**Supplementary Material**

Table S1. Age-period classification table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Period | | | | |
| age | 2005 | 2008 | 2011 | 2014 | 2017 |
| [70,72] | 1933-1935 | 1936-1938 | 1939-1941 | 1942-1944 | 1945-1947 |
|  | 33 | 23 | 21 | 15 | 24 |
| [73,75] | 1930-1932 | 1933-1935 | 1936-1938 | 1939-1941 | 1942-1944 |
|  | 48 | 29 | 43 | 22 | 26 |
| [76,78] | 1927-1929 | 1930-1932 | 1933-1935 | 1936-1938 | 1939-1941 |
|  | 69 | 39 | 39 | 37 | 53 |
| [79,81] | 1924-1926 | 1927-1929 | 1930-1932 | 1933-1935 | 1936-1938 |
|  | 78 | 75 | 63 | 44 | 71 |
| [82,84] | 1921-1923 | 1924-1926 | 1927-1929 | 1930-1932 | 1933-1935 |
|  | 88 | 85 | 82 | 68 | 89 |
| [85,87] | 1918-1920 | 1921-1923 | 1924-1926 | 1927-1929 | 1930-1932 |
|  | 273 | 133 | 93 | 86 | 136 |
| [88,90] | 1915-1917 | 1918-1920 | 1921-1923 | 1924-1926 | 1927-1929 |
|  | 336 | 253 | 146 | 87 | 221 |
| [91,93] | 1912-1914 | 1915-1917 | 1918-1920 | 1921-1923 | 1924-1926 |
|  | 350 | 344 | 207 | 100 | 277 |
| [94,96] | 1909-1911 | 1912-1914 | 1915-1917 | 1918-1920 | 1921-1923 |
|  | 352 | 300 | 260 | 127 | 335 |
| [97,99] | 1906-1908 | 1909-1911 | 1912-1914 | 1915-1917 | 1918-1920 |
|  | 297 | 243 | 155 | 99 | 239 |
| [100,102] | 1903-1905 | 1906-1908 | 1909-1911 | 1912-1914 | 1915-1917 |
|  | 798 | 942 | 239 | 90 | 895 |
| [103,105] | 1900-1902 | 1903-1905 | 1906-1908 | 1909-1911 | 1912-1914 |
|  | 431 | 434 | 245 | 44 | 269 |

Table S2. Proportion of having unmet needs by age group and period

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| age | 2005 | 2008 | 2011 | 2014 | 2017 |
| [70,72] | 60.61 | 47.83 | 71.43 | 80.00 | 58.33 |
| [73,75] | 62.50 | 62.07 | 51.16 | 59.09 | 76.92 |
| [76,78] | 46.38 | 61.54 | 56.41 | 51.35 | 60.38 |
| [79,81] | 61.54 | 50.67 | 63.49 | 50.00 | 47.89 |
| [82,84] | 64.77 | 55.29 | 71.95 | 57.35 | 58.43 |
| [85,87] | 62.27 | 57.14 | 58.06 | 46.51 | 47.06 |
| [88,90] | 54.17 | 55.34 | 54.79 | 57.47 | 49.32 |
| [91,93] | 54.17 | 55.34 | 54.79 | 57.47 | 49.32 |
| [94,96] | 60.86 | 57.56 | 51.69 | 46.00 | 44.77 |
| [97,99] | 62.22 | 63.00 | 56.54 | 51.18 | 48.06 |
| [100,102] | 55.56 | 61.73 | 52.26 | 56.57 | 43.93 |
| [103,105] | 58.52 | 51.70 | 49.37 | 54.44 | 49.61 |

Table S3. Estimated age main effects on unmet needs for LTC, with and without covariates, CLHLS, 2005-2017

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Age group | Unadjusted model | | Adjusted model | |
|  | Coef. | SE | Coef. | SE |
| [70,72] | 0.312 | 0.195 | 0.341 | 0.204 |
| [73,75] | 0.234 | 0.158 | 0.300 | 0.164 |
| [76,78] | -0.064 | 0.128 | 0.032 | 0.136 |
| [79,81] | -0.086 | 0.109 | -0.040 | 0.114 |
| [82,84] | 0.206\* | 0.100 | 0.240\* | 0.102 |
| [85,87] | -0.106 | 0.081 | -0.094 | 0.083 |
| [88,90] | -0.102 | 0.071 | -0.096 | 0.073 |
| [91,93] | -0.187\*\* | 0.065 | -0.203\*\* | 0.067 |
| [94,96] | -0.024 | 0.063 | -0.061 | 0.065 |
| [97,99] | -0.111 | 0.070 | -0.182\* | 0.072 |
| [100,102] | -0.168\*\* | 0.060 | -0.239\*\*\* | 0.063 |
| [103,105] | 0.097 | 0.078 | 0.002 | 0.082 |

Note: \*p<0.05, \*\*p<0.01, \*\*\*p<0.001

Table S4. Estimated period main effects on unmet needs for LTC, with and without covariates, CLHLS, 2005-2017

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Period | Unadjusted model | | Adjusted model | |
|  | Coef. | SE | Coef. | SE |
| 2005 | 0.087 | 0.054 | 0.206\*\*\* | 0.057 |
| 2008 | -0.020 | 0.061 | 0.020 | 0.065 |
| 2011 | 0.058 | 0.063 | 0.013 | 0.064 |
| 2014 | 0.001 | 0.077 | -0.045 | 0.082 |
| 2017 | -0.126\* | 0.062 | -0.194\*\* | 0.064 |

Note: \*p<0.05, \*\*p<0.01, \*\*\*p<0.001

Table S5. Estimated inter-cohort differences on unmet needs for LTC, with and without covariates, CLHLS, 2005-2017

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Cohort | Unadjusted model | | Adjusted model | |
|  | Coef. | SE | Coef. | SE |
| 1900-1902 | -0.067 | 0.113 | -0.127 | 0.116 |
| 1903-1905 | -0.042 | 0.071 | -0.038 | 0.074 |
| 1906-1908 | -0.040 | 0.063 | -0.053 | 0.065 |
| 1909-1911 | 0.141 | 0.080 | 0.165\* | 0.083 |
| 1912-1914 | 0.118\* | 0.059 | 0.106 | 0.060 |
| 1915-1917 | 0.041 | 0.054 | 0.049 | 0.054 |
| 1918-1920 | -0.052 | 0.058 | -0.050 | 0.059 |
| 1921-1923 | -0.061 | 0.071 | -0.079 | 0.072 |
| 1924-1926 | -0.002 | 0.082 | -0.014 | 0.083 |
| 1927-1929 | -0.117 | 0.090 | -0.101 | 0.091 |
| 1930-1932 | 0.030 | 0.109 | 0.059 | 0.113 |
| 1933-1935 | -0.096 | 0.133 | -0.092 | 0.139 |
| 1936-1938 | -0.364\* | 0.149 | -0.336\* | 0.158 |
| 1939-1941 | 0.134 | 0.212 | 0.098 | 0.215 |
| 1942-1944 | 0.797\* | 0.321 | 0.785\* | 0.340 |
| 1945-1947 | -0.133 | 0.356 | -0.209 | 0.344 |

Note: \*p<0.05, \*\*p<0.01, \*\*\*p<0.001

Table S6. Estimated intra-cohort dynamics on unmet needs for LTC, with and without covariates, CLHLS, 2005-2017

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Cohort | Unadjusted model | | Adjusted model | |
|  | Coef. | SE | Coef. | SE |
| 1900-1902 | - | - | - | - |
| 1903-1905 | -0.262\* | 0.107 | -0.252\* | 0.111 |
| 1906-1908 | -0.013 | 0.126 | 0.042 | 0.13 |
| 1909-1911 | -0.044 | 0.185 | 0.02 | 0.193 |
| 1912-1914 | -0.178 | 0.131 | -0.16 | 0.133 |
| 1915-1917 | 0.027 | 0.117 | 0.007 | 0.119 |
| 1918-1920 | -0.419\*\* | 0.132 | -0.429\*\* | 0.135 |
| 1921-1923 | -0.265 | 0.158 | -0.267 | 0.159 |
| 1924-1926 | -0.104 | 0.169 | -0.089 | 0.173 |
| 1927-1929 | 0.196 | 0.186 | 0.201 | 0.189 |
| 1930-1932 | -0.184 | 0.217 | -0.177 | 0.225 |
| 1933-1935 | 0.104 | 0.267 | 0.076 | 0.276 |
| 1936-1938 | 0.402 | 0.284 | 0.33 | 0.302 |
| 1939-1941 | 0.066 | 0.318 | 0.14 | 0.324 |
| 1942-1944 | 0.018 | 0.424 | 0.047 | 0.456 |
| 1945-1947 | - | - | - | - |

Note: \*p<0.05, \*\*p<0.01, \*\*\*p<0.001

Table S7. Estimated age main effects on unmet needs among rural and urban residents for LTC, with and without covariates, CLHLS, 2005-2017

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Age group | Rural residents | | | | Urban residents | | | |
|  | Unadjusted model | | Adjusted model | | Unadjusted model | | Adjusted model | |
|  | Coef. | SE | Coef. | SE | Coef. | SE | Coef. | SE |
| [70,72] | 0.249 | 0.289 | 0.324 | 0.306 | 0.372 | 0.286 | 0.406 | 0.286 |
| [73,75] | 0.571\* | 0.284 | 0.500 | 0.293 | 0.064 | 0.201 | 0.148 | 0.208 |
| [76,78] | -0.142 | 0.198 | -0.084 | 0.213 | -0.012 | 0.167 | 0.083 | 0.173 |
| [79,81] | -0.139 | 0.171 | -0.123 | 0.175 | -0.095 | 0.145 | -0.026 | 0.151 |
| [82,84] | 0.128 | 0.163 | 0.177 | 0.162 | 0.338\* | 0.135 | 0.359\*\* | 0.139 |
| [85,87] | -0.260\* | 0.128 | -0.246 | 0.132 | -0.031 | 0.108 | -0.024 | 0.111 |
| [88,90] | -0.082 | 0.109 | -0.074 | 0.111 | -0.100 | 0.098 | -0.099 | 0.102 |
| [91,93] | -0.283\*\* | 0.100 | -0.284\*\* | 0.104 | -0.153 | 0.089 | -0.154 | 0.09 |
| [94,96] | -0.093 | 0.102 | -0.110 | 0.102 | 0.025 | 0.082 | -0.029 | 0.085 |
| [97,99] | -0.053 | 0.105 | -0.112 | 0.107 | -0.183 | 0.098 | -0.243\* | 0.1 |
| [100,102] | -0.212\* | 0.087 | -0.201\* | 0.092 | -0.151 | 0.086 | -0.248\*\* | 0.089 |
| [103,105] | 0.317\* | 0.133 | 0.232 | 0.137 | -0.072 | 0.108 | -0.173 | 0.114 |

Note: \*p<0.05, \*\*p<0.01, \*\*\*p<0.001

Table S8. Estimated period main effects on unmet needs among rural and urban residents for LTC, with and without covariates, CLHLS, 2005-2017

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Period | Rural residents | | | | Urban residents | | | |
|  | Unadjusted model | | Adjusted model | | Unadjusted model | | Adjusted model | |
|  | Coef. | SE | Coef. | SE | Coef. | SE | Coef. | SE |
| 2005 | 0.161 | 0.088 | 0.224\* | 0.095 | 0.016 | 0.072 | 0.159\* | 0.075 |
| 2008 | -0.042 | 0.093 | -0.061 | 0.102 | -0.022 | 0.087 | 0.093 | 0.090 |
| 2011 | 0.029 | 0.097 | 0.030 | 0.100 | 0.049 | 0.085 | -0.009 | 0.086 |
| 2014 | -0.055 | 0.119 | -0.048 | 0.126 | 0.053 | 0.110 | -0.027 | 0.114 |
| 2017 | -0.093 | 0.106 | -0.145 | 0.105 | -0.097 | 0.080 | -0.217\*\* | 0.083 |

Note: \*p<0.05, \*\*p<0.01, \*\*\*p<0.001

Table S9. Estimated inter-cohort differences on unmet needs among rural and urban residents for LTC, with and without covariates, CLHLS, 2005-2017

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Cohort | Rural residents | | | | Urban residents | | | |
|  | Unadjusted model | | Adjusted model | | Unadjusted model | | Adjusted model | |
|  | Coef. | SE | Coef. | SE | Coef. | SE | Coef. | SE |
| 1900-1902 | -0.179 | 0.185 | -0.230 | 0.189 | 0.000 | 0.154 | -0.055 | 0.158 |
| 1903-1905 | -0.211 | 0.109 | -0.262\* | 0.113 | 0.105 | 0.099 | 0.126 | 0.103 |
| 1906-1908 | -0.216\* | 0.096 | -0.279\*\* | 0.098 | 0.129 | 0.087 | 0.155 | 0.090 |
| 1909-1911 | 0.211 | 0.133 | 0.246 | 0.135 | 0.065 | 0.116 | 0.082 | 0.121 |
| 1912-1914 | 0.200\* | 0.090 | 0.208\* | 0.092 | 0.058 | 0.083 | 0.029 | 0.084 |
| 1915-1917 | 0.115 | 0.082 | 0.123 | 0.083 | -0.025 | 0.072 | -0.008 | 0.073 |
| 1918-1920 | -0.121 | 0.095 | -0.107 | 0.095 | 0.000 | 0.075 | -0.018 | 0.077 |
| 1921-1923 | -0.042 | 0.105 | -0.040 | 0.107 | -0.102 | 0.100 | -0.120 | 0.102 |
| 1924-1926 | -0.074 | 0.121 | -0.042 | 0.126 | 0.053 | 0.114 | 0.017 | 0.119 |
| 1927-1929 | 0.101 | 0.141 | 0.064 | 0.142 | -0.233 | 0.122 | -0.186 | 0.123 |
| 1930-1932 | -0.085 | 0.172 | -0.009 | 0.176 | 0.078 | 0.144 | 0.083 | 0.149 |
| 1933-1935 | 0.129 | 0.228 | 0.156 | 0.249 | -0.227 | 0.174 | -0.268 | 0.177 |
| 1936-1938 | -0.431 | 0.230 | -0.494\* | 0.243 | -0.368 | 0.211 | -0.234 | 0.216 |
| 1939-1941 | 0.145 | 0.378 | 0.099 | 0.392 | 0.135 | 0.267 | 0.086 | 0.262 |
| 1942-1944 | 0.347 | 0.477 | 0.333 | 0.501 | 1.182\* | 0.478 | 1.141\* | 0.488 |
| 1945-1947 | -0.113 | 0.598 | -0.147 | 0.565 | -0.168 | 0.462 | -0.240 | 0.442 |

Note: \*p<0.05, \*\*p<0.01, \*\*\*p<0.001

Table S10. Estimated intra-cohort dynamics on unmet needs among rural and urban residents for LTC, with and without covariates, CLHLS, 2005-2017

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Cohort | Rural residents | | | | Urban residents | | | |
|  | Unadjusted model | | Adjusted model | | Unadjusted model | | Adjusted model | |
|  | Coef. | SE | Coef. | SE | Coef. | SE | Coef. | SE |
| 1900-1902 | - | - | - | - | - | - | - | - |
| 1903-1905 | -0.608\*\*\* | 0.166 | -0.570\*\*\* | 0.172 | -0.011 | 0.150 | 0.025 | 0.155 |
| 1906-1908 | 0.005 | 0.196 | 0.060 | 0.201 | -0.007 | 0.172 | 0.054 | 0.177 |
| 1909-1911 | 0.525 | 0.314 | 0.628 | 0.321 | -0.591\* | 0.260 | -0.554\* | 0.272 |
| 1912-1914 | -0.258 | 0.210 | -0.173 | 0.214 | -0.055 | 0.177 | -0.094 | 0.180 |
| 1915-1917 | 0.318 | 0.180 | 0.343 | 0.182 | -0.207 | 0.159 | -0.240 | 0.162 |
| 1918-1920 | -0.555\*\* | 0.213 | -0.501\* | 0.214 | -0.354\* | 0.174 | -0.379\* | 0.179 |
| 1921-1923 | -0.053 | 0.245 | -0.148 | 0.245 | -0.346 | 0.215 | -0.317 | 0.216 |
| 1924-1926 | -0.310 | 0.253 | -0.304 | 0.263 | 0.030 | 0.235 | 0.049 | 0.242 |
| 1927-1929 | 0.423 | 0.299 | 0.355 | 0.307 | 0.064 | 0.250 | 0.100 | 0.252 |
| 1930-1932 | -0.567 | 0.371 | -0.572 | 0.384 | -0.003 | 0.282 | 0.007 | 0.295 |
| 1933-1935 | 0.089 | 0.451 | -0.067 | 0.480 | 0.209 | 0.353 | 0.284 | 0.357 |
| 1936-1938 | 0.422 | 0.408 | 0.515 | 0.434 | 0.494 | 0.415 | 0.268 | 0.422 |
| 1939-1941 | -0.358 | 0.497 | -0.407 | 0.509 | 0.335 | 0.428 | 0.491 | 0.423 |
| 1942-1944 | 0.132 | 0.630 | 0.152 | 0.666 | -0.275 | 0.648 | -0.167 | 0.661 |
| 1945-1947 | - | - | - | - | - | - | - | - |

Note: \*p<0.05, \*\*p<0.01, \*\*\*p<0.001

Table S11. The coefficient and standard errors for all covariates in all adjusted models

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Total | | Rural | | Urban | |
|  | Coef | SE | Coef | SE | Coef | SE |
| Type of residence  (ref: rural) |  |  |  |  |  |  |
| City | -0.221\*\*\* | 0.034 |  |  |  |  |
| town | 0.083\* | 0.033 |  |  |  |  |
| Female | 0.054\* | 0.024 | 0.137\*\*\* | 0.038 | 0.001 | 0.031 |
| Ever migrated | -0.036 | 0.052 | 0.026 | 0.101 | -0.157\*\* | 0.059 |
| Region (ref: Northeast) |  |  |  |  |  |  |
| East | -0.090\*\* | 0.031 | -0.204\*\*\* | 0.051 | 0.014 | 0.041 |
| Central | 0.137\*\*\* | 0.039 | 0.234\*\*\* | 0.057 | 0.036 | 0.057 |
| West | 0.237\*\*\* | 0.041 | 0.290\*\*\* | 0.064 | 0.256\*\*\* | 0.056 |
| Educational level | -0.026\*\*\* | 0.007 | -0.041\* | 0.016 | -0.026\*\*\* | 0.008 |
| Distance of living  (ref: in the same village) |  |  |  |  |  |  |
| Not in the same village | 0.062 | 0.034 | 0.096 | 0.059 | 0.000 | 0.042 |
| Co-residence | -0.109\*\*\* | 0.029 | -0.060 | 0.045 | -0.169\*\*\* | 0.040 |
| Number of children | -0.050\*\*\* | 0.011 | -0.064\*\*\* | 0.016 | -0.032\* | 0.014 |
| Number of needs | 0.195\*\*\* | 0.011 | 0.199\*\*\* | 0.017 | 0.197\*\*\* | 0.015 |
| Intercept | 0.038 | 0.064 | 0.300\*\* | 0.101 | -0.116 | 0.085 |

Note: Effect coding is used for all categorical variables. The coefficient should be interpreted as the difference between the mean of a specific group and the grand mean. \*p<0.05, \*\*p<0.01, \*\*\*p<0.001.