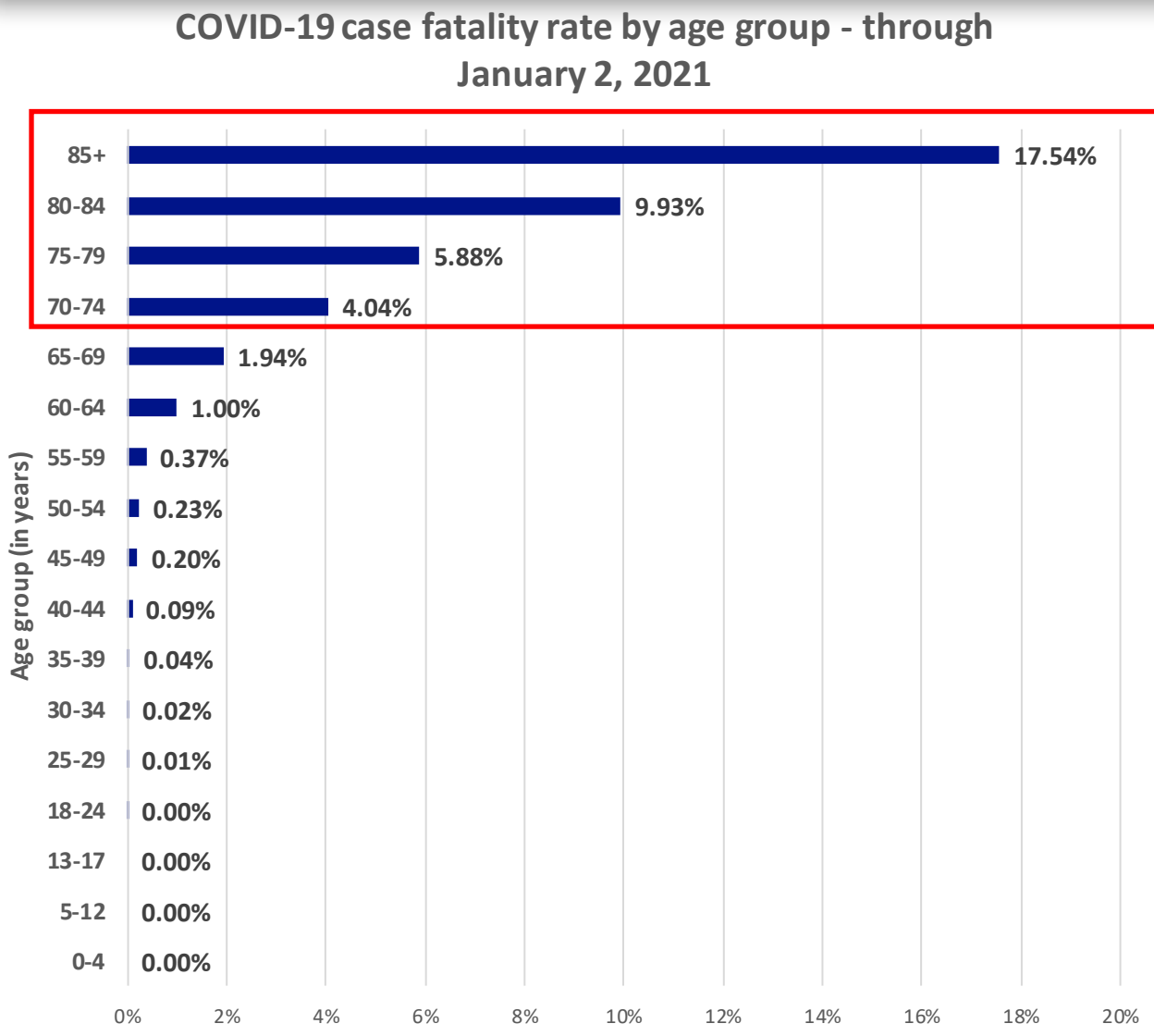


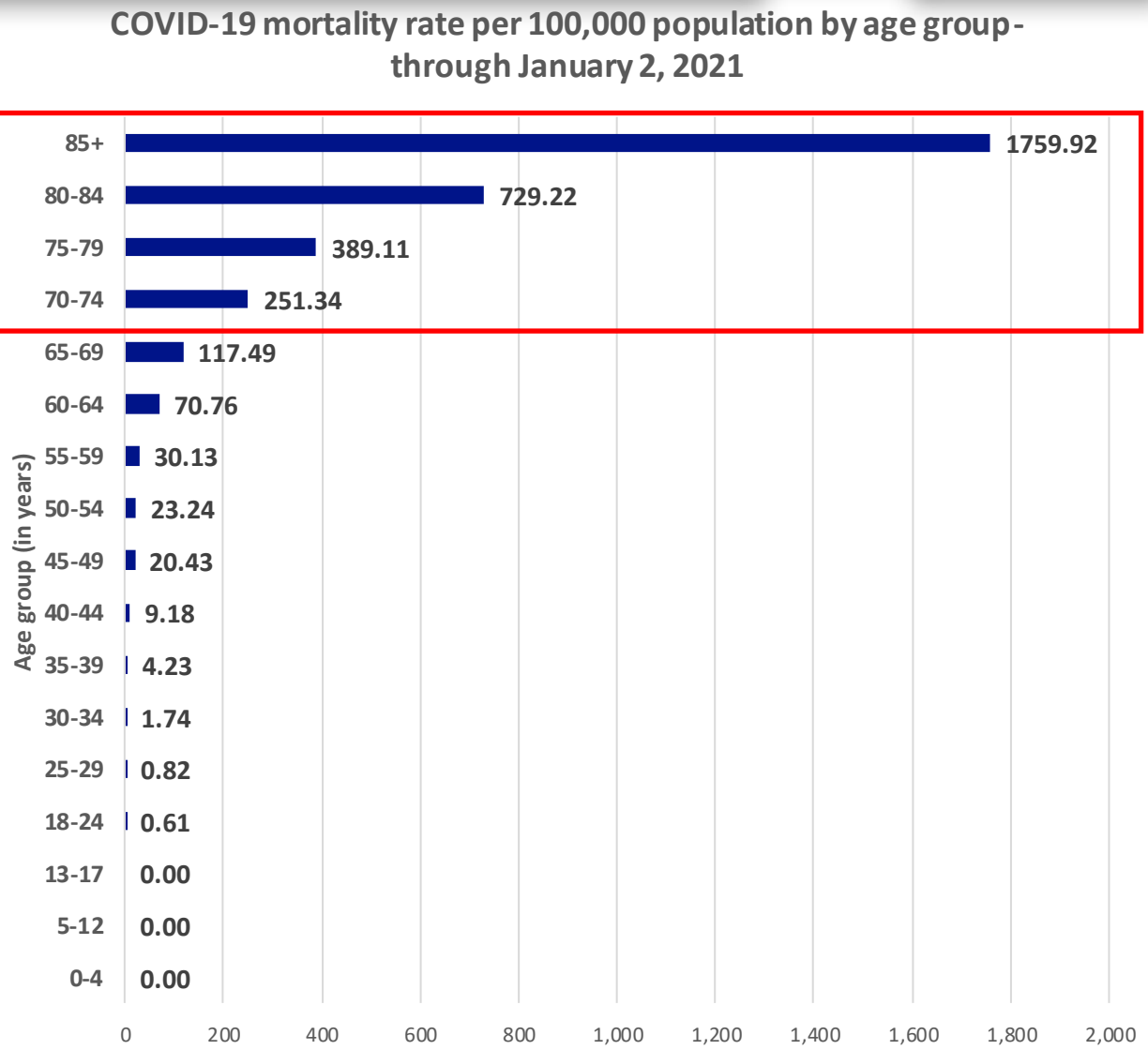


# Age-specific mortality in Idaho





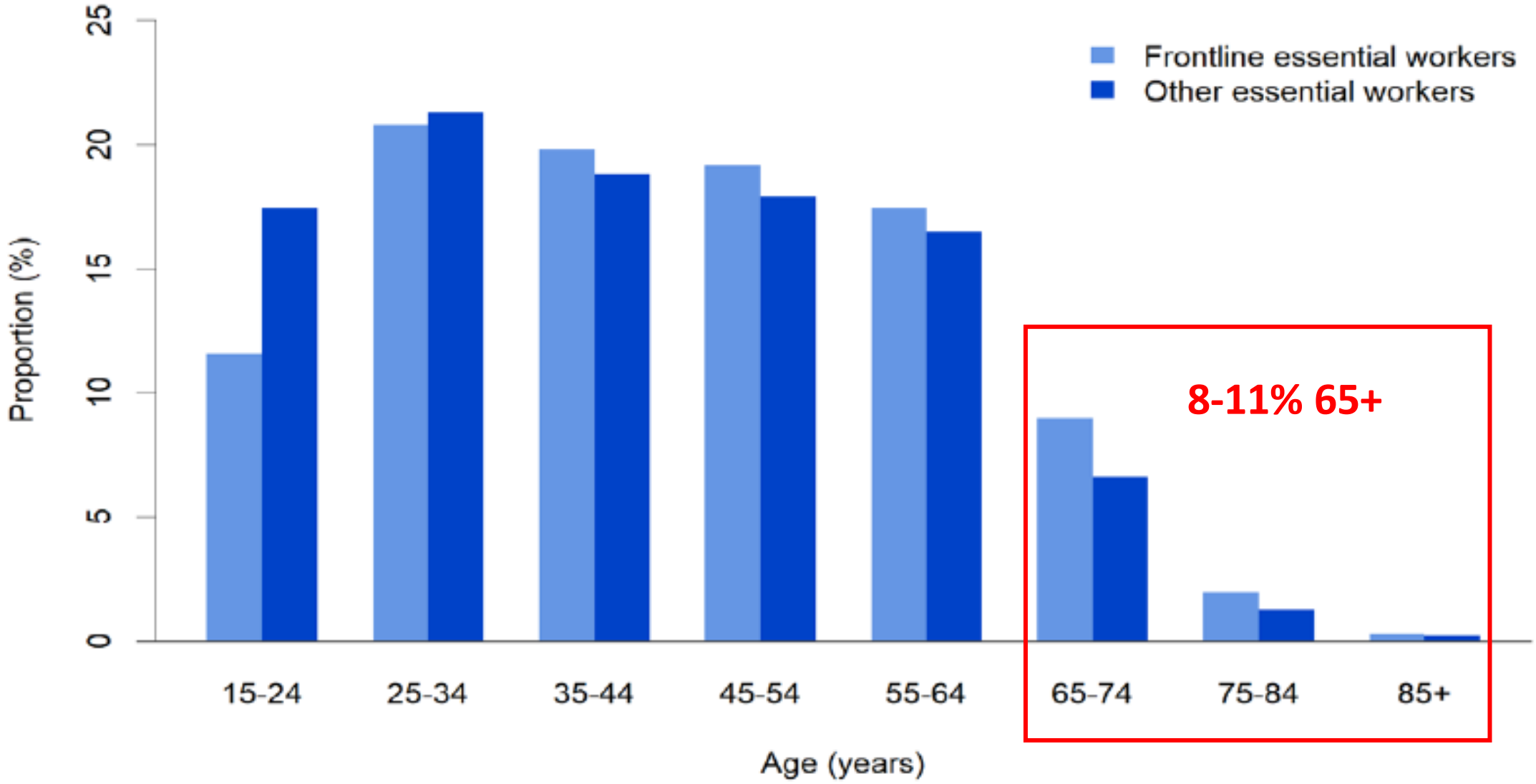
# Summary: Rate ratios



| AGE GROUP | CASES | HOSPITALIZATIONS | DEATHS |
|---|---|---|---|
| 0-4 | 0.13 | 0.45 | 0.00 |
| 5-12 | 0.18 | 0.09 | 0.00 |
| 13-17 | 0.45 | 0.46 | 0.00 |
| 18-24 | *COMPARISON* | *COMPARISON* | *COMPARISON* |
| 25-29 | 0.79 | 1.76 | 1.35 |
| 30-34 | 0.74 | 1.59 | 2.86 |
| 35-39 | 0.73 | 1.96 | 6.95 |
| 40-44 | 0.77 | 2.16 | 15.09 |
| 45-49 | 0.74 | 3.10 | 33.59 |
| 50-54 | 0.72 | 3.82 | 38.21 |
| 55-59 | 0.60 | 4.14 | 49.53 |
| 60-64 | 0.52 | 5.30 | 116.33 |
| 65-69 | 0.44 | 7.25 | 193.15 |
| 70-74 | 0.45 | 11.13 | 413.22 |
| 75-79 | 0.48 | 15.80 | 639.72 |
| 80-84 | 0.54 | 21.16 | 1198.88 |
| 85+ | 0.73 | 25.15 | 2893.42 |

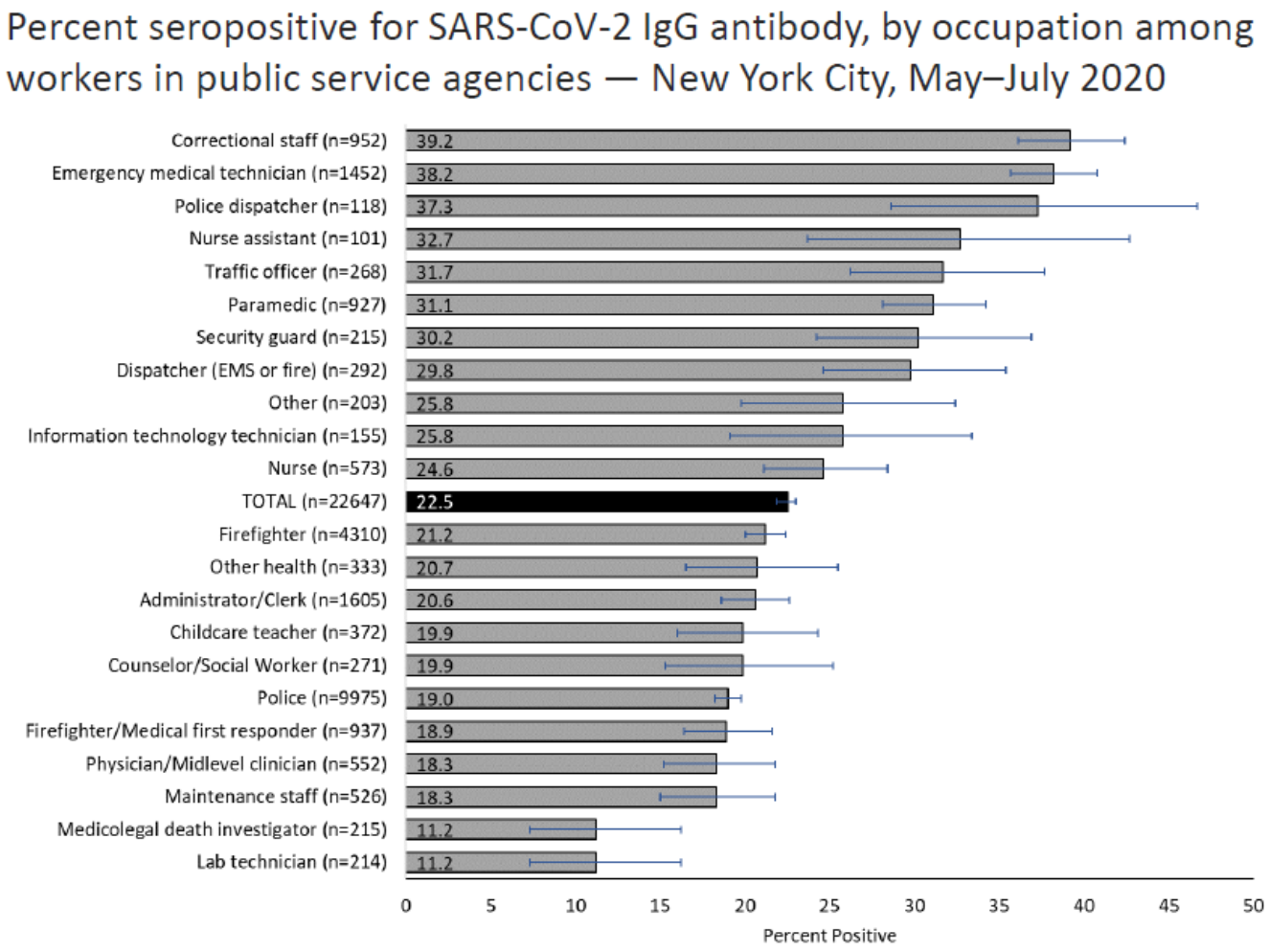
# Age of essential workers: national data





# Seroprevalence in frontline essential workers






**High seroprevalence among many frontline essential workers groups following first wave of pandemic in NYC**

Other includes Dietary Service Staff, Environmental Service Staff and participants who selected Other and were not reassigned to existing category
Other Health includes Student/Trainee, Respiratory Therapist, Occupational/Speech/Physical Therapist, Therapy Aide/Assistant, Pharmacist, Diagnostic Imaging Technician, Phlebotomist, Medical Registrar, Orderly, Dietician, Dentist, Clinical Technician, Medical Assistant. Sami *et al*.Manuscript in preparation.

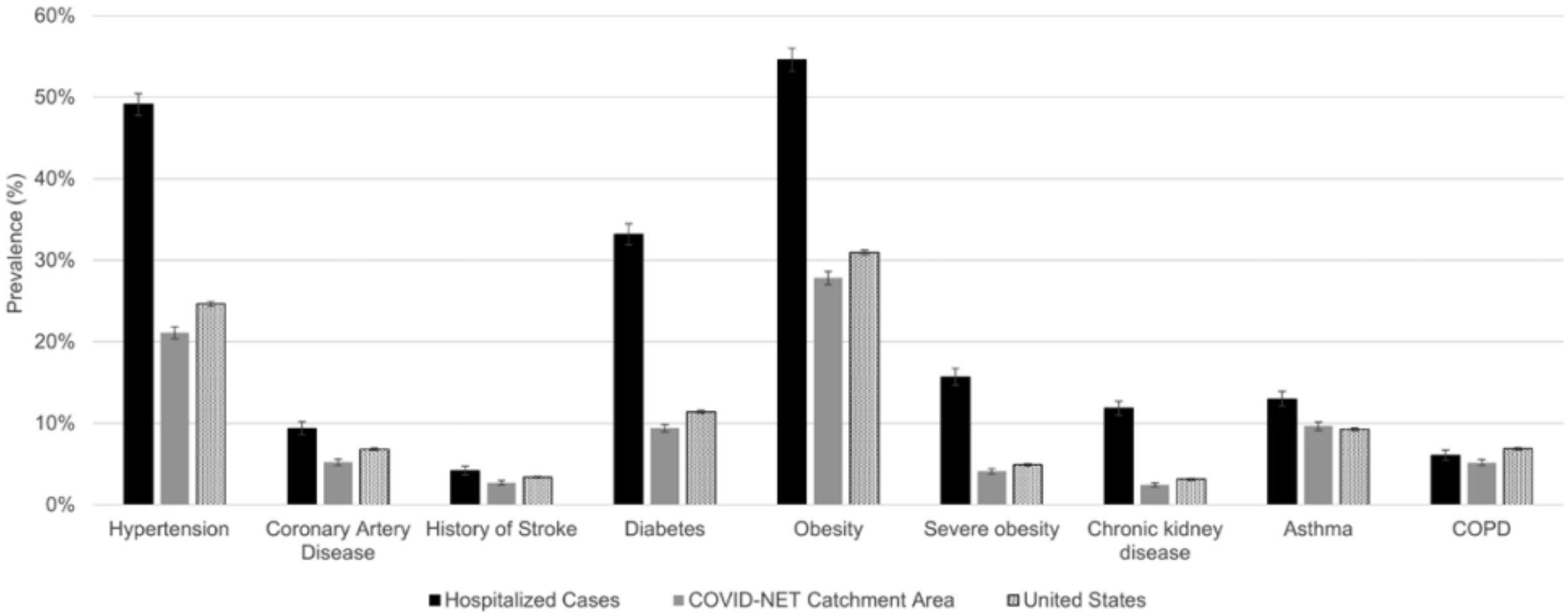
# Estimating exposure risk of workers



| | | Exposed > 1 time/month | | Exposed > 1 time/week | |
|---|---|---|---|---|---|
| 2-digit SOC | total in SOC | # | % | # | % |
| Healthcare Support | 4,117,450 | 3,958,560 | 96.1% | 3,160,890 | 76.8% |
| Healthcare Practitioners and Technical | 8,646,730 | 7,911,430 | 91.5% | 6,728,420 | 77.8% |
| Protective Services | 3,437,410 | 1,789,490 | 52.1% | 1,026,660 | 29.9% |
| Personal Care and Service | 5,451,330 | 2,841,730 | 52.1% | 29,810 | 0.5% |
| Community and Social Services | 2,171,820 | 704,280 | 32.4% | 168,190 | 7.7% |
| Education, Training, and Library | 8,779,780 | 2,048,070 | 23.3% | -- | -- |
| Building and Grounds Cleaning and Maintenance | 4,421,980 | 924,290 | 20.9% | -- | -- |
| Office and Administrative Support | 21,828,990 | 3,532,530 | 16.2% | 2,871,400 | 13.2% |
| Life, Physical, and Social Science | 1,171,910 | 159,970 | 13.7% | 20,030 | 1.7% |
| Computer and Mathematical | 4,384,300 | 587,970 | 13.4% | -- | -- |
| Transportation and Material Moving | 10,244,260 | 930,930 | 9.1% | 118,770 | 1.2% |
| Construction and Extraction | 5,962,640 | 491,990 | 8.3% | -- | -- |
| Production | 9,115,530 | 371,480 | 4.1% | -- | -- |
| Business and Financial Operations | 7,721,300 | 300,900 | 3.9% | 300,900 | 3.9% |
| Arts, Design, Entertainment, Sports, and Media | 1,951,170 | 57,140 | 2.9% | -- | -- |
| Management | 7,616,650 | 59,050 | 0.8% | -- | -- |
| Architecture and Engineering | 2,556,220 | -- | -- | -- | -- |
| Legal | 1,127,900 | -- | -- | -- | -- |
| Food Preparation and Serving Related | 13,374,620 | -- | -- | -- | -- |
| Sales and Related | 14,542,290 | -- | -- | -- | -- |
| Farming, Fishing, and Forestry | 480,130 | -- | -- | -- | -- |
| Installation, Maintenance, and Repair | 5,628,880 | -- | -- | -- | -- |
| **All SOCs** | **144,944,620** | **26,669,810** | **18.4%** | **4,425,070** | **10.0%** |

# Hospitalizations: Underlying medical conditions






Ko JY, Danielson ML, Town M, et al., Risk Factors for Coronavirus Disease 2019 (COVID-19)–Associated Hospitalization: COVID-19–Associated Hospitalization Surveillance Network and Behavioral Risk Factor Surveillance System, *Clinical Infectious Diseases*, , ciaa1419, https://doi.org/10.1093/cid/ciaa1419

# Hospitalization risk: Underlying conditions



## Unadjusted and Adjusted[a] Rate Ratios for Number of Underlying Medical Conditions and COVID-19-Associated Hospitalization, COVID-NET March 1- June 23, 2020

| | Unadjusted Rate Ratio (95%CI) | Adjusted Rate Ratio[a] (95%CI) |
|---|---|---|
| Number of conditions[b] | | |
| 1 | 2.8 (2.7, 3.1) | **2.5 (2.1, 3.0)** |
| 2 | 5.6 (5.2, 6.1) | **4.5 (3.7, 5.5)** |
| 3+ | 7.2 (6.6, 7.9) | **5.0 (3.9, 6.3)** |
| Age 45-64 years[c] | ----- | **1.8 (1.5, 2.2)** |
| Age 65+ years[c] | ----- | **2.6 (2.1, 3.1)** |
| Male sex[d] | ----- | **1.2 (1.1, 1.4)** |
| Non-Hispanic black[e] | ----- | **3.9 (3.3, 4.7)** |
| Other race/ethnicity[e] | ----- | **3.3 (2.8, 3.9)** |

CI: Confidence Interval; COVID-NET: Coronavirus Disease 2019-Associated Hospitalization Surveillance Network
[a]Model for number of conditions (variable) is adjusted for age, sex, and race/ethnicity
[b]Reference group is no underlying medical condition; Number of conditions is a sum of underlying medical conditions excluding hypertension; the most recent year of available BRFSS data for hypertension was 2017.
[c]Reference group is 18-44 years
[d]Reference group is female
[e]Reference group is non-Hispanic white

Ko, Sept 2020, doi: 10.1093/cid/ciaa1419

# Hospitalizations: Prevalence of underlying conditions



| | Overall | Age 18–44 y | Age 45–64 y | Age ≥65 y | Males | Females | Non-Hispanic White | Non-Hispanic Black | Other Race/Ethnicity[c] |
|---|---|---|---|---|---|---|---|---|---|
| **Underlying Medical Condition[b]** | **N = 5416** | **n = 1601 (30%)** | **n = 2162 (40%)** | **n = 1653 (31%)** | **n = 2847 (53%)** | **n = 2569 (47%)** | **n = 1758 (34%)** | **n = 1663 (32%)** | **n = 1798 (34%)** |
| Hypertension | 2658 (49) | 272 (17) | 1146 (53) | 1240 (75) | 1469 (52) | 1189 (46) | 956 (55) | 1026 (62) | 594 (33) |
| Coronary artery disease | 506 (9) | 11 (1) | 145 (7) | 350 (21) | 337 (12) | 169 (7) | 255 (15) | 155 (9) | 73 (4) |
| History of stroke | 227 (4) | 12 (1) | 70 (3) | 145 (9) | 134 (5) | 93 (4) | 79 (5) | 99 (6) | 41 (2) |
| Diabetes | 1793 (33) | 300 (19) | 798 (37) | 695 (42) | 984 (35) | 809 (32) | 528 (30) | 654 (39) | 548 (31) |
| Obesity | 2674 (55) | 801 (63) | 1238 (60) | 635 (41) | 1315 (49) | 1359 (62) | 879 (54) | 929 (60) | 785 (51) |
| Severe obesity | 769 (16) | 312 (25) | 353 (17) | 104 (7) | 316 (12) | 453 (21) | 240 (15) | 329 (21) | 191 (12) |
| Chronic kidney disease | 640 (12) | 54 (3) | 201 (9) | 385 (23) | 387 (14) | 253 (10) | 206 (12) | 285 (17) | 125 (7) |
| Asthma | 702 (13) | 211 (13) | 295 (14) | 196 (12) | 243 (9) | 459 (18) | 236 (13) | 276 (17) | 171 (10) |
| COPD | 328 (6) | …[d] | 104 (5) | 219 (13) | 179 (6) | 149 (6) | 189 (11) | 102 (6) | 29 (2) |
| Any condition[e] | 3938 (73) | 978 (61) | 1660 (77) | 1300 (79) | 2071 (73) | 1867 (73) | 1302 (74) | 1338 (80) | 1168 (65) |

Adjusting for the presence of an individual underlying medical condition, higher hospitalization rates were observed for adults aged ≥65 or 45–64 years (vs 18–44 years), males (vs females), and non-Hispanic black and other race/ethnicities (vs non-Hispanic whites).

Ko JY, Danielson ML, Town M, et al., Risk Factors for Coronavirus Disease 2020 (COVID-19)–Associated Hospitalization: COVID-19–Associated Hospitalization Surveillance Network and Behavioral Risk Factor Surveillance System, *Clinical Infectious Diseases*, , ciaa1419, https://doi.org/10.1093/cid/ciaa1419