



# Valuing Time Saved

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Assessing the Impact of Patient Time Saved from  
the Adoption of Consumer Health Solutions

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## Introduction

In this study, The Conference Board of Canada assesses the number of hours that patients would save if consumer health solutions were adopted in the Canadian health care system, in particular the following: the possibility for patients to consult with health care providers, have access to their test results (for example, lab test results, MRIs, and X-rays), and have their prescriptions renewed electronically. We also quantify the potential impact of these savings on economic output, that is, real gross domestic product (GDP).

The analysis is based on a large sample survey of households and thus captures the potential time savings from a user perspective. The time saved by households can be allocated to work or non-paid activities such as education, volunteer work, and leisure activities. While both work and non-work activities have value, only the time allotted to work will increase potential economic output. Survey results are sorted by age and gender cohorts in order to share total hours saved into work and non-paid activities. The share is allocated based on employment rates by age and gender cohort. The estimate of potential hours that can be allotted to work is further refined by using data on the share of average weekly hours worked to total hours available (the number of hours in a week that we are awake).

## Scope of This Study

The study is conducted from a household/patient perspective, based on Infoway's independently produced User Experience Survey that was conducted in March 2012 by Harris/Decima. As such, it does not capture all the benefits or costs involved in the adoption of electronic solutions in the health care system. The benefits from adopting such solutions would include, in addition to the time saved by patients, improved work efficiencies and time management by the staff in clinics and hospitals as well as improved quality of health care and health outcomes for patients, and reduced administrative costs over the long term. Also, implementing and maintaining such a system would require investment in technology, trials, and other related costs. In the context of this study, The Conference Board of Canada assesses only the potential economic impact of the time saved by patients from the adoption of consumer health solutions in the Canadian health care system.

## The Adoption of Consumer Health Solutions in Other Countries and the Potential for Saving Patient Time

In Canada, the adoption of consumer health solutions in the health care system is still at an early stage when compared with efforts that have been made in other countries. Currently, most patients in Canada cannot consult with their health care providers, have access to their test results, and have their prescriptions renewed electronically.

However, international experience suggests that widespread use of consumer health solutions is possible in practice<sup>1</sup> and may improve quality of care.<sup>2</sup> For example, Kaiser Permanente, a California-based not-for-profit health care organization that has had a patient electronic portal in place for several years, had more than 12 million e-visits in 2011 for its 8.9 million members.<sup>3</sup> In Europe, Denmark, Finland, and Sweden have invested in developing a more patient-centric health care system that empowers individuals to be involved in decisions regarding their health.<sup>4</sup> In this vein, Denmark in particular has been working toward giving patients access to the same data that are available to their health care providers.<sup>5</sup> For example, the country's e-health portal, called Sundhed.dk (launched in 2003), provides individuals with online access to web-based applications and services to manage their various health care needs and to allow electronic communication between patients and health care providers.<sup>6</sup> This electronic portal system allows patients to have access to a custom web page with information relevant to their own medical history, to view their hospital records, to send emails to health care providers, and to renew prescriptions.<sup>7</sup> They can also use the portal to check hospital quality ratings and identify the shortest waitlists for specific treatments.<sup>8</sup> This system provides many benefits to patients as well as improved efficiencies in the health care system. The services offered by the e-health portal have very likely allowed Danish patients to save time and re-allocate it to other activities, including work.

This study assesses the potential for patient time saved if services similar to the ones offered by Denmark's e-health portal were put in place in the Canadian health care system.

## Methodology and Calculation Process

We first estimate the number of work hours that could be saved by patients if they could consult with health care providers, have access to their test results, and have their prescriptions renewed electronically. Relying on the Conference Board's national economic model, we can use this information

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1 A. Silvestre, V.M. Sue, J.Y. Allen, "If You Build It, Will They Come? The Kaiser Permanente Model of Online Health Care," *Health Affairs* 28, 2 (2009), 334–344, <http://content.healthaffairs.org/content/28/2/334.full.pdf>.

2 Y.Y. Zhou, M.H. Kanter, J.J. Wang, and T. Garrido, "Improved Quality At Kaiser Permanente Through E-Mail Between Physicians And Patients," *Health Affairs* 29, 2 (July 2010), 1370–1375, <http://content.healthaffairs.org/content/29/7/1370.abstract>.

3 Kaiser Permanente, "Nearly 9 Million Kaiser Permanente Health Records Securely Available on Mobile Devices," press release, January 24, 2012, <http://xnet.kp.org/newscenter/pressreleases/nat/2012/012412kporgmobileoptimized.html>.

4 D. Castro, *Explaining International IT Application Leadership: Health IT* (Washington, DC: The Information Technology and Innovation Foundation, September 2009), <http://www.itif.org/files/2009-leadership-healthit.pdf>.

5 Economist Intelligence Unit Report, "Denmark: Electronic Patient Records" (Brussels: Eucomed, September 2011), <http://www.reforminghealthcare.eu/economist-report/some-roads-ahead-innovative-approaches-in-five-west-european-countries/denmark-electronic-patient-records>.

6 D. Castro, *Explaining International IT Application Leadership: Health IT* (The Information Technology and Innovation Foundation, September 2009). <http://www.itif.org/files/2009-leadership-healthit.pdf>.

7 Ibid.

8 Ibid.

to estimate the impact on economic output of adopting consumer health solutions in the health care system.

Specific questions from the User Experience Survey allow us to estimate the average number of visits per person to health care providers within a year, the average time respondents spent on their last appointment, and how often within the past year they think they could have avoided an in-person visit. Results of the survey vary widely by age and gender cohort. Older cohorts have a greater number of in-person visits to health care providers but spend the least time per visit. The percentage of appointments that could have been avoided also varies by age and gender, as does the probability that someone will utilize the extra hours in work. In an effort to keep track of these variations, our estimations were done separately for three age groups—those 18 to 34 years old, 35 to 54 years old, and 55 years and over—and by gender. A more detailed description of the methodology applied to calculate the number of hours added to potential work if consumer health solutions were adopted in the Canadian health care system is discussed in the technical notes at the end of this briefing.

## Potential Challenges to the Methodology

Since the study is conducted from a household/patient perspective, our conclusions are based on the perception of the patients. A critique of this approach is that the patients may not have all the information needed to judge whether they should have an in-person appointment to renew a prescription or to learn about lab test results. Electronic renewal of prescriptions may not be applicable to all health cases and all medications.

However, assuming patients are knowledgeable about the particularities of their case, they may have already factored this issue into their responses to the survey question about how often they could have avoided an in-person appointment. In this study, we assume that patients are aware of these particularities and took them into consideration when completing the survey.

## Main Findings

Overall, adult patients (aged 18 years and over) would have avoided nearly 47 million in-person visits in 2011 if they had been given choice of consulting with health care providers, having access to their test results, and having their prescriptions renewed electronically.<sup>9</sup>

They would have saved a total of 69.8 million hours. Of this, we estimate that patients could have worked an extra 18.8 million hours in 2011 (see Table 1), a \$408-million<sup>10</sup> boost to potential output, representing a gain of roughly 0.03 per cent to real GDP. The remaining 51 million hours saved would

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9 This number is based on the average number of appointments per person (calculated using questions 5A, 5E, 36, and 38 from Infoway's User Experience Survey) and the total number of people by gender and age group.

10 In real (inflation-adjusted) 2002 dollars.

have gone toward non-paid activities—not translating to additional gains in GDP, but a valuable benefit nonetheless for those patients.

**Table 1: Number of in-person visits that could have been avoided, total time saved, and total time saved that could have been allocated to work if consumer health solutions had been in place in 2011**

	Age groups	Total number of in-person visits that could have been avoided in 2011	Total time saved (hours)	Total time saved that could have been allocated to work (hours)
<b>Male</b>	<b>18 to 34</b>	5,236,775	7,050,572	2,585,489
	<b>35 to 54</b>	7,806,043	11,744,247	4,843,418
	<b>55 and over</b>	7,808,391	10,841,671	1,885,019
<b>Female</b>	<b>18 to 34</b>	8,399,097	13,914,937	3,830,516
	<b>35 to 54</b>	9,534,020	14,522,967	4,407,642
	<b>55 and over</b>	8,182,150	11,710,635	1,226,565
<b>Total</b>		<b>46,966,476</b>	<b>69,785,030</b>	<b>18,778,649</b>

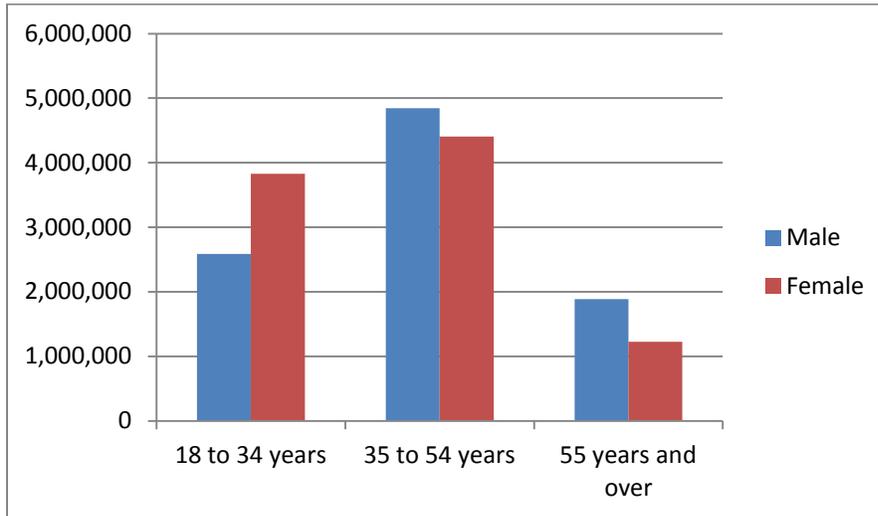
While the net addition to economic potential is modest as a share of overall economic output, it is important to note that the lift to our economy’s potential would be permanent. As such, economic activity would be increased by about \$400 million per year, in inflation-adjusted terms, year after year. Moreover, an even greater benefit in time saved for non-paid activities would accrue to patients, although the net economic benefits of this extra time are difficult to estimate.<sup>11</sup>

## Discussion

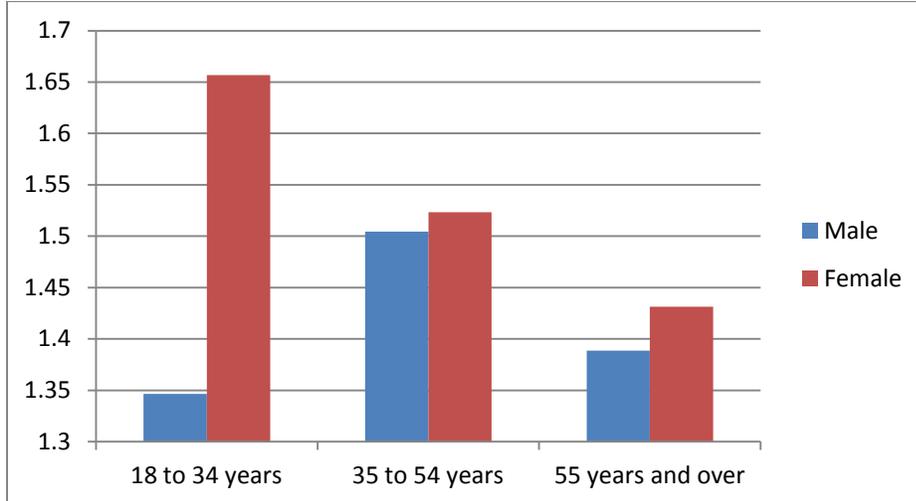
Various factors influence the patient time that would be saved from the adoption of consumer health solutions in the health care system and the number of hours worked that could consequently be added to the economy. For example, even though men and women in the 55-years-and-over age group have the highest average number of appointments with regular doctors, they would have saved the least amount of work time from the adoption of consumer health solutions in the health care system. (See Chart 1.)

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<sup>11</sup> Non-paid activities are simply not quantified in our national accounting framework. And while economic theory allows us to estimate the value of non-paid activities, depending on the current wage and other household-specific factors, this increased value to patients would not be captured as an increase in GDP.

**Chart 1: Patient time saved that could be added to potential output (hours)**

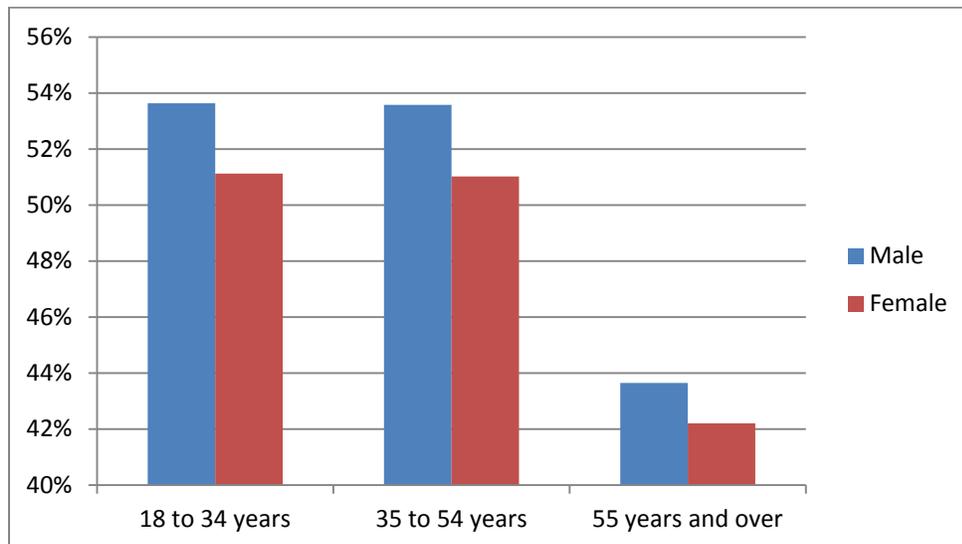
This can be explained by a number of reasons. First, while people aged 55 years and over have the highest number of appointments, they spend on average the shortest amount of time per appointment. (See Chart 2.)

**Chart 2: Average time spent on appointment (hours) per person**

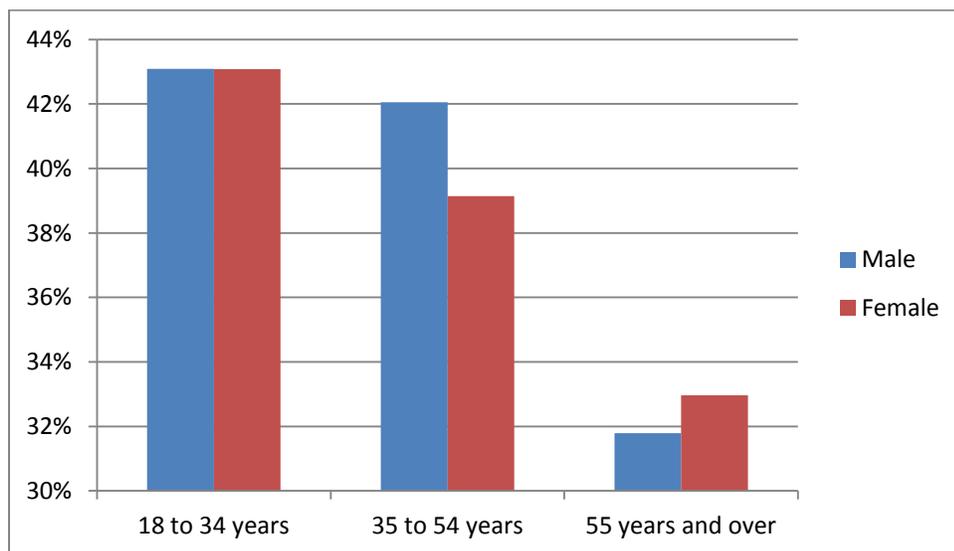
Moreover, those in the 55-and-over cohort have a lower employment rate, and those who do work usually work fewer hours per week. Therefore, a smaller proportion of the time potentially saved is allocated to work and to a gain in potential output. The User Experience Survey also tells us that this cohort would have been able to avoid a smaller percentage of in-person visits with regular doctors and specialists compared with younger cohorts (see charts 3 and 4). This may be explained, to some extent, by their lower level of comfort with computers. When compared with younger age cohorts, a smaller percentage of people aged 55 years and over are either comfortable or very comfortable with computers (see Table 2). However, the transition of younger people into the 55 years-and-over age

group as the population ages could potentially translate into a higher percentage of avoided appointments by this age group in the future.

**Chart 3: Percentage of in-person visits with regular doctor or place of care that could have been avoided (by age groups and gender)**



**Chart 4: Percentage of in-person visits or telephone calls with specialists that could have been avoided (by age groups and gender)**



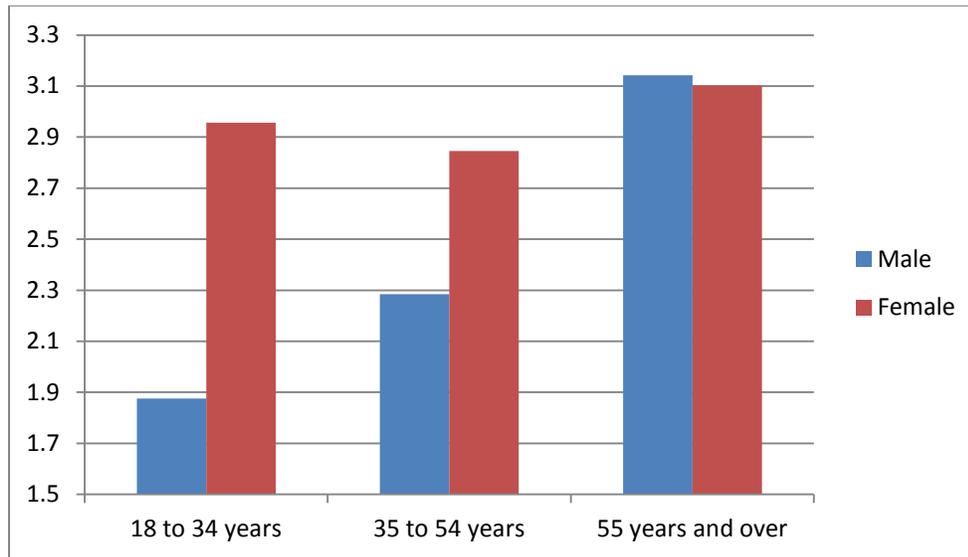
**Table 2: Percentage of respondents by age groups having different levels of comfort with computers**

<b>Age groups</b>	<b>Not at all comfortable with computers</b>	<b>Not very comfortable with computers</b>	<b>Either comfortable or very comfortable with computers</b>	<b>Don't know/ No answer</b>	<b>Total</b>
<b>18 to 34</b>	0.5	1.6	96	1.5	100
<b>35 to 54</b>	1.0	3.6	95	0.4	100
<b>55 and over</b>	4.5	8.5	86	0.7	100

Another potential explanation as to why people aged 55 years and over could have avoided a smaller percentage of appointments may lie in the particularity of their health cases. As people grow older, they may develop specific illnesses that require in-person visits. In the context of this study, we make the assumption that respondents are knowledgeable about their health and took into consideration these particularities when answering survey questions about how often they could have avoided in-person visits with a regular doctor or specialist. As the population ages, the health cases requiring in-person appointments may become more frequent, so the aging population could apply downward pressure on the percentage of overall appointments that could be avoided. However, at the same time, as older people continue to be encouraged to stay longer in the labour force, more of the time saved by avoiding in-person visits would be re-allocated to work and this would translate into additional gains in potential output.

People aged 35 to 54 would have saved the largest number of work hours from the adoption of consumer health solutions in the health care system (see Chart 1). This can be explained by the fact that the 35-to-54 age group has the highest number of people, the highest employment rate, high levels of comfort with computers, and a relatively high percentage of in-person visits that could have been avoided, especially by men.

People aged 18 to 34 would have saved the second largest number of work hours from the adoption of consumer health solutions in the health care system. Most of the work time saved would have been by women. This can be explained by the fact that they have a relatively high average number of appointments with regular doctors (see Chart 5) and specialists compared with men in the same age group and they have the longest average time spent on appointments among all age groups (for men and women). (See Chart 2.)

**Chart 5: Average number of appointments with regular doctor within a year**

## Conclusion

In this study, we assessed the patient time that could have been saved and added to the economy in 2011 if consumer health solutions had been in place. We concluded that adult patients would have avoided nearly 47 million in-person visits in 2011 and re-allocated 18.8 million hours to work. This would have translated into a \$408-million boost to potential output, representing a gain of roughly 0.03 per cent to real GDP. While modest as a share of overall economic output, the gain to the economy's potential would be permanent. Therefore, economic activity would be lifted by about \$408 million per year, in inflation-adjusted terms, year after year. It is also important to note that this gain does not account for the benefits to patients in time saved for non-paid activities (as the net economic benefits of this extra time are difficult to estimate).

Furthermore, since this study was conducted from a household/patient perspective, our assessment of the potential economic impact of the adoption of consumer health solutions is based solely on patient time saved. However, the benefits from adopting such electronic solutions would also likely result in a gain in productivity in the overall health care system.

## Technical Notes on the Methodology

Questions from Infoway's User Experience Survey combined with data from the Labour Force Survey provide the necessary information to calculate the number of hours that patients could save and re-allocate into work if they could consult with their health care providers, have access to their test results, and renew their prescriptions electronically. The March 2012 User Experience Survey was conducted independently by Harris/Decima and is proprietary to Canada Health Infoway. The survey asked nearly 3,200 Canadian households 60 health-related questions. Specific questions from the survey were analyzed using the SPSS software. The survey provides demographic information for each respondent.

The average total time spent by respondents on an appointment is calculated based on questions 30 and 31 of the survey. Question 30 asks about the time respondents spent to make their last appointment and question 31 on the time spent on the day of the appointment including travel, waiting time, and time with the doctor and other clinical staff. In this study, respondents' last appointment is used as the average appointment. For these two multiple choice questions, weighted averages were calculated to estimate the average time spent by respondents on an appointment.<sup>12</sup> The sum of these two averages gives the average total time spent by respondents on an appointment.

The average total time is then multiplied by the number of appointments that could have been avoided if consumer health solutions were adopted in the health care system. The number of appointments that could have been avoided is calculated based on questions 5A and 5E as well as questions 36 and 38.

Questions 36 and 38 provide data on how often respondents think they could have avoided in-person appointments with their regular doctors or place of care and medical specialists if they could have consulted with their regular doctor and medical specialists, had access to their test results, and requested prescription renewals online.<sup>13</sup> However, to be able to calculate the average number of appointments that could have been avoided if such electronic solutions existed, data on the average number of appointments per person per year are also needed. In other words, answers to questions 36 and 38 would need to be multiplied by the number of appointments with regular doctor and medical specialists. Unfortunately, the survey does not include questions specifically on this matter.

Nevertheless, answers to questions 5A and 5E give an approximation of the average number of appointments respondents have had with regular doctors (question 5A) and specialists (question 5E) over a period of 12 months. Still, for these questions, interpretation is uncertain.

Question 5A yields the number of times a respondent has seen his/her doctor or place of care within the past 12 months. Therefore, results from this question can account for appointments as well as

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12 For questions 30 and 31, the possible answer choices were time ranges. To calculate the weighted averages for all respondents, those time ranges were replaced by time averages. This method was also applied to questions 5A and 5E.

13 The possible answers to question 38 asking how often respondents could have avoided in-person visits or telephone calls with specialists include "Always," "Often," "Sometimes," "Rarely," and "Never." To calculate the weighted average for all respondents, these choices were replaced by percentages. For example, "Always" was replaced by 100 per cent, and "Sometimes" was replaced by 50 per cent.

emergency situations. For the purpose of this study, however, it must be assumed that when a respondent saw his or her regular doctor, it was by appointment. Multiplying question 5A by the percentage of in-person visits that could have been avoided (from question 36) is thus used as a way to estimate the number of appointments with regular doctors or place of care respondents could have avoided within the past 12 months.

The number of appointments with medical specialists that could have been avoided is calculated by multiplying question 5E by question 38. Similarly to question 5A, interpretation of question 5E is uncertain since a respondent could have seen a specialist in an emergency situation without an appointment. So, based on question 5E, the number of times a respondent saw a specialist could include emergency situations as well as appointments. For the purpose of this study, it was again assumed that, when a respondent saw a medical specialist, it was through an appointment.

Another problem arises from the use of questions 5E and 38. Question 5E is used as an approximation of the number of appointments respondents had with medical specialists within a year and question 38 is used as an approximation of the proportion of appointments with medical specialists that could have been avoided. However, both questions also include telephone calls with medical specialists. When question 5E is multiplied by the proportion of appointments and telephone calls respondents could have avoided (question 38), this gives the number of in-person visits and telephone calls that could have been avoided over the past year. However, it must be kept in mind that the resulting number will overestimate the number of appointments with medical specialists that could have been avoided over the past year since it also includes telephone calls.

At the same time, however, respondents have likely not taken into account the number of times they accompanied someone to an appointment when answering questions 5A and 5E. Time saved from avoiding these appointments would have also translated into extra work time for the economy. From this angle, our analysis potentially underestimates the total time saved from avoiding unnecessary appointments thanks to consumer health solutions.

The time that could have been saved per person by avoiding unnecessary appointments is calculated by multiplying the average number of avoided in-person appointments with regular doctor or place of care and medical specialists by the average time spent per appointment (based on the sum of the weighted averages calculated from questions 30 and 31). The total time saved by the employed population is then calculated by multiplying the time saved per person by the population, and by multiplying the results by the employment rate (by age groups and gender). To calculate the patient time saved (in hours) that could be added to potential output, the total time saved by the employed population is then multiplied by the proportion of individuals' wake-time during a week spent at work.

It must be noted that our calculation of patient time saved from the adoption of consumer health solutions does not take in account the time that patients would spend in accessing and using their electronic health portal if consumer health solutions were in place.

### **Comparing this method with another calculation method**

The number of hours worked that patients could have saved, calculated with the method described above, is compared with the number of hours worked that patients could have saved, calculated using another method based on different questions in the survey.

The initial method is based on questions 30 and 31 that ask about the total time spent by respondents on their last appointment. The alternative method is based on questions 33 and 34, which ask whether respondents took time off work or school for their last appointment and how much time off they took due to their last appointment. The number of hours patients could have saved calculated with this new method is much higher (over three times higher) than the number of hours saved calculated with the method we used for this study (based on questions 30 and 31).

The discrepancy may be explained by different factors. Questions 33 and 34 take into consideration time off work and time off school. The initial method, on the other hand, took into account only the hours saved that would be used toward work and added to potential output.

Also, the average time respondents took off work or school for their last appointment is much higher than the average time all respondents spent on their last appointment (based on question 31). This may be explained by the fact that the calculation of the average time taken off work or school based on question 34 excludes the average time spent on an appointment by respondents who did not take time off from work or school. Those who actually did take time off may have done so because they had to spend a longer period of time on their appointment. Therefore, this would bias upward the time taken off work (or school) based on question 34, compared with the average time spent on an appointment based on question 31, which includes both respondents who took time off and those who did not take time off.

Finally, the differences in the choices of answers for question 34 and the choices of answers for question 31 accentuate the difficulties when comparing the results of the two methods.

Overall, since the initial method to calculate the number of work hours that could be added to the economy takes into account only the work time saved (and excludes school time), it is seen as a more appropriate method to evaluate the gain in potential output that would emerge from the adoption of consumer health solutions in the health care system.