Time Constraints and Productivity in Health Care

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Motivation

- Having sufficient time per task is one of the key determinants of its successful completion
- 10% of the EU workers do not have sufficient time for completing their duties (Eurofound, 2017)
- Healthcare workers *enjoy* the highest share (14%)

In Catalonia...

With only seven minutes per visit, it's impossible for doctors to listen well to patients.

We suffer from lots of mental fatigue, together with anxiety if you're mistaken due to insufficient assessment time.

$\Rightarrow$ General healthcare strike in Catalonia (November 2018)

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✓ Reduction in the ratio of patients per hour (15th Feb. 2019)

Research Idea

- Estimate how reviewing time affects physicians' working quality and treatment choices

What Do I Do?

- Exploit on-the-day cancellations as random time shocks to the physicians' upcoming visits.

- Unique setting: First visits in the Spanish outpatient system
  - No prior contact physician-patient
  - No walk-outs/ins

- Compare the visiting intensity and outcome of visits just affected by a cancellation with those not.

What Do I Find?

- Physicians provide those patients just affected by a cancellation with 1.6 extra minutes

- Physicians react to longer reviewing time! $\forall$ extra visiting minute:
  - $\rightarrow$ 4.4% higher probability of providing a diagnosis
    - Driven by uncommon diagnoses
  - $\rightarrow$ 3.6% higher probability of testing
  - $\rightarrow$ 20.1% decrease in the prescription doses

- Effects driven by:
  - $\rightarrow$ Junior physicians (structurally under pressure)
  - $\rightarrow$ Less decisive physicians
  - $\rightarrow$ More urgent patients

Index

Literature Review

Literature Review

- Effect of time pressure/workload on physician's behavior (Neprash, 2016; Shurtz et al., 2019; Freedman et al., 2021)

- Effect of reviewing time on workers' decisions (Frakes and Wasserman, 2017; Song et al., 2022)

Institutional Setting

Spanish Healthcare System

- Universal and free of charge
- Composed by Primary and Specialized care units
  - Population is sorted based on their residence location
- Outpatient department is at the core of Specialized care.
- Limited patient choice when referred to the outpatient department.

Hospital Management Flow

- Production line approach
- Physicians work as single units in a given fixed location
- Physicians have complete information at any point in time Schedule

Data

Data

- Panel data with the universe of visits to a Spanish outpatient department from January 2016 to June 2018 Hospital Distributions
- High frequency information on the visiting, appointment, referral, and cancellation times
- Information on prescriptions and clinical analyses

My Sample

- Universe of 67,530 realized first visits
- 86 outpatient physicians in 19 different specializations

My Sample

- Universe of 67,530 realized first visits
- 86 outpatient physicians in 19 different specializations
- The average patient is a middle-aged Spanish woman living in an area adjacent to the hospital and with public coverage.
- The average first visit takes 12 minutes, with an average waiting list of 30 days, and an 8% likelihood of receiving a diagnosis. S. Stat.

Variables of Interest

- Diagnosis provision
  - Common vs. Uncommon diagnoses
- Treatment choice
  - Tests
  - Number of tests
  - Testing cost
  - Drugs
  - Number of drugs (DDD)

Empirical Strategy

Empirical Strategy

Second Stage

$$Y_{i,j,s} = \beta_0 + \beta_1 Length_{i,j,s} + \theta T_s + \omega_j + \psi X_{i,s} + \epsilon_{i,j,s}$$

Empirical Strategy

Second Stage

$$Y_{i,j,s} = \beta_0 + \beta_1 Length_{i,j,s} + \theta T_s + \omega_j + \psi X_{i,s} + \epsilon_{i,j,s}$$

First Stage

$$Length_{i,j,s} = \gamma_0 + \gamma_1 \text{Prior Cancel}_{i,j,s} + \Theta T_s + \Omega_j + \Psi X_{i,s} + \nu_{i,j,s}$$

Instrument - Prior Cancel

- Identify whether the previous visit was cancelled using the real cancellation time
  - takes value 1 if the prior appointment did no show up
  - takes value 1 if during the current visit a future visit was withdrawn
  - 0, otherwise

- Lower bound effect of cancellations, but easy interpretation.

1Stage Dist | Distribution Dist | ITT

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  1Stage Dist | Distribution Dist | ITT

Validity checks:

- ✓ Cancellations as random time shocks to next patients Cov. Test
- ✓ Exclusion restriction Excl. Res.

Results

Results - Benchmark

How do physicians react to an exogenous increase in reviewing time?

I find that:

- Visiting time is used effectively to provide diagnoses, specially uncommon ones Table
- Extra time is used as a complement of testing, specially more expensive ones Table
- Extra time leads to a reduction in the prescription dose

Intertemporal Input Substitution

Does the increase of reviewing time lead to a differential input utilization in the next follow-up visit?

I find:

- No intertemporal input substitution Table F. Cov. Test
- Suggestive evidence of physician satisfaction Table

Heterogeneous Effects

- What is driving these effects?

- Effect driven by:
  - Female patients Table
  - Patients not sharing the physician's gender Table
  - National patients Table
  - Urgent patients Table
  - Internal medicine specializations Table
  - Less decisive physicians Table

Role of Physicians' Contracts

- Exploit within specialization variation, driven by senior physicians having better schedules. S. Cov. Test
- Despite senior physicians having higher experience, and likely being more efficient, the hospital retains them by providing them better visiting conditions (wage is publicly regulated).
  - Visiting workload negatively evolves with tenure S. Intensity
- Result:
  - Extra visiting time **only** influences junior physicians Main Table Diag. Table

Quantification Exercise

Quantification Exercise

- What would be the direct labor cost of increasing diagnosis rate by 1p.p. ($\approx 12\%$ on the sample)?

- Two approaches:
  - i) Broad increase in visit length
    - General increase in all first visits by 2.77 minutes
    - Overall cost for the economy of €206m
  - ii) Tailored increase only to junior physicians
    - Increase of 1.37 minutes per patient only to junior physicians
    - Overall cost for the economy of €74m

Conclusion

- Builds a unique dataset to causally study how reviewing time affects diagnostic intensity and outcomes.
- Shows that physicians' reviewing time is insufficient to efficiently provide a diagnostic outcome.
- Highlights that policies in favor of improving the reviewing process should look at the underlying incentives

Conclusion... and Thanks!

- Builds a unique dataset to causally study how reviewing time affects diagnostic intensity and outcomes.
- Shows that physicians' reviewing time is insufficient to efficiently provide a diagnostic outcome.
- Highlights that policies in favor of improving the reviewing process should look at the underlying incentives

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Appendix

Sample Schedule at 10 a.m.

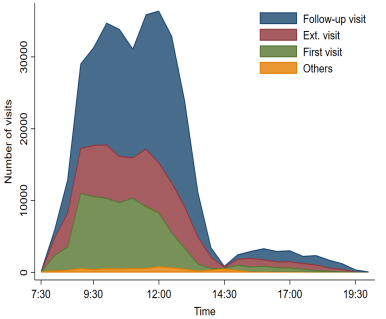
Appointment Time	Patient ID	Patient	Basic Health Zone	Status	Arrival time	Visit type
8:30	1	Antonio García Gracia	Barcelona 2-B	Completed	8:25	Follow-up
9:00	2	Jordi Bosch Fernández	Barcelona 3-A	Not present	-	Follow-up
9:10	3	Montserrat Muñoz Sánchez	Barcelona 4-D	Completed	9:05	First Visit
9:15	4	María del Carmen González Serra	Barcelona 5-D	Completed	9:00	First Visit
9:30	5	Anna Solé Pérez	Barcelona 1-C	Completed	9:10	Follow-up
9:40	6	José Giménez Sánchez	Barcelona 2-E	Completed	9:00	Long Cure
10:00	7	Wei Wang	Barcelona 8-B	Completed	9:40	Injection
10:15	8	María José Pérez Iglesias	Barcelona 4-C	Pending	9:45	First Visit
10:25	9	Montserrat Batlle Figueres	Barcelona 5-C	Pending	-	Follow-up
10:43	10	María del Mar Cardel Pérez	Barcelona 3-E	Cancelled	-	First Visit
11:00	11	Mohammed Alaoui	Barcelona 5-A	Pending	-	Follow-up

Back

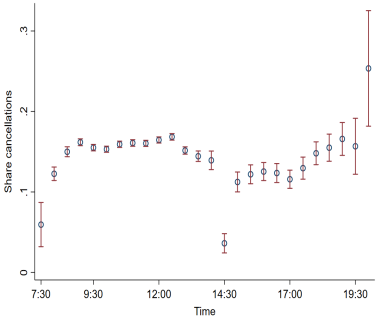
Hospital Specificities

- Contracted hospital with primarily patients with public insurance (SNS).
- Present in the neighbourhood of Sant Gervasi
  - 3rd wealthiest neighbourhood in Barcelona $\approx 70.000€$ per household
- High emphasis on quality control and patients satisfaction.
- Lower bound for other public hospitals

Back



(a) Distribution by visit type



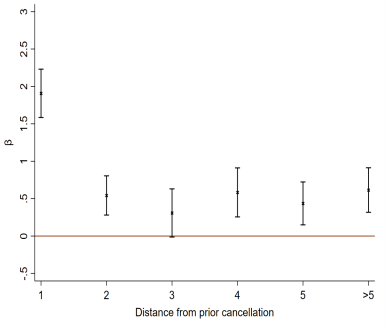
(b) Share of cancellations

Back

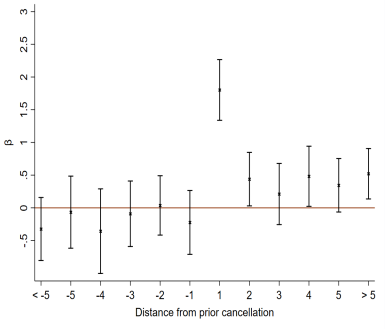
	Mean	SD	Min	Max	N
Patient characteristics					
Male	0.45	0.50	0	1	67530
Age	58.85	19.55	0	106	67530
Reference BHZ	0.60	0.49	0	1	67530
Distance from BHZ (km)	4.37	12.87	0	1979	67530
Born in Spain	0.68	0.47	0	1	67530
Public coverage	0.98	0.12	0	1	67530
Chronic condition	0.06	0.23	0	1	67530
Physician characteristics					
Physician: Male	0.59	0.49	0	1	66350
Physician: Age	49.78	9.32	32	65	58301
Visit characteristics					
Visit length (mins)	12.58	9.59	1	120	67530
Out of agenda	0.15	0.35	0	1	67530
Internal referral	0.11	0.32	0	1	67530
Waiting list (days)	29.73	52.02	0	770	67530
Waiting room (mins)	27.22	32.62	0	545	67530
Tests	0.29	0.75	0	15	67530
Test cost	12.67	50.58	0	2019	67530
Drugs	2.04	27.34	0	2600	67530
Diagnosis	0.08	0.27	0	1	67530

Back

First stage with multiple distances

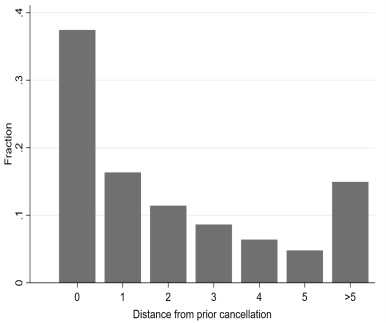


(a) All shifts

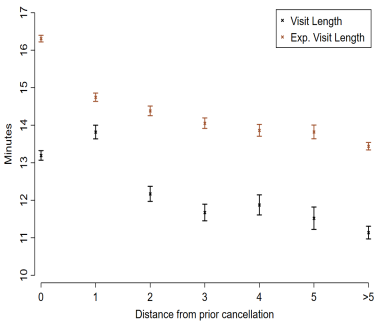


(b) Shifts with 0 or 1 cancellations

Back



(a) Distances to prior cancellation



(b) Unconditional means

Back

	(1) Diagnosis	(2) Test	(3) Num. Tests	(4) Test Cost	(5) Drug	(6) Num. Drugs	(7) Follow-up
Prior Cancel	0.0058*	0.0105**	0.0155**	1.3050**	-0.0016	-0.6661*	0.0149***
	(0.0029)	(0.0041)	(0.0072)	(0.5999)	(0.0017)	(0.3433)	(0.0052)
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hour FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Physician FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	67530	67530	67530	67530	67530	67530	67530
Dep. Var. Mean	0.0819	0.181	0.286	12.67	0.0333	2.043	0.280

Back

	(1) Male	(2) Age	(3) Ref. BHZ	(4) Dist. BHZ	(5) Chronic	(6) Pub. Cov	(7) Spanish	(8) Waiting list	(9) Same sex	(10) Same age
Prior Cancel	-0.0039	0.2213	0.0057	-0.0434	0.0032	0.0003	-0.0052	1.0568	-0.0030	0.0046
	(0.0045)	(0.1812)	(0.0056)	(0.1492)	(0.0023)	(0.0012)	(0.0047)	(0.7029)	(0.0046)	(0.0043)
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hour FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Physician FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	67530	67530	67530	67530	67530	67530	67530	67530	66350	58301
Dep. Var. Mean	0.447	58.85	0.598	4.365	0.0582	0.984	0.677	29.73	0.517	0.152

Back

Test on the Exclusion Restriction

- Prior to a given visit, physicians suffering from a cancellation decide on how fast to call the next patient (change the schedule pressure).
- Use a second instrument to account for the physician induced lower delay: Prior realized visit got late to her appointment time (Neprash, 2016)
- No clear evidence that physicians' workload pressure is relevant for the care provided, once taking into account reviewing time.

	(1) Length	(2) Delay	(3) Diagnosis	(4) Tests	(5) Num. Tests	(6) Test Cost	(7) Drugs	(8) Num. Drugs	(9) Follow-up
Length			0.0036**	0.0062***	0.0095**	0.7484**	-0.0005	-0.3482**	0.0105***
			(0.0017)	(0.0024)	(0.0045)	(0.3344)	(0.0009)	(0.1726)	(0.0032)
Delay			-0.0000	-0.0003	-0.0001	-0.0686	0.0006*	0.0764	0.0016*
			(0.0006)	(0.0006)	(0.0010)	(0.0802)	(0.0003)	(0.0686)	(0.0008)
Prior Cancel	1.6256***	-1.1688**							
	(0.1595)	(0.4783)							
Prior Late	0.1356	6.1898***							
	(0.1120)	(0.6744)							
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hour FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Physician FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	67530	67530	67530	67530	67530	67530	67530	67530	67530
Dep. Var. Mean	12.58	16.20	0.0819	0.181	0.286	12.67	0.0333	2.043	0.280
F - Stat	–	–	42.39	42.39	42.39	42.39	42.39	42.39	42.39

Back

	(1) Diagnosis	(2) Common	(3) Uncommon
Length	0.0036**	0.0001	0.0034**
	(0.0018)	(0.0008)	(0.0014)
Month-Year FE	Yes	Yes	Yes
Hour FE	Yes	Yes	Yes
Physician FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Observations	67530	67530	67530
Dep. Var. Mean	0.0819	0.0123	0.0695
F - Stat	104.3	104.3	104.3

Back

	(1) Length	(2) Diagnosis	(3) Test	(4) Num. Tests	(5) Testing cost	(6) Drug	(7) Num. Drugs	(8) Follow-up
Length		0.0036**	0.0065***	0.0096**	0.8045**	-0.0010	-0.4106*	0.0092***
		(0.0018)	(0.0023)	(0.0042)	(0.3470)	(0.0011)	(0.2166)	(0.0032)
Prior Cancel	1.6222***							
	(0.1598)							
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hour FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Physician FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	67530	67530	67530	67530	67530	67530	67530	67530
Dep. Var. Mean	12.58	0.0819	0.181	0.286	12.67	0.0333	2.043	0.280
F - Stat	–	104.3	104.3	104.3	104.3	104.3	104.3	104.3

Back

	(1) Length	(2) F. Length	(3) F. Tests	(4) F. Num. Tests	(5) F. Drugs	(6) F. Num. Drugs	(7) Same Physician
Length		0.0953	0.0008	-0.0013	0.0008	0.5331	0.0105***
		(0.1848)	(0.0034)	(0.0055)	(0.0008)	(0.4414)	(0.0037)
Prior Cancel	1.8596***						
	(0.2439)						
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hour FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Physician FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14350	14350	14350	14350	14350	14350	14350
Dep. Var. Mean	14.39	11.19	0.143	0.195	0.00613	0.552	0.656
F - Stat	–	58.82	58.82	58.82	58.82	58.82	58.82

Back

	(1) Male	(2) Age	(3) Ref. BHZ	(4) Dist. BHZ	(5) Chronic	(6) Pub. Cov	(7) Spanish	(8) Waiting list	(9) Same sex	(10) Same age
Prior Cancel	-0.0071	0.2368	0.0158	0.2433	0.0045	0.0031	-0.0226**	1.9820	0.0043	0.0072
	(0.0096)	(0.4141)	(0.0113)	(0.3040)	(0.0051)	(0.0023)	(0.0108)	(1.2038)	(0.0095)	(0.0087)
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hour FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Physician FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14350	14350	14350	14350	14350	14350	14350	14350	14266	12530
Dep. Var. Mean	0.432	62.16	0.663	4.078	0.0702	0.977	0.696	27.09	0.523	0.134

Back

		Next visit cancelled		
	Length	All	By patient	By physician
	(1)	(2)	(3)	(4)
Length		-0.0001	0.0036	-0.0037**
		(0.0048)	(0.0043)	(0.0018)
Prior Cancel	1.8328***			
	(0.1947)			
Month-Year FE	Yes	Yes	Yes	Yes
Hour FE	Yes	Yes	Yes	Yes
Physician FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Dep. Var. Mean	14.34	0.240	0.211	0.0287
F - Stat	–	89.65	89.65	89.65

Back

	(1) Male	(2) Age	(3) Ref. BHZ	(4) Dist. BHZ	(5) Chronic	(6) Pub. Cov	(7) Spanish	(8) Waiting list
Senior Physician	-0.0115	0.5690	0.0243	-0.0957	-0.0007	-0.0237	0.0099	-3.8768*
	(0.0093)	(0.3451)	(0.0306)	(0.5525)	(0.0027)	(0.0157)	(0.0168)	(2.0910)
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hour FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Specialty FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	58301	58301	58301	58301	58301	58301	58301	58301
Dep. Var. Mean	0.447	58.85	0.598	4.365	0.0582	0.984	0.677	29.73

Back

	(1) Exp. Visit Length	(2) Overbook	(3) Visits/hour	(4) Overloaded day
Senior Physician	-0.2446	-0.0367***	-0.2967***	-0.0829***
	(0.1983)	(0.0115)	(0.0955)	(0.0268)
Month-Year FE	Yes	Yes	Yes	Yes
Hour FE	Yes	Yes	Yes	Yes
Specialty FE	Yes	Yes	Yes	Yes
Observations	58301	58301	58301	58301
Dep. Var. Mean	14.93	0.212	4.255	0.240

Back

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Length	Length Senior	Diagnosis	Test	Num. Tests	Test Cost	Drug	Num. Drugs	Follow-up
Length			0.0073**	0.0068*	0.0130***	1.2940**	-0.0017	-0.6812*	0.0116***
			(0.0030)	(0.0036)	(0.0049)	(0.5066)	(0.0016)	(0.4093)	(0.0044)
Length × Senior			-0.0075*	-0.0029	-0.0071	-1.1112*	0.0009	0.4865	-0.0064
			(0.0042)	(0.0046)	(0.0091)	(0.6618)	(0.0021)	(0.3965)	(0.0060)
Senior	-0.7348***	11.1466***	0.0473	0.0473	0.1047	17.6521**	-0.0135	-6.2473	0.1078
	(0.2682)	(1.0392)	(0.0523)	(0.0558)	(0.1189)	(7.9696)	(0.0239)	(4.9516)	(0.0729)
Prior Cancel	1.7592***	-0.0574**							
	(0.2560)	(0.0274)							
Prior Cancel × Senior	-0.1712	1.7390***							
	(0.3677)	(0.2621)							
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hour FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Physician FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	58301	58301	58301	58301	58301	58301	58301	58301	58301
Joint Length p-value			0.949	0.223	0.443	0.680	0.598	0.0720	0.245
Dep. Var. Mean			0.0763	0.169	0.266	11.97	0.0384	2.363	0.283
F - Stat			22.05	22.05	22.05	22.05	22.05	22.05	22.05

Back

	(1) Length	(2) Length Senior	(3) Diagnosis	(4) Common	(5) Uncommon
Length			0.0073**	0.0009	0.0064***
			(0.0030)	(0.0014)	(0.0021)
Length × Senior			-0.0075*	-0.0010	-0.0065**
			(0.0042)	(0.0016)	(0.0033)
Senior	-0.7348***	11.1466***	0.0473	-0.0004	0.0476
	(0.2682)	(1.0392)	(0.0523)	(0.0199)	(0.0415)
Prior Cancel	1.7592***	-0.0574**			
	(0.2560)	(0.0274)			
Prior Cancel × Senior	-0.1712	1.7390***			
	(0.3677)	(0.2621)			
Month-Year FE	Yes	Yes	Yes	Yes	Yes
Hour FE	Yes	Yes	Yes	Yes	Yes
Physician FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Observations	58301	58301	58301	58301	58301
Joint Length p-value	–	–	0.949	0.945	0.959
Dep. Var. Mean	–	–	0.0763	0.0110	0.0653
F - Stat	–	–	22.05	22.05	22.05

Back

	(1) Length	(2) Length Male	(3) Diagnosis	(4) Test	(5) Num. Tests	(6) Test Cost	(7) Drug	(8) Num. Drugs
Length			0.0033	0.0081**	0.0107	1.4358***	-0.0019	-0.5883**
			(0.0022)	(0.0034)	(0.0067)	(0.4917)	(0.0019)	(0.2329)
Length × Male			0.0005	-0.0033	-0.0024	-1.3088*	0.0020	0.3682
			(0.0028)	(0.0044)	(0.0088)	(0.7509)	(0.0025)	(0.2928)
Male	-0.0163	12.3993***	-0.0052	0.0315	0.0138	16.6131*	-0.0232	-4.0772
	(0.1029)	(0.5845)	(0.0352)	(0.0565)	(0.1139)	(9.6802)	(0.0313)	(3.6727)
Prior Cancel	1.5313***	0.0901						
	(0.1754)	(0.0844)						
Prior Cancel × Male	0.2067	1.5743***						
	(0.1656)	(0.2835)						
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hour FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Physician FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	67530	67530	67530	67530	67530	67530	67530	67530
Joint Length p-value	–	–	0.0949	0.106	0.120	0.810	0.995	0.446
Dep. Var. Mean	–	–	0.0819	0.181	0.286	12.67	0.0333	2.043
F - Stat	–	–	19.15	19.15	19.15	19.15	19.15	19.15

Back

	(1) Length	(2) Length Male	(3) Diagnosis	(4) Test	(5) Num. Tests	(6) Test Cost	(7) Drug	(8) Num. Drugs
Length			0.0046**	0.0103***	0.0220***	1.4593***	0.0008	-0.3642
			(0.0021)	(0.0036)	(0.0064)	(0.4992)	(0.0016)	(0.2773)
Length × Same sex			-0.0021	-0.0073*	-0.0242***	-1.2207*	-0.0036	-0.0894
			(0.0027)	(0.0044)	(0.0091)	(0.7327)	(0.0026)	(0.2728)
Same sex	-0.0772	12.3465***	0.0292	0.0940*	0.3127***	16.4118*	0.0428	0.6551
	(0.1067)	(0.5926)	(0.0332)	(0.0561)	(0.1161)	(9.2885)	(0.0319)	(3.4255)
Prior Cancel	1.6723***	0.0824						
	(0.1621)	(0.1057)						
Prior Cancel × Same sex	-0.0264	1.4853***						
	(0.1727)	(0.2761)						
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hour FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Physician FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	66350	66350	66350	66350	66350	66350	66350	66350
Joint Length p-value	–	–	0.261	0.288	0.718	0.639	0.116	0.0506
Dep. Var. Mean	–	–	0.0819	0.181	0.286	12.67	0.0333	2.043
F - Stat	–	–	17.44	17.44	17.44	17.44	17.44	17.44

Back

	(1) Length	(2) Length Spanish	(3) Diagnosis	(4) Test	(5) Num. Tests	(6) Test Cost	(7) Drug	(8) Num. Drugs
Length			0.0044**	0.0054*	0.0095*	0.9784**	-0.0000	-0.5015
			(0.0021)	(0.0030)	(0.0057)	(0.4856)	(0.0014)	(0.3364)
Length × Non-Spanish			-0.0024	0.0031	0.0001	-0.5006	-0.0028	0.2617
			(0.0035)	(0.0059)	(0.0096)	(0.8946)	(0.0042)	(0.4364)
Non-Spanish	0.1674	12.2274***	0.0243	-0.0395	-0.0079	5.6797	0.0300	-3.5730
	(0.1450)	(0.5984)	(0.0465)	(0.0754)	(0.1228)	(11.1152)	(0.0487)	(5.5017)
Prior Cancel	1.6390***	0.0538						
	(0.1748)	(0.0677)						
Prior Cancel × Non-Spanish	-0.0507	1.5372***						
	(0.2392)	(0.2804)						
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hour FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Physician FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	67530	67530	67530	67530	67530	67530	67530	67530
Joint Length p-value	–	–	0.501	0.0629	0.178	0.468	0.392	0.269
Dep. Var. Mean	–	–	0.0819	0.181	0.286	12.67	0.0333	2.043
F - Stat	–	–	20.59	20.59	20.59	20.59	20.59	20.59

Back

	(1) Length	(2) Length WaitLong	(3) Diagnosis	(4) Test	(5) Num. Tests	(6) Test Cost	(7) Drug	(8) Num. Drugs
Length			0.0061**	0.0109***	0.0153***	0.7824*	-0.0023	-0.4661**
			(0.0025)	(0.0033)	(0.0058)	(0.4064)	(0.0016)	(0.2311)
Length × WaitLong			-0.0091**	-0.0149**	-0.0191**	0.0976	0.0042	0.1840
			(0.0037)	(0.0061)	(0.0097)	(0.5968)	(0.0035)	(0.2255)
WaitLong	-0.7258**	11.6228***	0.1012**	0.1604**	0.1836	-4.6967	-0.0540	-2.7691
	(0.3084)	(0.5002)	(0.0494)	(0.0768)	(0.1196)	(7.3844)	(0.0408)	(2.8035)
Prior Cancel	1.6671***	0.0187						
	(0.1834)	(0.0498)						
Prior Cancel × WaitLong	-0.1346	1.3745***						
	(0.2117)	(0.2154)						
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hour FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Physician FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	67530	67530	67530	67530	67530	67530	67530	67530
Joint Length p-value	–	–	0.221	0.370	0.593	0.0860	0.432	0.274
Dep. Var. Mean	–	–	0.0819	0.181	0.286	12.67	0.0333	2.043
F - Stat	–	–	25.17	25.17	25.17	25.17	25.17	25.17

Back

	(1) Length	(2) Diagnosis	(3) Tests	(4) Num. Tests	(5) Test Cost	(6) Drugs	(7) Num. Drugs	(8) Follow-up
Panel A: Internal medicine specialization								
Length		0.0055***	0.0060	0.0110**	1.1976**	0.0003	-0.6096	0.0136***
		(0.0015)	(0.0039)	(0.0055)	(0.5922)	(0.0011)	(0.5049)	(0.0034)
Prior Cancel	2.2361***							
	(0.3030)							
Observations	23339	23339	23339	23339	23339	23339	23339	23339
Dep. Var. Mean	15.65	0.0747	0.197	0.278	14.07	0.0295	2.840	0.343
F - Stat	–	55.86	55.86	55.86	55.86	55.86	55.86	55.86
Panel B: Surgical specialization								
Length		0.0022	0.0063**	0.0087	0.4616	-0.0020	-0.2617**	0.0065
		(0.0028)	(0.0028)	(0.0061)	(0.3715)	(0.0016)	(0.1070)	(0.0048)
Prior Cancel	1.3514***							
	(0.1691)							
Observations	44141	44141	44141	44141	44141	44141	44141	44141
Dep. Var. Mean	10.95	0.0857	0.172	0.291	11.94	0.0353	1.624	0.248
F - Stat	–	65.23	65.23	65.23	65.23	65.23	65.23	65.23
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hour FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Physician FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Back

	(1) Length	(2) Length High-Performing	(3) Diagnosis	(4) Test	(5) Num. Tests	(6) Test Cost	(7) Drug	(8) Num. Drugs
Length			0.0023	0.0056**	0.0116**	0.7769**	-0.0003	-0.3945
			(0.0016)	(0.0025)	(0.0053)	(0.3669)	(0.0008)	(0.2833)
Length × High-Performing			0.0041	0.0026	-0.0064	0.0846	-0.0021	-0.0510
			(0.0048)	(0.0052)	(0.0084)	(0.7778)	(0.0026)	(0.3128)
High-Performing	-1.2899	9.3470***	-0.1316**	-0.1999**	-0.2265	-15.6842	0.0448	1.6781
	(1.6542)	(1.8655)	(0.0540)	(0.0800)	(0.1508)	(9.5695)	(0.0435)	(4.8503)
Prior Cancel	1.8436***	-0.0519***						
	(0.2197)	(0.0195)						
Prior Cancel × High-Performing	-0.5610*	1.4276***						
	(0.3258)	(0.2391)						
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hour FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Physician FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	67530	67530	67530	67530	67530	67530	67530	67530
Joint Length p-value	–	–	0.156	0.0810	0.434	0.225	0.350	0.0280
Dep. Var. Mean	–	–	0.0819	0.181	0.286	12.67	0.0333	2.043
F - Stat	–	–	18.13	18.13	18.13	18.13	18.13	18.13

Back

	(1) Length	(2) Diagnosis	(3) Tests	(4) Num. Tests	(5) Test Cost	(6) Drugs	(7) Num. Drugs	(8) Follow-up
Panel A: No-Show								
Length		0.0036**	0.0078***	0.0111**	0.7637*	-0.0010	-0.3939*	0.0084***
		(0.0018)	(0.0027)	(0.0047)	(0.3910)	(0.0010)	(0.2106)	(0.0032)
Prior No-Show	1.6082***							
	(0.1594)							
Observations	66320	66320	66320	66320	66320	66320	66320	66320
Dep. Var. Mean	12.53	0.0817	0.181	0.286	12.63	0.0332	2.055	0.280
F - Stat	–	103	103	103	103	103	103	103
Panel B: Notification								
Length		0.0037	-0.0036	-0.0022	1.1875	-0.0011	-0.5477	0.0149
		(0.0046)	(0.0058)	(0.0097)	(0.8695)	(0.0027)	(0.3340)	(0.0091)
Prior Notification	1.7260***							
	(0.2885)							
Observations	57702	57702	57702	57702	57702	57702	57702	57702
Dep. Var. Mean	12.39	0.0816	0.180	0.286	12.59	0.0319	2.055	0.279
F - Stat	–	36.20	36.20	36.20	36.20	36.20	36.20	36.20
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hour FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Physician FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

	(1) Length	(2) Length Retired	(3) Diagnosis	(4) Test	(5) Num. Tests	(6) Test Cost	(7) Drug	(8) Num. Drugs
Length			0.0035	0.0043	0.0107	0.7382	-0.0010	-0.4595*
			(0.0029)	(0.0031)	(0.0066)	(0.4982)	(0.0013)	(0.2470)
Length × Retired			0.0000	0.0051	-0.0019	0.1852	-0.0001	0.1144
			(0.0043)	(0.0053)	(0.0095)	(0.7283)	(0.0016)	(0.2279)
Retired	0.2615	12.6102***	-0.0057	-0.0886	-0.0202	-5.4413	0.0006	-1.4926
	(0.1708)	(0.5866)	(0.0569)	(0.0661)	(0.1227)	(9.4129)	(0.0207)	(3.0157)
Prior Cancel	1.5211***	-0.0264						
	(0.1618)	(0.0627)						
Prior Cancel × Retired	0.2585	1.7836***						
	(0.1876)	(0.2516)						
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hour FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Physician FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	67530	67530	67530	67530	67530	67530	67530	67530
Joint Length p-value	–	–	0.177	0.0180	0.144	0.0683	0.413	0.142
Dep. Var. Mean	–	–	0.0819	0.181	0.286	12.67	0.0333	2.043
F - Stat	–	–	27.58	27.58	27.58	27.58	27.58	27.58

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