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by Edward Ng and Haozhen Zhang

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# The mental health of immigrants and refugees: Canadian evidence from a nationally linked database

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## Abstract

**Background:** Few studies of the healthy immigrant effect (HIE) have examined the mental health outcomes of Canadian-born individuals on a national scale compared with immigrants by admission category. This study fills this gap by examining the self-reported mental health (SRMH) of immigrants by admission category and other immigration dimensions (e.g., source world region and duration since landing) and making comparisons with Canadian-born respondents to a population-based survey.

**Data and methods:** Based on four cycles (2011 to 2014) of the Canadian Community Health Survey (CCHS) linked to the Longitudinal Immigration Database (IMDB), odds ratios of high (i.e., excellent or very good) SRMH among Canadian-born respondents and IMDB-linked immigrants are compared using logistic regression. Among the IMDB immigrant population, high SRMH was also examined according to the above-mentioned immigration dimensions. Adjusted results were hierarchically controlled for age, sex, social and economic factors, and sense of belonging.

**Results:** Age–sex adjusted results show that immigrants, especially refugees, are less likely than the Canadian-born population to report high mental health levels, but these differences disappeared after full adjustment. The odds of immigrants having high SRMH differed more by source world region and duration since landing. For example, fully adjusted results show support for the HIE, with recent immigrants (interviewed within 10 years of landing) more likely to report high SRMH than either the Canadian-born population or established immigrants. Greater odds of high SRMH among recent immigrants also holds across admission classes and for selected world regions.

**Interpretation:** This study provides new evidence on differences in mental health between Canadian-born individuals and immigrants by various characteristics. Results support a deterioration of the HIE in SRMH and identify factors significantly associated with SRMH. This study can also serve as a baseline for further studies on the impact of COVID-19 on immigrants' mental health by immigrant category.

**Keywords:** immigrant category, refugee, mental health, linked data, healthy immigrant effect

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Overall, immigrants are found to be healthier upon their arrival to Canada than the Canadian-born population—a phenomenon referred to as the healthy immigrant effect (HIE). However, this initial health advantage seems to disappear over time, partly because of stress and other integration challenges.<sup>1-3</sup> Whether this HIE and its deterioration also apply to mental health is an area of ongoing research.<sup>4-10</sup> The Canadian government's Immigration Levels Plan stipulates that almost 1 million immigrants will be admitted to Canada between 2018 and 2020, and immigrants to Canada will increase from 7.5 million to more than 12 million by 2036 (almost 30% of the Canadian population).<sup>11-12</sup> Because of the growth in Canada's immigrant population, it is important to monitor the health—including mental health—of immigrants. In light of the COVID-19 pandemic and its impact on mental health, this study can provide a baseline for future studies on the longer-term impact of COVID-19 on immigrants' mental health by immigrant category.<sup>13</sup>

Past mental health research on immigrants in Canada, typically based on a small sample of recent immigrants or refugees from various war-torn parts of the world, found that immigrants in Canada had a mental health disadvantage.<sup>14-15</sup> By contrast, recent studies based on nationally representative surveys found that immigrants had a mental health advantage over their Canadian-born counterparts in terms of both self-reported mental health (SRMH) and more specific mental health disorders. However, these studies were not as consistent on whether

and when immigrants' mental health advantage dissipates the longer they live in Canada.<sup>3,9,10,16-17</sup>

An important dimension to examine when studying immigrants' health is admission category. Because immigrants are selected through admission classes (mainly economic immigrants, family-class immigrants and refugees), each with distinct pre-migration experience and immigrant selection requirements, post-migration mental health outcomes may differ by admission category.<sup>18</sup> Few studies have examined the mental health of immigrants to Canada by admission category compared with the Canadian-born reference group. One key barrier to studying immigrant health by admission category is the lack of sizable datasets that include detailed immigration-related variables. Exceptions include provincial studies that link immigrant records from recent landing files to provincial health records, such as hospital and laboratory records for Ontario.<sup>19</sup> Typically, these studies do not have a well-defined Canadian-born comparison group, as the non-links in these record linkage projects include both Canadian-born individuals and more established immigrants. Furthermore, a study based on the Longitudinal Survey of Immigrants to Canada (LSIC) found that refugees had a greater mental health risk than other immigrant subgroups. However, the LSIC did not provide a Canadian-born reference group for comparison.<sup>10</sup> Linking the Canadian Community Health Survey (CCHS) to the Longitudinal Immigration Database (IMDB) provides opportunities to study the SRMH outcomes of immi-

## ***What is already known on this subject?***

- Most major immigrant-receiving countries reported a healthy immigrant effect, both in terms of self-reported perceived health and chronic conditions.
- Little research has been done on the mental health of immigrants by admission category, source world region or duration since landing. This is attributable in part to a lack of data.

## ***What does this study add?***

- Based on a newly linked national health-oriented dataset, immigrants—especially refugees—are less likely than the Canadian-born population to have high self-reported mental health (SRMH), but these differences largely disappeared after full model adjustments.
- The variations of high SRMH among immigrants are more noticeable by duration since landing and source world region, even after controlling for confounding factors.
- Data linkage provides a great opportunity to add value to existing datasets by producing policy-relevant insights for the health outcomes of immigrants, especially for mental health and by admission category.

grants across admission categories at the national level with a well-defined Canadian-born reference population. This study, based on the linked CCHS–IMDB database, fills an information gap by examining the SRMH of immigrant and Canadian-born survey respondents, controlling for confounding factors. In addition, the mental health of immigrants was examined by three immigration-related dimensions—admission category, source world region and duration since landing. It is important to look at duration since landing to evaluate whether the perceived mental health advan-

tage changes over time. Source world region is important because immigrants' post-migration mental health outcomes are influenced by differences in language, culture, institutions and politics between Canada and their source country.<sup>1,20-22</sup>

This study addresses three research questions. First, does SRMH differ between Canadian-born and immigrant respondents? Second, does the SRMH of immigrants differ by the three selected dimensions compared with that of Canadian-born respondents? Third, how does the SRMH of immigrants vary according to duration since landing within each admission category and source world region? To answer these questions, adjustment for socio-economic factors and individuals' sense of belonging were examined.

## **Data and methods**

### **Data sources**

The Immigrant Landing File (ILF) is an administrative census of people who have immigrated to Canada since 1980, with information on age, sex and other immigrant-related characteristics at landing (e.g., admission category). The IMDB is a database that combines the ILF and immigrants' Canadian tax information. Neither the ILF nor the IMDB contain health-related information.<sup>23-24</sup> First conducted in 2001 (cycle 1.1), the CCHS includes cross-sectional information on health, behaviours and health care use for the non-institutionalized household population aged 12 and older.<sup>25</sup> Overall, about 84% of CCHS respondents agreed to share and link to other data sources. This CCHS–IMDB linkage was conducted in the Social Data Linkage Environment (SDLE) at Statistics Canada through a dynamic relational database of basic personal identifiers—the Derived Record Depository (DRD).<sup>26</sup> Approximately 6.7 million (97%) of the 6.9 million eligible ILF records between 1980 and 2013 were either found in the DRD through common identifiers or added to the DRD as new contributors.<sup>27</sup> Similarly, about 95% of CCHS respondents who agreed to share their

records or have them linked from 2001 to 2014 were linked to the DRD. A total of 39,420 CCHS respondents were linked to the ILF and IMDB through the DRD. Of the 46,905 CCHS respondents who self-reported as immigrants who arrived between 1980 and 2013, 37,610 (80%) were linked to the IMDB.<sup>28</sup> More details on the surveys and linkage can be found elsewhere.<sup>29</sup>

Because of the coverage of the IMDB, immigrants who arrived in Canada before 1980 were excluded from the analytic sample. Special share–link samples and bootstrap weights were used to adjust for non-agreement to link. Validation indicated that the linked CCHS–IMDB file is representative of immigrant cohorts by admission category.<sup>30</sup> Specifically, the distribution of the characteristics in the linked file was compared with that obtained for the ILF, IMDB and CCHS input files. No outstanding socio-economic discrepancies were detected between the linked file and the CCHS or IMDB.

### **Study sample creation and definition**

This study used a pooled sample of respondents to annual CCHS between 2011 and 2014, inclusively (n=208,919), representing immigrants who landed between 1980 and 2013. To simplify, the term “immigrants” will be used to refer to CCHS respondents linked to the IMDB. Excluded from the analytic sample were 7% of CCHS respondents in the pooled sample who self-reported as immigrants but who arrived in Canada before 1980, and another 1% who self-reported as post-1980 immigrants but who were not linked to the IMDB successfully. The final study sample included 12,491 immigrants and 179,275 Canadian-born respondents, who are representative of a total population of 26 million individuals.

### **Outcomes and key immigration-related variables**

This study used SRMH as the primary outcome. SRMH has been associated with multi-item measures of mental

health, self-rated health and health problems.<sup>31</sup> It is a single item for which respondents rate their overall mental health on a five-point scale, ranging from excellent to poor. To minimize data loss, missing responses were imputed with the middle value of good. SRMH was considered high if respondents reported it as either very good or excellent. This approach, which contrasted with many previous studies focusing on poor mental health that grouped poor and very poor as low levels of SRMH, was adopted to increase the sample size in the outcome.

Immigrant admission category and duration since landing were based on IMDB records. Duration since landing, defined as the difference between the IMDB landing year and CCHS survey year, was categorized as recent (those surveyed within 10 years of landing) and established (10 years or more).

Immigrant admission categories include economic class, family class, refugees and other immigrants. Since the last category is small (n=500), the results of that category will not be presented in this study, although these individuals were included in the results for immigrants overall. Immigrants' countries of birth were also classified into eight source world regions as follows: (1) United States+ (i.e., United States, Australia, New Zealand and Western Europe), (2) Latin America and the Caribbean, (3) Eastern Europe, (4) Sub-Saharan Africa, (5) the Middle East and Western Asia, (6) Southern Asia, (7) Southeast Asia, and (8) East Asia.

### **Selected demographic, social and economic characteristics from the CCHS**

Age was grouped into four categories: 12 to 24, 25 to 39, 40 to 64, and 65 and older. Sex was male or female (a very small number of missing responses were excluded). Social characteristics included self-reported official language proficiency (both English and French, English only, French only, and neither English nor French), educational attainment (less than postsecondary education, and postsecondary education or higher)

and marital status (married or common law; widowed, separated or divorced; and single or never married). Economic characteristics included household income decile, which was measured at the health region level and classified into lower 20%, middle 60% and upper 20%. Respondents' employment status in the week prior to the CCHS was categorized as employed, not employed or permanently unable to work. Lastly, respondents' sense of belonging was based on a single question: "How would you describe your sense of belonging to your local community? Would you say it is: very strong? somewhat strong? somewhat weak? very weak?" Respondents who responded strong and very strong were classified as having a strong sense of belonging to their community. While the community to which the respondents have a strong sense of belonging was not made explicit (e.g., their immigrant group or neighbourhood), research shows that sense of community belonging is highly correlated with physical and mental health.<sup>32-33</sup>

### **Methods**

Cohort characteristics and the prevalence of high SRMH were first examined descriptively by immigrant status (Canadian-born individuals versus immigrants overall) and by the three selected immigration-related dimensions (admission category, duration since landing and source world region). Logistic regressions were used to examine the odds of high SRMH by the above-mentioned dimensions compared with the Canadian-born reference population. To further examine the impact of duration since landing on the immigrant population, logistic regressions were run to examine the SRMH differentials by cross-classified dimensions of admission category (or source world region) by duration since landing using recent economic immigrants (or recent immigrants from the United States+ category) as a reference group. Differences in SRMH were hierarchically controlled from models 2 to 5 for age and sex, as well as for potential confounding factors,

i.e., social factors (official languages, education and marital status), economic characteristics (health region income decile and employment status) and sense of belonging in the logistic regression context. These potential confounders may have an adverse impact on a person's mental health. Therefore, they need to be controlled for in the analysis. For example, immigrants with a lower sense of belonging to the local community may be at a greater risk for mental health problems. All analyses were conducted in SAS and SUDAAN using CCHS combined share-link weights and bootstrap weights for the variance estimation.

## **Results**

### **Descriptive characteristics**

Table 1 provides descriptive characteristics for 191,800 respondents, who represent an estimated population of 26 million individuals. About 16% of the study sample were immigrants who arrived between 1980 and 2013. The majority of these immigrants were admitted under the economic class (53%), followed by the family class (30%), refugees (13%) and others (4%—data not shown). Only 7% of immigrants were aged 65 and older, compared with 16% of Canadian-born respondents. Most immigrants were established immigrants who arrived 10 years or more prior to the survey (63%), and this proportion varied from 56% for economic immigrants to a high of 68% for family-class immigrants. The majority of immigrants came from Asia or the Middle East (57%).

Proportionately more immigrants than Canadian-born individuals were proficient in English only (75% and 64%, respectively), and approximately 6% of immigrants reported not being proficient in either official language (Table 1). More immigrants than Canadian-born individuals reported being married or in common-law relationships, having a job, and having postsecondary education, but more of them than their Canadian-born counterparts were classified as having incomes in the lower 20% decile of the health region. Socioeconomic character-

istics differ across admission categories. For example, a larger percentage of economic immigrants had postsecondary

degrees, had a job, and fell in the middle 60% or upper 20% income deciles.

**Table 1**

**Distribution of 2011-to-2014 linked CCHS-IMDB cohort, by selected demographic and socioeconomic characteristics for Canadian-born individuals and immigrants by admission category**

|                                                       | Canadian-born respondents | IMDB immigrants |                       |              |         |
|-------------------------------------------------------|---------------------------|-----------------|-----------------------|--------------|---------|
|                                                       |                           | Overall         | By admission category |              |         |
|                                                       |                           |                 | Economic class        | Family class | Refugee |
| Sample size                                           | 179,275                   | 12,490          | 6,840                 | 3,680        | 1,475   |
| Estimated population                                  | 22,140,000                | 4,219,000       | 2,233,000             | 1,268,000    | 548,000 |
| Percent within IMDB immigrant population <sup>†</sup> | ...                       | 100             | 53                    | 30           | 13      |
|                                                       |                           |                 | percent               |              |         |
| <b>Age group</b>                                      |                           |                 |                       |              |         |
| 12 to 24 years                                        | 21                        | 14              | 18                    | 8            | 15      |
| 25 to 39 years                                        | 23                        | 34              | 33                    | 38           | 34      |
| 40 to 64 years                                        | 40                        | 44              | 45                    | 40           | 46      |
| 65 years and older                                    | 16                        | 7               | 4                     | 13           | 4       |
| <b>Sex</b>                                            |                           |                 |                       |              |         |
| Male                                                  | 49                        | 50              | 52                    | 44           | 56      |
| Female                                                | 51                        | 50              | 49                    | 56           | 44      |
| <b>Duration since landing</b>                         |                           |                 |                       |              |         |
| Recent (less than 10 years)                           | ...                       | 37              | 44                    | 32           | 33      |
| Established (10 years or more)                        | ...                       | 63              | 56                    | 68           | 67      |
| <b>Source world region (from IMDB)</b>                |                           |                 |                       |              |         |
| United States+                                        | ...                       | 11              | 13                    | 13           | F       |
| Latin America and the Caribbean                       | ...                       | 15              | 8                     | 24           | 18      |
| Eastern Europe                                        | ...                       | 10              | 10                    | 7            | 21      |
| Sub-Saharan Africa                                    | ...                       | 6               | 5                     | 4            | 13      |
| Middle East and Western Asia                          | ...                       | 12              | 13                    | 7            | 22      |
| Southern Asia                                         | ...                       | 17              | 15                    | 22           | 14      |
| Southeast Asia                                        | ...                       | 14              | 17                    | 12           | 8       |
| East Asia                                             | ...                       | 14              | 19                    | 11           | F       |
| <b>Official language proficiency</b>                  |                           |                 |                       |              |         |
| Both English and French                               | 23                        | 13              | 15                    | 9            | 13      |
| English only                                          | 64                        | 75              | 76                    | 74           | 74      |
| French only                                           | 13                        | 6               | 6                     | 6            | 7       |
| Neither English nor French                            | 0                         | 6               | 3                     | 11           | 6       |
| <b>Education</b>                                      |                           |                 |                       |              |         |
| Some postsecondary                                    | 46                        | 33              | 25                    | 43           | 42      |
| Postsecondary education                               | 53                        | 66              | 74                    | 55           | 57      |
| <b>Marital status</b>                                 |                           |                 |                       |              |         |
| Married or common law                                 | 55                        | 66              | 65                    | 72           | 57      |
| Widowed, separated or divorced                        | 12                        | 9               | 6                     | 13           | 10      |
| Single or never married                               | 33                        | 25              | 29                    | 15           | 32      |
| <b>Health region income decile</b>                    |                           |                 |                       |              |         |
| Lower 20%                                             | 16                        | 32              | 29                    | 33           | 45      |
| Middle 60%                                            | 61                        | 57              | 59                    | 57           | 49      |
| Upper 20%                                             | 23                        | 11              | 12                    | 10           | 6       |
| <b>Employment</b>                                     |                           |                 |                       |              |         |
| Employed                                              | 62                        | 67              | 70                    | 63           | 67      |
| Did not have a job last week                          | 26                        | F               | F                     | F            | F       |
| Permanently unable to work                            | 3                         | F               | F                     | F            | F       |
| <b>Sense of belonging to local community</b>          |                           |                 |                       |              |         |
| Weak                                                  | 34                        | 32              | 33                    | 28           | 37      |
| Strong                                                | 63                        | 65              | 65                    | 68           | 58      |

...not applicable

F too unreliable to be published

<sup>†</sup> subtotals do not add up to overall due to exclusion of a small miscellaneous immigrant admission category

**Notes:** United States+ refers to United States, Australia, New Zealand and Western Europe. Proportions may not add up to 100% because of missing or miscellaneous grouping. CCHS stands for Canadian Community Health Survey. IMDB stands for Longitudinal Immigration Database.

**Source:** 2011-to-2014 linked CCHS-IMDB database.

### High SRMH by immigrant characteristics compared with Canadian-born respondents

Similar proportions of Canadian-born (72%) and immigrant (71%) respondents had high SRMH (Chart 1). Heterogeneity was observed among immigrants across admission categories, compared with Canadian-born respondents. In particular, economic immigrants had high levels of SRMH (72%) similar to their Canadian-born counterparts, but family-class immigrants and refugees were significantly less likely to report high SRMH (69% and 68%, respectively).

By duration since landing, a higher percentage of recent immigrants had high SRMH (74%), compared with a significantly lower proportion of established immigrants (68%). Across source world regions, significantly fewer immigrants from the Middle East and Western Asia (65%), and East Asia (62%) had high SRMH, while a significantly higher percentage of immigrants from the United States+ (77%) had high SRMH.

### Multivariate comparison between Canadian-born and immigrant respondents

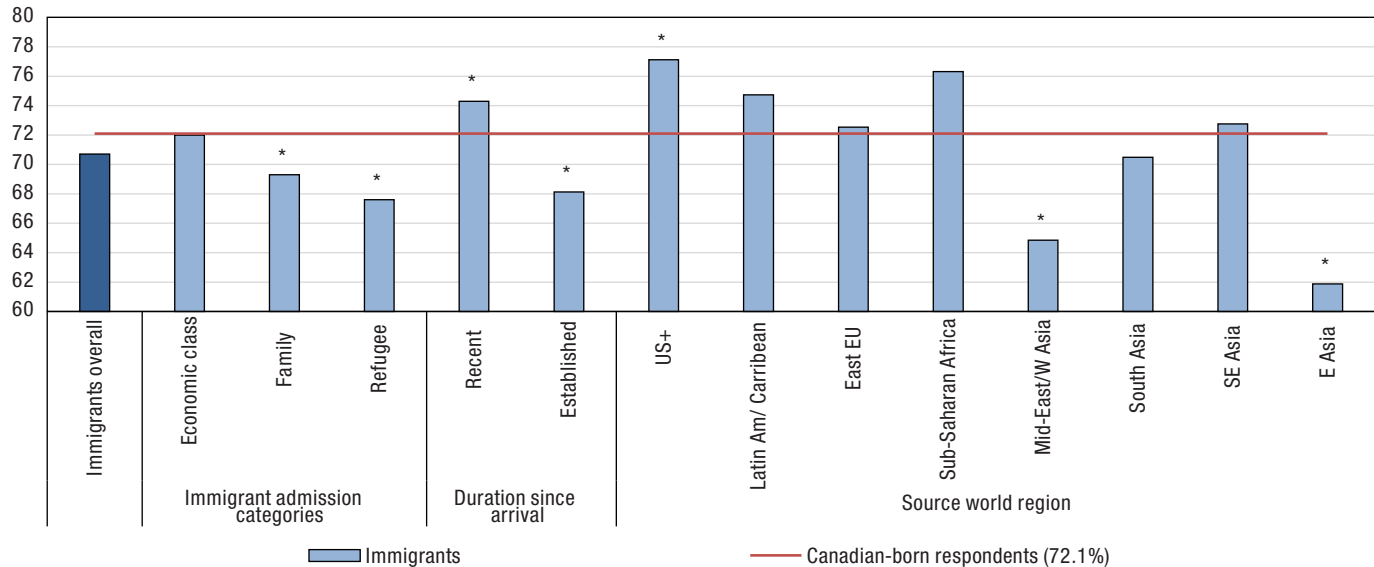
#### Overall and admission category effects

Table 2 presents the logistic regression results of high SRMH using the Canadian-born population as the reference group. After age and sex were adjusted for in the logistic regression (Table 2, Model 2), immigrants were statistically less likely overall than their Canadian-born counterparts to have high SRMH (odds ratio [OR]=0.93, 95% confidence interval [CI] from 0.87 to 0.99). By admission category, only refugees were less likely than Canadian-born respondents to have high age-sex adjusted SRMH (OR=0.80, 95% CI from 0.68 to 0.94). After all socioeconomic factors and sense of belonging to a local community were controlled for in Model 5, the difference in SRMH was no longer statistically significant for immigrants overall or by admission category

**Chart 1**

**Percentage of immigrants with high self-reported mental health, by selected characteristics, compared with Canadian-born respondents (reference)**

percent



\* significantly different from reference category ( $p < 0.05$ )

**Notes:** US + refers to United States, Australia, New Zealand and Western Europe. Recent is less than 10 years. Established is 10 years or more.

**Source:** 2011-to-2014 linked CCHS-IMDB database.

(including refugees) compared with the Canadian-born population (Table 2).

#### Source world region effect

Table 2 also provides estimated odds ratios of high SRMH by immigrants' source world region. Age-sex adjusted results show that immigrants from the United States+ were statistically more likely than Canadian-born respondents to have high SRMH (Table 2, Model 2). This result persisted through to the fully adjusted model. For immigrants from Latin America and the Caribbean, differences in high SRMH with Canadian-born respondents became statistically significant in Model 3 after adjusting for age, sex and social factors (OR=1.25, 95% CI from 1.03 to 1.52), with increasing odds after further controlling for economic factors and sense of belonging in Model 5 (OR=1.40, 95% CI from 1.14 to 1.71). Immigrants from the Middle East and Western Asia and from East Asia were persistently less likely than Canadian-born respondents to have high SRMH in all models with different control variables (e.g., OR=0.79, 95% CI

from 0.65 to 0.96, for East Asia after full adjustment; OR=0.79, 95% CI from 0.65 to 0.95, for the Middle East and Western Asia after full adjustment, Model 5, Table 2).

#### Duration since landing effect

As shown in Table 2 from unadjusted Model 1 to Model 3 (further adjusted for sociodemographic factors), established immigrants were significantly less likely than Canadian-born respondents to have high SRMH. This result became insignificant after further controlling for economic factors and remained insignificant in the full model. By contrast, the difference in the adjusted likelihood of having high SRMH between recent immigrants and the Canadian-born population became statistically significant only after adjusting for age, sex, and social and economic factors (Model 4), and it remained statistically significant in the fully adjusted model (Model 5).

#### Multivariate comparison of the duration effect within the immigrant population

Tables 3 and 4 present the odds ratios of high SRMH among recent and established immigrants by admission category and source world region, separately. Table 3 provides comparisons between admission categories by duration effect using recent economic immigrants as the reference group. Compared with the recent economic-class immigrants (i.e., the reference group), established immigrants in all three admission categories were significantly less likely to have high SRMH in most regressions, with the exception of established family-class immigrants after adjusting for social and economic factors (models 3 and 4). However, the odds became significantly different from the reference category again after a full adjustment in Model 5 (OR=0.80, 95% CI from 0.65 to 0.99). When recent economic immigrants were compared with recent immigrants in other admission categories, no statistically significant differences were found. Small changes in the size of the

**Table 2**

**Crude and adjusted odds ratios of high self-reported mental health, hierarchically controlled for selected demographic and socioeconomic characteristics, by selected immigration dimensions for the linked IMDB immigrant population compared with the Canadian-born population**

|                                       | Model 1: Unadjusted |                         |      | Model 2: Adjusted for age and sex |                         |      | Model 3: Additionally adjusted for social factors <sup>†</sup> |                         |      | Model 4: Additionally adjusted for economic factors <sup>††</sup> |                         |      | Model 5: Additionally adjusted for sense of belonging |                         |      |
|---------------------------------------|---------------------|-------------------------|------|-----------------------------------|-------------------------|------|----------------------------------------------------------------|-------------------------|------|-------------------------------------------------------------------|-------------------------|------|-------------------------------------------------------|-------------------------|------|
|                                       | Odds ratio          | 95% confidence Interval |      | Odds ratio                        | 95% confidence Interval |      | Odds ratio                                                     | 95% confidence Interval |      | Odds ratio                                                        | 95% confidence Interval |      | Odds ratio                                            | 95% confidence Interval |      |
|                                       |                     | from                    | to   |                                   | from                    | to   |                                                                | from                    | to   |                                                                   | from                    | to   |                                                       |                         |      |
|                                       |                     |                         |      |                                   |                         |      |                                                                |                         |      |                                                                   |                         |      |                                                       |                         |      |
| A: Overall                            |                     |                         |      |                                   |                         |      |                                                                |                         |      |                                                                   |                         |      |                                                       |                         |      |
| Canadian-born individuals (reference) | 1.00                | ...                     | ...  | 1.00                              | ...                     | ...  | 1.00                                                           | ...                     | ...  | 1.00                                                              | ...                     | ...  | 1.00                                                  | ...                     | ...  |
| Immigrants                            | 0.93                | 0.88                    | 1.00 | 0.93*                             | 0.87                    | 0.99 | 0.95                                                           | 0.88                    | 1.01 | 1.07                                                              | 1.00                    | 1.15 | 1.05                                                  | 0.98                    | 1.13 |
| B: Immigrants by admission category   |                     |                         |      |                                   |                         |      |                                                                |                         |      |                                                                   |                         |      |                                                       |                         |      |
| Canadian-born individuals (reference) | 1.00                | ...                     | ...  | 1.00                              | ...                     | ...  | 1.00                                                           | ...                     | ...  | 1.00                                                              | ...                     | ...  | 1.00                                                  | ...                     | ...  |
| Economic class                        | 0.99                | 0.91                    | 1.09 | 0.98                              | 0.86                    | 1.12 | 0.93                                                           | 0.85                    | 1.02 | 1.04                                                              | 0.95                    | 1.14 | 1.03                                                  | 0.94                    | 1.13 |
| Family class                          | 0.87*               | 0.77                    | 0.99 | 0.88                              | 0.78                    | 1.00 | 0.97                                                           | 0.85                    | 1.11 | 1.08                                                              | 0.94                    | 1.23 | 1.04                                                  | 0.91                    | 1.19 |
| Refugee                               | 0.81*               | 0.68                    | 0.96 | 0.80*                             | 0.68                    | 0.94 | 0.87                                                           | 0.74                    | 1.04 | 1.07                                                              | 0.90                    | 1.26 | 1.08                                                  | 0.91                    | 1.28 |
| C: Immigrants by source region        |                     |                         |      |                                   |                         |      |                                                                |                         |      |                                                                   |                         |      |                                                       |                         |      |
| Canadian-born individuals (reference) | 1.00                | ...                     | ...  | 1.00                              | ...                     | ...  | 1.00                                                           | ...                     | ...  | 1.00                                                              | ...                     | ...  | 1.00                                                  | ...                     | ...  |
| United States+                        | 1.31*               | 1.11                    | 1.53 | 1.31*                             | 1.12                    | 1.53 | 1.22*                                                          | 1.04                    | 1.42 | 1.22*                                                             | 1.04                    | 1.43 | 1.23*                                                 | 1.05                    | 1.45 |
| Latin America and the Caribbean       | 1.14                | 0.95                    | 1.38 | 1.15                              | 0.95                    | 1.39 | 1.25*                                                          | 1.03                    | 1.52 | 1.41*                                                             | 1.15                    | 1.72 | 1.40*                                                 | 1.14                    | 1.71 |
| Eastern Europe                        | 1.02                | 0.86                    | 1.22 | 1.03                              | 0.86                    | 1.22 | 0.97                                                           | 0.81                    | 1.16 | 1.08                                                              | 0.90                    | 1.30 | 1.14                                                  | 0.95                    | 1.37 |
| Sub-Saharan Africa                    | 1.25                | 0.96                    | 1.63 | 1.22                              | 0.94                    | 1.59 | 1.20                                                           | 0.91                    | 1.57 | 1.36*                                                             | 1.04                    | 1.78 | 1.30                                                  | 0.99                    | 1.70 |
| Middle East and Western Asia          | 0.71*               | 0.60                    | 0.86 | 0.70*                             | 0.59                    | 0.84 | 0.66*                                                          | 0.55                    | 0.80 | 0.82*                                                             | 0.68                    | 0.99 | 0.79*                                                 | 0.65                    | 0.95 |
| Southern Asia                         | 0.92                | 0.80                    | 1.07 | 0.91                              | 0.79                    | 1.06 | 0.92                                                           | 0.79                    | 1.08 | 1.10                                                              | 0.94                    | 1.29 | 1.02                                                  | 0.88                    | 1.20 |
| Southeast Asia                        | 1.03                | 0.86                    | 1.24 | 1.04                              | 0.87                    | 1.24 | 1.06                                                           | 0.88                    | 1.27 | 1.16                                                              | 0.97                    | 1.39 | 1.11                                                  | 0.93                    | 1.33 |
| East Asia                             | 0.63*               | 0.53                    | 0.75 | 0.63*                             | 0.53                    | 0.75 | 0.67*                                                          | 0.55                    | 0.81 | 0.75*                                                             | 0.62                    | 0.90 | 0.79*                                                 | 0.65                    | 0.96 |
| D: Immigrants by years since landing  |                     |                         |      |                                   |                         |      |                                                                |                         |      |                                                                   |                         |      |                                                       |                         |      |
| Canadian-born individuals (reference) | 1.00                | ...                     | ...  | 1.00                              | ...                     | ...  | 1.00                                                           | ...                     | ...  | 1.00                                                              | ...                     | ...  | 1.00                                                  | ...                     | ...  |
| Recent (less than 10 years)           | 1.13*               | 1.02                    | 1.25 | 1.10                              | 0.99                    | 1.22 | 1.09                                                           | 0.97                    | 1.22 | 1.32*                                                             | 1.18                    | 1.48 | 1.29*                                                 | 1.15                    | 1.45 |
| Established (10 years or more)        | 0.83*               | 0.76                    | 0.90 | 0.84*                             | 0.77                    | 0.91 | 0.87*                                                          | 0.79                    | 0.95 | 0.94                                                              | 0.86                    | 1.03 | 0.93                                                  | 0.85                    | 1.02 |

... not applicable

\* significantly different from reference category ( $p < 0.05$ )

<sup>†</sup>Social factors include official language proficiency, education and marital status.

<sup>††</sup>Economic factors include health region income decile and employment status.

**Notes:** United States+ refers to United States, Australia, New Zealand and Western Europe. Logistic regression hierarchically controlled from (1) crude odds ratios to those adjusted for (2) age and sex, (3) social factors, (4) economic factors, and (5) sense of belonging.

**Source:** 2011-to-2014 linked CCHS-IMDB database.

odds ratios were noted with full adjustments in models 2 to 5.

When duration effects by source world region (Table 4) were examined, three distinct patterns were observed in the fully adjusted model (Model 5). First, immigrants from the Middle East and Western Asia and from East Asia were less likely to have high SRMH than recent immigrants from United States+ (i.e., the reference group), regardless of duration since landing. Second, there was no significant difference in high

SRMH between the reference group and immigrants from Latin America and the Caribbean, Sub-Saharan Africa, and Eastern Europe, regardless of duration in Canada. Third, among immigrants from Southeast Asia, only established immigrants were less likely to have high SRMH.

## Discussion

This is the first study conducted using the linked CCHS-IMDB database to

examine mental health outcomes. The richness of the health data in the CCHS is enhanced by being linked to the IMDB, which adds immigrant-related characteristics to analyses. This provides a more comprehensive picture of mental health by admission category, source world region and—to a lesser extent—duration since landing.

This study provides new evidence on immigrants' mental health. First, there is no significant difference in the unadjusted prevalence of high SRMH

between Canadian-born respondents and immigrants overall. When examined by admission category, this finding held true for economic immigrants, but family-class immigrants and refugees were less likely than Canadian-born respondents to have high SRMH. This is consistent with studies that found that economic immigrants tended to have better health outcomes than refugees and—to a lesser extent—family-class immigrants.<sup>13</sup> Differences in SRMH became statistically insignificant for family-class immigrants after controlling for age and sex (Table 2, Model 2B); this suggests that demographic differences could be a factor in their lower SRMH. Further adjustments for social factors (Table 2, Model 3) removed any statistically significant difference in high SRMH between Canadian-born respondents and immigrants overall and immigrants by admission category (especially refugees), suggesting that initial differences could also be related to immigrants' different socioeconomic conditions. In short, improving refugees' socioeconomic conditions could have a positive impact on their mental health outcomes.

Second, the gap in SRMH is significant across immigrants from different source world regions. Immigrants from the United States+ and from Latin America and the Caribbean were more likely than Canadian-born respondents to have high SRMH, while those from East Asia and from the Middle East and Western Asia were less likely than Canadian-born respondents to have high SRMH. This finding corroborates other studies on ethnic variations of mental health outcomes,<sup>34</sup> as well as health differentials by source world region.<sup>35</sup> This finding also supports the hypothesis that differences in health outcomes between immigrants and Canadian-born individuals are the result of cultural and language proximity that relates to the amount of stress and difficulty of the challenges faced in the integration process (i.e., the similarity of Canadian culture and languages to those of the United States+ and Latin America and Caribbean source world regions may facilitate immigrant integration).<sup>20,22</sup>

Third, immigrants' mental health does not improve with time spent in Canada. Recent immigrants have higher unadjusted SRMH than both Canadian-born respondents and estab-

lished immigrants, reflecting and corroborating evidence of deterioration of the HIE in self-reported health,<sup>1-3</sup> as well as in mental health outcomes.<sup>36</sup> Furthermore, a study focusing on South Asians showed that Canadian-born South Asians had a higher prevalence of poor or fair SRMH than their immigrant counterparts.<sup>37</sup> This study finds that the presence of an HIE effect in SRMH for recent immigrants, and its subsequent disappearance for more established immigrants, holds across admission classes. Because existing settlement services mainly target landed immigrants and refugees upon arrival, investing more in settlement and mental health services for established immigrants and refugees could help them maintain their initial high levels of SRMH.

Alternatively, immigrants may have different expectations after 10 years in Canada, or the initial euphoria may have subsided and been replaced with an increasing comparison with those who have more. In this case, a broad set of interventions may better address this issue.

**Table 3**  
**Adjusted odds ratios of high levels of self-reported mental health within the Longitudinal Immigration Database (IMDB) immigrant population, hierarchically controlled for selected demographic and socioeconomic characteristics, by cross-classified immigration dimensions for the linked IMDB immigrant population, compared with recent immigrants from the economic class reference group**

| Immigrants by admission category  | Model 1: Unadjusted     |      |      | Model 2: Adjusted for age and sex |      |      | Model 3: Additionally adjusted for social factors <sup>†</sup> |      |      | Model 4: Additionally adjusted for economic factors <sup>††</sup> |      |      | Model 5: Additionally adjusted for sense of belonging |      |      |
|-----------------------------------|-------------------------|------|------|-----------------------------------|------|------|----------------------------------------------------------------|------|------|-------------------------------------------------------------------|------|------|-------------------------------------------------------|------|------|
|                                   | 95% confidence interval |      |      | 95% confidence interval           |      |      | 95% confidence interval                                        |      |      | 95% confidence interval                                           |      |      | 95% confidence interval                               |      |      |
|                                   | Odds ratio              | from | to   | Odds ratio                        | from | to   | Odds ratio                                                     | from | to   | Odds ratio                                                        | from | to   | Odds ratio                                            | from | to   |
| <b>Economic class (reference)</b> |                         |      |      |                                   |      |      |                                                                |      |      |                                                                   |      |      |                                                       |      |      |
| Recent (less than 10 years)       | 1.00                    | ...  | ...  | 1.00                              | ...  | ...  | 1.00                                                           | ...  | ...  | 1.00                                                              | ...  | ...  | 1.00                                                  | ...  | ...  |
| Established (10 years or more)    | 0.69*                   | 0.57 | 0.82 | 0.75*                             | 0.62 | 0.91 | 0.72*                                                          | 0.60 | 0.86 | 0.67*                                                             | 0.56 | 0.81 | 0.68*                                                 | 0.56 | 0.82 |
| <b>Family class</b>               |                         |      |      |                                   |      |      |                                                                |      |      |                                                                   |      |      |                                                       |      |      |
| Recent (less than 10 years)       | 0.78                    | 0.61 | 1.00 | 0.80                              | 0.63 | 1.03 | 0.89                                                           | 0.69 | 1.14 | 0.90                                                              | 0.70 | 1.16 | 0.89                                                  | 0.69 | 1.15 |
| Established (10 years or more)    | 0.68*                   | 0.55 | 0.84 | 0.78*                             | 0.63 | 0.97 | 0.87                                                           | 0.70 | 1.07 | 0.81                                                              | 0.66 | 1.00 | 0.80*                                                 | 0.65 | 0.99 |
| <b>Refugee</b>                    |                         |      |      |                                   |      |      |                                                                |      |      |                                                                   |      |      |                                                       |      |      |
| Recent (less than 10 years)       | 0.85                    | 0.60 | 1.20 | 0.85                              | 0.61 | 1.19 | 0.97                                                           | 0.65 | 1.44 | 1.06                                                              | 0.71 | 1.57 | 1.06                                                  | 0.72 | 1.57 |
| Established (10 years or more)    | 0.58*                   | 0.46 | 0.74 | 0.64*                             | 0.50 | 0.81 | 0.66*                                                          | 0.50 | 0.87 | 0.66*                                                             | 0.50 | 0.88 | 0.69*                                                 | 0.52 | 0.92 |

... not applicable

\*significantly different from reference category ( $p < 0.05$ )

<sup>†</sup>Social factors include official language proficiency, education and marital status.

<sup>††</sup>Economic factors include health region income decile and employment status.

**Note:** Logistic regression hierarchically controlled from (1) crude odds ratios to those adjusted for (2) age and sex, (3) social factors, (4) economic factors, and (5) sense of belonging.

**Source:** 2011-to-2014 linked CCHS-IMDB database.

**Table 4**

**Adjusted odds ratios of high levels of self-reported mental health within the Longitudinal Immigration Database (IMDB) immigrant population, hierarchically controlled for selected demographic and socioeconomic characteristics, by cross-classified immigration dimensions for the linked IMDB immigrant population compared with recent immigrants from the United States+ reference group**

| Immigrants by source world region      | Model 1: Unadjusted     |      |      | Model 2: Adjusted for age and sex |      |      | Model 3: Additionally adjusted for social factors <sup>†</sup> |      |      | Model 4: Additionally adjusted for economic factors <sup>††</sup> |      |      | Model 5: Additionally adjusted for sense of belonging |      |      |
|----------------------------------------|-------------------------|------|------|-----------------------------------|------|------|----------------------------------------------------------------|------|------|-------------------------------------------------------------------|------|------|-------------------------------------------------------|------|------|
|                                        | 95% confidence interval |      |      | 95% confidence interval           |      |      | 95% confidence interval                                        |      |      | 95% confidence interval                                           |      |      | 95% confidence interval                               |      |      |
|                                        | Odds ratio              | from | to   | Odds ratio                        | from | to   | Odds ratio                                                     | from | to   | Odds ratio                                                        | from | to   | Odds ratio                                            | from | to   |
| <b>United States+ (reference)</b>      |                         |      |      |                                   |      |      |                                                                |      |      |                                                                   |      |      |                                                       |      |      |
| Recent (less than 10 years)            | 1.00                    | ...  | ...  | 1.00                              | ...  | ...  | 1.00                                                           | ...  | ...  | 1.00                                                              | ...  | ...  | 1.00                                                  | ...  | ...  |
| Established (10 years or more)         | 0.81                    | 0.58 | 1.13 | 0.90                              | 0.64 | 1.27 | 0.89                                                           | 0.62 | 1.29 | 0.87                                                              | 0.60 | 1.26 | 0.83                                                  | 0.57 | 1.20 |
| <b>Latin America and the Caribbean</b> |                         |      |      |                                   |      |      |                                                                |      |      |                                                                   |      |      |                                                       |      |      |
| Recent (less than 10 years)            | 0.83                    | 0.54 | 1.27 | 0.84                              | 0.55 | 1.28 | 0.93                                                           | 0.60 | 1.45 | 1.03                                                              | 0.65 | 1.65 | 1.01                                                  | 0.63 | 1.61 |
| Established (10 years or more)         | 0.73                    | 0.51 | 1.05 | 0.81                              | 0.56 | 1.18 | 0.91                                                           | 0.61 | 1.34 | 0.94                                                              | 0.63 | 1.40 | 0.90                                                  | 0.60 | 1.34 |
| <b>Eastern Europe</b>                  |                         |      |      |                                   |      |      |                                                                |      |      |                                                                   |      |      |                                                       |      |      |
| Recent (less than 10 years)            | 0.89                    | 0.58 | 1.36 | 0.90                              | 0.59 | 1.38 | 0.96                                                           | 0.61 | 1.52 | 1.07                                                              | 0.67 | 1.71 | 1.05                                                  | 0.66 | 1.67 |
| Established (10 years or more)         | 0.61*                   | 0.43 | 0.86 | 0.68*                             | 0.48 | 0.97 | 0.66*                                                          | 0.46 | 0.95 | 0.68*                                                             | 0.47 | 0.99 | 0.69                                                  | 0.48 | 1.01 |
| <b>Sub-Saharan Africa</b>              |                         |      |      |                                   |      |      |                                                                |      |      |                                                                   |      |      |                                                       |      |      |
| Recent (less than 10 years)            | 0.87                    | 0.53 | 1.42 | 0.84                              | 0.51 | 1.38 | 0.89                                                           | 0.53 | 1.51 | 0.99                                                              | 0.59 | 1.66 | 0.91                                                  | 0.54 | 1.54 |
| Established (10 years or more)         | 0.81                    | 0.52 | 1.26 | 0.87                              | 0.55 | 1.36 | 0.87                                                           | 0.55 | 1.36 | 0.89                                                              | 0.57 | 1.39 | 0.83                                                  | 0.53 | 1.29 |
| <b>Middle East and Western Asia</b>    |                         |      |      |                                   |      |      |                                                                |      |      |                                                                   |      |      |                                                       |      |      |
| Recent (less than 10 years)            | 0.54*                   | 0.37 | 0.81 | 0.53*                             | 0.36 | 0.79 | 0.61*                                                          | 0.41 | 0.90 | 0.70                                                              | 0.47 | 1.06 | 0.64*                                                 | 0.42 | 0.97 |
| Established (10 years or more)         | 0.43*                   | 0.30 | 0.63 | 0.47*                             | 0.32 | 0.68 | 0.49*                                                          | 0.32 | 0.74 | 0.54*                                                             | 0.35 | 0.82 | 0.51*                                                 | 0.33 | 0.78 |
| <b>Southern Asia</b>                   |                         |      |      |                                   |      |      |                                                                |      |      |                                                                   |      |      |                                                       |      |      |
| Recent (less than 10 years)            | 0.67*                   | 0.47 | 0.96 | 0.67*                             | 0.46 | 0.96 | 0.68                                                           | 0.45 | 1.01 | 0.78                                                              | 0.52 | 1.16 | 0.69                                                  | 0.47 | 1.04 |
| Established (10 years or more)         | 0.58*                   | 0.42 | 0.81 | 0.63*                             | 0.45 | 0.88 | 0.64*                                                          | 0.46 | 0.89 | 0.69*                                                             | 0.49 | 0.96 | 0.62*                                                 | 0.45 | 0.87 |
| <b>Southeast Asia</b>                  |                         |      |      |                                   |      |      |                                                                |      |      |                                                                   |      |      |                                                       |      |      |
| Recent (less than 10 years)            | 1.25                    | 0.84 | 1.85 | 1.25                              | 0.84 | 1.86 | 1.18                                                           | 0.74 | 1.89 | 1.25                                                              | 0.78 | 2.00 | 1.13                                                  | 0.71 | 1.81 |
| Established (10 years or more)         | 0.46*                   | 0.32 | 0.67 | 0.52*                             | 0.36 | 0.75 | 0.51*                                                          | 0.36 | 0.74 | 0.53*                                                             | 0.37 | 0.77 | 0.50*                                                 | 0.34 | 0.72 |
| <b>East Asia</b>                       |                         |      |      |                                   |      |      |                                                                |      |      |                                                                   |      |      |                                                       |      |      |
| Recent (less than 10 years)            | 0.51*                   | 0.34 | 0.78 | 0.52*                             | 0.34 | 0.79 | 0.53*                                                          | 0.35 | 0.80 | 0.60*                                                             | 0.39 | 0.92 | 0.61*                                                 | 0.39 | 0.94 |
| Established (10 years or more)         | 0.38*                   | 0.27 | 0.53 | 0.42*                             | 0.30 | 0.59 | 0.44*                                                          | 0.30 | 0.62 | 0.45*                                                             | 0.31 | 0.64 | 0.44*                                                 | 0.31 | 0.63 |

... not applicable

\*significantly different from reference category ( $p < 0.05$ )<sup>†</sup>Social factors include official language proficiency, education and marital status.<sup>††</sup>Economic factors include health region income decile and employment status.

**Note:** United States+ refers to United States, Australia, New Zealand and Western Europe. Logistic regression hierarchically controlled from (1) crude odds ratios to those adjusted for (2) age and sex, (3) social factors, (4) economic factors, and (5) sense of belonging.

**Source:** 2011-to-2014 linked CCHS-IMDB database.

## Limitations

The SRMH measure used in this study is subjective and may be influenced by sociocultural factors, such as stigma, and non-random measurement errors (e.g., memory recall bias). It may be more challenging—especially for recent immigrants—to understand the concepts intended to be captured in health-related questions because of existing language barriers and differences in cultural background. Future studies could use administrative data, such as hospital records, as a complementary data source to the subjective survey data used in this study.<sup>38</sup>

Another limitation is related to the sample of immigrants used in this study. First, the IMDB immigrants identified in this study do not include those who arrived before 1980. Therefore, the findings cannot be generalized to those who landed before 1980. Second, the analytical CCHS-IMDB file is based on two databases that have somewhat different coverage targets. For example, the CCHS covers only the household population, while the IMDB includes immigrants staying in institutions. As a result, linking the CCHS to the IMDB excludes those living in institutions. Therefore, the results of this study could

not be generalized for this segment of the population. Third, only 84% of all potential CCHS respondents agreed to share their responses and have them linked to the DRD, and the CCHS-IMDB share-link weights should ideally take the unlinked records into consideration. While this was not done for this analytical file, for more recent efforts, a new set of SDLE weights for the linked CCHS-IMDB file was available. This could make it possible for it to be representative of the corresponding segment of the Canadian population. Lastly, the sample size of certain immigrant groups (e.g., refugees) is relatively small. The

CCHS–IMDB linkage was generally statistically sufficient to produce reliable results in this study. However, like most other previous studies, this relatively small sample size decreases the statistical power of the analysis of refugees. It also has the potential to generate bias when the effect of source world region, years since landing and other characteristics on the mental health status of refugees is examined.

Nevertheless, the strength of this study is the richness of the CCHS health data because it is now linked to the IMDB. This provides a more comprehensive picture of mental health by immigration category relative to the Canadian-born population.<sup>39</sup>

## Conclusion

Based on the analysis of a newly linked CCHS–IMDB database, this study provides new evidence of differences in SRMH between Canadian-born and immigrant respondents, as well as by important immigrant characteristics, such as admission category (especially for refugees), length of time in Canada and source world region. Results show a deterioration of the HIE in SRMH, as well as selected source world region effects, and suggest that factors such as household income, education and age were statistically significantly associated with SRMH. Future research could examine the relationship between SRMH and mental health consultation to better

understand the role of health care use in mental health. Additional research could also focus on common mental health conditions, such as depression, to corroborate the existing general results on SRMH. In light of the COVID-19 pandemic, this study can also serve as a baseline for future studies focusing on mental health by immigrant category.<sup>40</sup>

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