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Medically Uninsured Americans:
Evidence on Magnitude and Implications

By Carl Irvine and Martin Zelder
with Nadeem Esmail

Contents

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Editor & Designer: *Kristin McCahon*

For media information, please contact Suzanne Walters, Director of Communications,
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Executive Summary

Within the United States, the image of the medically uninsured being denied important medical treatment stirs the emotions of the American public, while the issue of how to address this problem has bedevilled American politicians throughout the 1990s and into the twenty-first century. The spectre of the medically uninsured in America haunts Canada as well. To defenders of the status quo in Canadian health care, the cardinal virtue of Canada's health care system is its universality. Whatever else its flaws and failings, its defenders routinely point to the uninsured in America as proof of the Canadian public health care system's "superiority" over the "private" health care of the United States.

Unfortunately, for an issue that has generated so much debate, little is actually understood about the medically uninsured in the US. This paper provides some much needed insight into and information on the issue.

Arguably the most important question surrounding the medically uninsured is simply how many there are. The 1997 Current Population Survey (CPS) figure is the most often cited, which estimated that 43.4 million Americans were uninsured in 1997. Unfortunately, this figure is not an accurate reflection of the number of uninsured in the United States; a fact acknowledged by the Census Bureau that administers the CPS. A more accurate estimate, based on the National Health Interview Survey (NHIS), suggests that the real number of uninsured in 1997 was 38 million.

The absence of health insurance, however, is problematic only if it is involuntary, i.e., if the individual wants health insurance but cannot acquire it. Our evidence suggests that a large number of the "uninsured," some 13 to 15 million Americans, could in fact acquire health insurance if they wanted to but, for whatever reason, have chosen not to.

This group, the "voluntary uninsured," includes some 6.2 million Americans who were eligible for free public health insurance in 1997, but who did not register for it. While these Americans were certainly uninsured in 1997, in the event of illness or injury they could have acquired public health insurance at no cost, particularly since Medicaid can apply retroactively to past health care costs. In this sense, this group is little different from the 200,000 British Columbians who did not pay the Medical Service Plan premiums in 1998, yet who are not considered to be uninsured in Canada.

Similarly, there are a large number of uninsured Americans with fairly high family incomes. To the extent that this group is uninsured, it could be argued that it is not the result of an inability to acquire health insurance, but rather a conscious choice not to buy it. Our findings buttress this conclusion, showing that family income has little effect on the decision to acquire health insurance above 333 percent of the federal poverty line, and indeed, the probability of acquiring health insurance starts to decline as family income exceeds 419 percent of the federal poverty line. Both suggest that many high-income families, some 3.4 to 5.6 million Americans in 1996-97, may choose not to buy health insurance.

When counting the uninsured in America, it is also important to address illegal immigration. The United States, by virtue of its prosperity and proximity to poorer countries, attracts far more illegal immigration than does Canada. Illegal immigrants in the United States are far less likely to have health insurance than the general population, and as a result, account for a large percentage of the medically uninsured. A conservative estimate suggests that between 2 and 3 million il-

legal immigrants lack health insurance in the United States. Note, however, that this does not mean that they are uninsured since they may have access to public health insurance in their home country (as would be the case of illegal migrants from either Canada or Mexico, two of the five largest sources of illegal migrants to the US). It is also important to note that whatever the merits of the Canadian health care system, illegal immigrants are not eligible for the "universal" health care coverage in Canada either.

The final derived estimate of the true number of involuntarily uninsured in America is approximately 23 to 25 million. While this number is still quite high, it is far less than the 43 million figure routinely cited. Moreover, if the true number of involuntarily uninsured Americans is 25 rather than 43 million, it becomes that much easier—and less expensive—to address their needs.

This raises another question about the medically uninsured. Health insurance is not in and of itself a good thing; rather, it is the access to health care services that health insurance enables that is important. Conventional wisdom suggests that, in the absence of health insurance, the uninsured will have less access to preventative and doctors' services. As a result of this lack of access, critics contend, the uninsured don't seek treatment until they are very ill, at which point they end up in the emergency room (ER).

Though our results support the claim that the uninsured are less likely to use doctors' services or get flu shots, they do not support the contention that the uninsured are more likely to use ER services than are the privately insured.

Ultimately, health insurance and the use of health services are only inputs into the production of health; health outcomes are the key result. Our study shows that, despite the differences in health care use, the lack of health insurance does not seem to adversely affect the health outcomes of the uninsured. At worst, being uninsured has a small negative impact on subjective health status. Using the objective measure of the number of days spent in bed due to illness, the absence of health insurance has no significant impact on health outcomes.

The implications of our findings are quite clear. The existence of the medically uninsured in the United States is not the disaster that many Americans, and Canadians, believe it to be. Given that large numbers of the uninsured in America either have access to free public health care, can afford private health care, or else would likely not be insured in Canada (or, for that matter, in any other country with a "universal" health care system), and that there do not appear to be systematic differences in health outcomes between the insured and the uninsured, it is not unreasonable to conclude that a large extent of the uninsured "crisis" in America is simply the result of Americans exercising their right to freedom of choice, in line with their own preferences with regards to health care and health outcomes.

1. The Uninsured in America

In recent years, few public policy issues have generated as much debate as the ongoing issue of the medically uninsured in America. The notion of the sick and dying being denied important medical treatment due to their inability to pay the associated bills stirs the emotions of many Americans. Of course, the concern felt by Americans regarding the uninsured is not purely altruistic. The inability to pay for medical treatment often means that the treatment for the uninsured is partially subsidized through higher costs to the insured, driving up health care costs for many ordinary Americans.

In light of these concerns it should come as no surprise that coverage for the uninsured has emerged as a major issue in the past decade for policymakers. Federally, Democrats and Republicans alike have proposed various measures to try and reduce the number of uninsured Americans. Many states have attempted to increase medical coverage for their residents, through methods ranging from the regulation of health insurance markets, to high-risk pools, to the expansion of publicly funded programs. Despite these attempts (or perhaps because of them) millions of Americans remain uninsured.

Moreover, the shadow of the medically uninsured looms large in Canada as well. Perhaps the most routinely cited virtue of the Canadian health care system is its universal coverage. In contrast, a system in which millions remain uninsured, as in the US, is viewed as clearly inferior.

Much of the problem lies in public ignorance of the nature of the problem of the uninsured. Take for instance, a question as simple as the number of uninsured, i.e., how many are there? Given the quantity of debate on the issue, one would expect this to be an easily answered question. Surprisingly, it is not. As we shall see, not only is the most widely cited figure wrong, but the agency that produces it acknowledges it to be inaccurate. Without basic data regarding the number of uninsured, intelligent debate is difficult. Nor is this an isolated example. Policymakers from all sides of the issue are ill informed on the subject of the uninsured. Despite an abundance of academic work over the past 20 years, many policymakers seem blissfully ignorant of the impact of being uninsured on health care use and outcomes, as well as of the characteristics of the uninsured. Much of the focus has been on insuring the uninsured, rather than on ensuring adequate access to care and good health for the uninsured. The excessive focus on insurance coverage has meant insufficient attention to the link between insurance and health. This paper aims to remedy these shortcomings.

Objectives of the study

The purpose of this study is to provide policymakers, observers, and voters with the necessary information needed to formulate—and critique—solutions to the problem of the uninsured. To do so, this report will look at three broad facets of the uninsured. Section 2 will examine the nature of the uninsured. How many Americans do not have health insurance? And, of those who do not have insurance, how many could get insurance, either on their own or through some public program, but have effectively chosen not to? Section 3 will explore the use of health care services by uninsured non-elderly adults. How does it compare with the use of medical services by the insured? Do the uninsured face barriers to the receipt of medical services? Finally, section 4 will look at the health status of uninsured non-elderly adults. Does their health suffer as a result of their being uninsured? Section 5 offers concluding remarks.

The analysis in sections 3 and 4, focusing on use of health care services and health status, concerns only non-elderly adults. While it would be interesting to look at the health status of children, that requires a substantially different and more complicated methodology. Moreover, with the recent changes in publicly provided health insurance for children, specifically, the introduction in 1997 of the State Children Health Insurance Plan (SCHIP), any results we might find would now be of reduced value.

Most of the data in this report come from the National Health Interview Survey (NHIS) for 1997, collected by the US National Center for Health Statistics. As its name suggests, the NHIS is designed to collect information on various aspects of the health of Americans, including insurance status. Section 2 will use the individual-level data from the NHIS, which is a nationally representative sample of 103,477 Americans of all ages. Sections 3 and 4 will primarily focus on data from the adult sample portion of the NHIS, a nationally representative sample of 36,116 adults. We use this sample, rather than the larger all-ages data set, largely because it contains additional, specific information on health care use and health status that will be exploited in the analysis found in these sections. As well, some information, particularly that presented in section 2 regarding the characteristics of the uninsured, is derived from the 1996-97 Community Tracking Study (CTS) conducted by the Center for Studying Health System Change. This is done because less data is missing from the CTS, which, in addition, has more detailed information with regard to income. The CTS is a telephone survey of 33,000 households, which is representative of the population of the 48 contiguous states. It was further supplemented by a field sample to collect data on households without telephones.

2. Measuring the Magnitude of the Uninsured

Adjustments for overcounting

The obvious starting point for studying the uninsured seems simple: to ascertain how many Americans are, in fact, uninsured. While this seems obvious, few discussions of the uninsured have critically examined the most commonly-cited figure, that issued by the Census Bureau at the Department of Commerce based upon the Current Population Survey (CPS). According to the conventional wisdom of the Census Bureau's 1998 CPS,[1] 43.4 million people were uninsured in 1997 (Bennefield, 1998). Politicians of all ranks, as well as public policy think tanks and lobby groups from all ends of the political spectrum, regularly cite this figure and others similarly derived. Yet, how accurate is this number?

Even the Census Bureau admits that the CPS measure is not a very accurate reflection of the uninsured. Specifically, the bureau warns that the CPS tends to understate the number of people covered by insurance, which results in the overstatement of the number of uninsured.[2] According to the Census Bureau: "A major reason for the lower CPS estimates [of the insured] is the fact

1 The CPS is done in March of the year following the target year, so the CPS examining the uninsured in 1997 is the 1998 CPS. Although the intention of the CPS is to elicit insurance status in the previous year, there is evidence that some respondents report their *current* insurance status (Lewis, *et al*., 1998, pp. 3, 6).

that the CPS is not designed specifically to collect health insurance data. Instead, it is largely a labor force survey, with minimum interviewer training on health insurance concepts" (Bennefield, 1998, p. 6).

The primary reason for this overstatement of the uninsured is that the CPS systematically understates Medicaid coverage (public health insurance for the poor and disabled). For instance, in 1995 according to the CPS, Medicaid covered 29 million Americans. However, according to the Health Care Financing Authority—the federal agency responsible for administering Medicaid at the national level—36.7 million people were enrolled in Medicaid in 1995 (Lewis, *et al*., 1998). In other words, the CPS understated Medicaid coverage by 7.7 million people. This understatement occurs largely due to the complexity of Medicaid. Many people may be unaware that they are covered by Medicaid when they are covered by a state-run plan with a different name. Moreover, others may not be aware of the health insurance coverage of their children, leading to exaggeration of the number of uninsured children. This latter problem is particularly true for Medicaid, since it often covers the children, but not the parents in a family, and indeed may only cover some of the children in a particular family. In addition, some individuals may be reluctant to acknowledge that they are covered by Medicaid due to the stigma associated with its recipiency.

Overstatement of the number of uninsured in the CPS derives from its calculation of the number of uninsured as a residual. That is, the Census Bureau does not ask people directly if they are uninsured; rather, it asks them if they are insured, and counts as uninsured anyone answering in the negative. This means that any undercount in the number of insured leads to an over count in the number of uninsured. An Urban Institute study based on the 1996 CPS found that, after adjusting for underreporting of Medicaid coverage, 35.7 million Americans were uninsured, instead of the 40.6 million reported in the CPS (Lewis, et al., 1998).

Of course, the difficulty of avoiding overestimation of the uninsured exists to some extent in other health insurance surveys. However, in these alternative surveys, this problem is better rectified through more in-depth questioning of respondents on the source of their health insurance coverage. For example, while the NHIS (the dataset primarily used in this study) also calculates health insurance coverage as a residual, it carries out extensive probes into the sources of individuals' health coverage to ensure that people who do not report insurance coverage are in fact uninsured. Conversely, the CTS, which is used in section 2 of this study, addresses this problem by asking respondents directly if they are uninsured or not, and following this question up with further probes.

Given that the CPS figures are flawed, what is an accurate count of the uninsured? For 1997, our analysis of the NHIS data indicates that 38 million Americans were uninsured, as opposed to the 43.4 million reported to be uninsured in the 1998 CPS (see table 2.1). This means that 5.4 million fewer Americans were uninsured compare to the commonly-cited figure, an exaggeration of 14 percent. Nor is this a singular finding. According to the 1996-97 CTS, 35.7 million people were uninsured, as opposed to 41.7 million according to the 1997 CPS, an overstatement of 6 million people, or 17 percent. Furthermore, these results are also consistent with the estimated

2 The CPS has since been revised and in March 2000 a new follow-up question was added to minimize underestimation of the insured. As a result, the count of uninsured fell from 42.6 million to 39.3 million in 1999. This still does not, however, address the principle problem of voluntary un-insurance, which is the focus of this paper.

Table 2.1: The Medically Uninsured, by Selected Characteristics, 1997

	CPS		NHIS	
	Number (000)	Percentage of population in category	Number (000)	Percentage of population in category
All	43,448	16.1	37,978	14.2
Sex				
Male	23,130	17.6	20,144	15.5
Female	20,319	14.8	17,833	13.1
Age				
Under 18 years	10,743	15.0	9,108	12.8
18 to 24 years	7,582	30.1	7192	28.8
25 to 34 years	9,162	23.3	8,823	22.3
35 to 44 years	7,699	17.3	6,558	15.0
45 to 64 years	7,928	14.1	6,001	10.9
65 years or older	333	1.0	289	0.9

Sources: Current Population Survey, 1998; National Health Interview Survey, 1997.

magnitude of overstatement for 1995 (4.9 million) found in the adjustment of the CPS data by Lewis, et al. (1998).

As is apparent from table 2.1, overcounting of the uninsured occurs for both genders, and in all age groups. But because such overstatements derive primarily from their failure to count Medicaid recipients accurately, they have the particular effect of overstating the number of children who are uninsured, since many children are the beneficiaries of these programs (see table 2.1). Thus, according to the 1997 NHIS, 9.1 million children under the age of 18 were uninsured, as opposed to 10.7 million according to the CPS, an overstatement of 17.6 percent. Similarly, the Urban Institute's study based on the CPS data found that while the CPS reported 9.8 million uninsured children in 1995, after accounting for the underreporting of Medicaid, the real number was only 6.9 million uninsured, an overstatement of 30 percent (Lewis, et al., 1998).

How many people are voluntarily uninsured?

Once this technically accurate count of the uninsured has been made, it is useful to examine the characteristics of those counted as uninsured. The specific reason for doing so is to determine whether some of those uninsured are uninsured by choice. At least two types of "voluntarily" uninsured might exist: those who are eligible for free public insurance (Medicaid) but choose not to take it up, and those who can afford private insurance but do not purchase it, or are offered coverage by their employer or otherwise, but decline.

The eligible uninsured

Consider, first, those who are eligible for Medicaid but are uninsured. Perhaps the definitive number of "eligible uninsured" comes from the Health Care Financing Authority. In fiscal year 1997, while 34.9 million Americans received Medicaid benefits, 41.5 million Americans were

eligible for these benefits, a gap of 6.7 million ("Medicaid Eligibles...," 1999; "Medicaid Recipients...," 1999). After deducting those elderly individuals who are covered jointly by Medicaid and Medicare (and thus would not be counted as uninsured) there still remained 6.2 million Americans, both adults and children, who were eligible for Medicaid coverage but not enrolled.

Highly represented among the eligible uninsured are children. Estimates of the number of eligible uninsured children vary from study to study. Some estimates suggest as many as 42 percent of uninsured children are eligible for insurance, while other estimates find that as few as 21 percent are eligible (Lewis, et al., 1998). The data from the 1996-97 CTS falls well within this range, indicating that 35 percent of uninsured children, or nearly 3.1 million children, are in fact eligible for public health insurance (Lewis, et al., 1998).

With the introduction of the State Children's Health Insurance Plan (SCHIP) in 1997, and recent changes in Medicaid, it is likely that even more uninsured children are now eligible for public health insurance but not enrolled. One estimate for 1999 is that almost 2.6 million uninsured children eligible for CHIP and another 4.7 million eligible for Medicaid were not enrolled (Perry, *et al*., 2000).

When asked, parents gave a variety of reasons for why their children were not enrolled. Many parents were confused regarding the eligibility requirements for Medicaid. For instance, 39 percent of the eligible uninsured thought that a family had to be on welfare to enroll in Medicaid. Similarly, 35 percent thought that a family could not own a car and still enroll in Medicaid (Perry, *et al*., 2000). This confusion regarding eligibility may explain why 31 percent of the parents of eligible uninsured children never tried to enroll their children in Medicaid. Indeed, 50 percent reported that they found the rules too confusing and the forms too complicated, while 56 percent did not know where or how to apply (Perry, *et al*., 2000). There is also the possibility of many parents choosing to not enroll in order to avoid "administrative hassles" knowing that coverage for medical care is instantaneous and may even be retroactive when necessary (Scandlen, 2001).

Among those who had tried to enroll in Medicaid in the past, 41 percent reported success, but 21 percent said that they could not complete the enrollment process. Among this latter group, 72 percent said that they could not complete the process because it was too difficult to get the required documentation, while 62 percent found it too confusing and complicated (Perry, *et al*., 2000). Furthermore, language was also a barrier, with 46 percent of Spanish-speaking respondents reporting that they could not complete the process because the materials were not available in Spanish (Perry, *et al*., 2000). Among the 15 percent of all respondents who applied and were denied, there was also some confusion. Nine percent of these respondents reported that they had been denied because the forms were incomplete, while 23 percent did not know why they had been denied coverage. Moreover, 48 percent reported having been denied coverage in the past because their income was too high, although at the time of the survey it was not, suggesting that they were now intimidated or discouraged by the enrollment process (Perry, *et al*., 2000).

For the purposes of measuring the number of American uninsured, both voluntary and involuntary, how should the eligible uninsured be categorized? Reasonable arguments can be made for excluding the eligible uninsured from both the total uninsured and the involuntarily uninsured.

Perhaps the strongest argument against counting the eligible uninsured as *insured* is an international comparative one. If the eligible uninsured in America are counted as uninsured, then comparisons between the US and other countries, such as Canada, are fundamentally flawed. Spe-

cifically, such comparisons reveal that the number of American uninsured is overstated due to the eligible uninsured. Canada, for instance, is considered to have universal health insurance, yet at any one time, thousands of Canadians are, often unknown to them, not covered by their provincial health insurance plans. This may be because they have changed provinces and forgotten to register in their new province, or they may have left the country for some time and, upon returning, found that they are no longer registered with their provincial plan. Since most provinces require a three-month waiting period prior to registering, this can mean that a significant number of individuals go uninsured in Canada despite its "universal" system.

This sort of loophole in Canada's "universal" system was recently illustrated when a former Quebec resident could not get needed heart surgery to reimplant his pacemaker because the Quebec government would not pay for it, and he was not yet eligible for coverage under the British Columbia plan (Fayerman, 2000). A second, related limitation in coverage exists in those provinces that require the payment of health insurance premiums (i.e., Alberta and British Columbia) in regard to those who have failed to maintain their health insurance payments. This limitation was recently demonstrated when a British Columbia man with a broken leg was removed from an operating table when it was revealed that he was in arrears on his health insurance payments (Zacharias, 2000). Although there are no authoritative national numbers of Canadian uninsured, some provincial data can be considered. For instance, in British Columbia as of June 31, 1998, there were approximately 3.8 million people registered with the provincial Medical Services Plan (MSP *Quick Facts*, 2000). However, in the same year, almost 4 million people resided in British Columbia (*Population*, 2000). This means that at that time perhaps as many as 200,000 British Columbians, or close to 5 percent of British Columbia's population, was effectively uninsured.

The important point to note about the Canadian uninsured is that none of these individuals can be regarded as in that position because of their financial circumstances. In BC, those who cannot afford to pay are given their insurance without cost. They must register however, and it is this non-registering behaviour that is accounted for.

Nevertheless, according to the OECD (Anderson and Poullier, 1999), Canada possesses a universal health insurance system; officially, no one is uninsured. But this characterization treats the eligible uninsured as insured. As a result, comparisons of US and Canadian uninsured overstate the true difference.

Furthermore, American hospitals that receive public funding—a significant number given the prevalence of Medicaid and Medicare—are required by law to provide treatment to stabilize the sick or injured, regardless of ability to pay (Social Security Act § 1867, 1997). Moreover, individuals who register for Medicaid can receive retroactive coverage for up to three months prior to actually being officially enrolled (*Medicaid Eligibility*, 1999). In this sense the US eligible uninsured ought to be considered insured because, in the event that they truly needed health coverage, they could, albeit with some difficulty, arrange it.

Finally, to the extent that the eligible uninsured are treated as uninsured, they are uninsured by choice, albeit in the case of children not their own, but through the choices of their parents and guardians. In other words, for these individuals, the cost of Medicaid or CHIP, i.e., the hassle of enrolling, exceeds the benefits of enrollment, and they thus can be justifiably regarded as voluntarily uninsured.

"High" income non-purchasers

A second potential category of voluntary uninsured consists of those who can afford private insurance but choose not to purchase it, or are

offered coverage at work but decline in order to recover the costs associated with health insurance. The most commonly-cited reason among working-age adults for being uninsured was that they could not afford health insurance, the response given by 51 percent of respondents to the Kaiser/Commonwealth 1997 *Survey of Health Insurance* (Schoen, *et al*., 1998). Of course, the subjectivity of this question makes it difficult to regard this survey evidence as definitive.

In fact, contrary to public perception, not all medically uninsured Americans are poor; some are not even close to being poor. According to the CTS, in 1996-97, 3.6 million Americans with household income 400 percent or more of the federal poverty line[3] were uninsured. This represented 10 percent of the uninsured in 1996-97, and 4.6 percent of those individuals with incomes in excess of 400 percent of the poverty line.[4] Given that a family income of 400 percent of the poverty line means, for a family of four, an annual income in excess of US$63,000, or over Cdn$75,000,[5] is it meaningful to characterize these individuals as involuntarily uninsured? Moreover, a sizable majority of these high-income uninsured—2.3 million (6.5 percent of the uninsured)—have family incomes in excess of 500 percent of the federal poverty line, almost US$80,000 for a family of four.

While one could arbitrarily select 400 percent of the federal poverty line as the income level above which a person is "voluntarily" uninsured, there may be a principled method to determine whether certain categories of people are "voluntarily" uninsured. If an uninsured individual wants health insurance, but cannot afford it, then one would expect that an increase in that individual's income would decrease the likelihood of that individual being uninsured. Conversely, if an individual can afford health insurance, but has simply chosen not to acquire it, then an increase in income would, by this reasoning, not have a statistically significant negative impact on the likelihood of being uninsured. In other words, if individuals above some income level choose to be uninsured, then beyond that income threshold, an increase in income would have no significant impact on their deicison to buy health insurance.

Methodology

This hypothesis—that higher income will, at some level, not negatively affect the probability of being uninsured—can be tested using probit techniques. The approach used here is a trial-and-error one in which a series of ascending income values are used as potential thresholds. For this analysis, we used the CTS, as its income data is not as heavily censored as that in the NHIS. This more extensive income data is obtained at the expense of health status measures, which are omitted from the CTS, and thus cannot be included. This does not appear to be a substantial limitation, as our (unreported) regressions on the likelihood of being uninsured that were performed using the NHIS suggest that health status has little, if any, impact on the likelihood of acquiring insurance, controlling for education, race, and age.

3 Calculations were made by the authors. In 1996, the US Federal Census poverty line for a single individual under 65 years old was US$7,995. For a family of four with two children it was US$15,911. In purchasing power parity terms, these work out to about Cdn$9,500 and Cdn$18,900, respectively.

4 The CTS, rather than the NHIS, is used because a higher percentage of its respondents reported their income category. In the NHIS almost 20 percent of respondents refused to give their income category; many simply indicated that their income was either greater or less than $20,000.

5 Currency conversion was made using the Purchasing Power Parity exchange rate from the OECD (*Purchasing Power Parities ...*, 2000).

Table 2.2: Estimates of the Effect of Income on the Likelihood of Being Uninsured, 1996-97

Group / Variable	Income 300% of poverty level	Income 332% of poverty level	Income 333% of poverty level	Income 365% of poverty level	Income 418% of poverty level	Income 419% of poverty level	Income 500% of poverty level
Income coefficient (std. error)	-0.021638 (0.006064)	-0.012359 (0.006432)	-0.007432 (0.006492)	-0.000195 (0.006788)	0.011477 (0.007533)	0.012889 (0.007545)	0.02427 (0.0089)
Significance	0.0004	0.0547	0.2523	0.9771	0.1276	0.0876	0.0064
Mean Dependent Variable	0.063449	0.059248	0.057795	0.053757	0.049320	0.048964	0.045023
N	24035	21638	21213	19402	16038	15971	11794

Source: Community Tracking Study, 1996-97.

Results

As table 2.2 clearly shows, at and beyond approximately 333 percent of the federal poverty line, income ceases to have a statistically significant negative impact on the likelihood of being uninsured, controlling for socio-economic characteristics and health status. What is more revealing, at approximately 419 percent of the federal poverty line, income starts having a statistically significant *positive* impact on the likelihood of being uninsured. At the very least, this suggests that uninsured individuals with incomes greater than 419 percent of the poverty line have chosen to be uninsured. Furthermore, uninsured individuals with incomes greater than 333 percent of the poverty line cannot credibly claim to be unable to afford insurance, since the data suggests that increasing income will have no significant negative effect on their being uninsured. Based on our estimate of the income threshold at which being uninsured becomes voluntary, we can estimate the number of "voluntarily" uninsured. At a minimum, using the top threshold, at and above which income has a positive impact on the likelihood of being uninsured, over 3.4 million Americans were "voluntarily" uninsured in 1996-97. If we take the lower income threshold, at which income stops having a negative impact on the likelihood of being uninsured, approximately 5.6 million Americans were voluntarily insured in 1996-97.

The existence of a substantial number of "voluntary" uninsured is also supported by a recent California study (California Health Care Foundation, 1999). It examined the non-poor uninsured (i.e., those earning in excess of 200 percent of the federal poverty line) in California in 1998. When asked why they were uninsured, 33 percent of respondents said they could get the care they needed for less than the cost of health insurance, 25 percent said they didn't think they needed health insurance, and 48 percent cited good health as a reason for not purchasing health insurance (California Health Care Foundation, 1999).[6] Indeed, health insurance ranked "very high" in terms of spending priorities for only 41 percent of the non-poor uninsured.

6 The apparent contradiction between the survey findings of good health being a significant factor in the choice of insurance coverage and the regression analysis finding that health status has little effect on the likelihood of being uninsured can be easily reconciled by noting that the regression analysis removes the age effect from the effect of health on uninsurance. In the California Health Care Foundation survey, 62 percent of the uninsured were under age 40.

Illegal Immigrants

When looking at the number of uninsured Americans, it is also important to recall that the United States, both by virtue of its relative prosperity and its proximity to poorer nations, attracts large numbers of immigrants, both legal and illegal. This is not inconsequential, since according to both the CPS and the NHIS, non-citizens (or foreign-born Americans in the case of the NHIS) are more likely to be uninsured than citizens. Indeed, calculations from the NHIS reveal that while only 12.4 percent of Americans born in the United States are uninsured, almost 30 percent of foreign-born Americans are uninsured. Moreover, in all likelihood, this understates the true number of uninsured recent immigrants, since it includes Americans who have lived in the US for decades, and who share the same insurance characteristics of native-born Americans (Thamer and Rinehart, 1998). Indeed, the 1989/90 NHIS reported that 46 percent of foreign-born persons residing in the US for less than 5 years were uninsured (Thamer and Rinehart, 1998). Moreover, it is impossible to tell from the data how many of the uninsured foreign-born Americans are also illegal immigrants. For obvious reasons, surveys, particularly government surveys, are reluctant to ask questions regarding an individual's citizenship status, which inevitably leads to an undercount of illegal aliens. In the case of the CTS, no questions are asked regarding citizenship status, and the NHIS only asks whether or not a respondent was born in the US. Because it is estimated that in 1996 close to 5 million illegal immigrants (*Illegal Alien Resident Population*, 1999) lived in the United States, and they are statistically much more likely to be uninsured, this is not a minor concern.

But why should it matter? After all, the fact that illegal immigrants in the US are uninsured is not altered by virtue of their being illegal immigrants. This is certainly true, but it is also true that in most countries, even those with so-called "universal" health insurance, illegal immigrants are not covered by government health insurance, but are not counted as uninsured. In Canada, for instance, to be eligible for health care coverage, one must be legally entitled to reside in one's home province. Clearly, this means that illegal immigrants are not covered by health insurance, and yet Canada is still considered to have universal health insurance. According to the OECD, 100 percent of Canadians have access to government-sponsored insurance (as reported in Anderson and Poullier, 1999). This may be either because the number of illegal migrants in Canada is so small as to be insignificant, or that they simply are not counted. Unfortunately, Canada does not produce figures on illegal immigration, so it is difficult to tell which explanation is true. However, if they are not counted in Canada, there is no reason why illegal immigrants should then be counted as uninsured in the US. If, on the other hand, Canada is considered to have universal health insurance only because the number of illegal immigrants is small, then it is unclear why the US should be statistically penalized for having a large number of illegal immigrants.

In addition, addressing the question of insuring the uninsured requires different policies for illegal immigrants than it does for legal immigrants or native-born citizens. Even if the US were to adopt a "Canadian-style" health care system, the 5 million illegal aliens in the United States would not have any better access to health care then they do now. Publicly-funded hospitals are already required to provide stabilizing emergency care regardless of ability to pay. Furthermore, even if illegal immigrants were eligible for coverage (as is not currently the case in Canada), it is questionable whether they would take advantage of such a program out of fear of being reported to immigration officials. Such a drastic reform probably would have no impact on the health insurance status of illegal aliens.

Perhaps, then, it is inappropriate to include uninsured illegal aliens in the United States in mea-

sures of uninsured Americans, since they are not included in the measures of the uninsured in any other country. Furthermore, some of them may have access to government-funded health insurance in their home country, which is likely to be the case among at least some of the estimated 2.7 million illegal aliens from Mexico who may have access to the Mexican national health system, as well as the approximately120,000 illegal aliens from Canada (*Illegal Alien Resident Population*, 1999) who may still be registered for insurance in Canada.

If it is decided that uninsured illegal aliens—uninsured in the sense that they do not have coverage in the United States—ought not to be included in measures of uninsured Americans, how many would be excluded? Even if we assume that illegal immigrants are no less likely than legal ones to have access to health insurance—an unlikely scenario since they are generally poorer, less educated, work in worse jobs, and do not have access to the myriad government health insurance programs such as Medicaid or Medicare (Camarota and Edwards, 2000)—this would still imply that 42 percent of them are uninsured, or over 2 million people. This may well be a lower bound. Another, more rigorous estimate of the number of uninsured illegal immigrants in the US suggests that 64 percent of illegal aliens were uninsured in 1998 (Camarota and Edwards, 2000). This would mean that there were almost 3.1 million uninsured illegal aliens living in the United States.

Calculating an adjusted number of uninsured

The foregoing analysis allows us to compute more accurate estimates of the number of uninsured, making adjustments for the various concerns raised in this section. Consider first the overstatement of the number of uninsured in the CPS data. Making this correction reduces the number of uninsured in 1997 from 43.4 million to 38 million. As well, the number of uninsured children is overstated by the CPS. Correcting for the CPS overstatement, the true number of uninsured children in 1997 falls from 10.7 million to 9.1 million.

The second source of overstatement arises from counting those who are eligible for Medicaid, but do not take it up, as uninsured. In 1997, 6.2 million people fell into this category. Of this number, 4.4 million were children.

As well, we can estimate the number of Americans who can afford insurance, but who have chosen not to purchase it. According to our analysis of the 1996-97 CTS, between 3.4 and 5.6 million Americans were uninsured, not because they could not afford insurance, but because they chose not to purchase it.

Finally, it is arguable that illegal aliens should be excluded from the count of the uninsured, as they are excluded in other countries. Given the size of the illegal alien population in the United States, and the probability that the majority of illegal aliens do not have access to health insurance in the United States, this adjustment reduces the count of uninsured Americans by approximately 2 to 3 million.

As a result of these adjustments, the number of Americans who are "involuntarily" uninsured is substantially less than the 43.4 million standard CPS figure. 5.4 million are insured but not counted as such. 6.2 million are uninsured but are eligible for Medicaid. Between 3.4 and 5.6 million people are estimated to have high enough income to be able to afford insurance, but do not purchase it (or do not purchase it for others, in the case of children). Finally, between 2 and 3 million illegal immigrants are counted as uninsured, an accounting not made in other countries. When one compiles these adjustments, as in table 2.3, an adjusted number of uninsured, incorporating all of these corrections, is computed to be between 23.1 and 25.4 million.

Table 2.3: Uninsured Americans, 1997

Estimate	Number (million)	Overstatement (million)
CPS estimate of the uninsured	43.4	
NHIS estimate of the uninsured	38	5.4
"Voluntarily uninsured"	3.35-5.58	8.75-10.98
"Eligible uninsured"	6.2	14.95-17.18
Involuntarily uninsured*	28.45-26.22	

*Including an estimated 3.1 million illegal immigrants

Sources: National Health Interview Survey, 1997; Current Population Survey, 1998; Community Tracking Study, 1996-97, calculations by author.

Table 2.4: Uninsured Children in America, 1997

Estimate	Number (million)	Overstatement (million)
CPS estimate of the uninsured (1997)	10.7	
NHIS (1997) Estimate of the uninsured	9.1	1.6
"Voluntarily uninsured"	0.35-0.57	1.95-2.17
"Eligible uninsured"	4.4	6.35-6.57
Adjusted uninsured	4.13-4.35	

Sources: National Health Interview Survey, 1997; Community Tracking Study, 1996-97; Current Population Survey, 1998; calculations by author.

The effect of this calculation on uninsured children is even more dramatic. 10.7 million children were reported to be uninsured in 1997 by the CPS, but the NHIS finds that 1.6 million of these children were actually insured. As well, we can deduct the 4.4 million children who, while eligible for Medicaid in 1997, were not enrolled. Finally, we can deduct the 0.3 million to 0.6 million children who are voluntarily uninsured (i.e., those whose families had sufficient income to afford insurance, but who chose not to acquire it). In total, the true number of "involuntarily" uninsured children is between 4.1 and 4.4 million (see table 2.4).

Summary: Implications of these Adjustments

While the primary purpose of this paper is not to provide policy recommendations regarding the uninsured, but rather to measure the magnitude of this problem, there remains one basic policy point to be made. While the true magnitude of the uninsured is smaller than is conventionally reported, it is still a substantial number: between 23.2 and 25.4 million, or between 8.6 and 9.4 percent of the population in 1997. Hence, this analysis does not imply that this problem should be ignored. But this refined estimate should allow policies to be better targeted to this population of "involuntarily" uninsured.

3. Use of Medical Services

Whatever constitutes an accurate count of the uninsured, an important remaining concern is the impact of insurance status (insured vs. uninsured) on the use of medical services. Indeed, for a variety of reasons, access to care lies at the heart of the problem of the uninsured. First, there is a question of whether or not the uninsured receive important health care services that would significantly benefit them. Second, there remains the question of whether the uninsured receive the appropriate type of care. It has been suggested that the uninsured are less likely to seek health care except at the point where they are gravely ill, at which time they pursue treatment at emergency room, rather than receiving much less expensive treatment from a doctor's office at an earlier stage. Clearly, if this suggestion is correct, such behaviour has an impact, both on the health of the uninsured (which we address in the fourth section of the paper), and because the uninsured often receive uncompensated care, on the overall cost of the health care system.

Previous literature on health services use

Given the prominence of the debate over the uninsured in recent years, it should come as little surprise that much work has been done on the effect of various forms of insurance coverage, or the lack thereof, on health care use. The literature can be divided into two broad categories. The first is studies investigating the impact of insurance status on the quantity of health care received; the second examines the impact of insurance on the appropriateness of care.

Consider, first, the studies focusing on the quantity of care received. Marquis and Long (1996), using the 1987 National Medical Expenditure Survey (NMES) and the Survey of Income and Program Participation (SIPP) for the years 1984 through 1988, tested the impact of Medicaid enrollment on ambulatory care and inpatient hospital care. They found that adult AFDC Medicaid beneficiaries had 60 to 90 percent more ambulatory contacts than the uninsured, while AFDC children had about 50 percent more ambulatory contacts than similarly situated uninsured children. In addition, compared to privately insured adults and children, AFDC Medicaid recipients experienced 6 to 7 percent more ambulatory contacts. The implication of this study is that the uninsured consume fewer ambulatory care services than those covered either by Medicaid or privately.

This 1996 paper mirrors the findings of an earlier study also by Long and Marquis (1994b), done for the US Congress's Office of Technical Assessment. This study was based on three different surveys covering multiple years: SIPP (1984 through 1988), NMES (1987), and the Health Interview Survey (1980, 1983, 1984, 1986, and 1989). This study found that being uninsured (as compared with being privately insured) decreased the probability of having an ambulatory contact in a given year by anywhere from 14 to 20 percent for adults, and decreased the probability of spending time in a hospital by 3 percent. Furthermore, it concluded that uninsured adults consumed between 57 and 67 percent of the ambulatory visits that the insured did. In addition, the uninsured consumed only 59 to 74 percent of the number of hospital days used by the insured. With regard to children, uninsured children were 10 to 12 percent less likely to have ambulatory contacts, and 1 to 2 percent less likely to use hospital days than were their insured counterparts. In addition, they found that uninsured children used 68 to 69 percent of the ambulatory contacts of the uninsured, and 77 to 85 percent of the hospital days. But if these studies tell us a great deal about how much health care the unin-

sured use, they tell us little about the "appropriateness" of care. A second category of studies assesses whether the individual use of "appropriate" health services depends on insurance status. A study on the appropriate usage of emergency room (ER) services (Gooding and Smith, 1996) found that 58.6 percent of insured ER visits and 58.9 percent of uninsured ER visits were non-urgent. Furthermore, 19.2 percent of insured ER visits were deemed inappropriate while 17.7 percent of uninsured visits were deemed inappropriate.[7] They concluded that "the ER utilization pattern of the uninsured more closely reflects that of consumers with HMO and private or commercial insurance coverage than that of Medicaid recipients" (Gooding and Smith, 1996). In other words, if the insured (particularly the publicly insured) use more medical services than do the uninsured, this may reflect "inappropriate" use of health care services, rather than better access to care. Although this section of the paper does not directly test the hypothesis that the uninsured are less likely to misuse health services, such conclusions may be inferred by comparing the differences in health care use and outcomes conditional on insurance addressed in the next section.

While previous studies provide valuable insight into health care use by the uninsured, they remain somewhat unsatisfying. Usage of ambulatory care, while important, is an extremely broad category, which thus tells us little about the consumption of specific categories of service. For example, it tells us little about the likelihood of the uninsured visiting a doctor, or the ER, or receiving preventive medical care. This study will look at the data to see if there is any evidence to support the hypothesis that the uninsured receive less health care or more "inappropriate" health care compared with those who have private health insurance. To do so, we will attempt a statistical analysis known as "ordinary least squares" (OLS), which will allow us to estimate the likelihood of using preventive and diagnostic services such as blood tests and flu shots, visits to both generalist and specialist doctors, and visits to emergency rooms.

Model

The NHIS contains a national sample of self-reported health usages and outcomes. The 1997 NHIS also includes a core sample of 36,116 adults for which detailed health care use and health outcome information is provided, and which can be linked to the larger person-file to obtain health insurance data. Unfortunately, measures of health care use in the NHIS are imperfect at best. Indicators of preventive and diagnostic care respectively include, for example, whether or not the individual received a flu shot, or a blood test, in the previous 12 months. Use of doctors' services is measured by two variables: one for general doctors' visits, the other for medical specialist visits.[8] Another variable measures acute medical treatment in terms of the number of visits to the ER in the past year.

7 The Gooding and Smith paper uses two approaches to define inappropriateness of care. First, they distinguish between care that is (retrospectively) defined by the health care provider as either urgent (i.e., appropriate) or non-urgent (i.e., potentially inappropriate). Then they look at whether any non-routine diagnostic procedures were performed. This is to take into account the fact that some non-urgent care may be appropriate, since some imperfectly informed patients cannot be certain that care was non-urgent. Under this definition, care was defined as either: 1) appropriate (i.e., urgent), 2) potentially appropriate (i.e., non-urgent but requiring non-routine diagnostic procedures to determine urgency), or 3) inappropriate (i.e., non-urgent with routine diagnostics).

8 The NHIS defines a general doctor as a doctor in general practice, family medicine, or internal medicine, and a medical specialist as "a medical doctor who specializes in a particular medical disease or problem (other than obstetrician/gynecologist, psychiatrist, or ophthalmologist)" (*Data File Documentation ...*, 2000).

Health care use is, as one would expect, highly correlated with the presence of a variety of acute and chronic conditions. Thus it is important to control for health status when determining the effect of health insurance status on health care use. Health status is also important to account for because insurance status may well be correlated with it (i.e., those in worse health may be more likely to be insured). To test for the existence of these effects, we have included 12 dummy variables to account for pre-existing medical conditions. Although this is a less than perfect measure of previous medical status, it is the best that is available in this data. Furthermore, because two conditions creating eligibility for Medicaid are severe disability (some non-severe disabilities also qualify one for Medicare) and blindness, it is necessary to include variables to adjust for the disproportionate representation in these two groups among individuals reporting coverage by Medicaid (and Medicare). In addition to controlling for previous health status, all empirical analysis controls for variables such as race, family income, education, immigration status, age, and gender.

Results

Based on previous studies (and conventional wisdom) indicating that the uninsured face barriers to proper medical care, we would expect to observe that the uninsured consume fewer medical services than the insured. Therefore, we hypothesize that being uninsured will have a negative impact on the consumption of preventive, diagnostic, and doctors' services. Furthermore, since we hypothesize that the uninsured consume fewer preventive and diagnostic services, we would expect them to be sicker when they do seek medical treatment, and thus we would expect to see them consume more emergency room services. Thus, we hypothesize that being uninsured will have a positive impact on the use of ER services.

Preventive care and diagnostic services

To test the hypothesis that the uninsured use fewer preventive health care services than the insured, we will look at the likelihood of an uninsured individual getting a shot to protect against influenza. Not only does such preventive treatment reduce the likelihood of contracting influenza, but it would also be expected to reduce future uses of health care services such as doctor visits or visits to the ER (Smith and McGhan, 1997). Table 3.1 presents the OLS estimates of the impact of having either private insurance or Medicaid (relative to being uninsured) on the likelihood of getting a flu shot, holding constant socioeconomic characteristics and indicators of pre-existing chronic illness (arthritis, cancer, diabetes, heart disease, etc.). Having private insurance coverage increases the likelihood of receiving a flu shot over a twelve-month period by 5.5 percent, a result that is statistically significant.[9] Having Medicaid coverage increases the likelihood of getting a flu shot by 4.1 percent, which was also statistically significant. Clearly, being uninsured seems to have a negative impact on the likelihood of receiving a flu shot vis-à-vis having either private insurance or Medicaid.

In the case of a diagnostic procedure such as blood tests, the impact of being uninsured is more ambiguous. While in comparison to being uninsured (again controlling for socio-economic and observable illness differences), having *private* insurance has no significant impact on receiving such tests, Medicaid coverage significantly increases the likelihood of getting one's blood tested by 4.9 percent. This result suggests that it is not insurance status per se that increases the like-

9 Statistical significance is defined as $\alpha = 0.1$.

Table 3.1: Estimates of the Effect of Health Insurance on the Probability of Receiving a Flu Shot, Non-Elderly Adults, 18-64

Variable	Coefficient (std error)	t-statistic
Private Health Insurance	0.05578*** (0.011034)	5.0554
Medicaid	0.041292* (0.021666)	1.905836
Unadjusted R-Squared	0.210791	
Adjusted R-Squared	0.174963	
Prob (F-statistic)	0.000000	
Mean Dependent Variable	0.257568	
N	27,611	

Notes:
[1]Additional independent variables (coefficients suppressed) measuring gender, age, education, employment status, immigration status, family income, race, and chronic illnesses were included in the model.
[2]The standard errors have been calculated using White's method and are in parentheses.
*indicates significance at $\alpha = 0.1$
**indicates significance at $\alpha = 0.05$, and
***indicates significance at $\alpha = 0.01$.

Table 3.2: Estimates of the Effect of Health Insurance on the Probability of Receiving a Blood Test, Non-Elderly Adults, 18-64

Variable	Coefficient (std error)	t-statistic
Private Health Insurance	-0.014942 (0.011694)	-1.277681
Medicaid	0.049012** (0.023652)	2.072196
Unadjusted R-Squared	0.068032	
Adjusted R-Squared	0.035044	
Prob (F-statistic)	0.000000	
Mean Dependent Variable	0.138508	
N	22,499	

Notes:
[1]Additional independent variables (coefficients suppressed) measuring gender, age, education, employment status, immigration status, family income, race, and chronic illnesses were included in the model.
[2]The standard errors have been calculated using White's method and are in parentheses.
*indicates significance at $\alpha = 0.1$
**indicates significance at $\alpha = 0.05$, and
***indicates significance at $\alpha = 0.01$.

lihood of getting a blood test, but possession of *public* health insurance, which increases the likelihood of such diagnostic treatments. This result may reflect selection bias, however, perhaps indicating that unobservably less healthy individuals (who are more likely to receive blood tests) may be more likely to be Medicaid recipients.

Thus, while being uninsured affects the use of preventive care, such as flu shots, the evidence is less conclusive with regard to diagnostic services, such as blood tests. The uninsured are less likely to have blood tests than those with Medicaid coverage (although this result should be interpreted with some caution) but they are no less likely to have had a blood test than those with private coverage.

Doctors' visits

Another important aspect of access to care is the use of doctors' services by the uninsured. Not only does regular contact with a doctor serve a *diagnostic* purpose—to detect and address illnesses prior to their becoming critical or acute—but doctors also potentially act as a more cost-effective method of *treating* illnesses, injuries, and diseases, than similar care received in an emergency room.[10]

On an unconditional average basis, we calculate from the CPS that the uninsured are less likely to visit a doctor than are the insured. Insured adults

10 Of course, while studies have generally shown that the per patient cost of treatment in the ER is higher than for similar treatment in doctors' offices, this may reflect the greater severity of illness among those who present themselves to the ER (Tyrance, *et al*., 1996).

Table 3.3: Estimates of the Effect of Health Insurance on the Probability of Visiting a Generalist MD, Non-Elderly Adults, 18-64

Variable	Coefficient (std error)	t-statistic
Private Health Insurance	0.161646*** (0.016603)	9.736203
Medicaid	0.155914*** (0.028130)	5.542606
Unadjusted R-Squared	0.356185	
Adjusted R-Squared	0.074039	
Prob (F-statistic)	0.000000	
Mean Dependent Variable	0.638205	
N	22,605	

Notes:
[1]Additional independent variables (coefficients suppressed) measuring gender, age, education, employment status, immigration status, family income, race, and chronic illnesses were included in the model.
[2]The standard errors have been calculated using White's method and are in parentheses.
*indicates significance at $\alpha = 0.1$
**indicates significance at $\alpha = 0.05$, and
***indicates significance at $\alpha = 0.01$.

Table 3.4: Estimates of the Effect of Health Insurance on the Probability of Visiting a Specialist MD, Non-Elderly Adults, 18-64

Variable	Coefficient (std error)	t-statistic
Private Health Insurance	0.064608*** (0.011054)	5.844994
Medicaid	0.076423*** (0.023673)	3.228311
Unadjusted R-Squared	0.136973	
Adjusted R-Squared	0.076134	
Prob (F-statistic)	0.000000	
Mean Dependent Variable	0.219403	
N	22,656	

Notes:
[1]Additional independent variables (coefficients suppressed) measuring gender, age, education, employment status, immigration status, family income, race, and chronic illnesses were included in the model.
[2]The standard errors have been calculated using White's method and are in parentheses.
*indicates significance at $\alpha = 0.1$
**indicates significance at $\alpha = 0.05$, and
***indicates significance at $\alpha = 0.01$.

visit a doctor, on average, 3.6 times a year, while the uninsured, on average, visit a doctor 1.9 times a year. Based solely on this aggregate and uncontrolled evidence, the uninsured consume only 54 percent of the number of doctors' visits that the insured consume.

Regression analysis provides more convincing evidence that the uninsured visit doctors less frequently than the insured. Table 3.3 contains the OLS estimates of the impact of possessing health insurance on general doctors' visits. For the privately insured, this impact is large and positive. Having private insurance coverage increases the likelihood of visiting a doctor by 16.2 percent. While this is a substantial difference, it is however, much less than the 50 percent divergence derived from the aggregate numbers. Individuals who are covered under Medicaid are also much more likely, relative to the uninsured, to visit a doctor in a given year. Medicaid coverage increases the likelihood of visiting a general doctor by 15.6 percent.[11]

A similar picture emerges with regard to the use of medical specialist services. As table 3.4 reports, the OLS estimate of the impact of being privately insured on the use of medical specialist services is large, positive, and statistically significant. Private coverage increases the likelihood of visiting a medical specialist by 6.5 percent. Similarly, Medicaid seems to have both a large and statisti-

11 Although there may be some substitution of nurse practitioner or physician assistant services for actual doctor's visits by the uninsured in order to avoid the higher costs associated with actual doctors, we currently do not possess the data to show whether this actually occurs for uninsured patients.

cally significantly positive impact on the use of medical specialist services. Medicaid coverage vis-à-vis being uninsured increases the likelihood of visiting a medical specialist by 7.6 percent. Being uninsured, compared to possessing either public or private insurance, has a negative impact on the likelihood of consuming medical specialist services.

ER visits

If the uninsured consume less preventive care and fewer doctors' services than the insured, do they also visit the ER more than the insured? Again, at first glance, the answer seems obvious. In 1996, according to our calculations from the CTS, the uninsured visited the ER, but were not admitted to hospital, on average, 0.33 times per year, while the insured visited the ER, but were not admitted to the hospital only 0.28 times a year. In other words, the uninsured consumed almost 18 percent more ER services than the insured, according to the aggregate data.

However, more sophisticated evidence from the NHIS does not support this first, cursory finding. After accounting for differences in socioeconomic and illness variables, the OLS estimate of the impact of private insurance (versus no insurance) on the likelihood of visiting the ER in the past year is insignificant. Medicaid coverage, however, significantly increases the likelihood of visiting the ER in the previous year by 10.7 percent. Thus, the claim that the uninsured consume a disproportionate amount of emergency room services, while superficially compelling, is upon further examination not supported. There is no evidence that being uninsured increases the likelihood of using ER services; in fact, the uninsured use emergency rooms less, accounting for other differences, than do those covered by Medicaid.

Do the uninsured have inadequate access to care?

Based on the evidence from the NHIS, conclusions are mixed regarding the impact of insurance coverage on access to care. While the uninsured were significantly less likely to obtain preventive medical treatment, such as flu shots, there seems to be little impact of being uninsured on the likelihood of having blood tests. Overall, the impact that being uninsured has on preventive and diagnostic treatments is mixed.

With regard to general doctors' services, the evidence seems to support the hypothesis that the uninsured use fewer services, as they were much less likely to visit generalists' offices. Furthermore, they were also less likely to visit medical specialists' offices for illness, injury, or disease compared to the insured. The implication of this is that the uninsured have inferior access to care compared to either the privately insured or those covered by Medicaid.

Finally, access to emergency room services is not impaired for the uninsured. Based on the NHIS, the evidence suggests that being uninsured has a negligible impact on the use of ER services vis-à-vis having private insurance. Nor does the NHIS data support the claim that public health insurance will reduce ER services. Despite being significantly more likely to use preventive and doctors' services (albeit slightly), individuals covered by Medicaid were still substantially more likely to use ER services in a given year than either the uninsured or individuals with private health insurance.

In sum, the evidence on use is inconclusive. The uninsured receive less preventive and diagnostic care than do the insured, which is not surprising since the uninsured must bear the full cost of such

treatment, unlike most of those who are insured. Yet, the uninsured are no more likely to end up at the ER than the insured, nor are they more likely to be admitted to the hospital via the ER. Indeed, in cases of serious medical crisis, it seems that the uninsured have the same access to care as the insured, or at least those insured who have an incentive to constrain costs. But to truly determine whether the uninsured face a barrier to adequate care, we must look not at total use, but at health outcomes. This is the subject of the next section.

4. Health outcomes

In the last section, we saw that, by and large, the uninsured consume fewer medical services than do the privately and publicly insured. But this finding, in and of itself, does not indicate whether lower consumption of medical services by the uninsured is harmful to them. In order to examine whether being uninsured is harmful, we must investigate the relationship between insurance status and health outcomes.

This section will examine whether being uninsured has any impact on the health of non-elderly adults. Like the section on use, this section will also employ data from the 1997 NHIS. This entails using a nationally representative sample of non-elderly adults to examine the effects of health insurance status on three measures of health status: self-rated health status, the relative change in self-rated health status over the previous year, and the number of days spent in bed due to illness ("bed-days") in the past year (as a proxy for morbidity).

Existing literature

Early literature bearing on the question of the impact of insurance on health was summarized in a 1992 US Office of Technology Assessment (OTA) study (US Congress, Office of Technical Assessment, 1992). Taken as a whole, the 14 pre-1992 studies did not provide conclusive results regarding the impact on health of insurance. Specifically, the OTA found that 8 studies reported that the uninsured had worse health outcomes, while three reported that there was no impact, and three more reported that the results were mixed (US Congress, Office of Technical Assessment, 1992).[12] Moreover, of the 7 studies that compared the health status of the uninsured with that of those covered by Medicaid, two found that Medicaid had a positive impact on health status vis-à-vis being uninsured, while one had mixed results, and four others found no impact of Medicaid relative to being uninsured. Consequently, the OTA summarized its findings thus: "Researchers… are understandably reluctant... to conclude definitively that, in the United States, lack of health insurance can make a substantial difference in ultimate health outcomes" (US Congress, Office of Technical Assessment, 1992).

12 These studies looked at the following indicators: potentially avoidable hospitalization or other institutionalization, emergency or urgent versus elective admission, higher clinical risk of mortality, higher case-mix severity, higher hospital-related mortality, delay in diagnosis, lower rates of cancer survival, higher rates of adverse outcomes for newborns, and higher rates of low birth weight among newborns.

Moreover, "The evidence on differences in health outcomes between uninsured and privately insured individuals is less consistent and compelling than the evidence on utilization" (US Congress, Office of Technical Assessment, 1992).

Since the OTA's review, several other studies have sought to investigate the impact of insurance status on health outcomes. A study by Pappas, *et al.* (1997) measured the impact of insurance status on avoidable hospitalization, which is defined as hospitalizations that could have been prevented by prior outpatient care. If lack of access to care has an impact on health status, then there ought to be an increase in avoidable hospitalization for the uninsured. Pappas, *et al*. (1997) found that the uninsured experienced a slightly higher rate of potentially avoidable hospitalization (4 per 1,000 individuals) than did the privately insured (3 per 1,000), and that the uninsured were far *less* likely than those on Medicaid to experience avoidable hospitalization (4 per 1,000 versus 23 per 1,000). These results, however, must be interpreted with some caution due to the small sample size and the absence of significance tests of the measured differences.

Another more thorough study, by Kaestner, *et al.* (1999) on the impact of public health insurance on low-income children found that the impact of insurance status on general health outcomes was mixed. Measuring the impact of insurance on general health status, they found that "while there was some evidence that Medicaid and private insurance improved general health status, it was not robust" (Kaestner, *et al*., 1999, p. 20). Furthermore, with regard to the number of bed days (days spent in bed due to illness during the previous 12 months), they found that, for children, "there was no evidence that Medicaid or private insurance affected morbidity as measured by the number of bed days" (Kaestner, *et al.*, 1999, p. 20). However, when they estimated the impact of Medicaid expansion on "ambulatory care sensitive" discharges (i.e., hospitalizations which could have been treated, earlier, as outpatient cases), they found that it had a relatively large impact on health status. Nevertheless, they concluded that their paper provided "at best weak support for the hypothesis that Medicaid improves the health of low-income children" (Kaestner, *et al*., 1999, p. 21).

Empirical Model

Because of the mixed evidence regarding the impact of insurance status on health, this paper undertakes statistical analysis to make new estimates of this effect. To do so, we model current health as a function of many variables. It is influenced both by the use of health care services (which is also affected by insurance status) and by pre-existing chronic illnesses. Because the data distinguishes between those insured privately and those insured by Medicaid, the model includes two "dummy variables" for insurance coverage. Furthermore, it includes a series of dummy variables for family income (relative to the poverty line) in the previous year, and dummy variables for race, age, employment status, and educational background, as well as whether or not the individual was born in the United States.

One potential limitation of this approach is that it assumes that current health status is affected only by current health determinants. However it is conceivable that someone who is currently insured may experience poor health because they were uninsured in a previous time period. This problem is addressed by including as regressors a set of variables that account for pre-existing chronic illnesses, measured by the presence of health conditions that "limit behavior" and that have been present for more than one year.

A second problem with this model is the possibility of selection bias. It may be that the unobservably illness-prone are more likely to acquire health insurance because they are more likely to benefit from holding insurance. This ad-

verse selection may tend to lead to a downward bias in the measured effect on health status from holding insurance; insurance holders will be selected disproportionately from the more illness-prone segment of the population, while those who forego insurance will be more likely to be healthy. On the other hand, the uninsured may have been denied insurance due to pre-existing conditions, meaning that the measured effect of holding insurance on health will be biased upward. This problem is, in part, accounted for by the inclusion of variables measuring past illnesses, as mentioned above. While a more explicit model of selection may be desirable, we are unfortunately limited by the available data.

Data

The NHIS contains three measures of health status. Two of them, self-reported current health status and improvement in health status over the previous year, are by definition inherently subjective indicators. A third, less subjective variable included in the NHIS is "bed days," the number of days spent in bed due to illness in the previous year. In any case, self-reported health status and bed days are both highly correlated with the presence of acute and chronic health conditions (Kaestner, *et al.*, 1999).

We also eliminate possible measurement error from transitions into and out of insurance. To do so, we included in our sample only those individuals who were either uninsured for the entire year, or who were insured for the whole year.

Results

Because the uninsured consume less of many health services, it is important to determine whether these forgone services would have significantly improved the health of the uninsured, or would have been essentially valueless. For the purposes of our analysis, we hypothesize that lower consumption of health services is detrimental to health. Our null hypothesis (or testable premise) is that health services are valueless, while the alternative hypothesis (or alternative result to passing the test) is that increased health care consumption due to the possession of insurance confers health benefits. Thus, our hypothesis supports the results failing the designated test. The results are tested on three measures of health status: self-reported health status, the change in that status, and bed days lost.

Table 4.1: Estimates of the Effect of Health Insurance on the Probability of Reporting One's Health Status as "Good" or Better, Non-Elderly Adults, 18-64

Variable	Coefficient (std error)	t-statistic
Private Health Insurance	0.012142** (0.006903)	1.75895
Medicaid	-0.018712 (0.021414)	-0.873818
Unadjusted R-Squared	0.792508	
Adjusted R-Squared	0.303646	
Prob (F-statistic)	0.000000	
Mean Dependent Variable	0.888559	
N	27,731	

Notes:
[1]Additional independent variables (coefficients suppressed) measuring gender, age, education, employment status, immigration status, family income, race, and chronic illnesses were included in the model.
[2]The standard errors have been calculated using White's method and are in parentheses.
*indicates significance at $\alpha = 0.1$
**indicates significance at $\alpha = 0.05$, and
***indicates significance at $\alpha = 0.01$.

Self-Reported health status

The estimated effects of possessing private insurance or Medicaid (as compared to being uninsured) on self-reported health status are presented in table 4.1. The measure of health status used here takes the value of 1 for those reporting themselves to be in "good" health or better, and the value of 0 for those in less than "good"

Table 4.2: Estimates of the Effect of Health Insurance on the Probability of Reporting an Improvement in Health Status Over the Previous 12 Months, Non-Elderly Adults, 18-64

Variable	Coefficient (std error)	t-statistic
Private Health Insurance	0.018539*** (0.007005)	2.646503
Medicaid	0.061115*** (0.016535)	3.695995
Unadjusted R-Squared	0.801582	
Adjusted R-Squared	0.095914	
Prob (F-statistic)	0.000000	
Mean Dependent Variable	0.928655	
N	22,652	

Notes:
[1]Additional independent variables (coefficients suppressed) measuring gender, age, education, employment status, immigration status, family income, race, and chronic illnesses were included in the model.
[2]The standard errors have been calculated using White's method and are in parentheses.
*indicates significance at $\alpha = 0.1$
**indicates significance at $\alpha = 0.05$, and
***indicates significance at $\alpha = 0.01$.

Table 4.3: Estimates of the Effect of Health Insurance on the Number of Bed Days, Non-Elderly Adults, 18-64

Variable	Coefficient (std error)	t-statistic
Private Health Insurance	0.21317 (0.468315)	0.455186
Medicaid	2.666910 (2.458019)	1.084984
Unadjusted R-Squared	0.153352	
Adjusted R-Squared	0.165484	
Prob (F-statistic)	0.000000	
Mean Dependent Variable	4.330843	
N	22,534	

Notes
[1]Additional independent variables (coefficients suppressed) measuring gender, age, education, employment status, immigration status, family income, race, and chronic illnesses were included in the model.
[2]The standard errors have been calculated using White's method and are in parentheses.
* indicates significance at a=0.1,
** indicates significance at a=0.05, and
*** indicates significance at a=0.01.

health. This analysis controls for individual differences in socio-economic characteristics and prior chronic illness. These results indicate that while holding private insurance improves health status, being a Medicaid beneficiary does not. Furthermore, the effect of private insurance is small: those with private insurance are only 1.2 percentage points more likely to report their health as "good" or better.

Improvement in health status

This analysis can be extended to consider the effect of insurance-holding, both private and public, on the *change* in one's self-reported health over a one-year period. The OLS estimates show that being insured seems to have a small but statistically significant impact on the likelihood of improved health status compared to one year earlier (see table 4.2). Being privately insured was associated with a 1.9 percentage point increase in the likelihood of reporting improved health status compared to the uninsured. Medicaid coverage was also associated with health status improvement, with an impact of 6.1 percentage points relative to being uninsured. Thus, with regard to improvements in health status, we reject the null hypothesis that being uninsured has no impact on changes in health status. This straightforward interpretation can be challenged, however, as we will see later in this section.

Bed-Days

Finally, the impact of being uninsured on time spent in bed due to illness can be estimated. The results of this estimation are presented in table 4.3. This reveals that there is no significant difference in bed-days between either group of insured—private or Medicaid—and the uninsured.

Table 4.4 Impact of Health Insurance on Frequency of Exercise in a Week

	Frequency of Vigorous or Moderate Exercise a Week		
Variable	**Coefficient**	**Std. Error**	**T**
Constant	3.332*	0.129	25.832
Age			
18-24	1.108*	0.124	8.913
25-34	0.652*	0.099	6.6
35-44	0.214*	0.096	2.22
55-64	-0.095	0.117	-0.814
65-	0.262	0.187	1.396
Male	0.653*	0.62	10.544
Race			
Hispanic	-0.812*	0.092	-8.871
Other	-0.768*	0.169	-4.546
Black	-0.745*	0.095	-7.842
Maritial Status			
Married	-0.403*	0.069	-5.856
Widowed	-0.454*	0.131	-3.459
Family Income as a percent of the poverty line			
Less than 100%	-0.326*	0.129	-2.53
100% to 200%	-0.373*	0.111	-3.359
200% to 300%	-0.081	0.109	-0.745
400% to 500%	0.273*	0.124	2.204
More than 500%	0.6*	0.106	5.671
Education			
Less than High School	-0.509*	0.094	-5.417
Some College	0.874*	0.089	9.799
Community College Degree	0.839*	0.117	7.199
Bachelor Degree	1.206*	0.101	11.924
Graduate or Professional Degree	1.432*	0.128	11.212
Health Insurance			
Medicaid	-0.529*	0.138	-3.826
Medicare	-0.488*	0.173	-2.818
Uninsured	-0.117	0.096	-1.227
R-squared	0.068		
F-Test	73.98		
N	24457		

*Indicates significance at the 10% significance level.

The healthy uninsured?

Viewed as a whole, the analysis of the impact of insurance status on health does not provide compelling evidence that being uninsured impairs health. Specifically, of the six insurance impacts estimated, only three were positive and significant. Those were the impacts on the change in health status (of both private insurance and Medicaid) and the impact of private insurance on health status itself. Moreover, the significant effects that were found were small in magnitude.

How might we explain these modest apparent health benefits from possessing insurance? Two possible explanations involve moral hazard on the part of the insured. First, consider choices with respect to risky behaviour. Because the insured know that their health care costs will be mostly or entirely covered by their insurer, they may engage in riskier behaviour than if they were uninsured. Thus, the fact that the health outcomes of the uninsured are so closely comparable to those of the insured, despite the uninsureds' lower consumption of health services, might be explained by their tendency to take fewer risks. In other words, the health status of the uninsured is predicted to be more highly self-produced (through healthy behaviour), whereas for the insured health status is more heavily due to consumption of medical services. Evidence from the NHIS does not indicate that the uninsured are lower-risk, however. While the uninsured are slightly more likely to engage in moderate or vigorous physical exercise than either the privately or publicly insured (table 4.4), this difference is not statistically significant. Moreover, the uninsured are also more likely to smoke or drink than are either the privately or publicly insured (table 4.5).

A second moral-hazard-based explanation of the modest impact of insurance status on health revolves around the marginal benefit of the additional health services consumed by the insured.

Table 4.5: Impact of Health Insurance on Smokers and Drinkers

Variable	Smoker			Frequent Heavy Drinker		
	Coefficient	Std. Error	T	Coefficient	Std. Error	T
Constant	0.375*	0.012	31.463	0.197*	0.1	19.703
Age						
18-24	0.065*	0.011	-6.018	0.048*	0.009	5.31
25-34	-0.024*	0.008	-3.072	0.032*	0.007	4.763
45-54	-0.008	0.008	-0.979	-0.048*	0.007	-6.88
55-64	-0.071*	0.01	-7.281	-0.101*	0.008	-12.416
65+	-0.24*	0.016	-15.202	-0.121*	0.013	-9.124
Male	0.053*	0.005	9.93	0.172*	0.004	38.208
Race						
Hispanic	-0.153*	0.008	-19.405	-0.03*	0.007	-4.546
Other	-0.078*	0.015	-5.377	-0.094*	0.012	-7.737
Black	-0.077*	0.008	-19.405	-0.083*	0.007	-12.089
Marital Status						
Separated/Divorced	0.06*	0.009	6.604	-0.017*	0.008	-2.223
Married	-0.063*	0.008	-8.355	-0.097*	0.006	-15.285
Widowed	-0.027*	0.012	-2.208	-0.03*	0.01	-2.918
Family Income as a percent of the poverty line						
Less than 100%	0.025*	0.011	2.304	-0.012	0.007	-1.319
100% to 200%	0.022*	0.01	2.318	-0.016*	0.008	-2.059
200% to 300%	0.013	0.009	1.38	-0.009	0.008	-1.167
400% to 500%	-0.018	0.011	-1.105	0.021*	0.009	2.46
More than 500%	-4.054*	0.009	-4.427	0.033*	0.008	4.32
Education						
Less than High School	0.023*	0.008	2.909	0.001	0.007	0.219
Some College	-0.048*	0.008	-6.259	0.002	0.006	0.36
Community College Degree	-0.061*	0.01	-6.053	-0.009	0.008	-1.017
Bachelor Degree	-0.165*	0.009	-18.781	-0.03*	0.007	-4.112
Graduate or Professional Degree	-0.201*	0.011	-18.157	-0.061*	0.009	-6.6
Health Insurance						
Medicaid	0.061*	0.012	5.157	-0.036*	0.01	-3.701
Medicare	0.019	0.014	1.304	-0.027*	0.012	-2.264
Uninsured	0.072*	0.008	8.674	0.012*	0.007	1.763
R-squared	0.093			0.118		
F-Test	102.306			133.944		
N	25040			25040		

*Signifies that the coefficient is significant at the 10% level.

Because the non-indigent uninsured must cover the full cost (or close to it) of their care, while the insured have most of their costs covered, the marginal benefit of the additional care consumed by the insured may well be low. This prediction appears to be supported in our data. For those services that are more discretionary (more price-elastic), such as general doctors' visits and flu shots, there is a large gap in usage between the insured and the uninsured. However, this gap diminishes as medical services become more and more medically necessary, and thus more price-inelastic. Thus, the gap is smaller for visits to medical specialists, and virtually non-existent for ER usage. If much of the difference in medical services consumed by the insured is accounted for by services with low marginal health benefits, then we would not expect to see much difference in health outcomes between insured and uninsured.

5. Conclusion

The intent of this study was to question conventional wisdom surrounding the issue of the medically uninsured in America. Specifically, its purpose was to answer three questions: How many Americans are involuntarily uninsured? What impact does being uninsured have on one's use of health care services? And finally, what is the impact of being uninsured on health outcomes? This paper was motivated by a desire to quantify the magnitude of the US uninsured problem, and therefore to estimate the extent of the vaunted benefits from Canada's universal health care program.

Regarding the number of US uninsured, while the standard estimate is that 43 million Americans were uninsured in 1997, adjustment of this figure for overcounting reveals instead that 38 million Americans lacked health insurance. Moreover, of these, only between 23 and 25 million Americans can properly be regarded as "involuntarily" uninsured, in that they cannot afford health insurance, and they do not have access to publicly provided health care. This is important, as it means that the other 13 to 15 million Americans properly reported as uninsured are uninsured by choice. Excluding the "voluntarily" uninsured from a count of the insured makes it easier—and less costly—to address America's health insurance problems.

Moreover, access to medical services is not substantially impaired for the uninsured. While the uninsured are less likely to consume some types of medical services, such as flu shots or doctors' services, the evidence does not support the contention that they are more likely to seek treatment at the ER than the insured.

Finally, to the extent that the uninsured use some medical services less frequently, it does not seem to impair their health substantially. Indeed, the evidence is mixed regarding the impact of being uninsured on health outcomes. For some health outcomes, being uninsured has a negative effect, for others there was no significant effect. Moreover, even where being uninsured has a statistically significant impact on health status, the magnitude of the impact is small. In short, there is no compelling evidence to conclude that being uninsured has a substantial negative impact on health outcomes.

The implications of these results seem quite clear. The existence of the medically uninsured in the US is not necessarily the health care disaster that many Canadians believe it to be. Given the fact

that a large number of the uninsured have access to free public insurance or can afford private health insurance, and that there seems to be no systematic differences in health outcomes between the insured and the uninsured, we can reasonably conclude that a large extent of the uninsured "crisis" in America may simply be Americans exercising their right to freedom of choice. These people may be those with higher personal health levels, may have lower preferences for health, or possibly prefer consumer goods to health insurance spending. People who choose not to buy, or sign up for, health insurance despite having the opportunity and ability to do so, should not be considered a crisis, especially when this choice does not seem to result in significantly different health outcomes for them.

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About the Authors

Carl Irvine completed his B.A. (Honours) in Economics at Queen's University, and received an M.A. in Economics at the University of Toronto. He is presently a doctoral candidate in Economics at the University of Toronto where his academic work focuses on public policy issues such as taxation and health care. He has previously written on a number of public policy topics, including market-based health reforms in Europe, Medicaid reforms in the US, and the economics of cigarette consumption.

Martin Zelder is a senior associate at Analysis Group Economics, a Boston-based consulting firm. Previously, he was Director of Health Policy Research at The Fraser Institute. He has held faculty positions at the College of William and Mary, and the Australian National University, as well as visiting positions at Northwestern University School of Law, and Michigan State University. He received his Ph.D. from the University of Chicago, where he completed his dissertation under Nobel Laureate Gary S. Becker.

Nadeem Esmail joined The Fraser Institute as a Health Policy Analyst in September 2001. He completed his B.A. (Honours) in Economics at the University of Calgary and received an M.A. in Economics from the University of British Columbia. Mr. Esmail is the lead researcher for The Fraser Institute's *Waiting Your Turn* annual survey of waiting lists in Canada and has written on a number of health care topics including health technology, insurance, and labour wages.