

### Spatial clustering and contextual factors associated with hospitalization and deaths due to COVID-19 in Sweden: a geospatial nationwide ecological study

Osvaldo Fonseca-Rodríguez<sup>1,\*</sup>, Per E. Gustafsson<sup>2</sup>, Miguel San Sebastian<sup>2</sup>, Anne-Marie Fors Connolly<sup>1</sup>

<sup>1</sup>Department of Clinical Microbiology, Umeå University, 901 85 Umeå, Sweden

<sup>2</sup>Department of Epidemiology and Global Health, Umeå University, 901 87 Umeå, Sweden

\*Corresponding author:

Osvaldo Fonseca-Rodríguez

Email: [osvaldo.fonseca@umu.se](mailto:osvaldo.fonseca@umu.se)

**Table A1.** Standardized Incidence of Hospitalizations (SIR) and Standardized Mortality Ratios (SMR) by municipalities in Sweden (February 2020 to October 5<sup>th</sup> 2020)

Municipality	SIR (95% CI)	SMR (95% CI)
Norrtälje	<b>0.59 (0.46-0.73)</b>	<b>0.62 (0.42-0.88)</b>
Sigtuna	<b>2.3 (1.97-2.68)</b>	<b>2.77 (2.1-3.58)</b>
Nynäshamn	0.93 (0.69-1.23)	0.84 (0.47-1.38)
Varberg	<b>0.62 (0.49-0.77)</b>	<b>0.53 (0.34-0.78)</b>
Krokom	<b>0.4 (0.2-0.72)</b>	<b>0 (0-0.38)</b>
Upplands Väsby	<b>1.8 (1.51-2.13)</b>	<b>3.38 (2.65-4.24)</b>
Trosa	0.62 (0.35-1.01)	0.46 (0.13-1.19)
Gnosjö	0.57 (0.27-1.04)	1.87 (0.97-3.27)
Gotland	<b>0.16 (0.1-0.25)</b>	<b>0.11 (0.04-0.26)</b>
Hässleholm	<b>0.43 (0.31-0.57)</b>	<b>0.48 (0.3-0.75)</b>
Tibro	1.08 (0.69-1.6)	1.36 (0.7-2.37)
Ulricehamn	0.91 (0.66-1.22)	<b>0.47 (0.22-0.9)</b>
Mariestad	<b>0.26 (0.14-0.44)</b>	<b>0.1 (0.01-0.36)</b>
Hofors	<b>1.56 (1.06-2.21)</b>	0.66 (0.21-1.53)
Hudiksvall	<b>0.75 (0.57-0.98)</b>	0.67 (0.4-1.04)
Sollefteå	<b>0.48 (0.29-0.74)</b>	0.75 (0.4-1.28)
Lycksele	<b>0.08 (0.01-0.3)</b>	<b>0 (0-0.39)</b>
Järfälla	<b>2.32 (2.06-2.6)</b>	<b>2.32 (1.88-2.83)</b>
Nyköping	1.1 (0.91-1.31)	1.28 (0.96-1.66)
Växjö	<b>0.48 (0.38-0.61)</b>	<b>0.56 (0.38-0.79)</b>
Högsby	<b>0.33 (0.09-0.84)</b>	<b>0 (0-0.76)</b>
Åstorp	<b>0.38 (0.18-0.7)</b>	0.35 (0.07-1.03)
Sotenäs	<b>0.23 (0.08-0.55)</b>	<b>0.23 (0.03-0.82)</b>
Mellerud	<b>0.4 (0.17-0.79)</b>	0.73 (0.27-1.58)
Hallsberg	<b>0.54 (0.31-0.87)</b>	0.47 (0.15-1.09)
Ånge	<b>0.54 (0.27-0.97)</b>	0.37 (0.08-1.07)
Kramfors	0.87 (0.61-1.21)	<b>2.23 (1.56-3.09)</b>
Överkalix	<b>0 (0-0.45)</b>	0 (0-1.07)
Luleå	<b>0.4 (0.3-0.52)</b>	<b>0.12 (0.05-0.27)</b>
Lidingö	1.17 (0.96-1.42)	<b>1.79 (1.37-2.29)</b>

Sävsjö	<b>0.49 (0.24-0.87)</b>	<b>0.34 (0.07-0.98)</b>
Herrljunga	<b>1.56 (1.04-2.24)</b>	1.14 (0.49-2.25)
Kungälv	<b>0.78 (0.6-0.99)</b>	<b>0.57 (0.33-0.91)</b>
Örebro	<b>1.24 (1.11-1.39)</b>	1.05 (0.84-1.29)
Jokkmokk	<b>0 (0-0.34)</b>	<b>0 (0-0.89)</b>
Övertorneå	0.84 (0.39-1.6)	0.65 (0.13-1.89)
Vaxholm	1.18 (0.76-1.74)	0.44 (0.09-1.3)
Ödeshög	<b>0.09 (0-0.51)</b>	0.24 (0.01-1.32)
Ätvidaberg	<b>0.46 (0.23-0.83)</b>	0.65 (0.24-1.41)
Gislaved	0.74 (0.53-1.01)	<b>0.51 (0.24-0.93)</b>
Partille	0.8 (0.6-1.05)	0.73 (0.42-1.18)
Bräcke	<b>0.22 (0.04-0.63)</b>	<b>2.85 (1.59-4.69)</b>
Malå	0.46 (0.1-1.35)	0.39 (0.01-2.19)
Pajala	0.9 (0.48-1.55)	0.67 (0.18-1.71)
Habo	0.87 (0.51-1.4)	<b>0.17 (0-0.94)</b>
Vaggeryd	<b>0.08 (0.01-0.29)</b>	1.14 (0.55-2.09)
Tjörn	<b>0.6 (0.37-0.93)</b>	0.48 (0.18-1.05)
Vansbro	<b>0.28 (0.08-0.71)</b>	0.69 (0.19-1.76)
Ovanåker	0.61 (0.34-1.01)	1.26 (0.65-2.2)
Stockholm	<b>2.22 (2.15-2.3)</b>	<b>2.46 (2.32-2.61)</b>
Olofström	<b>0.18 (0.06-0.41)</b>	<b>0.17 (0.02-0.62)</b>
Bjuv	<b>0.08 (0.01-0.27)</b>	<b>0 (0-0.44)</b>
Höör	<b>0.1 (0.02-0.29)</b>	<b>0.09 (0-0.52)</b>
Tomelilla	<b>0.11 (0.02-0.32)</b>	<b>0.1 (0-0.53)</b>
Falkenberg	<b>0.57 (0.43-0.75)</b>	0.69 (0.44-1.02)
Essunga	0.52 (0.19-1.14)	1.13 (0.37-2.63)
Eda	<b>0.23 (0.06-0.59)</b>	<b>0 (0-0.54)</b>
Nordmaling	<b>0.13 (0.02-0.48)</b>	<b>0 (0-0.63)</b>
Vindeln	0.43 (0.14-1.01)	0.62 (0.13-1.81)
Piteå	<b>0.32 (0.21-0.48)</b>	<b>0.39 (0.2-0.7)</b>
Tyresö	<b>1.87 (1.58-2.2)</b>	<b>2.28 (1.73-2.96)</b>
Södertälje	<b>3.5 (3.21-3.8)</b>	<b>2.7 (2.26-3.2)</b>
Östhammar	1.03 (0.76-1.36)	1.16 (0.73-1.76)
Gnesta	1.23 (0.81-1.81)	<b>2.08 (1.16-3.42)</b>
Hultsfred	<b>0.33 (0.16-0.61)</b>	<b>0.16 (0.02-0.58)</b>
Borås	<b>1.38 (1.22-1.56)</b>	1.17 (0.93-1.45)
Borlänge	<b>1.84 (1.57-2.14)</b>	<b>3.01 (2.44-3.66)</b>
Storuman	<b>0.15 (0.02-0.55)</b>	<b>0 (0-0.68)</b>
Boden	0.74 (0.53-1)	0.77 (0.44-1.24)
Nykvarn	1.36 (0.87-2.02)	<b>2.22 (1.11-3.98)</b>
Älvkarleby	0.86 (0.49-1.39)	<b>3.01 (1.86-4.6)</b>
Vingåker	<b>1.72 (1.17-2.44)</b>	<b>2.64 (1.54-4.23)</b>
Karlshamn	<b>0.15 (0.07-0.28)</b>	<b>0.16 (0.04-0.4)</b>
Orust	<b>0.3 (0.14-0.54)</b>	<b>0.3 (0.08-0.77)</b>

Grästorp	0.51 (0.19-1.11)	0.22 (0.01-1.21)
Falköping	<b>0.51 (0.35-0.72)</b>	<b>0.25 (0.09-0.54)</b>
Lindesberg	<b>0.5 (0.31-0.74)</b>	0.57 (0.27-1.05)
Sala	0.85 (0.6-1.16)	<b>1.7 (1.14-2.44)</b>
Östersund	<b>0.69 (0.55-0.86)</b>	0.85 (0.59-1.18)
Bjurholm	0.35 (0.04-1.28)	0 (0-1.29)
Robertsfors	<b>0.36 (0.12-0.84)</b>	0.56 (0.12-1.64)
Uppvidinge	0.83 (0.48-1.35)	0.38 (0.08-1.1)
Mönsterås	0.84 (0.53-1.26)	1.42 (0.79-2.34)
Burlöv	0.71 (0.44-1.07)	1.12 (0.56-2.01)
Örkelljunga	<b>0.29 (0.11-0.64)</b>	0.38 (0.08-1.11)
Alingsås	<b>0.69 (0.52-0.9)</b>	<b>0.45 (0.24-0.78)</b>
Torsby	<b>0.38 (0.18-0.7)</b>	<b>0.27 (0.06-0.79)</b>
Munkfors	<b>2.8 (1.8-4.17)</b>	<b>2.65 (1.27-4.87)</b>
Surahammar	0.6 (0.31-1.05)	<b>0.13 (0-0.75)</b>
Sundsvall	0.85 (0.72-1)	<b>0.75 (0.56-0.99)</b>
Åre	1.03 (0.63-1.59)	1.36 (0.59-2.68)
Oxelösund	<b>1.47 (1.03-2.03)</b>	1.07 (0.54-1.92)
Jönköping	<b>1.52 (1.36-1.68)</b>	1.01 (0.81-1.24)
Lessebo	<b>0.37 (0.13-0.8)</b>	0.49 (0.1-1.42)
Mörbylånga	<b>0.56 (0.32-0.89)</b>	0.45 (0.15-1.06)
Nybro	<b>0.53 (0.33-0.8)</b>	<b>0.3 (0.1-0.7)</b>
Perstorp	<b>0.29 (0.08-0.74)</b>	0.41 (0.05-1.47)
Götene	<b>0.19 (0.06-0.44)</b>	<b>0.1 (0-0.58)</b>
Kungsör	0.78 (0.42-1.33)	<b>0.17 (0-0.95)</b>
Malung-Sälen	<b>0.19 (0.05-0.48)</b>	<b>0.25 (0.03-0.9)</b>
Kiruna	<b>0.61 (0.4-0.89)</b>	1.5 (0.94-2.27)
Nacka	<b>1.49 (1.31-1.69)</b>	<b>1.99 (1.62-2.42)</b>
Flen	<b>1.4 (1.03-1.85)</b>	1.33 (0.79-2.11)
Mjölby	<b>0.53 (0.35-0.77)</b>	0.98 (0.58-1.55)
Borgholm	<b>0.41 (0.21-0.74)</b>	0.44 (0.14-1.02)
Simrishamn	<b>0.13 (0.05-0.29)</b>	<b>0.1 (0.01-0.37)</b>
Laholm	<b>0.37 (0.22-0.58)</b>	0.61 (0.32-1.07)
Dals-Ed	0.4 (0.11-1.03)	0.77 (0.16-2.25)
Gullspång	<b>0.25 (0.05-0.72)</b>	0.2 (0.01-1.13)
Vänersborg	0.78 (0.59-1)	<b>1.58 (1.15-2.12)</b>
Fagersta	0.65 (0.38-1.04)	0.84 (0.38-1.59)
Alvesta	0.87 (0.6-1.23)	<b>1.7 (1.1-2.51)</b>
Älmhult	0.88 (0.58-1.27)	0.98 (0.51-1.71)
Karlskrona	<b>0.44 (0.33-0.57)</b>	<b>0.2 (0.09-0.37)</b>
Ängelholm	<b>0.21 (0.13-0.34)</b>	<b>0.27 (0.12-0.51)</b>
Kungsbacka	<b>0.61 (0.49-0.75)</b>	<b>0.39 (0.24-0.6)</b>
Skövde	0.89 (0.71-1.1)	0.93 (0.63-1.31)
Storfors	0.69 (0.26-1.51)	0.31 (0.01-1.72)

Mora	<b>0.14 (0.05-0.31)</b>	<b>0.06 (0-0.34)</b>
Danderyd	1.04 (0.8-1.33)	0.73 (0.43-1.15)
Finspång	1.01 (0.73-1.35)	1.42 (0.91-2.11)
Sollentuna	<b>1.58 (1.36-1.82)</b>	<b>2.77 (2.26-3.36)</b>
Katrineholm	<b>1.79 (1.48-2.15)</b>	<b>2.19 (1.65-2.84)</b>
Vadstena	<b>0.23 (0.06-0.6)</b>	0.7 (0.23-1.62)
Kalmar	0.92 (0.76-1.11)	<b>0.3 (0.16-0.51)</b>
Svalöv	<b>0.21 (0.07-0.48)</b>	<b>0.26 (0.03-0.95)</b>
Svedala	<b>0.28 (0.13-0.51)</b>	<b>0.35 (0.1-0.9)</b>
Sjöbo	<b>0.16 (0.06-0.35)</b>	<b>0 (0-0.28)</b>
Vara	<b>0.19 (0.07-0.41)</b>	<b>0 (0-0.32)</b>
Töreboda	1.1 (0.68-1.68)	1.21 (0.56-2.31)
Mölnadal	1.01 (0.83-1.21)	1.01 (0.7-1.41)
Arvika	<b>0.41 (0.26-0.62)</b>	<b>0.13 (0.03-0.39)</b>
Sorsele	<b>0 (0-0.64)</b>	0 (0-1.48)
Solna	<b>1.83 (1.6-2.08)</b>	<b>2.13 (1.7-2.63)</b>
Strömstad	<b>0.16 (0.04-0.41)</b>	<b>0.21 (0.03-0.77)</b>
Tidaholm	<b>0.47 (0.24-0.82)</b>	0.5 (0.16-1.16)
Forshaga	<b>0.41 (0.19-0.78)</b>	0.62 (0.2-1.44)
Ludvika	0.87 (0.63-1.16)	1.14 (0.73-1.69)
Örnsköldsvik	<b>0.34 (0.24-0.46)</b>	<b>0.22 (0.1-0.41)</b>
Gällivare	<b>1.83 (1.42-2.32)</b>	<b>1.9 (1.25-2.76)</b>
Upplands-Bro	<b>1.48 (1.14-1.88)</b>	<b>2.45 (1.64-3.52)</b>
Tranås	<b>0.4 (0.22-0.66)</b>	<b>0.13 (0.02-0.46)</b>
Tingsryd	0.94 (0.61-1.37)	0.96 (0.5-1.68)
Sölvesborg	<b>0.17 (0.06-0.36)</b>	<b>0.07 (0-0.4)</b>
Kävlinge	<b>0.13 (0.05-0.27)</b>	<b>0.12 (0.01-0.43)</b>
Hörby	<b>0.17 (0.05-0.39)</b>	<b>0.09 (0-0.51)</b>
Munkedal	<b>0.38 (0.16-0.74)</b>	0.59 (0.19-1.38)
Färgelanda	1.12 (0.63-1.85)	0.4 (0.05-1.43)
Bollebygd	<b>0.3 (0.1-0.69)</b>	<b>0 (0-0.66)</b>
Uddevalla	<b>0.69 (0.54-0.87)</b>	0.78 (0.52-1.11)
Skinnskatteberg	<b>0.1 (0-0.58)</b>	0 (0-1.01)
Norsjö	<b>0.12 (0-0.66)</b>	0 (0-1.15)
Värmdö	<b>1.65 (1.37-1.97)</b>	<b>2.32 (1.7-3.08)</b>
Sundbyberg	<b>2.49 (2.15-2.88)</b>	<b>3.9 (3.08-4.87)</b>
Heby	<b>0.36 (0.17-0.66)</b>	0.47 (0.15-1.1)
Boxholm	0.62 (0.25-1.27)	<b>0 (0-0.86)</b>
Norrköping	<b>1.45 (1.31-1.61)</b>	<b>1.29 (1.05-1.55)</b>
Aneby	1.24 (0.71-2.01)	1.47 (0.59-3.03)
Härryda	<b>0.62 (0.44-0.85)</b>	0.69 (0.37-1.19)
Trollhättan	0.95 (0.77-1.16)	1.08 (0.77-1.47)
Årjäng	<b>0.1 (0.01-0.36)</b>	<b>0 (0-0.48)</b>
Hagfors	<b>0.37 (0.18-0.68)</b>	<b>0.18 (0.02-0.65)</b>

Leksand	0.83 (0.55-1.2)	1.09 (0.61-1.8)
Ockelbo	1.38 (0.8-2.21)	1.32 (0.49-2.88)
Härnösand	<b>0.72 (0.5-0.99)</b>	0.72 (0.4-1.22)
Haparanda	<b>0.2 (0.05-0.5)</b>	<b>0 (0-0.5)</b>
Tierp	<b>0.53 (0.33-0.8)</b>	<b>0.25 (0.07-0.63)</b>
Enköping	0.94 (0.74-1.18)	0.87 (0.56-1.28)
Ydre	0.49 (0.13-1.24)	0 (0-1.14)
Valdemarsvik	1.37 (0.87-2.03)	1.53 (0.77-2.74)
Ljungby	<b>0.55 (0.37-0.78)</b>	0.68 (0.38-1.12)
Bromölla	<b>0.16 (0.04-0.41)</b>	<b>0.11 (0-0.61)</b>
Malmö	<b>0.65 (0.58-0.72)</b>	<b>0.48 (0.38-0.6)</b>
Eslöv	<b>0.34 (0.21-0.53)</b>	<b>0.25 (0.08-0.59)</b>
Halmstad	<b>0.39 (0.31-0.49)</b>	<b>0.22 (0.12-0.37)</b>
Göteborg	<b>1.23 (1.16-1.31)</b>	<b>1.62 (1.48-1.78)</b>
Askersund	0.66 (0.38-1.07)	0.65 (0.24-1.42)
Sandviken	1.02 (0.81-1.28)	1.17 (0.8-1.64)
Arvidsjaur	<b>0.45 (0.17-0.99)</b>	0.38 (0.05-1.39)
Arjeplog	1.11 (0.45-2.28)	0 (0-1.39)
Kalix	<b>0.17 (0.06-0.37)</b>	<b>0.15 (0.02-0.52)</b>
Vårgårda	0.62 (0.33-1.05)	0.82 (0.3-1.78)
Sunne	<b>0.36 (0.17-0.67)</b>	0.66 (0.26-1.35)
Karlstad	<b>0.56 (0.45-0.68)</b>	<b>0.3 (0.18-0.47)</b>
Lekeberg	0.54 (0.24-1.07)	<b>0 (0-0.7)</b>
Laxå	0.64 (0.27-1.25)	<b>2.3 (1.19-4.02)</b>
Nora	<b>0.23 (0.08-0.54)</b>	<b>0 (0-0.46)</b>
Gävle	<b>1.27 (1.11-1.45)</b>	1.18 (0.93-1.49)
Strömsund	<b>0.15 (0.04-0.4)</b>	<b>0.28 (0.06-0.82)</b>
Vallentuna	0.85 (0.62-1.13)	0.69 (0.34-1.23)
Österåker	1.1 (0.88-1.36)	0.96 (0.61-1.44)
Botkyrka	<b>3.22 (2.93-3.54)</b>	<b>2.37 (1.89-2.93)</b>
Värnamo	0.88 (0.67-1.14)	1.09 (0.71-1.6)
Oskarshamn	<b>0.43 (0.27-0.65)</b>	<b>0.25 (0.08-0.58)</b>
Helsingborg	<b>0.6 (0.51-0.71)</b>	0.9 (0.72-1.13)
Tranemo	0.8 (0.48-1.25)	0.64 (0.24-1.4)
Lidköping	<b>0.46 (0.32-0.63)</b>	0.88 (0.57-1.3)
Kil	<b>0.17 (0.05-0.44)</b>	<b>0.11 (0-0.63)</b>
Berg	0.65 (0.31-1.19)	1.11 (0.45-2.28)
Emmaboda	<b>0.2 (0.05-0.5)</b>	<b>0 (0-0.43)</b>
Lund	<b>0.25 (0.18-0.33)</b>	<b>0.31 (0.19-0.48)</b>
Lilla Edet	0.8 (0.49-1.24)	1.12 (0.51-2.12)
Åmål	<b>0.49 (0.26-0.84)</b>	<b>0.36 (0.1-0.92)</b>
Hällefors	0.59 (0.27-1.12)	1.08 (0.43-2.23)
Hedemora	0.67 (0.41-1.02)	<b>0.42 (0.14-0.98)</b>
Bollnäs	<b>0.71 (0.5-0.97)</b>	<b>0.44 (0.2-0.83)</b>

Skellefteå	<b>0.33 (0.25-0.44)</b>	<b>0.29 (0.16-0.48)</b>
Ekerö	1.12 (0.84-1.46)	1.04 (0.58-1.72)
Knivsta	0.97 (0.64-1.43)	0.72 (0.23-1.67)
Vetlanda	<b>0.68 (0.48-0.93)</b>	<b>0.45 (0.22-0.83)</b>
Huddinge	<b>2.34 (2.12-2.59)</b>	<b>2.43 (1.99-2.93)</b>
Uppsala	<b>1.32 (1.2-1.44)</b>	<b>1.41 (1.2-1.64)</b>
Linköping	0.94 (0.82-1.06)	1.02 (0.82-1.24)
Markaryd	1.06 (0.66-1.6)	1.17 (0.56-2.16)
Ronneby	<b>0.2 (0.11-0.36)</b>	<b>0.17 (0.05-0.44)</b>
Staffanstorps	<b>0.21 (0.1-0.4)</b>	<b>0.14 (0.02-0.5)</b>
Östra Göinge	<b>0.32 (0.15-0.61)</b>	<b>0.28 (0.06-0.83)</b>
Trelleborg	<b>0.33 (0.22-0.48)</b>	<b>0.3 (0.14-0.57)</b>
Bengtstors	<b>0.42 (0.19-0.79)</b>	<b>0.33 (0.07-0.96)</b>
Grums	0.65 (0.33-1.13)	0.7 (0.23-1.64)
Härjedalen	<b>0.36 (0.15-0.7)</b>	<b>0.11 (0-0.6)</b>
Vilhelmina	<b>0 (0-0.27)</b>	<b>0 (0-0.7)</b>
Salem	<b>1.75 (1.29-2.32)</b>	<b>1.97 (1.17-3.11)</b>
Skurup	<b>0.25 (0.1-0.51)</b>	<b>0.1 (0-0.58)</b>
Ystad	<b>0.13 (0.05-0.25)</b>	<b>0.04 (0-0.22)</b>
Kristianstad	<b>0.25 (0.18-0.34)</b>	<b>0.24 (0.13-0.4)</b>
Hylte	<b>0.1 (0.01-0.35)</b>	<b>0.13 (0-0.71)</b>
Lerum	<b>0.74 (0.55-0.96)</b>	0.61 (0.33-1.03)
Svenljunga	<b>0.47 (0.22-0.86)</b>	<b>0.13 (0-0.72)</b>
Lysekil	<b>0.22 (0.09-0.45)</b>	<b>0.37 (0.12-0.87)</b>
Skara	0.82 (0.55-1.18)	1.33 (0.78-2.13)
Degerfors	0.97 (0.59-1.5)	1.24 (0.6-2.28)
Gagnef	<b>0.5 (0.24-0.91)</b>	1.35 (0.65-2.49)
Rättvik	<b>0.38 (0.18-0.71)</b>	<b>0.26 (0.05-0.76)</b>
Timrå	1.33 (0.97-1.78)	1.3 (0.73-2.15)
Dorotea	<b>0 (0-0.59)</b>	0 (0-1.3)
Vännäs	<b>0.19 (0.04-0.54)</b>	<b>0 (0-0.62)</b>
Täby	1.09 (0.91-1.28)	1.23 (0.93-1.6)
Strängnäs	<b>0.58 (0.41-0.79)</b>	<b>0.52 (0.27-0.91)</b>
Söderköping	0.91 (0.6-1.34)	0.59 (0.22-1.28)
Nässjö	<b>1.44 (1.15-1.78)</b>	1.15 (0.75-1.69)
Torsås	0.91 (0.5-1.53)	<b>1.95 (1.01-3.41)</b>
Västervik	<b>0.33 (0.21-0.48)</b>	<b>0.43 (0.23-0.72)</b>
Vellinge	<b>0.25 (0.14-0.4)</b>	<b>0.16 (0.04-0.42)</b>
Lomma	<b>0.2 (0.09-0.38)</b>	<b>0 (0-0.23)</b>
Osby	<b>0.34 (0.15-0.64)</b>	<b>0.36 (0.1-0.92)</b>
Tanum	<b>0.43 (0.22-0.76)</b>	0.45 (0.15-1.05)
Hjo	<b>0.21 (0.06-0.54)</b>	<b>0 (0-0.49)</b>
Ljusnarsberg	<b>0.19 (0.02-0.68)</b>	<b>0 (0-0.9)</b>
Karlskoga	0.82 (0.61-1.09)	0.67 (0.38-1.09)

Västerås	<b>1.26 (1.13-1.4)</b>	<b>1.38 (1.15-1.63)</b>
Köping	1.15 (0.87-1.48)	0.84 (0.49-1.35)
Håbo	0.76 (0.5-1.11)	1 (0.48-1.85)
Eskilstuna	<b>1.66 (1.48-1.85)</b>	<b>1.57 (1.28-1.9)</b>
Motala	<b>0.64 (0.48-0.84)</b>	<b>0.39 (0.2-0.68)</b>
Landskrona	<b>0.25 (0.15-0.38)</b>	<b>0.04 (0-0.2)</b>
Norberg	0.67 (0.29-1.32)	0.43 (0.05-1.57)
Arboga	0.63 (0.37-1)	1 (0.5-1.78)
Ragunda	0.5 (0.18-1.09)	<b>0 (0-0.72)</b>
Umeå	<b>0.27 (0.21-0.36)</b>	<b>0.14 (0.06-0.27)</b>
Älvsbyn	<b>0.18 (0.04-0.52)</b>	<b>0.15 (0-0.84)</b>
Eksjö	<b>0.57 (0.35-0.87)</b>	<b>0.28 (0.08-0.72)</b>
Klippan	<b>0.21 (0.08-0.42)</b>	<b>0.16 (0.02-0.57)</b>
Båstad	<b>0.35 (0.18-0.61)</b>	<b>0.21 (0.04-0.61)</b>
Höganäs	<b>0.23 (0.13-0.4)</b>	<b>0.18 (0.05-0.47)</b>
Stenungsund	<b>0.47 (0.29-0.71)</b>	<b>0.13 (0.02-0.47)</b>
Mark	<b>0.64 (0.47-0.87)</b>	0.75 (0.45-1.17)
Nordanstig	0.67 (0.36-1.14)	0.56 (0.15-1.44)
Kinda	0.82 (0.48-1.31)	1.11 (0.51-2.12)
Mullsjö	0.51 (0.2-1.04)	0.19 (0-1.06)
Vimmerby	<b>0.22 (0.09-0.45)</b>	<b>0.24 (0.05-0.69)</b>
Öckerö	0.73 (0.44-1.15)	0.84 (0.36-1.65)
Ale	0.91 (0.66-1.21)	<b>0.26 (0.07-0.67)</b>
Kumla	1.23 (0.9-1.64)	1.07 (0.59-1.8)
Orsa	<b>0.14 (0.02-0.49)</b>	<b>0 (0-0.62)</b>
Smedjebacken	0.87 (0.53-1.34)	0.94 (0.41-1.85)
Falun	0.97 (0.79-1.17)	1.13 (0.82-1.52)
Avesta	<b>0.61 (0.4-0.88)</b>	0.68 (0.35-1.18)
Ljusdal	<b>0.63 (0.41-0.93)</b>	0.51 (0.22-1)
Åsele	<b>0 (0-0.58)</b>	0 (0-1.34)
Haninge	<b>2.13 (1.9-2.39)</b>	<b>2.6 (2.11-3.17)</b>
Karlsborg	<b>0.33 (0.11-0.77)</b>	<b>0 (0-0.6)</b>
Hammarö	<b>0.39 (0.19-0.69)</b>	<b>0.22 (0.03-0.79)</b>
Kristinehamn	<b>0.63 (0.43-0.89)</b>	<b>0.44 (0.2-0.84)</b>
Filipstad	1.36 (0.93-1.93)	0.93 (0.43-1.77)
Säffle	<b>0.27 (0.12-0.51)</b>	<b>0.14 (0.02-0.52)</b>
Hallstahammar	0.88 (0.58-1.27)	<b>0.16 (0.02-0.57)</b>
Älvdalen	<b>0.19 (0.04-0.57)</b>	<b>0.16 (0-0.89)</b>
Säter	0.85 (0.51-1.32)	0.72 (0.26-1.57)
Söderhamn	<b>0.52 (0.35-0.75)</b>	1.01 (0.62-1.54)

Significant values (95% confidence intervals) at  $p < 0.05$  are marked in bold.

**Table A2.** Distribution of study contextual factors in municipalities inside and outside the spatial clusters

Outcome	Variables	Municipalities inside the Clusters n=50	Municipalities outside the clusters n=240
		Median (IQR)	Median (IQR)
<b>Hospitalizations</b>	Population density (Inhab./km <sup>2</sup> )	96.1 (33.9 - 206.1)	23.1 (10.5 - 52.6)
	Gini index	0.3 (0.3 - 0.3)	0.3 (0.3 - 0.3)
	Mean income (Thousands of SEK)	316.8 (293.8 - 354.9)	293.6 (280.1 - 309.5)
	Proportion of immigrants (%)	18.7 (14.9 - 26.1)	13.4 (10.8 - 17.6)
	Proportion of inhabitants with primary education (%)	16.8 (12.8 - 20.9)	20.8 (17.6 - 23.5)
	Proportion of Population 65+ (%)	19.2 (16.1 - 24.0)	24.8 (21.7 - 27.5)
	Variables	Municipalities inside the Clusters n=22	Municipalities outside the clusters n= 268
		Median (IQR)	Median (IQR)
<b>Mortality</b>	Population density (Inhab./km <sup>2</sup> )	401.1 (92.9 - 1380.3)	24.8 (11.6 - 64.0)
	Gini index	0.3 (0.3 - 0.3)	0.3 (0.3 - 0.3)
	Mean income (Thousands of SEK)	358.6 (320.3 - 385.8)	294.9 (281.2 - 310.5)
	Proportion of immigrants (%)	20.5 (17.6 - 29.3)	13.7 (10.9 - 17.8)
	Proportion of inhabitants with primary education (%)	12.8 (10.2 - 14.8)	20.7 (17.4 - 23.2)
	Proportion of Population 65+ (%)	16.6 (15.4 - 19.3)	24.6 (21.3 - 27.2)

**Table A3.** Rate ratio of hospitalizations and mortality between population younger than 65 and aged 65+ within spatial clusters and outside spatial clusters.

Outcome		Municipalities outside the clusters	Municipalities inside the Clusters
<b>Hospitalizations</b>	Hospitalizations 65+	3706	5762
	Population 65+	1363551	701816
	Hospitalizations <65	3176	5603
	Population <65	4858684	3403538
	Rate Ratio (95%CI)	4.16 (3.97 - 4.36)	4.99 (4.81 - 5.17)
	p-value	<0.001	<0.001
<b>Mortality</b>	Deaths 65+	3403	2600
	Population 65+	1654323	411044
	Deaths <65	186	195
	Population <65	6055915	2206307
	Rate Ratio (95%CI)	66.97 (57.78 - 77.63)	71.57 (61.88 - 82.78)
	p-value	<0.001	<0.001