**Supplementary Table 1a.** **Background factors among Swedish- and foreign-born first immigration men with incident** **congestive heart failure (CHF), with percentage, Hazard ratios (HRs) with 95% Confidence Intervals (CIs), and adjusted Population Attributable Fraction (PAF).\***

|  |  |  |  |
| --- | --- | --- | --- |
|  | Swedish-born (n=140,135) |  | Foreign-born (n=13,957) |
|  | % | HR | 95% CI | Adj. PAF (%) | 95% CI |  | % | HR | 95% CI | Adj. PAF (%) | 95% CI |
| Educational level (ref. ≤ 9 years) |  |  |  |  |  |  |  |  |  |  |  |
|  ≤ 9 years | 56.7 | 1.00 | (ref) | 0.0 | (ref) |  | 48.4 | 1.00 | (ref) | 0.0 | (ref) |
| 10-12 | 19.4 | 0.99 | 0.97-1.00 | -0.2 | -0.6; 0.0 |  | 20.7 | 1.07 | 1.02-1.12 | 1.4 | 0.4; 2.2 |
| >12 | 23.9 | 0.85 | 0.84-0.87 | -4.2 | -4.6; -.6 |  | 30.9 | 0.96 | 0.92-1.00 | -1.3 | -2.7; 0 |
| Region of residence (ref. Large cities) |  |  |  |  |  |  |  |  |  |  |  |
|  Large cities | 34.6 | 1.00 | (ref) | 0.0 | (ref) |  | 49.4 | 1.00 | (ref) | 0.0 | (ref) |
| Southern Sweden | 47.4 | 0.78 | 0.77-0.79 | -13.4 | -14.2; -12.6 |  | 35.4 | 0.83 | 0.80-0.87 | -7.3 | -8.8; -5.3 |
| Northern Sweden | 18 | 0.57 | 0.56-0.58 | -13.6 | -14.1; -13.0 |  | 15.2 | 0.49 | 0.47-0.52 | -15.8 | -17.1; -14.0 |
| Marital status (ref. Married) | 22.9 | 0.79 | 0.78-0.80 | -6.1 | -6.5; -5.7 |  | 26.8 | 0.80 | 0.77-0.83 | -6.7 | -8.0; -5.5 |
| Hospital diagnosis of COPD (ref. Non)  | 16 | 2.03 | 2.00-2.06 | 8.1 | 8.0; 8.2 |  | 20.7 | 2.22 | 2.13-2.32 | 11.4 | 11.0; 11.8 |
| Hospital diagnosis of obesity (ref. Non)  | 1.3 | 1.90 | 1.81-1.99 | 0.6 | 0.6; 0.6 |  | 2.5 | 1.62 | 1.46-1.81 | 1.0 | 0.8; 1.1 |
| Hospital diagnosis of CHD (ref. Non)  | 53.7 | 3.10 | 3.06-3.13 | 36.4 | 36.2; 36.5 |  | 60.4 | 4.28 | 4.12-4.45 | 46.3 | 45.7; 46.8 |
| Hospital diagnosis of diabetes (ref. Non)  | 20.8 | 1.68 | 1.66-1.70 | 8.4 | 8.3; 8.6 |  | 27.8 | 1.86 | 1.79-1.93 | 12.9 | 12.3; 13.4 |
| Hospital diagnosis of stroke (ref. Non)  | 21.7 | 1.10 | 1.08-1.11 | 2.0 | 1.6; 2.2 |  | 21.3 | 1.20 | 1.15-1.25 | 3.6 | 2.8; 4.3 |
| Hospital diagnosis of hypertension (ref. Non)  | 32.5 | 1.00 | 0.98-1.01 | 0.0 | -0.7; 0.3 |  | 38.3 | 1.09 | 1.05-1.13 | 3.2 | 1.8; 4.4 |
| Hospital diagnosis of chronic rheumatic heart disease (ref. Non)  | 0.9 | 1.73 | 1.63-1.83 | 0.4 | 0.3; 0.4 |  | 1.5 | 2.07 | 1.80-2.38 | 0.8 | 0.7; 0.9 |
| Hospital diagnosis of atrial fibrillation (ref. Non)  | 42.8 | 2.90 | 2.87-2.93 | 28.0 | 27.9; 28.2 |  | 38.7 | 3.01 | 2.90-3.13 | 25.8 | 25.3; 26.3 |
| Hospital diagnosis of cardiomyopathy (ref. Non)  | 5.5 | 6.04 | 5.90-6.18 | 4.6 | 4.6; 4.6 |  | 6.7 | 6.46 | 6.03-6.92 | 5.7 | 5.6; 5.7 |
| Hospital diagnosis of valvular heart disease (ref. Non)  | 11.8 | 1.86 | 1.83-1.89 | 5.5 | 5.4; 5.6 |  | 12.1 | 1.86 | 1.76-1.96 | 5.6 | 5.2; 5.9 |
| Neighbourhood deprivation (ref. Low) |  |  |  |  |  |  |  |  |  |  |  |
|  Low | 12.7 | 1.00 | (ref) | 0.0 | (ref) |  | 8.5 | 1.00 | (ref) | 0.0 | (ref) |
| Middle | 55.5 | 1.16 | 1.14-1.18 | 7.7 | 6.8; 8.5 |  | 38.9 | 1.17 | 1.10-1.25 | 5.7 | 3.5; 7. 8 |
| High | 12.9 | 1.25 | 1.23-1.28 | 2.6 | 2.4; 2.8 |  | 16.0 | 1.31 | 1.22-1.41 | 3.8 | 2.9; 4.7 |
| Unknown | 18.9 | 0.79 | 0.77-0.80 | -5.0 | -5.6; -4.7 |  | 36.6 | 0.98 | 0.92-1.05 | -0.7 | -3.2; 1.7 |

Full adjusted model. COPD=Chronic obstructive pulmonary disease; CHD=Coronary heart disease

Ref denotes reference group

**Supplementary Table 1b.** **Background factors among Swedish- and foreign-born first immigration women with incident** **congestive heart failure (CHF), with percentage, Hazard ratios (HRs) with 95% Confidence Intervals (CIs), and adjusted Population Attributable Fraction (PAF).\***

|  |  |  |  |
| --- | --- | --- | --- |
|  | Swedish-born (n=135,692) |  | Foreign-born (n=12,437) |
|  | % | HR | 95% CI | Adj.PAF (%) | 95% CI |  | % | HR | 95% CI | Adj.PAF (%) | 95% CI |
| Educational level (ref. ≤ 9 years) |  |  |  |  |  |  |  |  |  |  |  |
|  ≤ 9 years | 70.4 | 1.00 | (ref) | 0.0 | (ref) |  | 63 | 1.00 | (ref) | 0.0 | (ref) |
| 10-12 | 21.2 | 0.91 | 0.90-0.93 | -2.1 | -2.4; -1.6 |  | 23.0 | 0.94 | 0.90-0.98 | -1.5 | -2.6; -0.5 |
| >12 | 8.4 | 0.73 | 0.71-0.74 | -3.1 | -3.4; -3.0 |  | 14.0 | 0.85 | 0.80-0.89 | -2.5 | -3.5; -1.7 |
| Region of residence (ref. Large cities) |  |  |  |  |  |  |  |  |  |  |  |
|  Large cities | 35.3 | 1.00 | (ref) | 0.0 | (ref) |  | 48.6 | 1.00 | (ref) | 0.0 | (ref) |
| Southern Sweden | 47.2 | 0.87 | 0.86-0.88 | -7.1 | -7.7; -6.4 |  | 35.6 | 0.83 | 0.79-0.86 | -7.3 | -9.5; -5.8 |
| Northern Sweden | 17.5 | 0.70 | 0.69-0.71 | -7.5 | -7.9; -7.1 |  | 15.8 | 0.52 | 0.49-0.55 | -14.6 | -16.4; -12.9 |
| Marital status (ref. Married) | 31 | 0.84 | 0.83-0.85 | -5.9 | -6.3; -5.5 |  | 23.3 | 0.89 | 0.85-0.93 | -2.9 | -4.1; -1.8 |
| Hospital diagnosis of COPD (ref. Non)  | 16.3 | 2.35 | 2.32-2.39 | 9.4 | 9.3; 9.5 |  | 20.9 | 2.34 | 2.24-2.44 | 12.0 | 11.6; 12.3 |
| Hospital diagnosis of obesity (ref. Non)  | 1.3 | 2.09 | 2.00-2.20 | 0.7 | 0.7; 0.7 |  | 2.9 | 2.14 | 1.92-2.38 | 1.5 | 1.4; 1.7 |
| Hospital diagnosis of CHD (ref. Non)  | 43.4 | 2.75 | 2.72-2.78 | 27.6 | 27.4; 27.8 |  | 49.1 | 3.20 | 3.08-3.33 | 33.8 | 33.2; 34.4 |
| Hospital diagnosis of diabetes (ref. Non)  | 18.1 | 1.77 | 1.74-1.79 | 7.9 | 7.7; 8.0 |  | 24.4 | 2.12 | 2.03-2.21 | 12.9 | 12.4; 13.4 |
| Hospital diagnosis of stroke (ref. Non)  | 21.7 | 1.08 | 1.06-1.09 | 1.6 | 1.2; 1.8 |  | 21.5 | 1.12 | 1.07-1.17 | 2.3 | 1.4; 3.1 |
| Hospital diagnosis of hypertension (ref. Non)  | 35.4 | 1.01 | 1.00-1.02 | 0.4 | 0.0; 0.7 |  | 43.3 | 1.14 | 1.10-1.19 | 5.3 | 3.9; 6.9 |
| Hospital diagnosis of chronic rheumatic heart disease (ref. Non)  | 1.2 | 1.79 | 1.70-1.88 | 0.5 | 0.5; 0.6 |  | 2.1 | 1.91 | 1.67-2.17 | 1.0 | 0.8; 1.1 |
| Hospital diagnosis of atrial fibrillation (ref. Non)  | 40 | 2.94 | 2.90-2.97 | 26.4 | 26.2; 26.5 |  | 40.7 | 3.35 | 3.22-3.48 | 28.6 | 28.1; 29.0 |
| Hospital diagnosis of cardiomyopathy (ref. Non)  | 2.6 | 4.88 | 4.72-5.05 | 2.1 | 2.0; 2.1 |  | 3.3 | 3.75 | 3.39-4.15 | 2.4 | 2.3; 2.5 |
| Hospital diagnosis of valvular heart disease (ref. Non)  | 11.8 | 2.15 | 2.11-2.18 | 6.3 | 6.2; 6.4 |  | 12.5 | 2.10 | 1.98-2.22 | 6.5 | 6.2; 6.9 |
| Neighbourhood deprivation (ref. Low) |  |  |  |  |  |  |  |  |  |  |  |
|  Low | 10.6 | 1.00 | (ref) | 0.0 | (ref) |  | 7.5 | 1.00 | (ref) | 0.0 | (ref) |
| Middle | 56.4 | 1.15 | 1.13-1.17 | 7.4 | 6.5; 8.2 |  | 41.7 | 1.25 | 1.16-1.34 | 8.3 | 5.8; 10.6 |
| High | 13.6 | 1.25 | 1.23-1.28 | 2.7 | 2.5; 3.0 |  | 17.2 | 1.48 | 1.37-1.60 | 5.6 | 4.6; 6.5 |
| Unknown | 19.4 | 0.99 | 0.97-1.01 | -0.2 | -0.6; 0.2 |  | 33.6 | 1.00 | 0.93-1.07 | 0.0 | -2.5; 2.2 |

Full adjusted model. COPD=Chronic obstructive pulmonary disease; CHD=Coronary heart disease

Ref denotes reference group

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| **Supplementary Table 2a. Incidence of (hazard ratio (HR) with 95% confidence intervals (95% CI)) CHF in second-generation male immigrants compared to Swedish-born individuals (N=957,436)** |
|  | Model 1 |  | Model 2 |  | Model 3 |
|   | HR | 95% CI |   | HR | 95% CI |   | HR | 95% CI |
| Sweden | 1 |  |  |  | 1 |  |  |  | 1 |  |  |
| **Nordic countries** | 1.02 | 0.97 | 1.08 |  | 1.00 | 0.95 | 1.06 |  | 0.98 | 0.93 | 1.03 |
| Denmark | 0.91 | 0.80 | 1.04 |  | 0.91 | 0.80 | 1.04 |  | 0.91 | 0.79 | 1.03 |
| Finland | 1.09 | 1.00 | 1.17 |  | 1.05 | 0.98 | 1.14 |  | 1.00 | 0.93 | 1.08 |
| Norway | 1.01 | 0.92 | 1.11 |  | 0.99 | 0.90 | 1.09 |  | 0.98 | 0.89 | 1.08 |
| **Southern Europe** | 1.23 | 0.94 | 1.62 |  | 1.27 | 0.96 | 1.67 |  | **1.34** | **1.02** | **1.77** |
| France | 1.28 | 0.77 | 2.13 |  | 1.40 | 0.84 | 2.32 |  | 1.45 | 0.88 | 2.41 |
| Italy | 0.91 | 0.59 | 1.41 |  | 0.94 | 0.60 | 1.45 |  | 1.03 | 0.67 | 1.60 |
| Spain | **3.04** | **1.63** | **5.64** |  | **2.81** | **1.51** | **5.23** |  | **2.12** | **1.14** | **3.93** |
| **Western Europe** | **0.86** | **0.76** | **0.97** |  | 0.91 | 0.81 | 1.03 |  | 0.94 | 0.83 | 1.07 |
| The Netherlands | 0.65 | 0.32 | 1.29 |  | 0.67 | 0.34 | 1.34 |  | 0.77 | 0.39 | 1.55 |
| UK and Ireland | 0.80 | 0.52 | 1.22 |  | 0.86 | 0.56 | 1.32 |  | 0.83 | 0.54 | 1.27 |
| Germany | 0.87 | 0.76 | 1.01 |  | 0.93 | 0.80 | 1.07 |  | 0.96 | 0.83 | 1.11 |
| Austria | 0.83 | 0.57 | 1.21 |  | 0.88 | 0.61 | 1.27 |  | 0.95 | 0.65 | 1.37 |
| Other Western Europe | 1.17 | 0.65 | 2.12 |  | 1.29 | 0.71 | 2.32 |  | 1.13 | 0.63 | 2.05 |
| **Eastern Europe** | 1.29 | 0.89 | 1.85 |  | 1.27 | 0.88 | 1.82 |  | 0.92 | 0.64 | 1.32 |
| Yugoslavia | 1.46 | 0.94 | 2.27 |  | 1.36 | 0.88 | 2.12 |  | 1.12 | 0.72 | 1.74 |
| **Baltic countries** | 0.87 | 0.75 | 1.02 |  | 0.90 | 0.77 | 1.05 |  | 0.91 | 0.78 | 1.06 |
| Estonia | **0.80** | **0.68** | **0.95** |  | **0.83** | **0.70** | **0.98** |  | 0.86 | 0.72 | 1.02 |
| Latvia | 1.30 | 0.93 | 1.81 |  | 1.36 | 0.97 | 1.89 |  | 1.19 | 0.85 | 1.65 |
| **Central Europe** | 0.95 | 0.77 | 1.17 |  | 0.98 | 0.79 | 1.21 |  | 0.98 | 0.79 | 1.21 |
| Poland | 1.12 | 0.85 | 1.48 |  | 1.15 | 0.87 | 1.52 |  | 1.15 | 0.87 | 1.52 |
| Other Central Europe | 0.93 | 0.61 | 1.41 |  | 0.98 | 0.64 | 1.48 |  | 0.89 | 0.59 | 1.35 |
| Hungary | 0.63 | 0.37 | 1.07 |  | 0.64 | 0.38 | 1.08 |  | 0.71 | 0.42 | 1.19 |
| **North America** | 0.85 | 0.73 | 1.00 |  | 0.88 | 0.75 | 1.03 |  | 0.89 | 0.76 | 1.04 |
| **Latin America** | 0.34 | 0.08 | 1.33 |  | 0.36 | 0.09 | 1.42 |  | 0.56 | 0.14 | 2.23 |
| **Asia** | **0.41** | **0.20** | **0.86** |  | **0.44** | **0.21** | **0.93** |  | **0.47** | **0.23** | **0.99** |
| **Russia** | 1.14 | 0.91 | 1.43 |   | 1.15 | 0.91 | 1.44 |   | 1.06 | 0.85 | 1.33 |

Model 1 was adjusted for age and region of residence in Sweden; Model 2 was adjusted for age, region of residence in Sweden, educational level, marital status and neighbourhood SES; Model 3 was constructed as Model 2 with inclusion of co-morbidities.

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| --- |
| **Supplementary Table 2b. Incidence of (hazard ratio (HR) with 95% confidence intervals (95% CI)) CHF in second-generation female immigrants compared to Swedish-born individuals (N=942693)** |
|  | Model 1 |  | Model 2 |  | Model 3 |
|   | HR | 95% CI |   | HR | 95% CI |   | HR | 95% CI |
| Sweden | 1 |  |  |  | 1 |  |  |  | 1 |  |  |
| **Nordic countries** | **1.14** | **1.06** | **1.23** |  | **1.12** | **1.04** | **1.21** |  | 1.06 | 0.98 | 1.15 |
| Denmark | **1.21** | **1.02** | **1.43** |  | 1.18 | 0.99 | 1.40 |  | 1.07 | 0.90 | 1.28 |
| Finland | **1.12** | **1.00** | **1.26** |  | **1.11** | **1.00** | **1.25** |  | 1.01 | 0.90 | 1.13 |
| Norway | 1.13 | 0.99 | 1.29 |  | 1.11 | 0.97 | 1.26 |  | 1.13 | 0.99 | 1.29 |
| **Southern Europe** | 0.67 | 0.38 | 1.18 |  | 0.67 | 0.38 | 1.17 |  | 0.91 | 0.52 | 1.60 |
| France | 0.76 | 0.28 | 2.01 |  | 0.86 | 0.32 | 2.30 |  | 1.02 | 0.38 | 2.73 |
| Italy | 0.53 | 0.22 | 1.26 |  | 0.50 | 0.21 | 1.21 |  | 0.76 | 0.32 | 1.82 |
| Spain | 1.50 | 0.38 | 6.00 |  | 1.44 | 0.36 | 5.74 |  | 1.78 | 0.45 | 7.13 |
| **Western Europe** | 0.92 | 0.77 | 1.09 |  | 0.97 | 0.82 | 1.16 |  | 1.03 | 0.87 | 1.23 |
| The Netherlands | 1.12 | 0.50 | 2.49 |  | 1.16 | 0.52 | 2.58 |  | 1.68 | 0.75 | 3.73 |
| UK and Ireland | 0.78 | 0.40 | 1.49 |  | 0.83 | 0.43 | 1.60 |  | 0.78 | 0.40 | 1.49 |
| Germany | 0.93 | 0.76 | 1.14 |  | 0.99 | 0.81 | 1.21 |  | 1.05 | 0.85 | 1.28 |
| Austria | 0.54 | 0.28 | 1.04 |  | 0.59 | 0.31 | 1.13 |  | 0.63 | 0.33 | 1.21 |
| Other Western Europe | **2.08** | **1.08** | **3.99** |  | **2.28** | **1.19** | **4.39** |  | **2.60** | **1.35** | **5.00** |
| **Eastern Europe** | **1.68** | **1.01** | **2.79** |  | 1.59 | 0.96 | 2.64 |  | 1.26 | 0.76 | 2.10 |
| Yugoslavia | **1.96** | **1.09** | **3.54** |  | 1.73 | 0.96 | 3.12 |  | **1.87** | **1.04** | **3.39** |
| **Baltic countries** | 0.89 | 0.72 | 1.10 |  | 0.94 | 0.76 | 1.17 |  | 0.88 | 0.71 | 1.09 |
| Estonia | 0.93 | 0.74 | 1.16 |  | 0.98 | 0.78 | 1.23 |  | 0.92 | 0.74 | 1.16 |
| Latvia | 0.64 | 0.33 | 1.23 |  | 0.73 | 0.38 | 1.41 |  | 0.61 | 0.32 | 1.18 |
| **Central Europe** | 0.96 | 0.71 | 1.31 |  | 0.98 | 0.72 | 1.33 |  | 0.72 | 0.53 | 0.98 |
| Poland | 0.94 | 0.60 | 1.48 |  | 0.96 | 0.61 | 1.50 |  | 0.55 | 0.35 | 0.86 |
| Other Central Europe | 0.88 | 0.48 | 1.64 |  | 0.90 | 0.48 | 1.66 |  | 0.80 | 0.43 | 1.48 |
| Hungary | 1.10 | 0.61 | 1.98 |  | 1.10 | 0.61 | 1.99 |  | 1.29 | 0.72 | 2.34 |
| **North America** | **0.78** | **0.62** | **0.98** |  | 0.82 | 0.65 | 1.03 |  | 0.93 | 0.74 | 1.18 |
| **Latin America** | 0.82 | 0.21 | 3.29 |  | 0.84 | 0.21 | 3.36 |  | 1.32 | 0.33 | 5.30 |
| **Asia** | 0.57 | 0.21 | 1.52 |  | 0.63 | 0.24 | 1.68 |  | 0.83 | 0.31 | 2.22 |
| **Russia** | 1.05 | 0.76 | 1.46 |   | 1.07 | 0.77 | 1.49 |   | 0.91 | 0.66 | 1.26 |

Model 1 was adjusted for age and region of residence in Sweden; Model 2 was adjusted for age, region of residence in Sweden, educational level, marital status and neighbourhood SES; Model 3 was constructed as Model 2 with inclusion of co-morbidities.