Title

Patients' preferences over care settings for minor illnesses and injuries.

Journal

Health services research, 54(4)

ISSN

0017-9124

Authors

Mukamel, Dana B

Ladd, Heather

Amin, Alpesh

et al.

Publication Date

2019-08-01

DOI

10.1111/1475-6773.13154

Peer reviewed

DOI: 10.1111/1475-6773.13154

RESEARCH ARTICLE

HSR Health Services Research

Patients' preferences over care settings for minor illnesses and injuries

Dana B. Mukamel PhD[1] | Heather Ladd MS[1] | Alpesh Amin MD[2,3] | Dara H. Sorkin PhD[1]

[1]Division of General Internal Medicine, Department of Medicine, University of California, Irvine, Irvine, California

[2]Department of Medicine, University of California, Irvine, Irvine, California

[3]DOM Admin, Orange, California

Correspondence
Dana B. Mukamel, PhD, Division of General Internal Medicine, Department of Medicine, University of California, Irvine, 100 Theory, Suite 120, Irvine, CA 92617-3056.
Email: dmukamel@uci.edu

Funding information
Robert Wood Johnson Foundation, Grant/Award Number: 73053

Abstract

Objectives: To identify consumers' preferences over care settings, such as physicians' offices, emergency rooms (ERs), urgent care centers, retail clinics, and virtual physicians on smartphones, for minor illnesses.

Data Sources: A survey conducted between 9/27/16 and 12/7/16 emailed to all University of California, Irvine employees.

Study Design: Participants were presented with 10 clinical scenarios and asked to choose the setting in which they wanted to receive care. We estimated multinomial conditional logit regression models, conditioning the choice on out-of-pocket costs, wait time, travel time, and chooser characteristics.

Data Collection: 5451 out of 21 037 employees responded.

Principal Findings: Out-of-pocket costs and wait time had minimal impact on patient's preference for site of care. Choices were driven primarily by the clinical scenario and patient characteristics. For chronic conditions and children's well-visits, the doctor's office was the preferred choice by a strong majority, but for most acute conditions, either the ER (for high severity) or urgent care clinics (for lower severity) were preferred to the office setting, particularly among younger patients and those with less education.

Conclusions: Patients have several alternatives to traditional physicians' offices and ERs. The low impact of out-of-pocket costs suggests that insurers interested in encouraging increased utilization of alternatives would need to consider substantial changes to benefit structure.

KEYWORDS
ambulatory care settings, choice models, retail clinics, urgent care, virtual physicians

1 | INTRODUCTION

Recent decades have seen several innovations in the way acute, and primary care for minor ailments and injuries is provided. Physician offices and emergency rooms (ERs) are being complemented by new venues. These changes are spurred on by economic trends creating demand for care that is more financially, geographically, and time accessible on the one hand and technological innovations enabling supply to meet this new demand on the other hand. These new settings include "brick and mortar" options: urgent care centers that are clinics or physicians' offices with more convenient hours (evenings and weekends), accepting walk-ins and patients who do not have a long-standing relationship with the provider, and retail clinics that locate themselves in geographically accessible locations (eg, retail malls, large box stores, supermarkets, or pharmacies) and are more likely to be staffed by nurse practitioners than physicians.[1] They also

include virtual "offices," offering either a visit with a nurse over the phone (nurse advice lines), or more recently, with a physician over the Internet (such as Teladoc).[2] There are also some new consumer-facing apps reviving the old practice of offering physician home visits.[3,4]

Some of these alternative care settings are more established than others. The number of urgent care centers is estimated at 7400-8100.[5,6] Retail clinics are estimated at around 2000[7] with about 6 million physician visits.[1] While nurse advice lines have been common for many years, virtual physician visits via computers, tablets, or smartphones are a new and fast-growing modality.[8] Teladoc,[2] the largest and fastest growing national company offering virtual physician visits, reported that in 2017 over 23 million members made close to 1.5 million virtual visits. The most recent entrant is home care, pioneered by Heal, which offers a family doctor or pediatrician within 20-60 minutes of placing the order on their app and paying the $99 price, any time between 8 AM and 8 PM. Heal started in Los Angeles, expanded to San Francisco, and in 2015 was set to move into 15 additional major cities.[9]

Most studies to date, comparing the traditional physician office and ER care to the newer settings, focused on patient characteristics associated with specific setting types[8,10-14] and the clinical appropriateness of the setting for the conditions treated.[15-17] Some studies compared utilization, costs to payers,[18-20] and the quality of the care these settings offer.[21-24] These studies offer a mixed picture, suggesting that some urgent care centers, retail clinics, and virtual physician visits may provide a viable alternative to the traditional care settings for some segments of the population, some part of the time, depending on the diagnosis, that they may or may not lead to cost savings, and that quality of care may often not be comparable to the traditional physician office. Despite this lack of clear cut evidence about the effectiveness of these new alternatives, insurers have been changing coverage to entice beneficiaries toward increased use of these settings.[25,26]

We found only two studies conducted in the United States that examined consumers'/patients' perceptions and preferences over these new settings. Wang et al[27] interviewed 61 patients at six retail clinics, finding that location, lower prices, and time constraints were the major advantages leading patients to choose retail clinics. Ahmed and Fincham[28] conducted a discrete choice experiment with about 500 Georgia residents and found that both time and cost savings make retail clinics attractive to patients.

Our objective in the study presented here was to expand the evidence base regarding consumers' preferences and the factors that influence their choice between care settings, focusing in particular on three factors that offer insurers and providers policy levers for influencing referral patterns: out-of-pocket costs (OPC), travel time, and wait time. We report on a large preference elicitation experiment in which over 5000 individuals were presented with scenarios depicting a variety of clinical situations occurring at different times of day and days of the week. OPC, travel time, and wait time were manipulated experimentally. Subjects were asked to choose between eight care settings, mimicking real-life options. Controlling all these parameters allowed us to explore their effect on patient preferences and the potential substitution between care settings.

2 | METHODS

2.1 | Population

The population included all 21 037 employees and retirees of the University of California, Irvine campus (UCI). UCI was chosen for this study because it can be viewed as a "mini" city that employs individuals in all occupations, including, but not limited to, medical services (the hospital and clinics and their associated services, ranging from clinical such as laboratories, to cafeteria, and hospitality), teachers and students (only student employees were included), police, housing, transportation, landscaping and janitorial, electrical and building maintenance, factory workers, clerical workers, retail shops, and more. Thus, the UCI population includes individuals from all socioeconomic strata.

All employees (full, part time, student employees, and retirees) received invitations to participate in the survey. A total of 5451 responded for a response rate of 26 percent. A total of 607 (11 percent) failed to complete at least one scenario or were missing data for one or more explanatory variables and were excluded from the analyses. Of the remaining 4844 (89 percent), 29 completed 5 to 9 scenarios and 4815 completed all 10 scenarios.

2.2 | Survey development

The survey included several sections: (a) sociodemographic and economic questions; (b) questions about health status; and (c) a preference elicitation module—12 scenarios, each presenting a different clinical situation and asking the respondent to indicate which of eight care settings he or she would choose in each scenario. (Note that each respondent received only 10 scenarios. Two scenarios involved the care of children and were only given to respondents who indicated they currently had children under the age of 18 living in their home. We, therefore, had a total of 12 scenarios.)

We constructed the scenarios to have varying degrees of care-seeking discretion. Discretion is related to both the severity of the medical condition and the time urgency implied in the scenario. Consider the scenarios listed in Table 1. The least discretionary scenario is the chest pain scenario—the medical condition is the most severe from all those presented. It is also the most time urgent, and the time urgency is implied by the medical condition. On the other hand, the child physical scenario required for participation in sports, which has to be done within a couple of days, is highly discretionary because the clinical condition is not urgent at all. The only urgency is due to the time constraint.

The care settings included ER, physician's office, urgent care, retail clinic, virtual physician, physician's home visit, nurse advice line, and "wait and see." Each scenario was presented separately with pictures

TABLE 1 List of clinical scenarios presented to respondents

Scenario name	Clinical severity	Time of day/ week	Time urgency	Degree of discretion
Chronic condition: Assume that you have been diagnosed with a chronic health condition like diabetes or high blood pressure, which requires that you have regular tests or examinations.	Low	Any time	Low	High
Child needs physical: Your child needs a physical before he or she can participate in sports. You completely forgot about it until today—Tuesday. Now it has to be done by the end of this week.	Low	Midweek	Moderate	High/Moderate
Immunization: You would like to get an immunization, for example, a flu shot or shingles.	Low	Any time	Low	High/Moderate
Allergies: It is springtime and your allergies are acting up really badly. You cannot take it anymore. It is now Wednesday early afternoon and you have decided to seek help.	Low	Midweek, early afternoon	Moderate	High/Moderate
Bad cold: It is 10 AM on a Sunday morning. Tomorrow you have an important trip out of town and you have to leave early. You are getting a really bad cold, with cough, runny nose, and headache.	Low	Weekend, trip out of town next day	Moderate	High/Moderate
Twisted ankle: You twisted your ankle on the weekend and fell down. Monday morning you get up with a swollen foot that hurts very much. You wonder if you might have broken your ankle, but are not sure.	Moderate	Monday morning	Moderate	Moderate
Red eye: You wake up in the morning with a red and itchy eye. You don't think it is allergies. It is a Thursday morning and you need to get to work.	Moderate	Morning—need to get to work.	Moderate	Moderate
Self-diarrhea: It is Monday morning. You had a really bad night with stomach cramps and severe diarrhea. This morning is not any better. You need to be at work in a couple of hours.	Moderate	Morning—need to get to work	Low	Moderate
Deep cut: On Tuesday, you were doing some work around the house with a sharp knife. You were working all morning and getting tired, became less careful and ended up with a deep cut in your arm. You think it might require stitches but are not sure.	High	Mid morning	Moderate	Low
Burn: It is Tuesday at 6 PM. You are cooking dinner. The grease from the pan splatters on you and burns your hand and arm. They both are very red and are starting to have blisters. They hurt a lot.	High	Early evening	High	Low
Child diarrhea: It is Monday morning. Your child had a really bad night with stomach cramps and severe diarrhea. This morning is not any better.	High	Morning	Moderate	Low
Chest pain: It is the middle of the day, Thursday. You are at work and suddenly your chest hurts terribly. You feel like you cannot breath and every movement is painful.	High	Middle of the day	High	Low

of the eight care settings, all at the same time (see Appendix S1 for an example). Each scenario presentation also included information about the OPC, wait time, and travel time the respondent should associate with the setting. The range of values for these parameters (see Appendix S2) was based on a survey of providers in the area. These values (OPC, wait time, and travel time by care setting) were randomized across respondents, but kept constant across the scenarios for the same respondent. This allowed us to experimentally vary the OPC and times across respondents while maintaining cognitive coherence within each respondent's choice set as he or she moved from one scenario to the next. Respondents were instructed to ignore the actual insurance that they carry and to consider only the hypothetical information provided in the scenarios. The preference elicitation module was preceded by an educational module defining and explaining each care setting.

2.3 | Survey administration

Survey invitations were sent to all employees using their UCI email addresses. The invitation email came from the Vice Chancellor for Health Affairs, explaining the purpose of the study, its importance, and promising confidentiality. Respondents were eligible to participate in a sweepstake with prizes ranging from $100 to $575. We also had the deans of the schools and directors of non-academic departments send follow-up emails to their employees to encourage them to participate. In addition, we sent up to 10 email reminders. Employees without regular access to computers (eg, janitorial staff) were invited to attend sessions in which they could access the survey on iPads we provided. The survey was available in Spanish as well. The survey was open between September 27, 2016, and December 7, 2016.

2.4 | Analyses

2.4.1 | Weighting

To account for potential response bias, all analyses were weighted using the distribution of respondents and non-respondents among UCI employees in terms of age by gender and race/ethnicity.

2.4.2 | Unadjusted probabilities

We first present the unadjusted (except for applying UCI weights) probabilities at which each care setting was chosen by scenario.

2.4.3 | Adjusted probabilities

We estimated 12 separate conditional logit models, one for each scenario, where the probability, p_{ij}, that respondent *i* will choose setting *j* (*j* = 1…8) includes both care settings and chooser characteristics and is given by

$$p_{ij} = \frac{\exp\left(\beta_1 \mathrm{OPC}_{ij} + \beta_2 \mathrm{Wait}_{ij} + \beta_3 \mathrm{Travel}_{ij} + \gamma_j Z_i\right)}{\sum_{l=1}^{8} \exp\left(\beta_1 \mathrm{OPC}_{il} + \beta_2 \mathrm{Wait}_{il} + \beta_3 \mathrm{Travel}_{il} + \gamma_j Z_i\right)}$$

Z_i is a vector of respondent-specific sociodemographic characteristics including age, sex, race/ethnicity, educational attainment, health status, an indicator that English is not a spoken language at home, and variables capturing prior experience with care settings: (a) knowledge about them, (b) having a regular doctor, and (c) number of visits to any of the care settings in the previous 12 months. In the two scenarios presented to respondents with children, we also included marital status and percent of the federal poverty level. These were not significant in the other models.

2.4.4 | The marginal effect of out-of-pocket cost, wait time, and travel time

We calculated the marginal own effects of OPC, wait time, and travel time on choice of care setting for a 20 percent increase in their values. Using OPC as an example, the marginal effect on the probability of person *i* choosing setting *j* if the OPC of setting *j* is increased by $\$\Delta\mathrm{OPC}_{ij}$ (the own-OPC effect) is given by

$$\frac{\Delta p_{i,j}}{\Delta \mathrm{OPC}_{ij}} = \Delta \mathrm{OPC}_{ij} \times \beta_1 \times p_{i,j} \times (1 - p_{i,j})$$

where β_1 is the coefficient for OPC. Similar equations describe the marginal effects for wait time and travel time, replacing β_1 with β_2 or β_3, respectively.

We also calculated the marginal cross-effects, for example, the effect of an increase in OPC of setting i on the probability of seeking care in setting *j#i*. Due to space limitations, we do not present these, except to note that these marginal cross-effects were positive, and typically an order of magnitude smaller than the marginal own effects.

2.4.5 | Ratio of price and time elasticities

To determine the average respondent's sensitivity to increases in own OPC and wait time, we calculated for each scenario and each care setting separately the percent change in the predicted probability of choosing the care setting (a) when the own OPC for the care setting is increased by 1 percent relative to the average; and (b) when the own wait time for the care setting is increased relative to the average by 1 percent, that is, elasticities. To assess whether individuals are more sensitive to price or time cost, we calculated the ratio of the OPC to wait-time elasticities for all scenarios and care settings. The elasticity ratios we present are averaged over all care settings within each scenario, (excluding those care settings with average predicted probabilities of being chosen of less than 10 percent which had extreme elasticities). A ratio of 1 implies that individuals are equally sensitive to both OPC and wait time. As the ratio increases above 1, it indicates that individuals are more sensitive to an increase in OPC than to an increase in wait time.

3 | RESULTS

Table 2 presents statistics describing the respondents and compares them to the UCI population. Table 1 describes the scenarios sorted by their severity, time sensitivity, and hence level of discretion. The first, chronic condition is the most discretionary, both in terms of lack of clinical severity and in terms of time constraint. It is followed by child physical, immunizations, allergies, and bad cold on the weekend, which also have low clinical severity, but impart a somewhat higher degree of urgency, and can still be viewed as mostly discretionary. The next three scenarios, twisted ankle, red eye, and adult severe diarrhea, are more severe conditions, implying a higher level of acuity. These are followed by deep cut which might require stitches, a burned hand, and child diarrhea. The final scenario is chest pain, which is the most severe and most immediate. This scenario was included for falsification purposes, with the expectation that the majority of respondents would recognize that this situation is the most serious and merits ER care, an assumption confirmed by the finding (shown in Table 3) that 68.9 percent chose ER followed by 16.3 percent who chose urgent care.

Table 3 lists the scenarios in the same order as Table 1 from most discretionary to least discretionary. The second column shows the average ratio of OPC to wait-time elasticities for each scenario, revealing an interesting pattern. (The elasticities are provided in Appendix S3.) There are four distinct scenario groups based on the distances in the elasticity ratios between and across these groups. The first two groups, starting from the top of the table, include monitoring of chronic conditions, which is the most discretionary, least severe, and most time flexible, with a ratio of 23.8 followed by child physical within a few days, immunizations, allergies, and bad cold on the weekend with an average elasticity ratio of 5.16 (4.29-5.89). This is followed by the moderately severe scenarios of twisted ankle,

TABLE 2 Descriptive statistics

	Respondents		UCI population (N = 19 449)[a]	
	N	%	N	%
Gender (N = 5201)				
Female	3439	66.1	11 378	58.5
Male	1743	33.5	8071	41.5
Other	19	0.4	NA	NA
Age (N = 5202)				
18-24	828	15.9	4880	25.1
25-39	1906	36.6	6699	34.4
40-64	2236	43.0	7197	37.0
65+	232	4.5	673	3.5
Race/Ethnicity (N = 4884)				
White	2030	41.6	7189	37.0
Asian/Pacific Islander	1472	30.1	6064	31.2
Hispanic	976	20.0	4343	22.3
African American or Black	108	2.2	622	3.2
Other	298	6.1	1231	6.3
Education (N = 5200)[b]				
Graduate/Professional degree (MBA, MS, MD, PhD, etc.)	1934	37.2		
College degree (BA, BS)	1660	31.9		
Associate's degree/Post-high school training/Some college but no degree	1249	24.0		
High school degree/High school equivalency/Did not complete high school	357	6.9		
Percent of federal poverty level (N = 4363)[b]				
400%+	2554	58.5		
300%-399%	718	16.5		
150%-299%	632	14.5		
0%-149%	459	10.5		
Speak English at home (N = 4958)[b]				
Yes	4484	90.4		
No	474	9.6		
Marital status (N = 5197)[b]				
Married or live with partner	3096	59.6		
Divorced, separated, or widowed	509	9.8		
Never married	1592	30.6		
Rating of general health (N = 5199)[b]				
Excellent or very good	3465	66.6		
Good	1457	28.0		
Fair or Poor	277	5.3		
Has a personal doctor (N = 5121)[b]	4435	86.6		
Aware of provider type (N = 5200)[b]				
Urgent care	5032	96.8		
Retail clinics or minute clinics	2306	44.4		
Virtual physician visit or Tel-A-Doc or visit with physician by smartphone or video chat	3295	63.4		
Nurse advice line	3695	71.1		
Physician visit at your home	2843	54.7		

(Continues)

TABLE 2 (Continued)

	Respondents		UCI population (N = 19 449)[a]	
	N	%	N	%
Received medical care from provider type in the past 12 mo[b]				
Emergency room (N = 5084)	580	11.4		
Physician office (N = 5107)	4277	83.8		
Urgent care (N = 5090)	1336	26.3		
Retail clinic (N = 5083)	508	10.0		
Virtual physician visit (N = 5075)	155	3.1		
Physician Home Visit (N = 5075)	11	0.2		
Called a nurse advice line in the past 12 mo (N = 5082)[b]	686	13.5		

Note. Comparisons between the analysis sample and the UCI population are all statistically significant at the 0.001 level except for the Asian and other categories of race which are 0.097 and 0.565, respectively.
The survey included retirees as well. We also note that ideally, for comparison to the respondent sample, this Table should have included data for the non-respondents and not all UCI employees as shown in the last two right columns, but we only had data for all UCI employees available to us.
Abbreviation: UCI, University of California, Irvine.
[a]This number is lower than the sample receiving the survey because it includes only current employees.
[b]Data are not available for the UCI population.

red eye, and adult severe diarrhea with an average ratio of 2.49 (1.90-2.93). The fourth group, with the most severe conditions, deep cut which might require stitches, a burned hand, child diarrhea, and chest pain had an average elasticity ratio of 1.31 (range 0.80-1.69).

Table 3 also presents the UCI weighted, unadjusted probabilities of choosing each care setting under each scenario. All care settings were chosen by at least a few respondents in all scenarios, with the exception of child physical. In three scenarios, chronic condition, child physical, and chest pain, the majority of repondents had a clear preference for one care setting, with 50 percent or more choosing physician office for the first two scenarios, and ER for chest pain. A bad cold was dominated by wait and see with 49 percent. The other non–time-sensitive scenarios were also dominated by physician offices, with immunization at 45.4 percent and allergies at 36.3 percent. Unlike chronic conditions, there was more variation in this group: For immunizations, respondents also chose retail clinics at 39.8 percent, and for allergies, respondent chose all options but ER and physician at home, and all at about the same likelihood.

Twisted ankle, red eyes, and adult (self) diarrhea seem to be an intermediate group in terms of care-setting choices. Most respondents tended to choose physician's office or urgent care for the twisted ankle scenario (at 29.2 percent and 42 percent), and while these were popular choices for red eye (18.4 percent and 16.2 percent) and diarrhea (13.5 percent and 20.0 percent) as well, these scenarios were dominated by "wait and see" at (25.2 percent and 29.9 percent, respectively).

Lastly, in the most clinically severe and time-sensitive scenarios respondents chose primarily the ER (chest pain at 68.9 percent and deep cut at 34.1 percent as top choices) or urgent care (burn at 28.2 percent, child diarrhea at 30.0 percent, and deep cut at 41.9 percent as top choices). All other settings were much less likely to be chosen, with the exception of child diarrhea, where physician's office was chosen by a similar percent of 29.5 percent of respondents.

It is also interesting to note the different choices made by parents when presented with the child diarrhea versus the adult/self-diarrhea scenario. Unlike the adults choosing for themselves to mostly "wait and see," the majority of parents chose to either go to the physician office or an urgent care center when the child had diarrhea. They were much less likely to "wait and see" at only 5.8 percent compared with 29.9 percent of adults choosing this option for themselves.

Figures 1 and 2 report the UCI weighted, adjusted for individual covariates, marginal own effects of OPC, and wait time, respectively, for all scenarios and all care settings. These were significant at the 0.05 level in almost all cases. The marginal own effects for travel time were not significant at the 0.1 level or below for any scenario and any care setting, and we do not present them. Each chart shows the probabilities of choosing each care setting for one scenario for the average respondent. The total height of each bar is the probability of the average respondent choosing the setting given average OPC, wait time, and travel time. The top part of each bar, shown in a different color, is the marginal effect. In other words, it is the decrease in probability due to increase in OPC or wait time for the specific care setting. For example, in Figure 1, the chart for the allergies scenario shows that the average respondent was most likely to visit their physician (40.4 percent), with urgent care, retail clinics, virtual physicians, nurse advice, and wait and see all having about equal probabilities at around 10 percent each. A 20 percent increase in the OPC of the physician visit decreased the likelihood of the average respondent choosing this setting by 3.6 percentage points. A 20 percent increase in OPC decreased urgent care visits by 1.5 percentage points, retail clinics by 1.3, and virtual physicians and nurse advice lines by 0.8 percentage points each.

The last bar in each chart, shown in a different color, depicts the probability of choosing the "wait and see" option. Because this option is not associated with either OPC or wait time, the marginal effect for this option is always zero.

TABLE 3 Elasticity ratios and University of California, Irvine-weighted probabilities of choosing a care setting by scenario[a]

Scenario	Ratio of OPC to wait-time elasticities[b]	Emergency room (%)	Physician's office (%)	Urgent care (%)	Retail clinic (%)	Virtual physician (%)	Physician home visit (%)	Nurse advice line (%)	Self-care/wait and see (%)
Chronic condition[c] (N = 4840)	23.8	*0.6*	**80.0**	*3.1*	*5.6*	*3.0*	*5.8*	*0.8*	*1.1*
Child needs physical[c] (N = 1415)	5.89	*NA*	**67.2**	*8.3*	10.4	*7.0*	*5.4*	*1.7*	*NA*
Immunization (N = 4838)	5.43	*0.7*	**45.4**	*6.5*	**39.8**	*0.6*	*3.8*	*1.9*	*1.4*
Allergies (N = 3605)	5.01	*1.7*	**36.3**	10.7	13.4	11.3	*2.5*	11.6	12.5
Bad cold (N = 4842)	4.29	*1.3*	*6.6*	13.0	*7.3*	*7.5*	*2.5*	12.7	**49.0**
Twisted ankle (N = 4844)	2.93	12.7	**29.2**	**42.0**	*1.5*	*2.1*	*4.6*	*3.3*	*4.6*
Red eye (N = 4841)	2.64	*1.3*	18.4	16.2	*6.5*	13.9	*1.7*	16.8	**25.2**
Self-diarrhea (N = 3603)	1.90	*4.0*	13.5	**20.0**	*3.9*	*9.3*	*3.9*	15.6	**29.9**
Deep cut (N = 4843)	1.69	**34.1**	*8.5*	**41.9**	*1.7*	*3.6*	*2.0*	*4.1*	*4.1*
Burn (N = 4843)	1.46	14.6	*5.0*	**28.2**	*3.8*	*5.7*	*2.5*	13.1	**27.2**
Child diarrhea (N = 1423)	1.29	*7.9*	**29.5**	**30.0**	*1.9*	*7.3*	*4.0*	13.5	*5.8*
Chest pain[c] (N = 4843)	0.80	**68.9**	*5.8*	16.3	*0.7*	*2.4*	*1.1*	*2.5*	*2.3*

Abbreviation: OPC, out-of-pocket cost.

[a]Each cell in columns 3-10 shows the percent of respondent choosing the care setting for that scenario:

- High probabilities (greater than 20%) are bolded.
- Moderate probabilities (10%-20%) are underlined.
- Low probabilities (less than 10%) are italicized.

[b]Predicted ratios for the average respondent based on the estimated model adjusting for prices, wait time, travel time, and individual characteristics, University of California, Irvine weighted.

[c]The majority of repondents (over 50%) have a preference for one specific care setting in this scenario.

FIGURE 1 Adjusted probability that the average repondent chose a care setting and the marginal effect of a 20% increase in out-of-pocket cost (All significant at $P < 0.05$ except for * = Not Significant) [Color figure can be viewed at wileyonlinelibrary.com]

The own effect of increasing OPC for all scenarios was significant at the 0.05 level, except for ER for chronic condition. It ranged from less than 1 to several percentage points. It tended to be larger for those settings that had higher probabilities of being chosen, and ranged from about five to ten percent of the base probability (ie, the probability of the average patient with average prices). Comparing across scenarios, the marginal effects of OPC for the highest probability settings are the largest for immunizations, at 13.2 percent in physician offices of

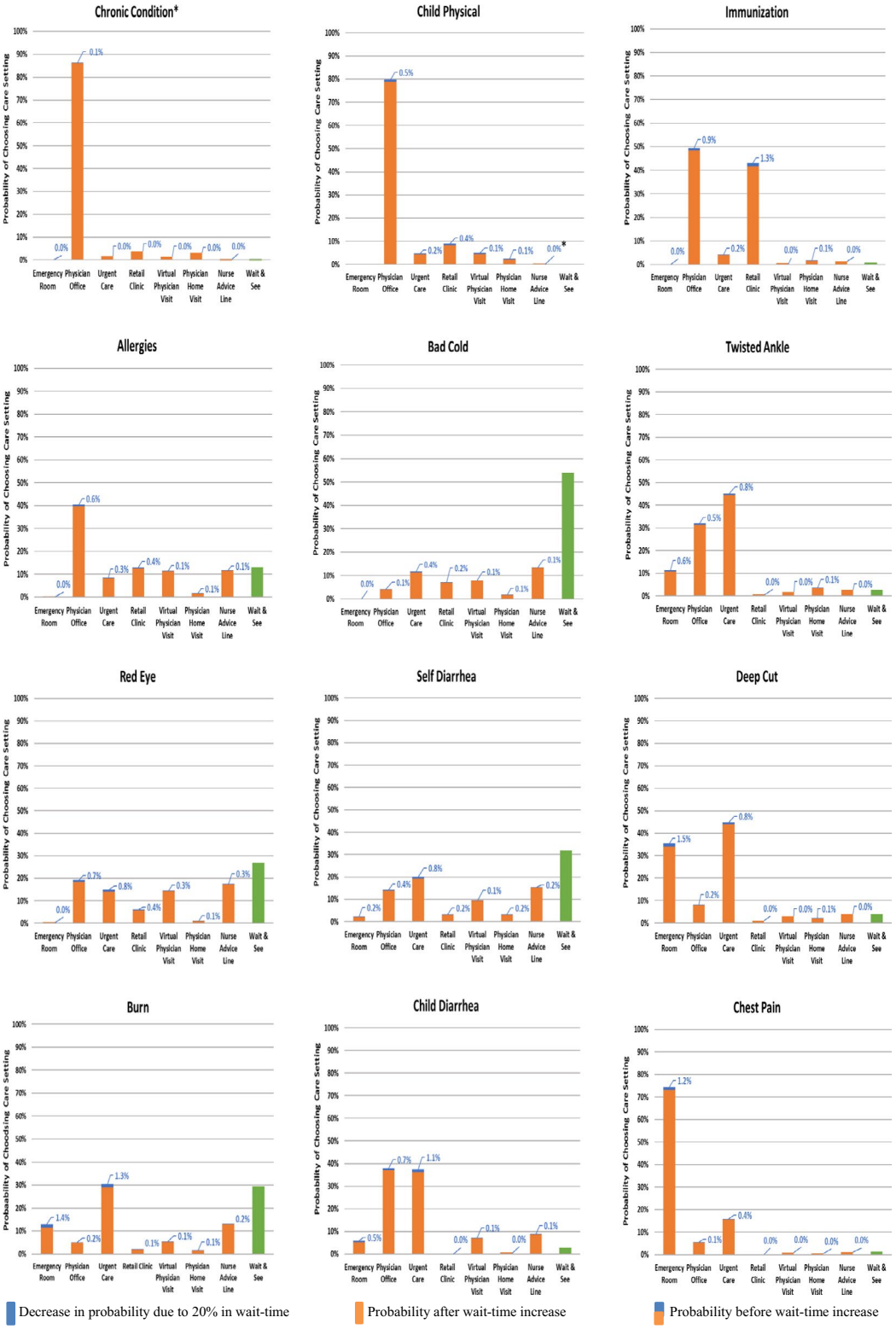

FIGURE 2 Adjusted probability that the average respondent chose a care setting and the marginal effect of a 20% increase in wait time (All significant at $P < 0.05$ except for * = Not Significant) [Color figure can be viewed at wileyonlinelibrary.com]

the average probability and 11.1 percent in retail clinics, followed by allergies (at 8.9 percent) and child physical (at 3.8 percent).

The effect of increasing wait times, shown in Figure 2, is smaller compared with the effect of OPC. It is mostly below 1 percentage point. It is statistically significant at the 0.05 level for all scenarios except for all providers for chronic care and nurse advice line for child physical. The largest effect is for the deep cut scenario with 1.5 percentage point decline in probability of choosing the ER, followed

by burn with a 1.4 decrease in probability for ER and 1.3 for urgent care. Immunizations in retail clinics had a similar decrease of 1.3.

Due to lack of space, we do not present the marginal effects of individual patient characteristics, but provide a summary of the statistically significant and dominant trends. Respondents were more likely to choose a provider they had experience with in the past 12 months across all scenarios, especially in the case of ER and urgent care. Experience with a physician home visit was the exception. Those respondents were more likely to choose a physician office and less likely to choose a home visit. Respondents who were aware of virtual physician were more likely to choose that provider. Young individuals, 18-24, were more likely than older adults to choose retail clinics, and the oldest individuals were more likely to choose the physician's office in general. Men were more likely than women to choose the ER across all scenarios. When compared to Whites, non-Hispanic respondents, Hispanic, and African Americans were less likely to choose wait and see. Asians were more likely to choose the ER when compared to Whites and more likely to use the nurse advice line among the least time sensitive of scenarios. Education affected probabilities as expected, with those at the lowest level of education more likely to choose ER or urgent care across all scenarios. As education levels increased, marginal probabilities shifted, with individuals choosing urgent care as well, and as education increased further individuals were no longer more likely to choose the ER. They were only more likely to choose urgent care. Those who did not speak English at home were more likely to choose ER or urgent care compared with English speakers. For those scenarios on the lower end of time sensitivity, respondents with a personal doctor were less likely to call a nurse advice line. Health status of patients did not exhibit any trends in choice across scenarios.

4 | DISCUSSION

Individuals seeking medical care for minor injuries and ailments have more care settings to choose from than they did a decade or so ago. Each setting has different characteristics, including services covered, qualifications and quality of care, convenience of hours and geography, insurance coverage, and others. These settings may also have made different inroads into consumers' consciousness: People may or may not be aware of their existence, and even if they are, they may not be fully knowledgeable about them and what they offer.

The study we present was designed to understand patients' preferences over these care settings. To this end, we presented a large and diverse population with scenarios depicting various clinical conditions, varying in their clinical acuity, times of day, OPC, wait time, and travel time. We hypothesized that the latter three factors would influence the choice of care settings and would influence them differently depending on the clinical acuity and time urgency of the scenario.

Our findings show that OPC and wait time indeed significantly affect care-setting choice in almost all cases, but travel time never does. This might be due to the fact that the variation in travel time we presented, ranging from 10 to 20 to 30 minutes, was not sufficiently high to elicit a statistically significant response given our scenarios. Perhaps a higher time differential, which may not be realistic in urban environments but could be realistic in rural areas, would lead to significantly different choices.

The effects of OPC, though highly significant likely due to the large sample size, exhibited small effect sizes in terms of percentage point change in the probability of choosing between care setting, never more than single digit percentage points, and often one or even less than one percentage point. Furthermore, the OPC elasticities are mostly around −0.1 or less, indicating that peoples' choice between care settings is not very sensitive to changes in relative prices in the ranges presented. Such small price elasticities are consistent with previous studies, with estimates ranging from −0.04 for ER[29] to −0.1 to −0.2 for physician office visits.[30,31] We note, however, that even though one of the choices respondents had was "wait and see," the price elasticities we measured do not reflect only a choice between "care" and "no care," but also reflect choice between different care settings, and, therefore, would be expected to be higher (in absolute value) than elasticities found in prior studies, which primarily reflected a choice between "care" and "no care."

This finding of small effect size and low elasticities with respect to care-setting choice is consistent with findings of a 2015 Kaiser Family Foundation tracking poll, which reported that only 6 percent of people saw information about physicians' or hospitals' prices and only 2 percent-3 percent acted on it.[32] A more recent national survey by Mehrotra et al[33] found similarly that only 13 percent sought out information about their OPC liability before choosing a provider. Mehrotra et al identified two main reasons for the low percent of respondents seeking information about OPC: difficulty in obtaining the information and reluctance to disrupt existing relationship with their provider. In our study, however, these do not seem to be appropriate explanations. Each scenario we presented included explicit information about the OPC for each care setting (see Appendix S2). The information was available in an easy to "compare across settings" fashion, together with the information about wait time and travel time for each setting, as well as the description of the clinical situation. As to the issue of existing relationship with a provider, we performed a sensitivity analysis in which we excluded variables capturing prior experience of the respondent with the care setting in the last 12 months, awareness of the care setting, and having a regular doctor. While these had a direct impact on the probability of seeking care in specific scenarios, they did not affect the OPC or wait-time elasticities.

This suggests that on average, care-setting choices are not very sensitive to their relative prices, and at least for the population we surveyed and the range of parameters we deemed reasonable, we should not expect major and drastic changes in the market in the near term. With time, as patients' awareness, trust, and comfort with some of the newer care setting increase, we might observe an increase in these elasticities. Our findings suggest an evolution rather than a revolution in referral patterns. If insurers wish to incentivize fast and large changes in referrals, it seems that they may need to implement major restructuring in benefit design.

The low price sensitivity also raises questions about the likely effectiveness of cost transparency policies that states and insurers have been adopting with the expectation that price information will influence patients' choices.[34] While the observed lack of response to OPC has been explained in studies as due to lack of information when patients make decisions,[35] our experiment, which shows very low elasticities even under full price information, suggests that informing patients will not suffice. More direct incentives, related to network design, might be needed.[34]

The effect size and elasticities we find for wait times are even smaller than for OPC, suggesting that individuals are more responsive to changes in OPC than to time. However (see Table 3), this relationship seems to be modified by the time urgency and clinical acuity of the scenario. The more severe and urgent the condition, the more parity we find between the importance respondents place on time and OPC. The ratio of OPC to wait-time elasticity is actually below 1 (0.8) for the chest pain scenario. It is highest for ongoing monitoring of chronic condition such as diabetes, at 23.8. And there is a clear trend for scenarios in between: The ratio increases as discretion increases (ie, lower clinical acuity and less time urgency) indicating that people place more weight on lower OPC and are willing to accept longer wait times.

The choice of care settings themselves makes sense given the medical condition and time sensitivity, indicating that most people make reasonable choices. Inspection of Table 3 suggests that some people view urgent care as a substitute for ER. The falsification scenario of chest pain had 68.9 percent choosing the ER with another 16.3 percent choosing urgent care. Similarly, the scenario of deep cuts possibly requiring stitches had 34.1 percent choosing the ER and 41.9 percent choosing urgent care. It is also interesting to note that people made different choices for the same medical condition for themselves and their children. The diarrhea scenario for adults had the majority choosing "wait and see" (29.9 percent) with the rest split between physician's office, urgent care, virtual physician, and nurse advice line. The same scenario for the child is split between physician's office (29.5 percent) and urgent care (30.0 percent), suggesting that parents are much less willing to tolerate "risk" when making decisions about their child's health.

A noteworthy limitation of this study is that it is based on hypothetical scenarios and people's behavior when faced with real choices might be different. Furthermore, the findings may not generalize to the country as a whole. While the findings were weighted to be representative of the UCI population, and hence presumably of individuals living in Southern California, caution should be exercised in assuming that they generalize to the rest of the country where not only sociodemographic characteristics might be different, but culture, care-seeking behavior, and knowledge of different care settings might vary.

Another important limitation of this manuscript is its inability to present the full richness of information and findings obtained in the analyses we performed. Because of the complexity of the statistical model we estimated and the large number of scenarios we investigated, we are unable to present all our results. Furthermore, it is not appropriate to extrapolate linearly from those results that we do present. Therefore, we developed a public website that allows users to simulate patients' choice of providers using the models we estimated and the user's specified population characteristics and assumptions about OPC, wait times, and travel times. This website allows the user to test different hypotheses and gain a better understanding of how the various factors interact, in ways that we are unable to communicate in this manuscript. It is available at https://WhereDoPatientsGo.health.uci.edu.

To summarize, this manuscript presents data from a large survey of individuals, representing a cross section of Southern California and weighted to reflect the UCI population. The analyses indicate that patients make reasonable decisions given the clinical condition and time constraints that they are facing, and that they consider both OPC and wait time when making these choices. They are more sensitive to their OPC than to their time costs, but the relatively low demand elasticities suggest that there might be other barriers to switching between the traditional and the new care-setting options in addition to OPC and time differentials.

ACKNOWLEDGMENTS

Joint Acknowledgment/Disclosure Statement: Support for this article was provided by the Robert Wood Johnson Foundation (grant #73053). The views expressed here do not necessarily reflect the views of the Foundation. We also wish to thank Dr. Howard Federoff, Vice Chancellor, Health Affairs/CEO, UCI Health System and Ms. Susan Pihl, Specialized Services Director—Campus Human Resources, of the University of California Irvine who made this study possible and provided important insights.

ORCID

Dana B. Mukamel https://orcid.org/0000-0003-4147-5785
Heather Ladd https://orcid.org/0000-0003-4427-7178
Alpesh Amin https://orcid.org/0000-0001-6982-9763
Dara H. Sorkin https://orcid.org/0000-0003-0742-9240

REFERENCES

1. Mehrotra A, Lave JR. Visits to retail clinics grew fourfold from 2007 to 2009, although their share of overall outpatient visits remains low. *Health Aff (Millwood)*. 2012;31(9):2123-2129.
2. Teladoc. About our company - Teladoc. 2017. http://www.teladoc.com/what-is-teladoc/about-our-company/. Accessed April 6, 2015.
3. Kavilanz P. These doctors do house calls – for just $99. 2017. http://money.cnn.com/2015/03/03/smallbusiness/startup-doctors-heal/index.html. Accessed June 30, 2017.
4. Heal Inc. See a doctor now - in the comfort of your home. 2017. On-Demand House Calls, Every Day From 8am to 8pm. https://heal.com/. Accessed June 30, 2017.
5. Urgent Care Association of America. Industry FAQs. 2017. http://www.ucaoa.org/?page=IndustryFAQs. Accessed June 29, 2017.
6. Weinick RM, Bristol SJ, DesRoches CM. Urgent care centers in the U.S.: findings from a national survey. *BMC Health Serv Res*. 2009;9:79.

7. Ashwood JS, Gaynor M, Setodji CM, Reid RO, Weber E, Mehrotra A. Retail clinic visits for low-acuity conditions increase utilization and spending. *Health Aff (Millwood)*. 2016;35(3):449-455.
8. Uscher-Pines L, Mehrotra A. Analysis of Teladoc use seems to indicate expanded access to care for patients without prior connection to a provider. *Health Aff (Millwood)*. 2014;33(2):258-264.
9. Jolly J. An Uber for Doctor Housecalls. 2015. https://well.blogs.nytimes.com/2015/05/05/an-uber-for-doctor-housecalls/. Accessed June 29, 2017.
10. Angstman KB, Bernard ME, Rohrer JE, Garrison GM, Maclaughlin KL. Repeat retail clinic visits: impact of insurance coverage and age of patient. *Populat Health Manage*. 2012;15(6):358-361.
11. Thygeson M, Van Vorst KA, Maciosek MV, Solberg L. Use and costs of care in retail clinics versus traditional care sites. *Health Aff (Millwood)*. 2008;27(5):1283-1292.
12. Lee BY, Mehrotra A, Burns RM, Harris KM. Alternative vaccination locations: who uses them and can they increase flu vaccination rates? *Vaccine*. 2009;27(32):4252-4256.
13. Mehrotra A, Paone S, Martich GD, Albert SM, Shevchik GJ. Characteristics of patients who seek care via eVisits instead of office visits. *Telemed J E-health*. 2013;19(7):515-519.
14. Ashwood JS, Reid RO, Setodji CM, Weber E, Gaynor M, Mehrotra A. Trends in retail clinic use among the commercially insured. *Am J Manag Care*. 2011;17(11):e443-e448.
15. Mehrotra A, Wang MC, Lave JR, Adams JL, McGlynn EA. Retail clinics, primary care physicians, and emergency departments: a comparison of patients' visits. *Health Aff (Millwood)*. 2008;27(5):1272-1282.
16. Weinick RM, Burns RM, Mehrotra A. Many emergency department visits could be managed at urgent care centers and retail clinics. *Health Aff (Millwood)*. 2010;29(9):1630-1636.
17. Wilson AR, Zhou XT, Shi W, et al. Retail clinic versus office setting: do patients choose appropriate providers? *Am J Manag Care*. 2010;16(10):753-759.
18. Gordon AS, Adamson WC, DeVries AR. Virtual visits for acute, nonurgent care: a claims analysis of episode-level utilization. *J Med Internet Res*. 2017;19(2):e35.
19. Ashwood JS, Mehrotra A, Cowling D, Uscher-Pines L. Direct-to-consumer telehealth may increase access to care but does not decrease spending. *Health Aff (Millwood)*. 2017;36(3):485-491.
20. Martsolf G, Fingar KR, Coffey R, et al. Association between the opening of retail clinics and low-acuity emergency department visits. *Ann Emerg Med*. 2017;69(4):397-403.e395.
21. Reid RO, Ashwood JS, Friedberg MW, Weber ES, Setodji CM, Mehrotra A. Retail clinic visits and receipt of primary care. *J Gen Intern Med*. 2013;28(4):504-512.
22. Mehrotra A, Paone S, Martich GD, Albert SM, Shevchik GJ. A comparison of care at e-visits and physician office visits for sinusitis and urinary tract infection. *JAMA Intern Med*. 2013;173(1):72-74.
23. Mehrotra A, Liu H, Adams JL, et al. Comparing costs and quality of care at retail clinics with that of other medical settings for 3 common illnesses. *Ann Intern Med*. 2009;151(5):321-328.
24. Uscher-Pines L, Mulcahy A, Cowling D, Hunter G, Burns R, Mehrotra A. Access and quality of care in direct-to-consumer telemedicine. *Telemed J E-health*. 2016;22(4):282-287.
25. Chou S-CA, Schuur JD. Beware this insurer's sneak attack on emergency care coverage. 2018. https://www.statnews.com/2018/03/09/anthem-insurance-emergency-care/. Accessed July 18, 2018.
26. Japsen B. UnitedHealth Widens Telehealth Coverage To Millions Of Americans. 2015. https://www.forbes.com/sites/brucejapsen/2015/05/05/unitedhealth-widens-telehealth-coverage-to-millions-of-americans/#6e32303b1cb7. Accessed July 18, 2018.
27. Wang MC, Ryan G, McGlynn EA, Mehrotra A. Why do patients seek care at retail clinics, and what alternatives did they consider? *Am J Med Qual*. 2010;25(2):128-134.
28. Ahmed A, Fincham JE. Physician office vs retail clinic: patient preferences in care seeking for minor illnesses. *Ann Fam Med*. 2010;8(2):117-123.
29. Ellis RP, Martins B, Zhu W. Demand elasticities and service selection incentives among competing private health plans. *J Health Econ*. 2017;56:352-367.
30. Chandra A, Gruber J, McKnight R. Patient cost-sharing and hospitalization offsets in the elderly. *Am Econ Rev*. 2010;100(1):193-213.
31. Dunn A. Health insurance and the demand for medical care: instrumental variable estimates using health insurer claims data. *J Health Econ*. 2016;48:74-88.
32. Kaiser Family Foundation. Kaiser Health Tracking Poll: April 2015. 2015; Published April 21, 2015. http://www.kff.org/health-reform/poll-finding/kaiser-health-tracking-poll-April-2015/. Accessed September 7, 2017.
33. Mehrotra A, Dean KM, Sinaiko AD, Sood N. Americans support price shopping for health care, but few actually seek out price information. *Health Aff (Millwood)*. 2017;36(8):1392-1400.
34. Mehrotra A, Chernew ME, Sinaiko AD. Promise and reality of price transparency. *N Engl J Med*. 2018;378(14):1348-1354.
35. Farrell KS, Finocchio LJ, Trivedi AN, Mehrotra A. Does price transparency legislation allow the uninsured to shop for care? *J Gen Intern Med*. 2010;25(2):110-114.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

How to cite this article: Mukamel DB, Ladd H, Amin A, Sorkin DH. Patients' preferences over care settings for minor illnesses and injuries. *Health Serv Res*. 2019;54:827-838. https://doi.org/10.1111/1475-6773.13154