

# Assessing Shifts in Outpatient Visits to Physicians of Other Specialties in Rural Areas with Shortages of Cardiologists and Gastroenterologists: A Preliminary Analysis

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## I. Executive Summary/Key Findings

Although physician workforce planning approaches the need for physicians of each specialty individually, in fact many services are provided by physicians of several specialties. Further, there is some evidence that physicians adjust the scope and balance of services they provide when there are too few physicians of other specialties in their communities, although when this “service shifting” happens and for which services and specialties is not known. This study uses Medicare data to assess changes in the number of outpatient visits made to various specialty groups for atrial fibrillation and for esophageal, gastric and duodenal disorders in rural areas that vary in their local availability of cardiologists and gastroenterologists, respectively. Analyses find evidence in one situation for visit shifting across specialties; specifically, where there are fewer local gastroenterologists, rural elderly make more visits for the selected gastrointestinal disorders to other, non-primary care physicians. This partially offsets the loss of visits made to gastroenterologists. Visit numbers to primary care physicians did not change for either atrial fibrillation with fewer cardiologists or for these gastrointestinal disorders with fewer gastroenterologists. Similarly, visits for atrial fibrillation made to other, non-primary physicians did not change with fewer cardiologists.

The finding of shifting of visit numbers across some specialties for some medical conditions has implications for workforce planning and modeling. With shifting of outpatient visit numbers between specialties, physicians of various specialties can flexibly absorb local demand for services and reduce the service shortages otherwise anticipated when there are too few physicians of some specialties. Medical educators need to prepare physicians so they are able to provide services beyond the traditional focus of their specialty to help fill local service needs due to shortages in other specialties.

## CONCLUSIONS AND IMPLICATIONS FOR POLICY

- 1) **In response to local physician shortages in a given medical specialty, physicians of other specialties will sometimes adapt the services they provide to meet local service needs (“service shifting”).**
- 2) **Healthcare workforce planners should be mindful that service shifting across specialties can mitigate the effects of local shortages of specialists by offsetting local health care service shortfalls, i.e., local shortages in some specialties do not always yield local service shortages.**
- 3) **Medical educators and policy makers should ensure that residencies in many and perhaps most specialties prepare graduates so that they have the breadth of skills to step up to provide the range of services that their communities may need.**

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## II. Background

Current workforce planning assesses a community or population's need, demand and shortages for physicians separately for each specialty. This approach assumes that a single specialty exclusively provides care for any given medical condition, such as a cardiologist cares for atrial fibrillation and a gastroenterologist for peptic ulcer disease. In reality, physicians of several specialties provide care for many medical conditions. Further and although little studied, to some extent each physician adjusts the range and balance of services s/he provides to complement the services provided by other local physicians of their own and other specialties. This informal coordination, likely driven by a sense of responsibility to patients and also market opportunity, means that physicians collectively act to meet their communities' health service needs, which may tend to offset visit shortages where there are too few physicians in various specialties.

This shifting of services from physicians of one specialty to another may be particularly important to and perhaps greatest in rural areas, where specialist shortages are common and travel distance to those specialists in neighboring communities can be prohibitive. By nature of their broader training and competency, primary care physicians may play a particularly important role in providing care that would otherwise be unavailable locally. Their broad capacity in part explains why primary care physicians constitute about half of the physician workforce in rural areas generally, and two-thirds of the workforce in isolated small rural areas.<sup>1</sup>

Rural physicians of many specialties have a wider scope of practice than urban physicians<sup>2</sup>, which is indirect evidence for rural physicians adapting their services to fill needs typically provided by other specialties. The most direct evidence to date of one specialty adjusting services to fill local needs is that rural family physicians are more likely to provide obstetrical deliveries in counties with fewer obstetricians.<sup>3,4</sup> To better understand when a community's workforce numbers and composition will leave people without needed services—when physician shortages yield service shortages—it is important to more fully demonstrate the circumstances and extent to which physicians of one specialty alter the scope and volume of services they provide to blunt the effects of shortages in other specialties.

This study assesses how variation in local availability of cardiologists and gastroenterologists affects the number of visits that rural Medicare beneficiaries make to primary care physicians and to physicians of other, non-primary care specialties for atrial fibrillation and select gastrointestinal disorders. We anticipate that physicians of all specialties will adapt the services they provide when there are local shortages in other specialties, but by virtue of their broad training and greater numbers in rural areas we expect that service shifting will happen most often with primary care physicians. Because a concomitant shortage of primary care physicians may inhibit their ability to take on more visits when there are also local specialist shortages, we assess how shifts in visits to other specialties vary for communities with different availability of primary care physicians. We use Medicare data because it allows us to assess outpatient visits for rural communities nationwide, and we limit analyses to people ages 65 and older.

### III. Methods

Physician visit data were a 20% sample of the Medicare 2011 Outpatient and Carrier Files, which include all visits in outpatient settings of all types, including acute care visits, wellness visits, home visits and consultations. The rural data in our analyses include doctor visits by 302,704 Medicare beneficiaries living in all 3,389 rural Primary Care Service Areas (PCSA, 2010 definitions), <sup>5,6</sup> which include 16,842 ZIP codes and overlap with 2,604 Hospital Service Areas (HSA).<sup>7</sup> National Provider Identifiers (NPI) for the physician who provided each visit in the Outpatient and Carrier files were linked to the AMA's Physician Masterfile to identify the primary specialty of the treating physician, whether located in the patient's community or in other communities. In this rural sample, we identified 423,234 visits for atrial fibrillation (ICD9 427.31 and 427.32) and 267,774 visits for diseases of the esophagus, stomach and duodenum (ICD9 530-538) in 2011. These groups of conditions were chosen because they are common and managed by both primary care and specialist physicians, either jointly or separately. Visit counts for each of these conditions were summed for Medicare beneficiaries living in each ZIP code based on home addresses in the Medicare Beneficiary Summary File.

Using the AMA Masterfile data for all US physicians as of 2011, adult primary care physician counts (family medicine and general internal medicine) were determined for each Primary Care Service Area (PCSA), and physician counts of the two targeted specialties and also for all remaining specialties were determined for each Hospital Service Area (HSA). Population counts for each Primary Care Service Area and Hospital Service Area were derived from the 2010 US Census. These data allowed us to calculate physician-to-population ratios for primary care physicians for each Primary Care Service Area and for specialist physicians of the three groups (cardiology, gastroenterology, all other specialties combined) for each Hospital Service Area. Analyses were performed at the ZIP code level. The primary care physician availability for each ZIP code was taken to be the primary care physician-to-population ratio of the Primary Care Service Area of which it was a part. The specialist physician availability for each ZIP code for each of the three specialty groups were the corresponding specialist physician-to-population ratios for the Hospital Service Area each ZIP code was within.

**Analysis.** We were interested in estimating the number of outpatient visits for a particular medical condition (e.g., atrial fibrillation) to each physician type within a ZIP code. Analyses for the different medical conditions were performed independently. For a particular medical condition the physician types included primary care physicians, a referent specialty group, and "other physicians". The referent specialty group was the specialty trained to treat the particular medical condition (e.g., cardiologists for atrial fibrillation) and "other physicians" represented all other specialties but also nurse practitioners and physician assistants whose visits were identified by their NPI in the Medicare files. Therefore, for a particular physician type, its number of outpatient visits for a particular medical condition was a product of the total number of visits by that ZIP code's population for that medical condition in 2011 multiplied by the percent of all visits in the ZIP code for that medical condition that were attributed to that physician type.

Using multiple linear regression, we first estimated the total number of visits by ZIP code as a function of local physician availability (population per primary care physician of the Primary Care Service Area, and ratios of population to the referent specialty and to all other specialties of the Hospital Service Area), the square of these main effects, and pairwise interaction terms of all main effects and square term variables. Final models were reduced through backwards stepwise regression to arrive at a best set of covariates for each medical outcome, using AIC as a model criterion.<sup>8</sup> We then used multinomial logistic regression to estimate the proportion of visits by physician type (e.g., cardiologist, primary care, other physicians) as a function of the same parsimonious list of variables used in total visit count estimates.

Parameter estimates from these two equations were then used to simulate how a change in the supply of specialists affected total outpatient visits and visits to each physician type in an “average” rural ZIP code, that is in a ZIP code within a median size rural Primary Care Service Area (19,672 population) and a median size rural Hospital Service Area (39,656 population). We conducted the analyses under three primary care physician supply scenarios: a shortage (1:3,500 population), an average rural supply (1:1,554) and a seemingly quite ample supply (1:750).

## V. Results

Data within **Table 1** and **Figure 1** show that as the number of local cardiologists decreases within the hypothetical ZIP code of median Hospital and Primary Care Service Area populations, the number of visits made to cardiologists for atrial fibrillation also decreases. Visits to cardiologists do not fall completely to “0” even when there are no cardiologists in the Hospital Service Area because people can travel to cardiologists in neighboring service areas.

As the number of local cardiologists decreases, no response is seen in the number of visits for atrial fibrillation made to either the primary care or the “all other physicians” groups. Therefore, with visits to cardiologists falling with fewer cardiologists and no increase in visits to primary care and other physicians, the total number of outpatient visits for atrial fibrillation decreases for Medicare recipients in this modeled rural ZIP code. This happens regardless of the adequacy of the local primary care physician population—whether there is an average supply, too few or ample availability.

**Table 2** and **Figure 2** tell a somewhat different story for visits for esophageal, stomach and duodenal conditions. As seen with cardiologists and atrial fibrillation visits, when the number of local gastroenterologists decreases in the hypothetical ZIP code the number of visits to gastroenterologists for esophageal, stomach and duodenal conditions decreases. Similar to the cardiologist and atrial fibrillation situation, primary care physicians do not take on more visits for these gastrointestinal disorders when there are fewer gastroenterologists. However, when there are fewer gastroenterologists there are significantly more visits to “other physicians,” with their visit numbers increasing by 30-40% with the fall from 3 to 0 gastroenterologists for the modeled rural ZIP code regardless of local primary care physician availability. In magnitude, physicians of the “other” group take on two-thirds or more of the visits that are not made to

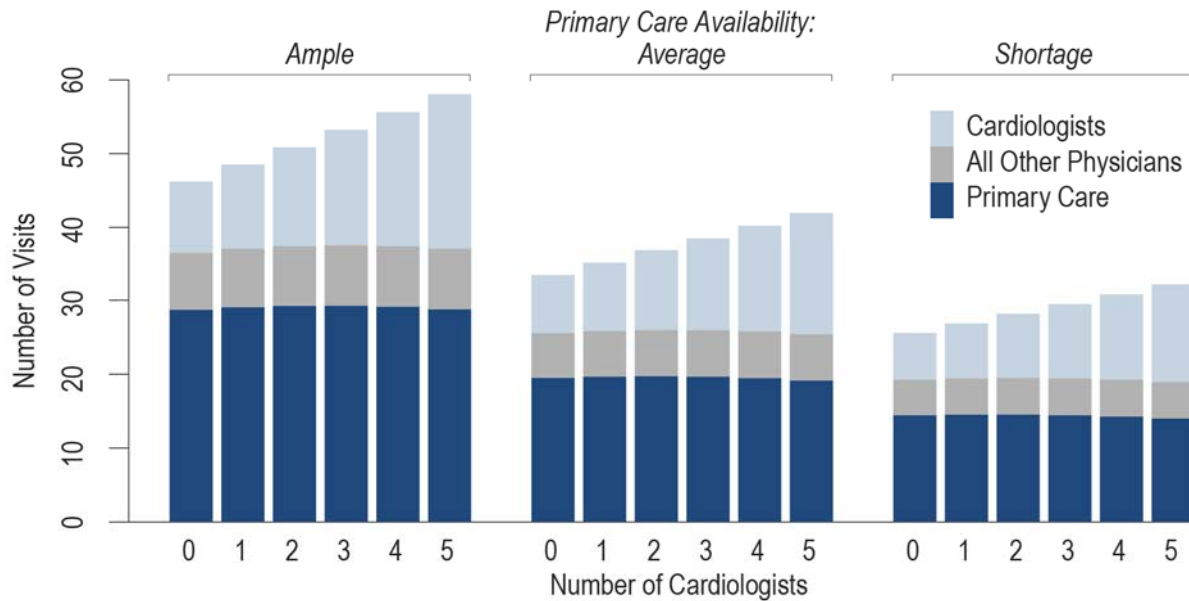
gastroenterologists when there are fewer locally, so overall visit numbers for these gastrointestinal conditions still decrease but only by about one-third as much if there had been no visit shifting to the “other” group of specialists.

Although not the focus of this study, we note that for visits both for atrial fibrillation and the gastrointestinal disorders, as the local availability of primary care physicians increases (i.e., comparing across section rows of the tables, and across grouped columns on the graphs), the number of visits seen by primary care physicians for these conditions increases. Further, the increase in total visit numbers—visits made to physicians of all three specialty groups combined—is greater with increasing local primary care physician availability than with increasing local cardiologist and gastroenterologist availability.

**TABLE 1:** Variation in number of expected atrial fibrillation outpatient visits in total and to each physician specialty group when there are from 0 to 5 local cardiologists for a rural ZIP code of median PCSA and HSA population size; analyses where primary care physician numbers are ample, average and in shortage

Local primary care availability	Number of local cardiologists	Number of outpatient visits			
		Total	Cardiologists	Primary Care	Other Physicians
Ample availability (1:750 pop)	0	46	10	29	8
	1	49	12	29	8
	2	51	14	29	8
	3	53	16	29	8
	4	56	18	29	8
	5	58	21	29	8
National rural average availability (1:1,554 pop)	0	33	8	20	6
	1	35	9	20	6
	2	37	11	20	6
	3	38	13	20	6
	4	40	14	19	6
	5	42	17	19	6
Shortage level availability (1:3,500 pop)	0	26	6	14	5
	1	27	7	15	5
	2	28	9	15	5
	3	29	10	14	5
	4	31	12	14	5
	5	32	13	14	5

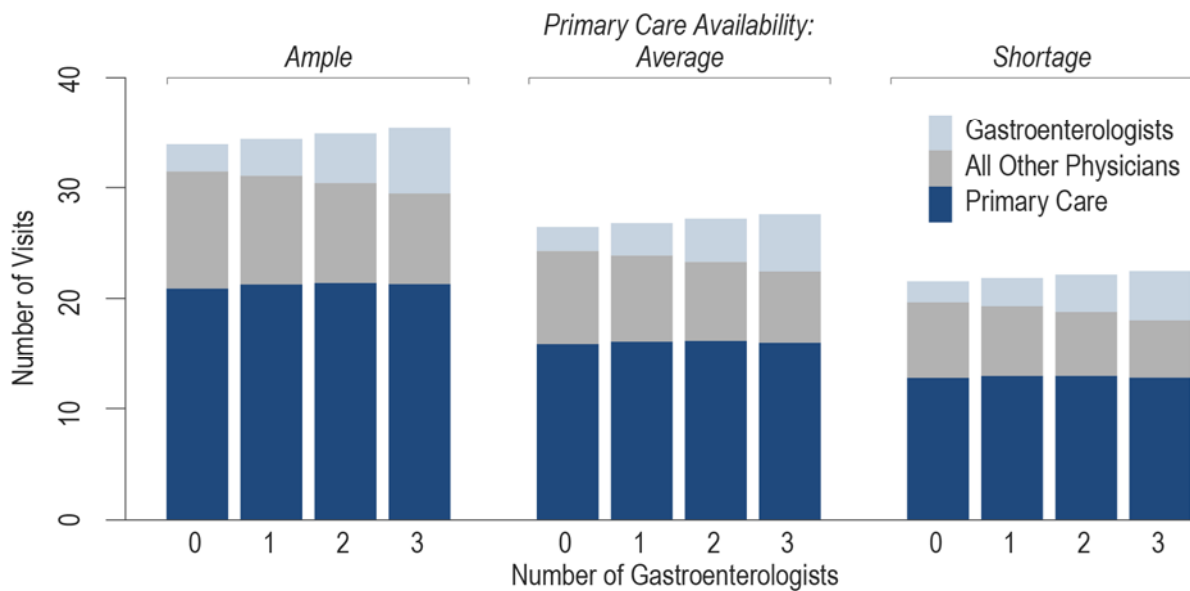
**Figure 1:** Variation in number of expected atrial fibrillation outpatient visits in total and to each physician specialty group when there are from 0 to 5 local cardiologists for a rural ZIP code of median PCSA and HSA population size; analyses where primary care physician numbers are ample, average and in shortage.



**TABLE 2:** Variation in number of expected esophageal, stomach and duodenal disorder outpatient visits in total and to each physician specialty group when there are from 0 to 3 local gastroenterologists for a rural ZIP code of median PCSA and HSA population size; analyses where primary care physician numbers are ample, average and in shortage

Local primary care physician availability	Number of local gastroenterologists	Number of outpatient visits			
		Total	Gastro-enterologists	Primary care physicians	Other physicians
Ample availability (1:750 pop)	0	34	2	21	11
	1	34	3	21	10
	2	35	4	21	9
	3	35	6	21	8
National rural average availability (1:1,554 pop)	0	26	2	16	8
	1	27	3	16	8
	2	27	4	16	7
	3	28	5	16	6
Shortage level availability (1:3,500 pop)	0	22	2	13	7
	1	22	3	13	6
	2	22	3	13	6
	3	22	4	13	5

**Figure 2:** Variation in number of expected esophageal, stomach and duodenal disorder outpatient visits in total and to each physician specialty group when there are from 0 to 3 local gastroenterologists for a rural ZIP code of median PCSA and HSA population size; analyses where primary care physician numbers are ample, average and in shortage.



## V. Discussion

Findings from this study show a situation where the outpatient care needs of rural communities are partially met by other local physicians when there are local shortages of specialists and a situation where they are not met by other local physicians. For both atrial fibrillation and esophageal, gastric and duodenal disorders, fewer local cardiologists and gastroenterologists means that people are less often seen by these specialists for these disorders. Contrary to what we anticipated, visits to primary care physicians for these conditions did not increase in response. On the other hand, visits to “other physicians” increased for the gastrointestinal disorders, though not for atrial fibrillation. Thus, these data provide evidence that physicians of some specialties do, indeed, mitigate part of the visit shortfall when there are shortages of physicians of other specialties, but not necessarily for all specialties and/or all medical conditions. This shifting of visits across specialties did not occur with primary care physicians as we expected, but with other physicians, i.e., physicians who are neither in primary care nor gastroenterology. Who are these other physicians who took on more gastrointestinal visits? Because of sample sizes, we cannot tell with our data which specialty(ies) within the “other” group responded with more gastrointestinal visits. However, Baldwin et al<sup>9</sup> showed that rural surgeons have more visits for gastrointestinal disorders than urban physicians, so perhaps surgeons are taking on visits when there are too few gastroenterologists in rural communities. Alternatively, pulmonologists, nephrologists or other medical specialists may be seeing more of these gastrointestinal disorders, or perhaps physician assistants and nurse practitioners. Service shifting across specialties may be part of the reason why rural physicians of many specialties have broader scopes of practice than urban physicians.

**LIMITATIONS:** These findings are limited by the Medicare data used and focus of the analyses presented. This study is the first of its type and should be regarded as exploratory. These analyses will need to be extended to more medical conditions and other specialties, to non-elderly patients, and also to assess shifting across specialties in services beyond outpatient visits, such as in number of outpatient procedures performed and inpatient services. Service shifting should also be studied in a variety of rural and urban communities, including for smaller and larger Hospital and Primary Care Service Areas. Future studies should also assess if patients' insurance coverage affects physicians' willingness to shift their balance of services.

This study relied on approximations of the factors and conditions within communities included in its models. Most importantly, Primary Care and Hospital Service Areas are only approximations for the local community resources that physicians and patients feel and that influence physicians' practice decisions and patients' care seeking choices. Models could also not account for local numbers of physician assistants and nurse practitioners—two other disciplines that can offer visits for the medical conditions studied—as national data are not available. Lastly, these analyses only assessed changes in numbers of visits and did not assess the content or quality of care provided in these visits.

## **VI. Conclusions/Implications for Policy**

There is much more to be learned about the phenomena of overlapping clinical competencies for physicians of different specialties, variation among physicians of a given specialty in the range and balance of services they provide (“plasticity”)<sup>10</sup>, and the effects of local shortages or excesses for physicians of one specialty on the services provided by local physicians of other specialties (service shifting). Until more is known about the conditions, geographies, specialties and medical conditions that affect service shifting across specialties, health workforce planners and modelers should be mindful that a population's need for some or many types of services may be met by physicians of several specialties who are adapting their services to the local availability of physicians of other specialties and to community needs. This provides beneficial flexibility, as it helps offset what would otherwise be more frequent and severe service shortages for communities as individual physicians of particular specialties come and go. Planners need to keep in mind that some people can successfully travel further to get needed care and will experience comparable outcomes<sup>11</sup>, and some will find care from physicians of other specialties, as seen in this study.

The phenomena of plasticity and the importance of service shifting across specialties also mean that physician educators and policy makers need to ensure that residencies prepare physicians so that they are able to provide any of a broad range of services that their communities may need. This is likely important for residencies in many specialties whose graduates work in rural areas, as likely few physicians in rural communities can maintain a sharply focused practice. ❖



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