Do New Patients Displace Existing Patients' Treatment?

Jori Barash
University of Oregon

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Healthcare policy interventions often target the supply of physicians

- Underpinned by assumption: too many patients $\rightarrow$ inadequate treatment
- e.g., patient limits per physician and subsidized entry into less profitable areas

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- Causal evidence is limited and unobserved factors likely matter
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Research question

What is the effect of a primary care physician's number of registered patients ("enrollment") on short-run treatment intensity?

This Paper

Instrument for enrollment with quasi-random patient assignments

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Use theoretical framework to distinguish between two mechanisms

- Capacity constraints $\rightarrow$ Need more physicians
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- Effect heterogeneity most consistent with idiosyncratic capacity constraints

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Contextualize findings

- Suggestive evidence: baseline treatment intensity might be too low
- Fixing physician supply, simulate new targeted patient assignment

Contribution

Healthcare disruptions: [Emergency Care] Jena et al., 2017; Gruber, Hoe and Stoye, 2018; Hsia and Shen, 2019; Hoe, 2022; [Short-Term Disruptions in Primary Care] Shurtz et al., 2018; Harris, Liu and McCarthy, 2020; Freedman et al., 2021; Kovacs and Lagarde, 2022; ▸ Details

- Persistent disruption in primary care

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Consequences of Physician Retirement: Kwok, 2018; Fadlon and Van Parys, 2020; Bischof and Kaiser, 2021; Simonsen et al., 2021; Zhang, 2022; Sabety, 2023)

- Consequences for nearby patients and test of exclusion

Why Norway?

Automatic reassignment of the patients of physicians who exit the market

- Random conditional on municipality and availability
- I focus on patients of nearby physicians (exogenous treatment need)

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Universal public healthcare system: data includes almost all patients + physicians

- Registration system design has far-reaching consequences for health and spending
- Statistical power to estimate small effects, test model predictions

Summary Statistics: Treatment Intensity per Physician

Variable	Mean	Std. Dev.	10th Percentile	Median	90th Percentile
Enrollment	1,262.00	354.23	811.00	1,237.50	1,710.00
Visits	372.52	210.86	51.00	368.00	641.00
Spending	10,858.77	27,152.92	1,056.89	10,111.69	17,832.71
Hours	103.25	42.84	45.29	107.94	153.00
Avoidable Hosp.	3.61	2.93	1.00	3.00	7.00
Follow-up Visits	110.29	74.31	21.00	102.00	204.00
Bill Lines	1,140.84	700.84	322.00	1,060.00	2,019.00
Diagnostics	72.59	88.72	8.00	51.50	150.00
Procedures	274.05	215.50	57.00	228.00	541.00
per Visit	2.94	0.84	2.04	2.81	4.01
Physician-Spells	2,722				

Econometric Model

$$Y_{jt} = \beta_1 \widehat{\text{Enroll}}_{jt} + \beta_j + \beta_t + \epsilon_{jt}$$
$$\text{Enroll}_{jt} = \gamma_1 \text{Auto}_{jt} + \gamma_j + \gamma_t + \varepsilon_{jt}\,.$$

Y_{jt} is the outcome of interest, t months after auto-reassignment

- Sum among incumbent patients of physician j

Enroll_{jt} is total enrollment, including incumbents and newly joined patients

Auto_{jt} reflects the cumulative number of patients auto-reassigned

Identifying Assumptions: Exclusion

Assumption: Timing and size of auto-reassignment

- Independent of factors determining changes to incumbent illness severity that are specific to a physician, e.g., missed preventative or local viral outbreak

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Balance test: auto-reassigned patient counts uncorrelated with incumbent severity

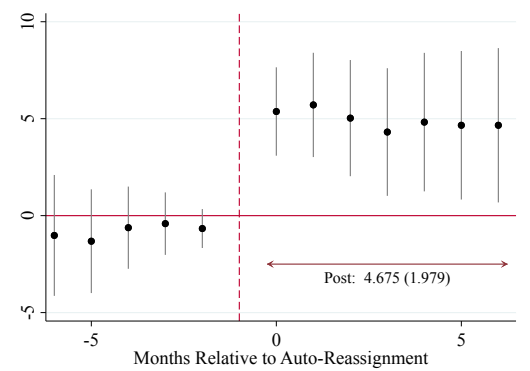
- Conditional on availability, a shared municipality, and the exiting physician

Similar trends in outcomes prior to auto-reassignment

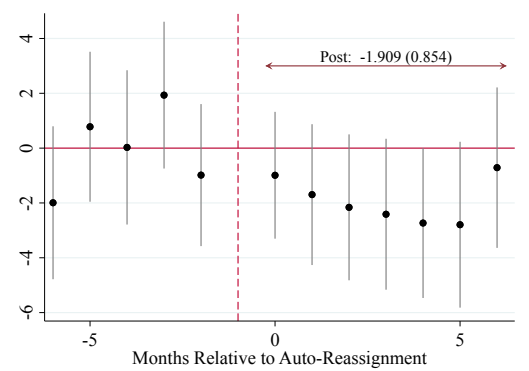
- Event-Study: Large vs. small auto-reassignments (1 patient)

Trends Among Incumbent Patients: Large vs. Small Auto-Reassignments

(a) Enrollment



(b) Hours



Effect of Enrollment Among Incumbent Patients

	Enrollment (1)	Hours (2)	Bill Lines (3)	Spending (4)	Visits (5)
Cuml. Auto-Joins	1.055				
	(0.055)				
	[<0.001]				
Enrollment		−0.048	−0.345	2.230	0.004
		(0.026)	(0.055)	(4.597)	(0.152)
		[0.070]	[<0.001]	[0.628]	[0.980]
Dep. Var. Mean	1274.917	101.349	1126.464	10299.286	370.160
New Pat. Mean		0.124	1.313	131.205	0.400
F-Statistic	117.129	20.101	30.679	9.458	28.624
Observations	35,386	35,386	35,386	35,386	35,386

	Lines Per Visit (6)	Procedures (7)	Diagnostics (8)	Follow-ups (9)	Avoidable Hosp. (10)
Enrollment	−0.002	−0.038	−0.058	−0.023	0.001
	(0.000)	(0.019)	(0.015)	(0.021)	(0.000)
	[<0.001]	[0.045]	[<0.001]	[0.268]	[0.024]
Dep. Var. Mean	2.940	70.908	270.428	135.084	3.619
New Pat. Mean	3.244	0.096	0.293	0.165	0.004
F-Statistic	36.423	46.320	43.653	26.550	6.869
Observations	34,578	35,386	35,386	35,386	35,386

Heterogeneity in the Effect of Enrollment on Hours

	Capacity		Fee Level		Schedule	
	Slack	Binds	Low	High	Part-Time	Full-Time
	(1)	(2)	(3)	(4)	(5)	(6)
Enrollment	−0.025	−0.051	−0.045	−0.039	−0.083	−0.005
	(0.023)	(0.027)	(0.027)	(0.030)	(0.004)	(0.010)
	[0.281]	[0.057]	[0.095]	[0.197]	[<0.001]	[0.609]
Dep. Var. Mean	94.515	107.514	84.576	113.236	78.104	113.770
1st Stage F-Stat.	33.577	134.240	83.519	46.769	100.088	66.967
Observations	16,783	18,603	14,677	20,709	12,324	23,062
	Age		Diagnoses		Gender	
	Under 65	Over 65	Healthy	Chronic	Male	Female
	(7)	(8)	(9)	(10)	(11)	(12)
Enrollment	−0.042	−0.007	−0.037	−0.012	−0.013	−0.036
	(0.020)	(0.006)	(0.020)	(0.006)	(0.007)	(0.019)
	[0.035]	[0.248]	[0.061]	[0.045]	[0.068]	[0.053]
Dep. Var. Mean	72.288	29.061	58.032	43.316	42.905	58.444
1st Stage F-Stat.	112.037	112.037	112.037	112.037	112.037	112.037
Observations	35,386	35,386	35,386	35,386	35,386	35,386

Robustness of the Effect of Enrollment on Hours

		Estimate			Mean	F-Stat.	Obs.
(1)	Add Controls	−0.044	(0.030)	[0.149]	101.349	88.295	35,386
(2)	Top 5%	−0.045	(0.028)	[0.109]	96.568	77.400	2,158
(3)	Drop Event-Month	−0.045	(0.024)	[0.056]	101.349	100.906	35,386
(4)	Calendar Month	−0.061	(0.023)	[0.007]	101.349	61.752	35,386
(5)	Hours Always 8+	−0.034	(0.020)	[0.095]	110.662	69.265	30,472
(6)	Drop Middle Months	−0.056	(0.030)	[0.064]	101.028	61.412	27,220
(7)	Constant Ceiling	−0.077	(0.057)	[0.178]	102.791	72.963	29,328
(8)	Avoidable Hosp.	−0.081	(0.005)	[<0.001]	103.043	88.793	32,097
(9)	Alt. 1st Stage	−0.050	(0.026)	[0.053]	101.349	3509.565	35,386
(10)	Weighted	−0.057	(0.022)	[0.011]	101.349	98.327	35,386

Should Crowd-Out be Prevented?

Other similar Norwegian patients get more time with physicians (5% of mean)

- Others also have lower avoidable hospitalizations (5% of mean)

Prior surveys of Norwegian patients: concerned about primary care undertreatment

- e.g., 25% dissatisfied with duration of consultations, 50% with wait times

Prior surveys of Norwegian physicians: growing dissatisfaction

- Work hours, amount of responsibility, treatment discretion
- Focus groups: growing workloads could cause issues for patient safety

Norway has lower treatment intensity than most other OECD countries

- More physicians, but fewer visits

Counterfactual: Targeted Patient Assignment

If crowd-out exacerbates undertreatment, policymakers could increase capacity

- Might be too expensive relative to effect size
- Fixing the set of physicians, can we do better than random patient assignment?

Target physician-patient assignments with low crowd-out

- Separate estimates for old vs. young patients
- Separate estimates for high- vs. low- crowd-out physicians
  (High: part-time or near capacity)
- Simulate sequential assignments to nearby physicians, prioritizing lowest crowd-out

Takeaway

86% of crowd-out hours avoided by targeted assignment

Conclusion

Healthcare providers can sometimes shift labor supply without large frictions

- New patients minimally displace the primary care of existing patients
- Leverage quasi-random administrative assignment

Policy implications: rural subsidies, targeted assignment, and patient limits

- Important to consider heterogeneous capacity constraints
- Income effects and reimbursement