

ARTICLE

Evolution of the determinants of unmet health care needs in a universal health care system: Canada, 2001–2014

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Abstract

While ensuring adequate access to care is a central concern in countries with universal health care coverage, unmet health care needs remain prevalent. However, subjective unmet health care needs (SUN) can arise from features of a health care system (system reasons) or from health care users' choices or constraints (personal reasons). Furthermore, investigating the evolution of SUN within a health care system has rarely been carried out. We investigate whether health needs, predisposing factors and enabling factors differentially affect SUN for system reasons and SUN for personal reasons, and whether these influences are stable over time, using representative data from the Canadian Community Health Surveys from 2001 to 2014. While SUN slightly decreased overall during our period of observation, the share of SUN for system reasons increased. Some key determinants appear to consistently increase SUN reporting over all our observation periods, in particular being a woman, younger, in poorer health or not having a regular doctor. The distinction between personal and system reasons is important to better understand individual experiences. Notably, women report more SUN for system reasons and less for personal reasons, and reporting system reasons increases with age. Given this stability over time, our results may inform health policymakers on which subpopulations to target to ensure access to health care is universal.

Key words: Accessibility of care; Canada; longitudinal analysis; system and personal barriers; universal health care systems; unmet health care needs

1. Introduction

Countries with universal health care coverage strive to ensure adequate health care system access for their residents (OECD, 2017). While already offering first-dollar coverage for most hospital and physician services, Canada is no exception and has implemented several policies targeting accessibility of care in the past few decades (Marchildon, 2013). While there are different measures of accessibility, such as health care utilization or the presence of a regular provider of care (Dunlop *et al.*, 2000), the concept of unmet health care need retains a prominent position in the literature as utilization measures do not capture whether the care provided met individuals' needs, nor whether difficulties were experienced in accessing care (Sibley and Glazier, 2009; Allin *et al.*, 2010).

Unmet health care needs can be generally defined as the “difference between healthcare services deemed necessary to deal with a particular health problem and the actual services received” (Sanmartin *et al.*, 2002). While unmet need can be clinician validated, research has focused on subjective unmet health care needs (SUN), in part due to the limited data available on other categories, but also because individuals may provide the best assessment of their own needs (Sibley and Glazier, 2009; Allin *et al.*, 2010).

Unmet health care needs can arise from features of a health care system, such as long waiting times or the cost of care (system reasons). But they can also arise from individual characteristics of care-seeking individuals, as individual preferences or time constraints (personal reasons). From a health policy perspective, this distinction is fundamental as health policymakers can be expected to address the former in priority, since the latter may reflect individuals' experiences that are more difficult to attend. As the reasons given for reporting unmet needs may evolve over time, it may be necessary to regularly adjust access policies. For example, Sanmartin *et al.* (2002) found that the prevalence of SUN in Canada increased from 4 to 12% over the period of 1994–2001, with health care system reasons (primarily long wait times) taking a larger proportional share. From an academic perspective, knowing if the determinants of system reasons for SUN are consistently different over time from those contributing to personal reasons allows an assessment of whether different types of individuals are more likely to have SUN of one type, which has implications for the measurement of inequity in health care (Gibson *et al.*, 2019).

While studies have explored the relationships between SUN and health, socioeconomic and demographic characteristics in the United States (Shi and Stevens, 2005; Pagan and Pauly, 2006), Canada (Sibley and Glazier, 2009; Allin *et al.*, 2010) and Europe (Cavaliere, 2013; Fjær *et al.*, 2017), none simultaneously addresses whether the needs are due to system barriers or personal constraints, and the longitudinal dimension of the evolution of SUN and its determinants. Such information would be particularly relevant for health policymakers interested in tailoring their accessibility programs and identifying subpopulation groups who may consistently lack access over time, especially for system reasons.

The objectives of this study, and its novel contribution, are (i) to examine how the effect on SUN of a comprehensive set of predisposing, enabling and needs factors varies over time and (ii) to investigate if this same set of factors differently affects SUN due to system reasons and SUN due to personal reasons. To do so, we focus on the period from 2001 to 2014 in Canada.

2. Methods

2.1 Data and variables

We use the Canadian Community Health Survey (CCHS), a nationally representative survey of Canadian residents aged 12 or older (exclusive of individuals living on reserves, members of the Canadian forces and institutionalized populations), augmented with health region-level physician density data from the Canadian Institute for Health Information. Our analysis is restricted to respondents aged 18 and above to avoid proxy respondents and excludes respondents in the territories due to a small respondent pool and to conform to Statistics Canada confidentiality rules. The years analyzed (2001, 2003, 2005, 2010 and 2014) were included based on availability of SUN variables. Full variable definitions are available in the Appendix (Table A1).

SUN is measured by the question, 'During the past 12 months, was there ever a time when you felt that you needed healthcare but didn't receive it?'. Since we are interested in separating system reasons from the personal reasons of SUN, we also use the close-ended follow-up question 'Thinking of the most recent time, why didn't you get care?' and categorize reasons as outlined in Table 1. We focus only on reasons available in all years studied for comparability. System reasons represent barriers to access beyond the control of the individual, but that health policymakers could accommodate, such as cost or wait times. Personal reasons capture when a need goes unmet due to individual choice, preferences or constraints not directly amenable to by the health care system. System reasons hence have direct relevance for health policy, while personal reasons have implications for inequity measurement (Allin *et al.*, 2010; Gibson *et al.*, 2019). Previous studies have offered similar categorizations, though differing in labeling and placement on waiting times (Allin *et al.*, 2010) and knowledge of resources (Chen and Hou, 2002; Sibley and Glazier, 2009).

Table 1. Categories of stated reasons for subjective unmet health care needs

System reasons	Personal reasons	Other
Not available in area	Felt would be inadequate	Other
Not available when required	Too busy	No reason stated
Waiting time too long	Didn't get around to it	
Cost of care	Decided not to seek care	
Doctor didn't think necessary		

Note: The system reasons category includes geographic, time and financial barriers that could be altered by health policymakers, as they are features of the health care system. The personal reasons category includes personal preferences or personal constraints that are not considered directly amenable to by health policymakers. The other reasons category includes motives that cannot be classified as either system or personal. It is possible for a respondent to have both system and personal categories of SUN, but the other category captures only respondents who do not state system or personal reasons.

According to Andersen's (1995) influential behavioral model, an individual's access to health care is a function of: (i) predisposing factors capturing social, economic and cultural characteristics of an individual typically independent of a health need, (ii) enabling factors that influence the logistics of care or are necessary for access and (iii) health need factors, which may include health behaviors. Within Andersen's model, SUN captures an interaction (whether realized or not) with the health care system and is not itself a determinant of care-seeking behavior (Allin *et al.*, 2010). Thus, we use Andersen's categorization to organize the variables likely to affect SUN (see Table A1 for details) and selected for the reasons outlined below.

Predisposing factors include socio-economic and demographic factors. We include the following variables: respondent age, sex, educational attainment, immigrant status and time since immigration and social and familial support. Findings on the significance of gender are mixed. Several studies have found that women are more likely to report unmet need (Kasman and Badley, 2004; Sibley and Glazier, 2009; Socias *et al.*, 2016), while others found no such relation (Chen and Hou, 2002; Law *et al.*, 2005). Younger respondents and those with higher education have been found to be more likely to report unmet need in repeated studies (Chen and Hou, 2002; Guend and Tesson, 2009; Sibley and Glazier, 2009; Marshall, 2011). Previous research has found that immigrants have more difficulty in accessing health care (Sanmartin and Ross, 2006; Clarke, 2016), are less likely to have a regular doctor (Devlin and Rudolph-Zbarsky, 2014), but are less likely to report an unmet need (Wu *et al.*, 2005). However, over time immigrants' behavior converges to Canadian-born populations (McDonald and Kennedy, 2004). Family status, namely marital status and household size, may influence attitudes and decisions toward health care if they encourage securing one's own health in response to increased obligations to others (Folland, 2006, 2008), hence potentially affecting SUN. Social supports are associated with health care utilization and health outcomes (Hendryx *et al.*, 2002; Laporte *et al.*, 2008), including SUN (Baiden *et al.*, 2014). We use a measure of self-reported belonging to the local community, in keeping with previous research (Laporte *et al.*, 2008; Devlin and Rudolph-Zbarsky, 2014).

Enabling resources are captured by three individual-level variables (having a regular doctor, household income and rural residence) and three community-level variables (family and specialist physician density, and province of residence). As primary care physicians act as gatekeepers of specialist care in Canada, access to a regular doctor may influence unmet need (Dunlop *et al.*, 2000; Chan and Austin, 2003). Individuals from low-income households have repeatedly been found to be more likely to report unmet needs (Chen and Hou, 2002; Hendryx *et al.*, 2002; Kasman and Badley, 2004; Allin *et al.*, 2010). Evidence on place of residence is mixed, though most studies found higher unmet needs in urban areas (Kasman and Badley, 2004; Law *et al.*, 2005; McDonald and Conde, 2010). In terms of community-level variables, higher physician

density has been associated with lower unmet needs (McDonald and Conde, 2010), but the associations differ between family and specialist physicians (Dunlop *et al.*, 2000; Sibley and Weiner, 2011). Canadian health care policy is provincially determined, and there are significant differences in the relative provincial levels of SUN (Sibley and Glazier, 2009).

Health needs are captured primarily by health status and health behavior variables. For health status, we use a self-reported five-category (poor to excellent) variable since it has been associated with a greater likelihood of SUN (Guend and Tesser, 2009). We also use indicators for five common chronic conditions (arthritis, asthma, diabetes, heart disease and high blood pressure) and an indicator of additional chronic conditions in the CCHS. Chronic conditions are associated with increased unmet needs (Ronksley *et al.*, 2013), or other measures of utilization and access (McDonald and Conde, 2010; Devlin and Rudolph-Zbarsky, 2014). As for health behavior, we retain smoking and drinking as these behaviors have been found to influence utilization rates (Laporte *et al.*, 2008), and may thus influence SUN. Following Dunlop *et al.* (2000), activity level is included as an additional proxy for pro-health behaviors.

2.2 Empirical framework

To generate a mutually exclusive set of reasons for SUN, they were grouped into three categories (system, personal and other) and selecting both system and personal reasons was treated as a separate category. This last category allows for conservative estimates of factors contributing to system SUN *only* or personal SUN *only*, while allowing individuals who have *both* system and personal reasons to have a different set of contributing factors. Hence, the five categories of reasons for SUN are system, personal, both system and personal reasons, other and no SUN. Rather a multinomial logit with all five categories, in keeping with our study objective, we selected to split the analysis into two parts to facilitate the interpretation of results. First, we run five binary logits (one for each year of observation) where we explore the association between the predictors and likelihood to report SUN. Second, among those reporting SUN, we use five multinomial logits (again, one per year) to analyze the relationship between predictors and the stated reasons for SUN. In each regression, the predictors include the predisposing, enabling and needs factors simultaneously.

The primary methodological concern with the multinomial logit is the independence of irrelevant alternative (IIA) assumption which holds that the relative odds of selecting a choice does not depend on the existence of alternatives, so removing or adding alternatives leaves the relative odds unchanged. To test the IIA assumption, a set of generalized Hausman tests were conducted for each year. The test compared the estimations of the full model with estimations of a restricted model with an alternative excluded. For 2003, 2005, 2010 and 2014 results showed that we cannot reject the equality of the coefficients in common between the full and restricted models (available upon request). Except for 2001, the IIA assumption appears to hold for all years, hence we feel confident using multinomial logits.

As a non-linear model, the estimated coefficients of logit are more difficult to interpret. Hence, results are reported as average marginal effects. Marginal effects for continuous variables use an increase of a single standard deviation, for binary variables as moving from 0 to 1, and for ordinal variables as reported in regression tables. All estimates produced were weighted to be representative and used bootstrap variance estimates to account for the design effects of the CCHS. Analyses were performed in Stata 13.

To compare how the influence of each independent variable varies over time, we check whether the marginal effect calculated in a given year falls within the 95% confidence intervals of the marginal effect of the preceding year. To facilitate the reading of our regression tables, we use a font and color system to indicate if the influence of an independent variable is statistically significantly higher or lower than the preceding year (at the 5% level) and report the complete tables with confidence intervals in the Appendix (Tables A2–A7).

3. Results

3.1 Summary statistics

Table 2 presents the sample means with standard deviations or the percentages of all variables. In the interest of space, we comment only on the SUN variables here. The proportion of respondents reporting unmet need decreased after 2001 (13%) and is relatively constant from 2003 onward (11.6–12%). Similarly, the proportion of respondents who state both system and personal reasons (0.6–0.8%) for SUN has remained stable. It has slightly increased for those who stated system reasons only (6.8–7.7%). From 2001 to 2005, the proportion reporting SUN for personal reasons declined from 4.4 to 2.1%, while the proportion in the other category increased from 0.8 to 2%, but after 2005 both remained stable (about 2%). By 2014, stating personal reason makes up 16.8% of individuals with unmet needs, a substantial decline from 34.1% in 2001, while system reasons remain dominant at 60.0% of SUN in 2014.

3.2 Predisposing factors

The marginal effects for the SUN variable logit regressions are reported in **Table 3**, and the marginal effects for the multinomial logit on the reasons stated for SUN are reported in **Table 4**. Many predisposing factors influenced reporting SUN, and some on stating a particular reason for SUN.

Adjusting for all other variables, women were significantly more likely to report SUN than men in all years (+2.3–3.6%). Among those with SUN, being a woman decreased the likelihood of reporting a personal reason. The effect on personal reason was significant in most years, with the largest in 2003 (–9.5%), significantly different than the years on either side. Being a woman increased reporting of a system reason from 2001 to 2010 (+3.4–5.9%), though the trend decreased from 2005.

Age was also significant in all years and decreased the likelihood of reporting SUN. On average, a standard deviation increase in age (+13.3–19.8 years) decreased the likelihood of reporting unmet need by 4% in 2001, declined to 2.4% by 2014, and this was a significant trend. Age also had a consistent significant effect on stated reasons for SUN. In all five years, increased age decreased the likelihood of a personal reason (–2.3 to 4.2%) and increased it for system reasons (+2.1–4.9%). The effect of age on stated reasons was roughly stable over time.

Married (or common law) individuals had a higher likelihood of reporting SUN relative to single individuals except in 2014 (+0.8–2.2%) and were more likely to report system reasons (+4.9–6.6%) in three years. While separated or divorced respondents were significantly more likely to report SUN in all five years (+2.1–3.2%, again compared to single individuals), with no significant effect on stated reasons except in 2005. Household size had no effect on reporting unmet needs but was significantly associated with stating a personal reason in 2001 and 2003 (+1.7–1.8%).

Individuals with a somewhat strong sense of community belonging were significantly less likely to report SUN than those with a very strong sense (–0.9 to 2.2%), except for 2010. However, the effects were non-linear. Indeed, those with a somewhat weak sense of community were more likely to report unmet need (+2–2.9%) compared to those with a somewhat strong sense. Regarding reasons for SUN, a very strong (vs somewhat strong) sense of belonging tended to increase the likelihood of personal reasons, but only in 2003 and 2014 (+ 5.7–6.4%).

Immigrant status had a small reducing effect on reporting SUN in 2001 and 2005 for those who immigrated in the past 5–10 years (–1.9 to 2.9%), but the association disappeared in the following years. Furthermore, immigrant status was associated with a large and significant reduction in the likelihood of stating personal reasons for SUN (–6.1 to 12.9%) in all years but 2001, with the association being mostly concentrated on long-term immigrant who have been in Canada for 15 years and more.

Table 2. Summary statistics

	Mean with (SD) or percentage				
	2001	2003	2005	2010	2014
SUN					
Subjective unmet healthcare need (all)	0.130	0.116	0.118	0.120	0.118
System reasons only	0.070	0.073	0.068	0.077	0.071
Personal reasons only	0.044	0.029	0.021	0.017	0.020
Both system and personal reasons	0.008	0.008	0.006	0.007	0.007
Other reason	0.008	0.007	0.024	0.020	0.020
Predisposing					
Female	0.510	0.510	0.510	0.509	0.509
Age	45.036 (19.819)	45.527 (19.834)	45.835 (19.701)	46.749 (13.320)	47.562 (13.333)
Marital – Married/common-law	0.640	0.644	0.649	0.637	0.626
Marital – Widowed	0.057	0.055	0.053	0.052	0.049
Marital – Separated/divorced	0.077	0.073	0.072	0.081	0.084
Marital – Single	0.226	0.227	0.226	0.230	0.241
Household size	2.939 (1.678)	2.948 (1.639)	2.905 (1.608)	2.803 (1.059)	2.814 (1.076)
Non-immigrant	0.783	0.781	0.777	0.756	0.741
Immigrant 0-10 years	0.114	0.117	0.114	0.122	0.135
Immigrant 10-20 years	0.016	0.018	0.026	0.026	0.022
Immigrant 20+ years	0.030	0.029	0.025	0.031	0.033
Education – Less than secondary	0.226	0.194	0.167	0.142	0.131
Education – Secondary	0.204	0.199	0.166	0.172	0.207
Education – Some postsecondary	0.088	0.082	0.091	0.082	0.055
Education – Postsecondary	0.481	0.525	0.576	0.604	0.607

(Continued)

Table 2. (Continued.)

	Mean with (SD) or percentage				
	2001	2003	2005	2010	2014
Ethnicity – White	0.861	0.848	0.836	0.796	0.767
Ethnicity – Other minority	0.127	0.138	0.143	0.176	0.199
Ethnicity – Aboriginal	0.012	0.014	0.020	0.029	0.034
Belonging – very strong	0.166	0.160	0.167	0.172	0.169
Belonging – somewhat strong	0.400	0.464	0.463	0.470	0.483
Belonging – somewhat weak	0.290	0.277	0.269	0.264	0.268
Belonging – very weak	0.144	0.099	0.101	0.094	0.080
Enabling resources					
Regular doctor	0.840	0.859	0.858	0.847	0.850
Household income under 5k	0.013	0.009	0.007	0.007	0.007
Household income 5k–10k	0.023	0.017	0.013	0.012	0.010
Household income 10k–15k	0.052	0.043	0.038	0.032	0.024
Household income 15k–20k	0.051	0.042	0.039	0.037	0.034
Household income 20k–30k	0.113	0.100	0.092	0.083	0.086
Household income 30k–40k	0.120	0.110	0.102	0.090	0.091
Household income 40k–50k	0.108	0.104	0.100	0.089	0.092
Household income 50k–60k	0.105	0.103	0.097	0.089	0.087
Household income 60k–80k	0.167	0.168	0.173	0.160	0.148
Household income 80k+	0.248	0.304	0.339	0.400	0.422
Family physician density	95.989 (28.676)	97.239 (28.876)	98.395 (28.909)	104.473 (20.291)	115.033 (20.776)
Specialist physician density	94.827 (73.776)	92.500 (70.711)	94.876 (71.045)	103.131 (49.597)	112.152 (49.633)
Rural	0.180	0.185	0.178	0.177	0.183

Health need					
Health status – excellent	0.251	0.221	0.216	0.224	0.206
Health status – very good	0.353	0.354	0.377	0.369	0.376
Health status – good	0.269	0.305	0.288	0.285	0.296
Health status – fair	0.095	0.093	0.089	0.092	0.090
Health status – poor	0.033	0.028	0.030	0.031	0.032
Asthma	0.079	0.079	0.079	0.082	0.081
Diabetes	0.045	0.051	0.054	0.069	0.072
Heart disease	0.055	0.055	0.052	0.054	0.053
Arthritis	0.168	0.185	0.180	0.168	0.173
High blood pressure	0.139	0.159	0.165	0.187	0.192
Other chronic conditions	0.157	0.168	0.170	0.157	0.150
Smokes – daily	0.227	0.191	0.178	0.167	0.144
Smokes – occasionally	0.044	0.052	0.053	0.053	0.048
Smokes – never	0.729	0.757	0.769	0.780	0.809
Alcohol – daily	0.065	0.074	0.077	0.075	0.070
Alcohol – occasionally	0.737	0.738	0.737	0.725	0.727
Alcohol – none	0.198	0.188	0.186	0.200	0.203
Activity level – active	0.206	0.243	0.246	0.253	0.272
Activity level – Moderately active	0.235	0.251	0.253	0.249	0.250
Activity level – Inactive	0.559	0.506	0.500	0.498	0.478
<i>N</i>	95,897	95,401	97,215	44,332	51,094

Notes: Standard deviation in bracket below the mean. Other chronic conditions include: back problems (excluding fibromyalgia and arthritis), migraine headaches, cancer, stomach or intestinal ulcers, effects of a stroke, urinary incontinence, bowel disorder (including Crohn's disease or colitis), and Alzheimer's disease or other dementia.

Table 3. Logit models for determinants of SUN

	2001	2003	2005	2010	2014
Predisposing characteristics					
Female	0.030***	0.029***	0.033***	0.036***	0.023***
Age	-0.040***	-0.036***	-0.028***	-0.028***	-0.024***
MS married/common-law	0.008*	0.018***	0.012***	0.022***	0.011
MS widowed	0.014	0.004	-0.017**	0.012	-0.003
MS separated/divorced	0.028***	0.032***	0.021***	0.030***	0.030**
HH size	-0.001	-0.001	-0.001	-0.002	-0.004
Immigrant 0–5 years	-0.001	-0.002	-0.002	0.010	-0.010
Immigrant 5–10 years	-0.027*	-0.005	-0.019*	0.031	0.022
Immigrant 10–15 years	-0.009	-0.011	0.007	0.026	-0.005
Immigrant 15–20 years	0.000	-0.028**	0.010	0.009	-0.007
Immigrant 20+ years	-0.040***	-0.013	0.014	0.004	-0.020
Educ. – Sec. (no sec.)	0.009**	0.005	0.020***	0.017**	0.016*
Educ. – Some post-sec. (sec.)	0.040***	0.026***	0.029***	0.032***	0.024*
Educ. – Post-sec. (some post-sec)	-0.007	0.004	0.005	0.011	-0.001
Ethnicity – Other minority	-0.029***	0.001	-0.006	-0.020*	0.009
Ethnicity – Aboriginal	0.016	0.021**	0.015*	0.025	0.030**
Belong SS (VS)	-0.010**	-0.016***	-0.009**	-0.013	-0.022***
Belong SW (SS)	0.020***	0.022***	0.020***	0.008	0.029***
Belong VW (SW)	0.001	0.021***	0.022***	0.030***	0.027**
Enabling resources					
Regular doctor	-0.032***	-0.037***	-0.044***	-0.053***	-0.047***
Family physician density	-0.005*	-0.006**	-0.001	0.002	-0.001
Specialist density	0.002	0.003	0.001	-0.002	0.005

Household income increase 5k–10k	0.021	0.007	0.013	0.018	0.029
HH inc increase 10k–15k	−0.009	0.000	−0.010	−0.023	−0.021
HH inc increase 15k–20k	−0.001	−0.012	−0.013	−0.010	−0.039*
HH inc increase 20k–30k	−0.008	−0.012	0.003	0.002	0.017
HH inc increase 30k–40k	0.000	0.007	0.000	0.003	−0.007
HH inc increase 40k–50k	−0.002	0.006	−0.005	−0.034***	0.002
HH inc increase 50k–60k	0.001	−0.007	−0.002	0.001	−0.010
HH inc increase 60k–80k	0.002	−0.006	0.006	0.003	0.004
HH inc increase 80k+	−0.007	−0.001	0.001	0.016**	−0.004
Rural	−0.001	0.001	0.000	−0.006	−0.003
Province – NL	0.007	0.031***	−0.004	−0.001	−0.030***
Province – PEI	−0.004	−0.021**	0.005	0.007	0.002
Province – NS	0.009	0.001	−0.016**	−0.017	−0.010
Province – NB	0.001	0.010	−0.009	−0.013	−0.022**
Province – QC	0.004	0.019***	0.003	0.043***	0.030***
Province – MB	0.005	0.025***	0.011	0.008	−0.002
Province – SK	−0.005	−0.012	−0.022***	0.006	−0.040***
Province – AB	−0.003	0.000	−0.027***	0.014	−0.013
Province – BC	0.004	0.024***	0.002	0.014	0.011
Need					
HS fair (poor)	−0.102***	−0.113***	−0.060***	−0.102***	−0.084***
HS good (fair)	−0.079***	−0.064***	−0.081***	−0.073***	−0.096***
HS vs good (good)	−0.049***	−0.040***	−0.037***	−0.042***	−0.051***
HS excellent (vs good)	−0.037***	−0.029***	−0.032***	−0.038***	−0.029***
Asthma	0.050***	0.047***	0.046***	0.039***	0.036***
Diabetes	−0.007	−0.004	−0.015**	−0.006	−0.012

(Continued)

Table 3. (Continued.)

	2001	2003	2005	2010	2014
Heart	0.023***	0.015*	0.015*	0.003	-0.019**
Arthritis	0.079***	0.070***	0.070***	0.078***	0.066***
High BP	0.003	0.005	0.009*	-0.003	-0.007
Other condition	0.082***	0.072***	0.071***	0.077***	0.052***
Smk. occ. (daily)	-0.002	0.005	-0.006	-0.005	-0.020
Smk. never (occ.)	-0.015*	-0.028***	-0.016**	-0.001	0.003
Smk. never (daily)	-0.017***	-0.023***	-0.022***	-0.006	-0.017**
Alc. occ. (daily)	0.001	-0.009	0.006	-0.021*	-0.015
Alc. none (occ.)	-0.010**	-0.008*	-0.005	-0.003	-0.013*
Alc. none (daily)	-0.009	-0.018**	0.002	-0.024*	-0.028**
Mod. active (active)	-0.012***	0.001	-0.010**	-0.018**	-0.004
Inactive (mod. active)	-0.003	-0.007	0.007*	0.009	-0.016**
Inactive (active)	-0.016***	-0.006	-0.003	-0.009	-0.020***
N	95,897	95,401	97,215	44,332	51,094

***p < 0.01, **p < 0.05, *p < 0.10.

Note: **Bold** indicates greater than the previous year's confidence interval upper limit; *italic* indicates smaller than the previous years' lower limit

Table 4. Multinomial logit models for the determinants of the reasons stated for unmet health care needs

	2001				2003				2005			
	System	Personal	Both	Other	System	Personal	Both	Other	System	Personal	Both	Other
Predisposing characteristics												
Female	0.036***	-0.041***	0.000	0.005	0.071***	-0.095***	0.011	0.012	0.026*	-0.043***	-0.010	0.027**
Age	0.021**	-0.024***	-0.007*	0.010*	0.049***	-0.042***	-0.010**	0.004	0.025**	-0.033***	-0.006*	0.014
MS married/common-law	0.051**	-0.037*	0.002	-0.016*	0.024	-0.028	0.009	-0.004	0.053***	-0.043***	0.001	-0.011
MS widowed	-0.006	-0.003	0.009	-0.001	-0.117***	0.117***	0.010	-0.010	0.001	-0.006	-0.006	0.011
MS separated/divorced	0.011	-0.017	0.007	-0.001	0.016	-0.027	0.013	-0.002	0.057**	-0.046**	0.008	-0.018
HH size	-0.024**	0.018**	-0.004	0.010**	-0.011	0.017*	0.000	-0.006*	-0.009	0.002	0.000	0.006
Immigrant 0–5 years	0.001	-0.010	0.004	0.005	0.008	-0.001	0.010	-0.017	0.052**	-0.033	0.006	-0.025
Immigrant 5–10 years	-0.032	-0.089	-0.023	0.143*	-0.032	0.003	0.069	-0.040	-0.001	0.040	0.001	-0.041
Immigrant 10–15 years	-0.109*	0.085	0.043	-0.019	0.072	-0.086*	0.034	-0.021	0.028	-0.032	0.006	-0.002
Immigrant 15–20 years	0.056	-0.040	0.003	-0.019	0.052	-0.103**	0.089*	-0.038***	0.092*	-0.055	0.030	-0.067*
Immigrant 20+ years	0.011	0.007	-0.001	-0.017	0.103*	-0.083*	0.011	-0.031	-0.066	-0.063**	-0.009	0.138**
Educ. Sec. (no sec.)	0.015	-0.020	0.007	-0.002	0.014	-0.009	0.004	-0.009	0.025	-0.006	-0.023*	0.004
Educ. Some post-sec. (sec.)	-0.001	0.014	0.009	-0.021*	0.039	-0.056**	0.008	0.010	-0.058*	0.009	0.032**	0.017
Educ. Post-sec. (some post-sec)	-0.001	-0.012	0.008	0.005	0.011	-0.002	-0.006	-0.004	0.074***	-0.028	-0.019	-0.027
Ethnicity – Other minority	0.029	-0.008	-0.008	-0.013	0.028	-0.022	-0.021	0.015	0.052*	-0.032	0.016	-0.035
Ethnicity – Aboriginal	-0.036	0.008	0.026	0.001	-0.027	0.020	0.000	0.007	0.045	-0.004	-0.015	-0.026
Belong SS (VS)	-0.024	0.017	0.004	0.003	-0.037*	0.057***	-0.018	-0.002	0.012	-0.018	0.010	-0.004
Belong SW (SS)	-0.026	0.020	-0.007	0.013*	-0.035**	0.025	0.008	0.002	-0.010	0.004	0.001	0.005
Belong VW (SW)	-0.015	0.008	-0.004	0.011	0.019	-0.035	0.019	-0.003	-0.033	-0.002	-0.001	0.035*
Enabling resources												
Regular doctor	-0.002	0.018	0.009	-0.025***	0.028	0.018	-0.024***	-0.022***	0.037**	0.009	-0.020***	-0.026**
Family physician density	0.017	-0.010	-0.001	-0.006	0.015	0.004	-0.008	-0.011*	0.023*	-0.010	-0.005	-0.008
Specialist density	-0.040***	0.028**	-0.004	0.016**	-0.039***	0.017	0.009	0.013	-0.019	0.006	0.002	0.011

(Continued)

Table 4. (Continued.)

	2001				2003				2005			
	System	Personal	Both	Other	System	Personal	Both	Other	System	Personal	Both	Other
HH inc. increase 5k–10k	−0.172***	0.192***	−0.016	−0.004	0.076	−0.008	−0.086	0.018	−0.111	0.058	0.021	0.032
HH inc. increase 10k–15k	0.051	−0.039	−0.005	−0.007	0.027	−0.029	−0.023	0.026	−0.028	−0.001	−0.022	0.051
HH inc. increase 15k–20k	0.004	−0.004	0.006	−0.007	0.032	−0.009	0.021	−0.044***	0.069*	−0.004	−0.008	−0.057*
HH inc. increase 20k–30k	−0.052*	0.064**	−0.008	−0.003	−0.011	−0.012	0.010	0.013	−0.006	0.003	0.010	−0.007
HH inc. increase 30k–40k	0.010	−0.021	0.015	−0.005	0.005	0.036	−0.025	−0.016	−0.038	0.029	0.010	−0.001
HH inc. increase 40k–50k	0.017	−0.031	−0.006	0.020	−0.035	−0.006	0.020	0.021	0.005	−0.031	−0.004	0.030
HH inc. increase 50k–60k	0.017	0.006	0.003	−0.026**	0.017	−0.021	0.001	0.003	0.021	0.012	0.005	−0.038
HH inc. increase 60k–80k	0.013	−0.016	−0.011	0.014	−0.003	0.030	−0.011	−0.015	−0.019	0.006	−0.007	0.021
HH inc. increase 80k+	−0.029	0.037*	−0.001	−0.007	−0.021	0.008	−0.004	0.018	−0.002	0.011	−0.010	0.002
Rural	−0.018	0.008	0.011	−0.001	−0.036**	0.038**	−0.005	0.003	−0.019	0.001	0.002	0.015
Province – NL	−0.025	0.014	−0.004	0.015	−0.006	−0.025	0.060*	−0.029	−0.048	0.045	0.018	−0.016
Province – PEI	0.052	−0.024	−0.008	−0.019	−0.082	0.028	0.003	0.052	0.117**	−0.061*	0.000	−0.056
Province – NS	0.038	−0.051*	0.015	−0.003	−0.001	−0.017	0.043*	−0.025	0.040	−0.017	0.018	−0.041
Province – NB	−0.016	−0.018	−0.025**	0.059***	0.079**	−0.069**	0.009	−0.019	−0.020	0.014	0.011	−0.005
Province – QC	0.055***	−0.043**	0.000	−0.013	0.027	−0.017	0.029***	−0.039***	0.031	−0.004	0.012	−0.039**
Province – MB	−0.004	−0.004	0.023*	−0.015	−0.040	0.030	0.040**	−0.031**	−0.001	0.047	0.008	−0.054**
Province – SK	−0.057**	0.050*	−0.006	0.013	−0.141***	0.097**	0.018	0.026	−0.118***	0.089***	−0.003	0.031
Province – AB	0.009	−0.020	0.017	−0.006	−0.058**	0.015	0.045***	−0.001	−0.042	0.024	0.013	0.005
Province – BC	−0.021	0.012	−0.015	0.025*	−0.041	0.027	0.010	0.004	−0.037	0.034	0.011	−0.008
Need												
HS fair (poor)	0.017	0.005	−0.008	−0.014	−0.043	0.003	0.024	0.017	0.007	0.021	0.000	−0.028
HS good (fair)	−0.046**	0.039**	0.011	−0.005	0.013	0.009	−0.010	−0.013	−0.003	0.018	−0.007	−0.008
HS vs good (good)	0.007	0.015	−0.018**	−0.004	−0.010	0.030*	−0.021**	0.001	0.008	0.011	0.004	−0.023
HS excellent (vs good)	0.004	0.001	−0.004	−0.002	0.024	−0.005	−0.016	−0.003	−0.027	0.025	−0.009	0.011

(Continued)

Table 4. (Continued.)

	2001				2003				2005			
	System	Personal	Both	Other	System	Personal	Both	Other	System	Personal	Both	Other
Asthma	0.013	-0.025	0.012	0.000	0.039*	-0.026	-0.003	-0.009	0.006	-0.006	0.024*	-0.025
Diabetes	-0.015	0.028	-0.014	0.001	0.034	-0.071***	0.014	0.023	0.011	-0.034	0.025	-0.002
Heart	-0.028	0.036	0.010	-0.018**	-0.008	-0.020	-0.011	0.039*	-0.001	-0.036*	0.006	0.031
Arthritis	0.011	-0.028*	0.019*	-0.002	0.017	-0.011	0.005	-0.012	0.028	-0.016	-0.001	-0.011
High BP	0.028	-0.019	-0.006	-0.003	-0.023	0.001	0.023	-0.001	0.066***	-0.017	-0.017**	-0.033**
Other condition	0.002	0.001	-0.003	-0.001	0.002	-0.017	0.010	0.005	0.053***	-0.024**	0.000	-0.029**
Smk. occ. (daily)	0.022	0.016	-0.015	-0.023**	0.028	0.011	-0.017	-0.023	0.013	-0.019	0.010	-0.004
Smk. never (occ.)	-0.024	-0.017	0.020**	0.021**	-0.021	-0.017	0.027**	0.011	-0.019	0.015	-0.009	0.013
Smk. never (daily)	-0.002	-0.001	0.005	-0.002	0.007	-0.005	0.010	-0.011	-0.007	-0.004	0.001	0.009
Alc. occ. (daily)	-0.084***	0.081***	0.008	-0.005	0.035	-0.039	-0.007	0.010	0.062**	-0.037	0.004	-0.029
Alc. none (occ.)	0.018	-0.025	-0.008	0.015*	0.044**	-0.020	-0.025***	0.001	-0.006	-0.028*	0.001	0.034
Alc. none (daily)	-0.066**	0.056*	0.000	0.010	0.079**	-0.059*	-0.031	0.011	0.056*	-0.065**	0.005	0.005
Mod. active vs active	-0.012	0.023	-0.017**	0.007	0.018	0.002	-0.003	-0.016	0.011	-0.001	-0.002	-0.009
Inactive vs mod. active	0.010	-0.006	0.010	-0.014*	-0.044**	0.010	0.020**	0.014*	-0.046***	0.038***	0.004	0.004
Inactive vs active	-0.002	0.016	-0.008	-0.007	-0.027	0.012	0.017*	-0.002	-0.035*	0.038***	0.002	-0.005
N	13,242	-	-	-	11,365	-	-	-	11,756	-	-	-

	2010				2014			
	System	Personal	Both	Other	System	Personal	Both	Other
Predisposing characteristics								
Female	0.040*	-0.040**	-0.009	0.010	0.019	-0.028	0.000	0.010
Age	0.032**	-0.026***	-0.013**	0.008	0.030*	-0.042***	0.002	0.010
MS married/common-law	0.060*	-0.021	-0.011	-0.028	-0.027	0.033	0.011	-0.017
MS widowed	-0.064	0.058	-0.002	0.008	-0.061	0.019	-0.019	0.060

(Continued)

Table 4. (Continued.)

	2010				2014			
	System	Personal	Both	Other	System	Personal	Both	Other
MS separated/divorced	-0.021	0.036	0.013	-0.028	-0.012	0.011	0.011	-0.010
HH size	0.015	-0.009	-0.008	0.002	0.015	-0.005	0.001	-0.012
Immigrant 0-5 years	0.025	-0.061**	0.003	0.032	-0.030	0.009	0.042	-0.021
Immigrant 5-10 years	-0.059	-0.002	-0.050***	0.112	-0.052	-0.076	0.061	0.067
Immigrant 10-15 years	0.041	-0.055	0.038	-0.025	0.014	-0.017	0.115	-0.113*
Immigrant 15-20 years	-0.002	-0.066	-0.021	0.089	-0.051	-0.113***	0.059	0.105
Immigrant 20+ years	0.118	-0.080	-0.041	0.003	0.003	-0.129***	0.086	0.040
Educ. Sec. (no sec.)	0.029	0.002	-0.002	-0.029	-0.044	0.007	0.008	0.028
Educ. Some post-sec. (sec.)	0.031	-0.009	-0.012	-0.010	-0.003	0.082	-0.048	-0.031
Educ. Post-sec. (some post-sec)	-0.026	0.010	0.012	0.004	0.082	-0.109**	0.024	0.004
Ethnicity – Other minority	0.072	-0.011	0.026	-0.088***	0.048	0.020	-0.014	-0.054*
Ethnicity – Aboriginal	-0.010	0.080	0.005	-0.075***	-0.056	-0.035	0.008	0.084
Belong SS (VS)	0.027	-0.051	0.012	0.012	-0.055	0.064**	0.038**	-0.047*
Belong SW (SS)	0.032	0.001	-0.004	-0.028	-0.013	-0.021	-0.017	0.051**
Belong VW (SW)	-0.015	-0.033	0.004	0.044	-0.002	-0.038	0.016	0.023
Enabling resources								
Regular doctor	-0.057*	0.031	-0.019***	0.044*	0.000	-0.010	-0.023**	0.033
Family physician density	0.025	0.025*	-0.005	-0.045***	-0.022	0.001	0.000	0.021
Specialist density	-0.019	-0.021*	0.007	0.033	-0.005	0.002	0.004	-0.002
HH inc. increase 5k–10k	-0.025	0.069	0.036	-0.080	0.039	0.108	-0.073	-0.075
HH inc. increase 10k–15k	0.061	-0.036	-0.025	0.001	-0.008	0.054	-0.088	0.042
HH inc. increase 15k–20k	-0.075	0.080*	0.002	-0.007	-0.040	0.011	0.080	-0.051
HH inc. increase 20k–30k	0.042	-0.037	0.010	-0.015	0.076	-0.023	-0.070	0.017
HH inc. increase 30k–40k	-0.008	0.008	0.019	-0.019	-0.004	-0.028	0.042*	-0.010

(Continued)

Table 4. (Continued.)

	2010				2014			
	System	Personal	Both	Other	System	Personal	Both	Other
HH inc. increase 40k–50k	−0.011	−0.007	−0.004	0.021	0.041	−0.033	−0.006	−0.002
HH inc. increase 50k–60k	−0.070	0.039	0.001	0.029	−0.068	0.035	0.031	0.002
HH inc. increase 60k–80k	−0.037	0.024	0.006	0.007	0.009	−0.018	−0.040	0.049
HH inc. increase 80k+	0.080**	−0.060**	−0.008	−0.012	−0.017	0.019	−0.001	−0.001
Rural	0.008	0.012	0.026	−0.046***	0.055**	−0.021	−0.005	−0.029
Province – NL	−0.018	0.014	−0.005	0.010	0.017	0.098	−0.022	−0.093**
Province – PEI	0.137	−0.112*	−0.028	0.004	0.014	0.087	−0.020	−0.082
Province – NS	−0.178**	0.024	−0.017	0.172**	−0.015	0.063	−0.005	−0.043
Province – NB	−0.030	−0.077***	0.015	0.092	−0.063	0.079	−0.011	−0.006
Province – QC	0.039	−0.041*	−0.013	0.015	0.019	−0.003	0.002	−0.018
Province – MB	0.028	−0.017	−0.039***	0.028	−0.062	0.006	0.000	0.056
Province – SK	−0.016	−0.050	−0.034*	0.100**	−0.035	0.039	−0.020	0.016
Province – AB	0.000	−0.022	−0.008	0.030	0.022	0.007	−0.019	−0.009
Province – BC	−0.034	0.000	−0.029*	0.063	0.033	0.012	0.006	−0.051*
Need								
HS fair (poor)	−0.034	0.007	0.021	0.006	−0.004	0.025	0.012	−0.032
HS good (fair)	0.046	0.021	−0.023	−0.045	−0.015	0.016	−0.004	0.003
HS vgood (good)	−0.036	0.025	−0.013	0.024	0.001	0.013	−0.003	−0.011
HS excellent (vgood)	0.027	−0.011	0.018	−0.034	0.016	0.006	−0.006	−0.016
Asthma	0.041	0.008	−0.009	−0.040*	0.019	−0.021	0.011	−0.008
Diabetes	0.050	−0.026	−0.002	−0.022	−0.029	−0.005	0.010	0.023
Heart	−0.041	−0.025	0.039	0.027	0.071*	−0.058*	−0.006	−0.008
Arthritis	0.049	−0.014	−0.014	−0.021	0.025	−0.012	−0.001	−0.012
High BP	0.017	−0.015	−0.007	0.005	0.018	−0.001	−0.017	0.000

(Continued)

Table 4. (Continued.)

	2010				2014			
	System	Personal	Both	Other	System	Personal	Both	Other
Other Condition	0.026	0.007	0.009	-0.043**	0.017	-0.028	0.002	0.010
Smk occ. (daily)	-0.010	0.022	0.017	-0.028	-0.033	-0.079**	0.001	0.111**
Smk never (occ.)	0.023	0.005	-0.015	-0.012	0.081	0.051	-0.025	-0.107**
Smk never (daily)	0.013	0.027	0.002	-0.041	0.048	-0.028	-0.024	0.004
Alc occ. (daily)	-0.002	-0.010	-0.002	0.014	0.068	-0.068*	0.009	-0.009
Alc none (occ.)	0.004	-0.031*	0.007	0.021	-0.047	0.005	-0.012	0.054*
Alc none (daily)	0.002	-0.041	0.004	0.035	0.021	-0.063	-0.004	0.045
Mod. active vs active	0.007	-0.016	0.011	-0.001	0.017	-0.033	-0.008	0.025
Inactive vs mod. active	-0.041	0.029	0.009	0.004	-0.035	0.045**	-0.004	-0.007
Inactive vs active	-0.034	0.013	0.019	0.002	-0.018	0.012	-0.012	0.018
N	5144	-	-	-	5401	-	-	-

***p < 0.01, **p < 0.05, *p < 0.10.

Note: Red indicates greater than the previous year's confidence interval upper limit; Yellow indicates smaller than the previous years' lower limit.

Indigenous individuals were significantly more likely to report SUN in most years (2003, 2005 and 2014). However, this variable had no effect on stated reason for SUN. Non-white and non-indigenous individuals were more likely to report SUN, however in 2001 and 2010 only, and had no difference in the likelihood of the stated reasons.

The level of education attained significantly affected the probability of reporting SUN in all five years. The relative magnitude of effects indicates that the most substantial shift occurs between the absence of postsecondary education and some postsecondary education (+2.4–4.0%). No level of education had a consistent effect on the reason stated for SUN.

3.3 Enabling factors

Among the enabling factors, having a regular doctor had a consistent significant influence on the likelihood of reporting SUN and reasons stated. The effect ranged from a reduction in SUN of 3.2% in 2001 to 5.3% in 2010, and the protective effect increased post 2003. Furthermore, among those with SUN, having a regular doctor reduced the likelihood of reporting both system and personal reasons (–1.9 to 2.5%).

Family physician and specialist physician density did not substantially affect the likelihood of reporting SUN. Specialist density decreased the likelihood of reporting system reasons (–3.9 to 4.1%) but was only significant in 2001 and 2003.

With a few exceptions, the effects of household income were not significant contributors to SUN. The same applied to the reasons for SUN, and when significant, the largest change occurs in moving from \$5000 or under to between \$5000 and \$10,000.

The geographic indicator for rural residence was not significant with respect to SUN and almost never significant on reason stated. Importantly, when significant it was for system reasons. The pattern indicates an increasing trend, with living in a rural community decreasing the chance of stating a system reason in 2003 (–3.6%) and increasing it in 2014 (+5.5%).

The effects of the province of residence were not consistently significant, except for Quebec residents who were more likely to report a SUN in 2003, 2010 and 2014, with a slight increase over time (+1.9–4.3%). While those in Newfoundland were more likely to report SUN in 2003, the effect reversed in 2014. In the first three years those in Saskatchewan experienced large and significant reduction in system reasons (–5.7 to 14.1%), but the effect was not significant afterward.

3.4 Health needs factors

The health status group of variables most consistently and strongly affected the likelihood of SUN, but were largely not meaningful in reasons for SUN. In all years, an increase in self-assessed health was significantly associated with a decreased likelihood of SUN, with effects roughly stable over the 2001–2014 period. The contribution to reduced SUN was more substantial from poor to fair health (–6.0 to 11.3%) than from very good to excellent health (–2.9 to 3.7%), with a gradient in the intermediate levels. Self-assessed health, however, was not associated with stating a given reason with any consistency.

Indicators of chronic conditions produced different sets of results, which indicates that an aggregated indicator of chronic disease alone is insufficient for capturing their differing effects on SUN. Neither diabetes nor high blood pressure had a significant effect on reporting an unmet need. Heart disease was significantly associated with a 2% increase in SUN in 2001, but a 2% decrease in 2014, with a significant trend between the two years. Those with arthritis (+6.6–7.9%) or one of the other conditions (+5.2–8.2%) were significantly more likely to report SUN. Except for having any other chronic conditions (+5.3%) or high blood pressure (+6.6%), which increased system reasons in 2005, chronic conditions did not significantly influence the likelihood of reasons for SUN.

In terms of health behaviors, reductions in alcohol and tobacco consumption, when significant, had the same directionality, with (relative) abstinence decreasing the likelihood of reporting SUN, but the significance of the effects was variable. Except for 2010, non-smokers had a reduced likelihood of reporting SUN (−1.7 to 2.3%). There was no clear significant difference between daily and occasional alcohol users in SUN, and when comparing alcohol consumers with the abstinent significant differences were observed in some years, and larger between the daily users and the abstinent. When significant, decreases in activity were associated with moderate reduction in the likelihood of SUN, with the sharpest effect between the inactive and active categories (−1.6 to 2%). Few of the health behavior variables exhibited a consistent explanatory pattern of the SUN reasons. Inactive individuals were less likely to state a system reason (in 2003 and 2005) and more likely to state a personal reason (in 2005 and 2014) than their active counterparts.

4. Discussion

Reported subjective unmet needs declined from 13% of respondents in 2001 to 11.8% in 2014, a substantial reversal compared to the 1990s when unmet needs were on the rise (Sanmartin *et al.*, 2002), even if SUN remained stable from 2005 to 2014. This stability is nonetheless remarkable during the period of the Great Recession, as other countries experienced a rise in SUN between the mid-2000s and the mid-2010s (Zavras *et al.*, 2016; Connolly and Wren, 2017). That being said, personal reasons have been decreasing at a greater rate than others over our period of observation, showing a noticeable decline from 49% of the stated SUN reasons in 1999 (Chen and Hou, 2002). It may be the case that Canadians have adjusted to persistently low level of accessibility, while system reasons have yet to be fully addressed by health policymakers. This interpretation would be consistent with international comparisons regularly ranking the Canadian system low on accessibility (Davis *et al.*, 2014). While many efforts have been made to improve the health care system performance in the 2000s–2010s, including 10-years of dedicated funding with the 2004 Health Accord (Marchildon, 2013) and primary care renewal (Hutchison *et al.*, 2011), accessibility does not appear to have improved accordingly. A variety of factors could explain this situation, including the federated system resulting in a fragmented governance and accountability structure (Maioni, 2002; Flood *et al.*, 2017), health care responsibility sitting at the provincial level while the federal role is mostly limited to using its spending power through financial transfers (Banting and Corbett, 2002), and political factors constraining policy changes to be small-scale and gradual (Tuohy, 2018). All of these points may hinder the implementation of strong information technology and performance measurement tools that would allow progress to be monitored (Johnston and Hogel, 2016), as a contrast, specific areas of waiting times, which were tied to the federal-provincial transfer and measured, witnessed some improvement (Canadian Institute for Health Information, 2017).

Knowing which factors affect SUN in general, and particularly for system reasons, over time is a central piece of information that Canadian health policymakers can use. Our results show that some key determinants consistently appear to increase SUN reporting over all periods of time covered in this study: women, younger, in poorer health or without a regular doctor. With gaps stable over a period of 14 years, it is clear that these subgroups should be priority targets for Canadian health ministries, and that providing access to a regular doctor is a central policy tool to reach this goal.

The benefits of having a regular doctor have been documented in numerous studies (Lambrew *et al.*, 1996; Sanmartin and Ross, 2006), and is consistent with our findings. It is worth noting the increasing trend of reduced likelihood of SUN in having a regular doctor, particularly in 2005 and 2010. This finding may result from primary care reforms that occurred across most Canadian jurisdictions around this timeframe (Hutchison *et al.*, 2011), meaning that having a regular doctor was possibly a way to maintain continuity of care during these reorganizations (Menec *et al.*,

2006). The absence of an association of family physician density with SUN contrasts with previous findings showing a positive correlation with health (Piérard, 2014). However, since we include a regular doctor indicator in the regressions, this suggests that the organization of primary care delivery matters more. Furthermore, the density captures only the number of physicians, not the time worked, which is important in ensuring access (Swami *et al.*, 2018). This point is particularly relevant for the province of Quebec, where our findings indicate higher SUN in most years: physicians in this province have reduced their number of days worked (Contandriopoulos *et al.*, 2015) and work less hours per week than the rest of Canada or other developed countries (Forget, 2014).

The situation in rural settings may need further monitoring in the coming years. The reversal of the effect of rural residence, decreasing SUN for system reasons in 2003 but increasing them in 2014, indicates that access may have deteriorated in rural areas. While the effect of rurality on accessibility depends on how rural is defined (Sibley and Weiner, 2011), past study has shown that patients in rural communities sometimes have had to take risks to get to their point of service, e.g. travel during times of poor road conditions (Wong and Regan, 2009). Given the widespread geography of Canada, pursuing the deployment of telehealth technology could help curb this new trend (Hailey, 2001; Praxia Information Intelligence and Gartner Incorporated, 2011).

Among the predisposing factors, women consistently report more SUN. Previous studies have argued that women experience more unmet needs because they have less time available to access care for themselves, presumably due to their typical familial responsibilities (Pederson *et al.*, 2010). Our results indicate that barriers relate more to the health care system: indeed, everything else equal, women are more likely to report SUN for system reasons, less likely to do so for personal reasons, and do not report having SUN for both system and personal reasons differently than men. Increasing primary care after-hours and weekend access is one strategy that several governments have implemented recently, consistent with our findings (Hutchison *et al.*, 2001; Marchildon and Hutchison, 2016). Because we define system reasons with respect to health policies only, it should be noted that other interventions could include affordable childcare and a more equitable repartition of domestic labor across genders (Women and Gender Equity Knowledge Network, 2007).

Previous Canadian research also found a decrease of SUN with age (Kasman and Badley, 2004; Nelson and Park, 2006; Sibley and Glazier, 2009; Marshall, 2011). Our new findings are that reporting system reasons increases with age, while reporting personal reasons decreases with it; and that the protective effect of aging on SUN has declined over time, from a 4% reduction in 2001 to 2.5% in 2014. While further research is needed, this may indicate that some sectors of the health care system offer less accessible care than before, and this may be the case with long-term care (Ontario Long Term Care Association, 2018).

An important finding is that immigrants tend to report less SUN for personal reasons *ceteris paribus*, which may reflect a different socio-cultural perception of health and illness among immigrants (Wu *et al.*, 2005), at least for recent immigrants. Our finding that the likelihood of stating personal reasons is lower with longer time spent in Canada (even if it is not significant in all years) is to put in the context of a convergence of immigrants' behavior and health toward the native-born populations (McDonald and Kennedy, 2004; Vang *et al.*, 2017), which may be reflected in the likelihood of system reasons being similar between long-term immigrant and native-born.

Previous research that has disaggregated stated reasons for SUN has tended to use a binary or count variable for chronic conditions (Chen and Hou, 2002; Sibley and Glazier, 2009). The finding that there is no significant difference in the likelihood to report unmet need between individuals with diabetes, heart disease and high blood pressure and individuals without suggests, conditional on general health and other chronic conditions, these conditions are not differentially managed by the health care system. The change in heart disease, increasing SUN in 2001 but

decreasing it in 2014, also indicates a better management of this condition, *ceteris paribus*. However, arthritis patients in Canada may be underserved by current services.

Disaggregating SUN in system and personal reasons is useful to better understand the determinants of this complex concept, and inform future work on access-based measures of inequity (Gibson *et al.*, 2019). It shall be noted that further research is needed on the personal reasons for SUN, to more fully understand what stems from individual personal choice as opposed to individual personal constraint. We recognize that our categorization of these reasons may affect our findings, hence we used alternative categorizations following Allin *et al.* (2010) and Chen and Hou (2002) in sensitivity analyses (Tables A8–A10 in the Appendix). Our main results were not substantially altered, in particular, the factors explaining the reasons for SUN were mostly stable over time.

Our study is obviously not exempt from limitations. The CCHS is cross-sectional, and while we use different waves representative of the population at the time of the survey, we cannot use panel-data methods and our results remain correlational. An important limitation comes from the absence of information on private health insurance in the CCHS. Previous research has indicated that insurance is significantly associated with unmet health care needs (Hendryx *et al.*, 2002; Kasman and Badley, 2004; Shi and Stevens, 2005; Pagan and Pauly, 2006; Allin *et al.*, 2010), and we might expect its influence to split unevenly between system and personal reasons. Private insurance in Canada is used to cover services other than those of physicians and hospitals, such as prescription drugs, which have been shown to impact publicly provided health care services (Allin and Hurley, 2009; Devlin *et al.*, 2011). Nevertheless, absent a recent Canadian longitudinal health survey, the CCHS remains the best source of information to study SUN in this country.

As most papers focusing on unmet health care needs, the information in this study is based on self-reports. The question for unmet need is open to interpretation by respondents, who may not be aware of the services available to them. Some options in the close-ended reasons list may lack granularity to fully capture individuals' experiences. Respondents' answers may be influenced by social and cultural characteristics, which we mitigated by having both immigration and ethnicity variables in our regression. The 12-month time period in the question for unmet need opens the measure to some recall bias. However, two recent studies have found that higher SUN causes poorer health in the future, suggesting SUN at least partially measure lack of access to needed care (Bataineh *et al.*, 2018; Gibson *et al.*, 2019). Despite these limitations, our study provides new evidence on the determinants of SUN and their evolution in Canada that may be relevant for countries with universal health care systems.

5. Conclusions

We investigated the determinants of SUN and found that women, younger individuals and those in poorer health or without a regular doctor had consistently higher SUN over a period of almost 15 years, despite being in a universal health care system. To further disentangle the association between health needs, predisposing factors, enabling factors and SUN, we separated SUN due to system reasons from SUN due to personal reasons. This distinction helped further understand the influence of predisposing and enabling factors on SUN, but less so for health needs. Overall, our findings suggest both that increasing access to a regular provider of care and targeted policies for specific subgroups are needed. Investigation is warranted as to whether multiple, cumulative disadvantages occur for intersections of these subgroups (e.g. women in rural setting), guided by intersectionality research methods (Bauer and Scheim, 2019). Given that the Canadian system has a distinctively generous public coverage but only for a limited range of services, future research could use the same methodology to assess the evolution of the determinants of unmet health care needs in other universal health care systems where similar surveys are available (e.g. PES in Australia, Australian Bureau of Statistics (2018) ESPS in France, Institute for Research and

Information in Health Economics (IRDES) (2018) and SHARE and EU-SILC in Europe Börsch-Supan (2019), Eurostat (2019)).

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References

- Allin S and Hurley J (2009) Inequity in publicly funded physician care: what is the role of private prescription drug insurance? *Health Economics* **18**, 1218–1232.
- Allin S, Grignon M and Le Grand J (2010) Subjective unmet need and utilization of health care services in Canada: what are the equity implications? *Social Science & Medicine* (1982) **70**, 465–472.
- Andersen RM (1995) Revisiting the behavioral model and access to medical care: does it matter? *Journal of Health and Social Behavior* **36**, 1–10.
- Australian Bureau of Statistics (2018) Patient Experiences in Australia. Available at <https://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4839.0Explanatory%20Notes12017-18?OpenDocument>.
- Baiden P, Dunnen WD, Arku G and Mkandawire P (2014) The role of sense of community belonging on unmet health care needs in Ontario, Canada: findings from the 2012 Canadian community health survey. *Journal of Public Health* **22**, 467–478.
- Banting KG and Corbett S (2002) Health policy and federalism: an introduction. In Banting KG and Corbett S (eds), *Health Policy and Federalism: A Comparative Perspective on Multi-Level Governance*. Social Union Series. Montreal: McGill-Queen's Univ. Press., pp. 1–38.
- Bataineh H, Devlin RA and Barham V (2018) Does Unmet Health Care Lead to Poorer Health Outcomes? In Working Paper #1803E.
- Bauer GR and Scheim AI (2019) Advancing quantitative intersectionality research methods: intracategorical and intercategory approaches to shared and differential constructs. *Social Science & Medicine* **226**, 260–262.
- Börsch-Supan A (2019) Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 7. SHARE-ERIC. Available at <http://www.share-project.org/data-documentation/waves-overview/wave-7.html?L=0>.
- Canadian Institute for Health Information (2017) *Wait Times for Priority Procedures in Canada, 2017*. Ottawa, Ontario: CIHI.
- Cavalieri M (2013) Geographical variation of unmet medical needs in Italy: a multivariate logistic regression analysis. *International Journal of Health Geographics* **12**, 27.
- Chan BTB and Austin PC (2003) Patient, physician, and community factors affecting referrals to specialists in Ontario, Canada: a population-based, multi-level modelling approach. *Medical Care* **41**, 500–511.
- Chen J and Hou F (2002) Unmet needs for health care. *Health Reports* **13**, 23–34.
- Clarke J (2016) Difficulty Accessing Health Care Services in Canada. Health at a Glance. Statistics Canada.
- Connolly S and Wren M-A (2017) Unmet healthcare needs in Ireland: analysis using the EU-SILC survey. *Health Policy (Amsterdam, Netherlands)* **121**, 434–441.
- Contandriopoulos D, Brousselle A, Breton M, Duhoux A, Hudon C and Vadeboncoeur A (2015) Analyse Des Impacts de La Rémunération Des Médecins Sur Leur Pratique et La Performance Du Système de Santé Au Québec. 2015-BE-187183.
- Davis K, Stremikis K, Squires D and Schoen C (2014) Mirror, Mirror on the Wall: How the Performance of the U.S. Health Care System Compares Internationally. Commonwealth Fund.
- Devlin RA and Rudolph-Zbarsky J (2014) Social networks and the probability of having a regular family doctor. *Social Science & Medicine* **115**, 21–28.
- Devlin RA, Sarma S and Zhang Q (2011) The role of supplemental coverage in a universal health insurance system: some Canadian evidence. *Health Policy (Amsterdam, Netherlands)* **100**, 81–90.
- Dunlop S, Coyte PC and McIsaac W (2000) Socio-economic status and the utilisation of physicians' services: results from the Canadian National Population Health Survey. *Social Science & Medicine* (1982) **51**, 123–133.

- Eurostat** (2019) European Union Statistics on Income and Living Conditions (EU-SILC). Available at <https://ec.europa.eu/eurostat/web/income-and-living-conditions/overview>.
- Fjær EL, Stornes P, Borisova LV, McNamara CL and Eikemo TA** (2017) Subjective perceptions of unmet need for health care in Europe among social groups: findings from the European Social Survey (2014) special module on the social determinants of health. *European Journal of Public Health* **27** (suppl. 1), 82–89.
- Flood C, Lahey W and Thomas B** (2017) Federalism and health care in Canada: a troubled romance? In Oliver P, Macklem P and Des Rosiers N (eds), *The Oxford Handbook of the Canadian Constitution*, vol. 1. New York: Oxford University Press, pp. 449–474.
- Folland S** (2006) Value of life and behavior toward health risks: an interpretation of social capital. *Health Economics* **15**, 159–171.
- Folland S** (2008) An economic model of social capital and health. *Health Economics, Policy and Law* **3**, 333–348.
- Forget CE** (2014) *The Case of the Vanishing Québec Physicians: How to Improve Access to Care*. Toronto: C.D. Howe Institute.
- Gibson G, Grignon M, Hurley J and Wang L** (2019) Here comes the SUN: self-assessed unmet need, worsening health outcomes, and health care inequity. *Health Economics* **28**, 727–735.
- Guend H and Tesseron A-L** (2009) Unmet Needs for Primary Care in the Context of a Universal Healthcare System: The Case of Quebec. Working Papers. Montreal, Quebec: Centre – Urbanisation Culture Société, Institut national de la recherche scientifique.
- Hailey D** (2001) Some successes and limitations with telehealth in Canada. *Journal of Telemedicine and Telecare* **7**(suppl. 2), 73–75.
- Hendryx MS, Ahern MM, Lovrich NP and McCurdy AH** (2002) Access to health care and community social capital. *Health Services Research* **37**, 85–101.
- Hutchison B, Abelson J and Lavis J** (2001) Primary care in Canada: so much innovation, so little change. *Health Affairs* **20**, 116–131.
- Hutchison B, Levesque J-F, Strumpf E and Coyle N** (2011) Primary health care in Canada: systems in motion. *The Milbank Quarterly* **89**, 256–288.
- Institute for Research and Information in Health Economics (IRDES)** (2018) Enquête Santé Et Protection Sociale (ESPS). Available at <https://www.irdes.fr/recherche/enquetes/esps-enquete-sur-la-sante-et-la-protection-sociale/actualites.html>.
- Johnston S and Hogel M** (2016) A decade lost: primary healthcare performance reporting across Canada under the action plan for health system renewal. *Healthcare Policy* **11**, e95–110.
- Kasman NM and Badley EM** (2004) Beyond access: who reports that health care is not being received when needed in a publicly-funded health care system? *Canadian Journal of Public Health=Revue Canadienne De Sante Publique* **95**, 304–308.
- Lambrew JM, DeFries GH, Carey TS, Ricketts TC and Biddle AK** (1996) The effects of having a regular doctor on access to primary care. *Medical Care* **34**, 138–151.
- Laporte A, Nauenberg E and Shen L** (2008) Aging, social capital, and health care utilization in Canada. *Health Economics, Policy, and Law* **3**, 393–411.
- Law M, Kathi W, John E, Susan E, Michael J, Tina M and Isaac L** (2005) Meeting health need, accessing health care: the role of neighbourhood. *Health & Place* **11**, 367–377.
- Maioni A** (2002) Federalism and health care in Canada. In *Health Policy and Federalism: A Comparative Perspective on Multi-Level Governance*. Banting KG and Queen's University (eds), Social Union Series. Montreal: McGill-Queen's Univ. Press, pp. 173–199.
- Marchildon GP** (2013) Canada: health system review. *Health Systems in Transition* **15**, 1–179.
- Marchildon GP and Hutchison B** (2016) Primary care in Ontario, Canada: new proposals after 15 years of reform. *Health Policy* **120**, 732–738.
- Marshall EG** (2011) Do young adults have unmet healthcare needs? *The Journal of Adolescent Health* **49**, 490–497.
- McDonald JT and Conde H** (2010) Does geography matter? The health service Use and unmet health care needs of older Canadians. *Canadian Journal on Aging=La Revue Canadienne Du Vieillessement* **29**, 23–37.
- McDonald JT and Kennedy S** (2004) Insights into the 'Healthy Immigrant Effect': health status and health service use of immigrants to Canada. *Social Science & Medicine* **59**, 1613–1627.
- Menec VH, Sirski M, Attawar D and Katz A** (2006) Does continuity of care with a family physician reduce hospitalizations among older adults? *Journal of Health Services Research & Policy* **11**, 196–201.
- Nelson CH and Park J** (2006) The nature and correlates of unmet health care needs in Ontario, Canada. *Social Science & Medicine* (1982) **62**, 2291–2300.
- OECD** (2017) *Health at a Glance 2017*. Paris, France: OECD Publishing. Available at https://doi.org/10.1787/health_glance-2017-en.
- Ontario Long Term Care Association** (2018) This Is Long-Term Care 2018. Ontario Long Term Care Association.
- Pagan JA and Pauly MV** (2006) Community-level uninsurance and the unmet medical needs of insured and uninsured adults. *Health Services Research* **41**, 788–803.
- Pederson A, Raphael D and Johnson E** (2010) Gender, race, and health inequalities. In Raphael D, Bryant T and Rioux MH (eds), *Staying Alive: Critical Perspectives on Health, Illness, and Health Care*, 2nd Edn. CSPI, pp. 205–237

- Piérard E** (2014) The effect of physician supply on health status: Canadian evidence. *Health Policy* **118**, 56–65.
- Praxia Information Intelligence, and Gartner Incorporated** (2011) Telehealth Benefits and Adoption: Connecting People and Providers Across Canada. Canada Health Infoway.
- Ronksley PE, Sanmartin C, Quan H, Ravani P, Tonelli M, Manns B and Hemmelgarn BR** (2013) Association between perceived unmet health care needs and risk of adverse health outcomes among patients with chronic medical conditions. *Open Medicine: A Peer-Reviewed, Independent, Open-Access Journal* **7**, e21–e30.
- Sanmartin C and Ross N** (2006) Experiencing difficulties accessing first-contact health services in Canada: Canadians without regular doctors and recent immigrants have difficulties accessing first-contact healthcare services. Reports of difficulties in accessing care vary by age, sex and region. *Healthcare Policy= Politiques De Sante* **1**, 103–119.
- Sanmartin C, Houle C, Tremblay S and Berthelot J-M** (2002) Changes in unmet health care needs. *Health Reports* **13**, 15–21.
- Shi L and Stevens GD** (2005) Vulnerability and unmet health care needs: the influence of multiple risk factors. *Journal of General Internal Medicine* **20**, 148–154.
- Sibley LM and Glazier R** (2009) Reasons for self-reported unmet healthcare needs in Canada: a population-based provincial comparison. *Healthcare Policy Politiques de Santé* **5**, 87–101.
- Sibley LM and Weiner JP** (2011) An evaluation of access to health care services along the rural-urban continuum in Canada. *BMC Health Services Research* **11**, 1–11.
- Sociás ME, Koehoorn M and Shoveller J** (2016) Gender inequalities in access to health care among adults living in British Columbia, Canada. *Women's Health Issues* **26**, 74–79.
- Swami M, Gravelle H, Scott A and Williams J** (2018) Hours worked by general practitioners and waiting times for primary care. *Health Economics* **27**, 1513–1532.
- Tuohy C** (2018) *Remaking Policy: Scale, Pace, and Political Strategy in Health Care Reform*. Toronto, Canada: University of Toronto Press. Available at <https://utorontopress.com/ca/remaking-policy-2>.
- Vang ZM, Sigouin J, Flenon A and Gagnon A** (2017) Are immigrants healthier than native-born Canadians? A systematic review of the healthy immigrant effect in Canada. *Ethnicity & Health* **22**, 209–241.
- Women and Gender Equity Knowledge Network** (2007) Unequal, Unfair, Ineffective and Inefficient. Gender Inequity in Health: Why It Exists and How We Can Change It. WHO Commission on Social Determinants of Health.
- Wong ST and Regan S** (2009) Patient perspectives on primary health care in rural communities: effects of geography on access, continuity and efficiency. *Rural and Remote Health* **9**, 1142.
- Wu Z, Penning MJ and Schimmele CM** (2005) Immigrant status and unmet health care needs. *Canadian Journal of Public Health= Revue Canadienne De Sante Publique* **96**, 369–373.
- Zavras D, Zavras AI, Kyriopoulos I-I and Kyriopoulos J** (2016) Economic crisis, austerity and unmet healthcare needs: the case of Greece. *BMC Health Services Research* **16**, 309.

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