

Supplementary file for the paper

Transmission of SARS-CoV-2 into and within
immigrant households. Nation-wide registry-study
from Norway.

By Methi et al., 2021.

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S-Table 1: Regression table by immigrant definition.

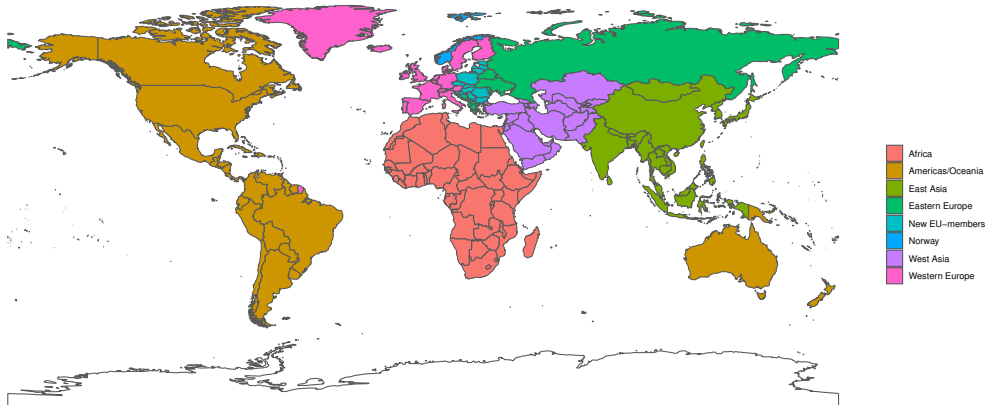
In this regression we include use different definitions of "immigrant households". In model 1, an immigrant household is defined as at least one person in the household being born abroad. This is the definition used throughout the paper. In model 2, a household is defined as an immigrant household if 50% or more of the household is born abroad. In model 3 we compare these two definitions with the first definition as the baseline.

	(1) Immigrant: 1 or more	(2) Immigrant: 50% or more	(3) (1) vs (2)
REGION (BASELINE: NORWAY / NORWAY / IMMIGRANT: 1 OR MORE)			
Immigrant	1.66*** (0.044)	1.59*** (0.042)	1.06 (0.087)
AGE (BASELINE: 0-9 YEARS)			
10-19 years	1.08* (0.034)	1.07* (0.034)	1.21*** (0.048)
20-29 years	0.53*** (0.020)	0.52*** (0.020)	0.63*** (0.031)
30-39 years	0.98 (0.031)	0.98 (0.031)	0.98 (0.039)
40-49 years	0.94 (0.031)	0.93* (0.030)	0.94 (0.039)
50-59 years	0.73*** (0.027)	0.72*** (0.027)	0.79*** (0.039)
60-69 years	0.91 (0.047)	0.90* (0.046)	0.76*** (0.056)
70+ years	1.06 (0.074)	1.05 (0.073)	0.81 (0.089)
SEX (BASELINE: FEMALE)			
Male	0.87*** (0.015)	0.86*** (0.015)	0.80*** (0.018)
HOUSEHOLD SIZE (BASELINE: 2 AND NON-GENERATIONAL)			
3	0.86*** (0.032)	0.86*** (0.032)	1.13* (0.061)
4	0.88*** (0.031)	0.90** (0.032)	1.16** (0.061)
5	0.85*** (0.036)	0.87*** (0.037)	1.17** (0.069)
6	1.01 (0.059)	1.07 (0.062)	1.46*** (0.11)
7+	0.86* (0.064)	0.90 (0.067)	1.20* (0.10)
Generational	0.80** (0.060)	0.80** (0.060)	0.79** (0.070)
COUNTY (BASELINE: OSLO)			
Rogaland	0.39*** (0.047)	0.39*** (0.046)	0.49*** (0.084)
Møre og Romsdal	0.052*** (0.030)	0.051*** (0.030)	0.093** (0.075)
Nordland	0.81* (0.087)	0.79* (0.085)	0.85 (0.16)
Viken	0.86*** (0.027)	0.85*** (0.026)	0.78*** (0.031)
Innlandet	0.25*** (0.046)	0.25*** (0.046)	0.31*** (0.076)
Vestfold og Telemark	0.80*** (0.040)	0.79*** (0.039)	0.76*** (0.057)
Agder	0.76*** (0.049)	0.74*** (0.048)	0.71*** (0.072)
Vestland	0.60*** (0.029)	0.59*** (0.028)	0.56*** (0.041)
Trøndelag	0.14*** (0.030)	0.14*** (0.030)	0.13*** (0.037)
Troms og Finnmark	0.40*** (0.046)	0.39*** (0.045)	0.27*** (0.059)
Unknown	0.33** (0.11)	0.32** (0.11)	0.29 (0.21)
Observations	67490	67490	34700

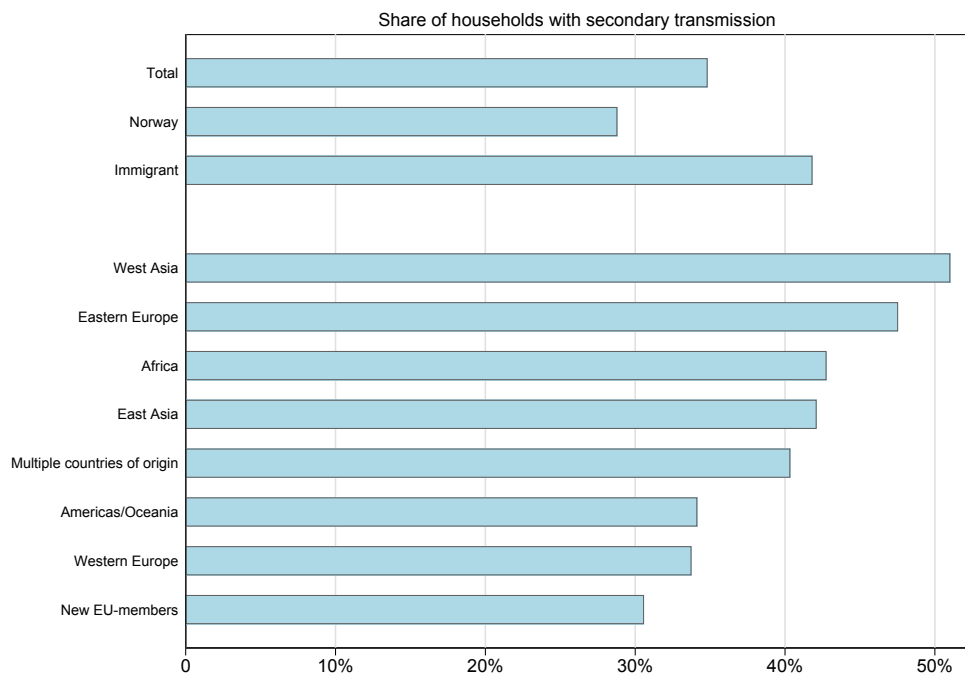
Odds ratios; Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In model (1) immigrants are defined as at least one member being born abroad. Model (2) if 50% or more are born abroad, and model (3) compares these immigrants definitions with the first model being baseline.

S-Figure 1: Map of regions

Note: Number of household-members included in the study: Africa (107,600), Americas/Oceania (85,245), East Asia (168,943), Eastern Europe (73,209), New EU-members (166,461), Norway (3,065,877), West Asia (152,826), and Western Europe (243,377). French Guyana is included in Americas/Oceania despite the pink color.

S-Figure 2: Households with secondary transmission

S-Table 2: Regression table with coindexes.

In addition to the 27,730 households with one index persons, 3,411 households contain multiple index persons. These have been excluded in the main analyses. In this regression analysis we included them. In order to do so, we perform a random draw of the index person and remove the other index person(s) from the sample. Households containing two persons only, where both were indexes, were excluded (n = 869), leaving us with 2,542 extra households and 7,803 persons.

	Crude	+ Age and sex	+ HH-size	+ County
CO-INDEX (BASELINE: 1 INDEX)				
2+ indexes	2.15*** (0.086)	2.13*** (0.086)	2.20*** (0.090)	2.16*** (0.090)
REGION (BASELINE: NORWAY)				
Africa	1.86*** (0.082)	1.82*** (0.080)	1.90*** (0.084)	1.78*** (0.080)
Americas/Oceania	1.25** (0.10)	1.22* (0.099)	1.23* (0.100)	1.16 (0.094)
East Asia	1.62*** (0.093)	1.59*** (0.092)	1.64*** (0.095)	1.51*** (0.088)
Eastern Europe	2.12*** (0.12)	2.08*** (0.12)	2.15*** (0.13)	1.96*** (0.12)
Multiple countries of origin	1.60*** (0.093)	1.56*** (0.091)	1.62*** (0.094)	1.50*** (0.088)
New EU-members	1.04 (0.059)	1.02 (0.058)	1.02 (0.057)	1.00 (0.057)
West Asia	2.26*** (0.074)	2.23*** (0.074)	2.35*** (0.079)	2.10*** (0.073)
Western Europe	1.20*** (0.065)	1.17** (0.064)	1.18** (0.064)	1.10 (0.060)
AGE (BASELINE: 0-9 YEARS)				
10-19 years		1.07* (0.032)	1.09** (0.032)	1.11*** (0.033)
20-29 years		0.52*** (0.019)	0.50*** (0.018)	0.52*** (0.019)
30-39 years		1.02 (0.031)	0.98 (0.030)	0.99 (0.030)
40-49 years		0.98 (0.030)	0.96 (0.030)	0.98 (0.030)
50-59 years		0.77*** (0.027)	0.74*** (0.026)	0.77*** (0.027)
60-69 years		0.91 (0.045)	0.89* (0.044)	0.92 (0.045)
70+ years		1.03 (0.069)	0.99 (0.066)	1.02 (0.070)
SEX (BASELINE: FEMALE)				
Male		0.87*** (0.014)	0.87*** (0.014)	0.88*** (0.014)
HOUSEHOLD SIZE (BASELINE: 2 AND NON-GENERATIONAL)				
3			0.81*** (0.029)	0.83*** (0.030)
4			0.83*** (0.028)	0.84*** (0.029)
5			0.74*** (0.030)	0.76*** (0.031)
6			0.83*** (0.045)	0.86** (0.048)
7+			0.73*** (0.048)	0.78*** (0.052)
Generational			0.75*** (0.053)	0.73*** (0.052)
COUNTY (BASELINE: OSLO)				
Rogaland				0.44*** (0.048)
Møre og Romsdal				0.067*** (0.034)
Nordland				0.83 (0.085)
Viken				0.89*** (0.026)
Innlandet				0.28*** (0.047)
Vestfold og Telemark				0.84*** (0.040)
Agder				0.80*** (0.049)
Vestland				0.64*** (0.029)
Trøndelag				0.18*** (0.034)
Troms og Finnmark				0.47*** (0.051)
Unknown				0.38** (0.12)
Observations	75293	75293	75293	75293

Odds ratios; Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

S-Table 3: Descriptive statistics

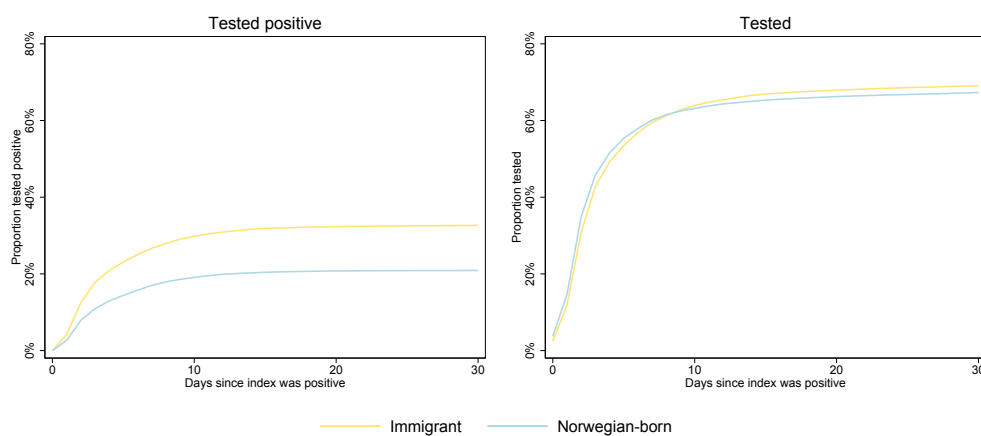
<i>Region</i>	<i>Households</i>	<i>Mean size</i>	<i>Mean age</i>	<i>Generational</i>	Households with at least one ...				
					<i>Index</i>	<i>Tested</i>	<i>Hospitalized</i>	<i>Dead</i>	<i>Secondary infected</i>
Norway	1,079,394	2.8	40.1	17,979 (1.7%)	14,903 (1.4%)	528,101 (48.9%)	996 (0.1%)	117 (0.01%)	4294 (28.8%)
Western Europe	81,333	3.0	37.3	1764 (2.2%)	1570 (1.9%)	46,278 (56.9%)	92 (0.1%)	6 (0.01%)	530 (33.8%)
New EU-members	56,648	2.9	32.7	648 (1.1%)	1618 (2.9%)	28,042 (49.5%)	74 (0.1%)	<5 -	495 (30.6%)
East Asia	54,431	3.1	35.4	3823 (7.0%)	1382 (2.5%)	28,092 (51.6%)	176 (0.3%)	14 (0.03%)	582 (42.1%)
West Asia	41,831	3.7	29.6	1747 (4.2%)	3200 (7.6%)	26,539 (63.4%)	441 (1.1%)	27 (0.06%)	1633 (51.0%)
Africa	30,588	3.5	27.7	1172 (3.8%)	2116 (6.9%)	18,834 (61.6%)	188 (0.6%)	<5 -	905 (42.8%)
Americas/Oceania	27,749	3.1	35.6	1023 (3.7%)	656 (2.4%)	16,496 (59.4%)	38 (0.1%)	<5 -	224 (34.1%)
Multiple countries of origin	27,180	3.4	30.7	1178 (4.3%)	1244 (4.6%)	16,232 (59.7%)	120 (0.4%)	<5 -	502 (40.4%)
Eastern Europe	23,254	3.1	33.7	900 (3.9%)	1041 (4.5%)	13,140 (56.5%)	121 (0.5%)	<5 -	495 (47.6%)
Immigrant	343,017	3.2	33.3	12,255 (3.6%)	12,827 (3.7%)	193,654 (56.5%)	1250 (0.4%)	59 (0.02%)	5366 (41.8%)
Total	1,422,411	2.9	38.3	30,234 (2.1%)	27,730 (1.9%)	721,755 (50.7%)	2246 (0.2%)	176 (0.01%)	9660 (34.8%)

S-Table 4: Main regression table.

	Crude	+ Age and sex	+ HH-size	+ County
REGION (BASELINE: NORWAY)				
Africa	1.95*** (0.092)	1.91*** (0.090)	2.01*** (0.094)	1.88*** (0.091)
Americas/Oceania	1.27** (0.11)	1.24* (0.11)	1.25** (0.11)	1.18* (0.10)
East Asia	1.79*** (0.10)	1.75*** (0.099)	1.81*** (0.10)	1.66*** (0.096)
Eastern Europe	2.19*** (0.14)	2.14*** (0.14)	2.22*** (0.14)	2.02*** (0.13)
Multiple countries of origin	1.63*** (0.098)	1.59*** (0.097)	1.66*** (0.10)	1.54*** (0.094)
New EU-members	1.10 (0.065)	1.07 (0.064)	1.07 (0.063)	1.05 (0.062)
West Asia	2.46*** (0.093)	2.42*** (0.092)	2.57*** (0.099)	2.28*** (0.091)
Western Europe	1.23*** (0.070)	1.20** (0.069)	1.21*** (0.069)	1.14* (0.065)
AGE (BASELINE: 0-9 YEARS)				
10-19 years		1.06 (0.034)	1.07* (0.034)	1.09** (0.035)
20-29 years		0.52*** (0.020)	0.50*** (0.019)	0.52*** (0.020)
30-39 years		1.02 (0.032)	0.98 (0.032)	1.00 (0.032)
40-49 years		0.97 (0.032)	0.96 (0.031)	0.98 (0.032)
50-59 years		0.74*** (0.027)	0.71*** (0.027)	0.74*** (0.028)
60-69 years		0.91 (0.046)	0.88* (0.045)	0.91 (0.047)
70+ years		1.07 (0.073)	1.01 (0.069)	1.05 (0.074)
SEX (BASELINE: FEMALE)				
Male		0.87*** (0.015)	0.88*** (0.015)	0.88*** (0.015)
HOUSEHOLD SIZE (BASELINE: 2 AND NON-GENERATIONAL)				
3			0.84*** (0.031)	0.85*** (0.031)
4			0.84*** (0.030)	0.86*** (0.030)
5			0.76*** (0.032)	0.78*** (0.033)
6			0.86* (0.051)	0.89 (0.053)
7+			0.70*** (0.052)	0.75*** (0.056)
Generational				
			0.79** (0.060)	0.77*** (0.058)
COUNTY (BASELINE: OSLO)				
Rogaland				0.41*** (0.049)
Møre og Romsdal				0.056*** (0.032)
Nordland				0.86 (0.092)
Viken				0.90*** (0.028)
Innlandet				0.26*** (0.048)
Vestfold og Telemark				0.85*** (0.042)
Agder				0.81** (0.053)
Vestland				0.65*** (0.031)
Trøndelag				0.16*** (0.032)
Troms og Finnmark				0.44*** (0.050)
Unknown				0.33** (0.12)
Observations	67490	67490	67490	67490

Odds ratios; Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

S-Figure 3: Share tested and positive within 30 days.

Note: Cumulative proportion of secondary transmission (left pane) and members tested within households (right pane) by country of origin, for households where index case tested positive between August 1st 2020 and May 1st 2021.

S-Table 5: SAR14 by month.

Month	Norwegian-born	Immigrant
August 2020	7% (6%-10%)	19% (16%-23%)
September 2020	10% (8%-11%)	19% (17%-21%)
October 2020	14% (13%-15%)	23% (22%-25%)
November 2020	17% (16%-18%)	28% (26%-29%)
December 2020	23% (22%-24%)	31% (30%-32%)
January 2021	20% (18%-21%)	27% (26%-29%)
February 2021	25% (24%-27%)	36% (35%-38%)
March 2021	24% (23%-25%)	38% (37%-39%)
April 2021	23% (22%-24%)	37% (35%-38%)

Note: SAR-14 by month and country of origin between August 1st 2020 and May 1st 2021. 95% CIs (in parentheses) around the estimated rates were calculated using the Wilson method.