

A Comparison of Retrospective Attribution Rules

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Much of provider payment reform (bundled payments,¹ pay-for-performance,² shared savings programs³⁻⁶) requires patients to be linked to an individual provider or provider systems. Because prospective selection of a medical home is rare, many compensation methods rely on retrospective attribution of patients to providers. Retrospective attribution is the process of assigning responsibility for patients to an individual provider or provider systems after care is received. However, there is no generally accepted method of retrospective attribution, and methods are sometimes proprietary, making comparison of methods difficult.^{3,6,7} Attribution rules are typically defined by: 1) level of attribution (provider system, clinic location, individual physician), 2) provider types included (primary care physicians [PCPs], specialty physicians, nurse practitioners, physician assistants), 3) encounter type (any office visit, evaluation and management [E&M] visits), 4) unit of measure (visit counts, allowed charges), and 5) level of concentration of care required (majority, plurality).

For instance, the Medicare Shared Savings Program (MSSP) uses visits to PCPs (ie, general practice, family practice, internal medicine, and geriatric medicine physicians) to attribute patients to provider systems. In the MSSP, a provider system is responsible for a patient if the overall cost of all types of visits to PCPs was in that system. If a patient did not have PCP visits, then they use visits to all physicians as the attribution criterion.⁸ Both attribution and financial evaluation are retrospective. Specifically, after 2015 claims data were completed in 2016, Medicare used this 2015 experience to retrospectively attribute patients to provider systems and evaluate whether the year's financial goals were achieved.

An ideal attribution rule balances 2 conflicting goals: maximizing the fraction of patients attributed and maximizing the stability of attribution to a particular provider system. An attribution rule assigning a large fraction of patients to a provider system makes payment reform relevant to a larger portion of the insured population. However, such rules may compromise stability. Conversely, attribution rules that consistently assign patients to the same provider system generate stable incentives for managing population health. An unstable

ABSTRACT

OBJECTIVES: To compare the performance of methods to retrospectively attribute patients to provider systems by comparing the fraction attributed and the stability of assignment over time.

STUDY DESIGN: Retrospective cross-sectional study.

METHODS: Descriptive statistics are used to measure the fraction of patients attributed and stability of attribution from year to year. This study uses a panel of administrative claims data (2010-2011). Attribution rules were defined by unit of measure (count of physician visits, dollars paid), type of providers (primary care physicians [PCPs], all physicians), type of encounters (all visits, evaluation and management visits only), and level of concentration of care (majority, plurality). We created 32 retrospective attribution rules, spanning PCP-only rules, all-physician rules, hierarchical rules based on PCPs then all physicians, and lookback rules based on current-year PCP visits then prior-year experience.

RESULTS: All methods exhibit a tradeoff between stability of attribution and fraction of the population attributed. This tradeoff is minimized when PCP-based rules are supplemented by a 1-year lookback when the current-year experience does not result in attribution.

CONCLUSIONS: We recommend using this lookback method when multiple years of data are available. In absence of multiple years of data, PCP-based rules maximize stability; hierarchical rules result in a greater fraction attributed with less loss of stability than simple all-provider rules.

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attribution rule may assign patients to different provider systems over time due to variations in patterns of care rather than a true change in patient-provider affiliation; however, maximizing stability may require criteria so strict that the rule attributes few patients.

Our goal was to evaluate a variety of attribution rules by comparing the fraction attributed with the stability of assignment for each rule. Because we focused on shared savings contracts and other provider reimbursement methods administered at the level where reimbursement is negotiated, we attributed patients at the provider system level. We expected that more restrictive measures (PCPs only, E&M visits only) would exhibit greater stability of attribution over time and broader measures (all types of physicians, all types of visits) would attribute a greater fraction of the population but may be less stable.

There is a small body of literature evaluating attribution methods, much of it focused on attribution at the individual provider level. Mehrotra et al⁷ used commercial health plan data to compare 12 rules attributing patients to individual physicians and the subsequent categorization of physicians in cost categories. They found that the attribution rule could substantially affect the cost category assignment. Pham et al⁹ tested the fraction attributed and stability of attribution of Medicare patients to individual physicians; attribution rules were based on E&M visits and differed by concentration of care (majority, plurality), provider type (PCPs only, any provider), and a rule that allowed a patient to be attributed to several providers. The fraction attributed ranged from 79% to 94%, and stability of attribution ranged from 48% to 74%. In one of the few studies comparing attribution rules at the provider system level, Lewis et al³ compared prospective and retrospective application of the Medicare Shared Savings rule to Medicare beneficiaries. They found retrospective attribution more accurately identified patients who received care from an accountable care organization (ACO). A robustness check using claims from all types of physicians yielded the same results.

Our study builds on and improves the literature in several ways. First, we attributed health plan members at the provider system level to support public and private shared savings contracts. Second, since these compensation methods are being adopted by private health plans, we expand the literature by assessing how attribution performs among commercially insured and managed Medicaid populations.

METHODS

Setting and Data

The study used data from a regional health plan headquartered in Minnesota, which is at the forefront of consolidation of providers

TAKEAWAY POINTS

The process of assigning patients to provider systems is a key component of many payment reform efforts. The majority of these payment systems rely on retrospective attribution of patients to provider systems, but there is no generally accepted method. We evaluated retrospective attribution rules, measuring the fraction attributed and the stability of attribution.

- ▶ The performance of attribution rules varies in terms of patients attributed and the stability of attribution.
- ▶ We recommend attribution rules based on primary care physician visits, with a look back to the prior year's experience if the most recent year does not result in attribution.

into vertically integrated delivery systems (IDSs) capable of functioning as ACOs and of shared savings contracting with public and private payers.^{6,10} Yet, there remains significant exposure to other care settings, with 64% of the office visits in our data coming from providers practicing outside of an IDS setting. We believe that Minnesota is a mature shared savings environment that offers insights into the future of delivery of care in America.

We used claims and enrollment data from 2010 and 2011 for plan members ("patients") aged 18 to 64 years. Patients were enrolled in commercial group, individual and family, and managed Medicaid products. The study was limited to adults younger than 65 years because Medicare paid on a primary basis for the plan's Medicare Cost products, so we may not have observed all physician visits for these products.

Attribution measures were based on visits that occurred in a home or clinic setting or, for Medicaid only, the emergency department (as Medicaid patients may seek primary or specialty care at the emergency department in nonemergent settings¹¹). Encounters were categorized as E&M visits (identified by the current procedural terminology [CPT] codes 99050, 99053-99057, 99058, 99201-99205, 99211-99215, 99241-99245, 99324-99328, 99334-99337, 99339-99345, 99347-99350, 99354, 99355, 99374, 99375, 99381-99387, 99391-99397) or non-E&M visits. We excluded most nonphysician encounters, although visits to nurse practitioners and physician assistants were retained with visits to physicians, categorized as primary or specialty care according to their area of practice. Providers specializing in general practice, internal medicine, pediatrics, family practice, or obstetrics-gynecology were categorized as primary care. Cost of care was defined as allowed charges, including both plan and member payments.

Table 1 shows sociodemographic characteristics of the population. Demographics (age, sex, plan type) were drawn from enrollment data. A categorical measure of health status (resource utilization band) and indicators of frailty and chronic conditions (diabetes, depression, high cholesterol, and high blood pressure) were computed by the Johns Hopkins Adjusted Clinical Groups (ACG) System¹² based on diagnosis and pharmacy history. Neighborhood effects were based on 2010 US Census and 2011 5-year average American Community Survey data, within block

TABLE. Demographic Characteristics

	N	Mean	SD
Age, years			
18-22	448,411	11.4%	31.8
23-34	448,411	28.8%	45.3
35-44	448,411	20.8%	40.6
45-54	448,411	22.6%	41.8
55-64	448,411	16.5%	37.1
Female	448,409	53.0%	49.9
Prior-year resource utilization band			
No utilization	333,287	14.2%	34.9
Healthy user	333,287	13.9%	34.6
Low	333,287	14.8%	35.5
Moderate	333,287	43.2%	49.5
High	333,287	11.1%	31.5
Very high	333,287	2.7%	16.3
Frailty flag: previous year	332,140	3.1%	17.4
Diabetes: previous year	332,140	5.6%	23.0
Depression: previous year	332,140	19.2%	39.4
High cholesterol: previous year	332,140	15.0%	35.7
High blood pressure: previous year	332,140	17.0%	37.6
Insurance type			
Broad PPO	448,411	67.1%	47.0
Narrow network	448,411	9.5%	29.4
Medicaid	448,411	23.4%	42.3
Neighborhood			
High school or less	431,353	26.5%	9.8
More than high school	431,353	65.3%	13.7
Median income \$0-\$47,999	431,347	25.6%	43.6
Median income \$48,000-\$62,999	431,347	23.6%	42.5
Median income \$63,000-\$82,999	431,347	25.3%	43.5
Median income \$83,000 and above	431,347	25.5%	43.6
Urban	431,353	80.8%	39.4
Non-Hispanic whites	431,353	82.6%	21.5
Foreign	431,353	7.6%	7.6

PPO indicates preferred provider organization; SD, standard deviation.

(percent non-Hispanic whites), block group (levels of median income, education distribution), and census tract (urban, percent foreign-born).

Attribution Rules

Our attribution rules retrospectively assigned patients to a provider system based on the most recent calendar year of claims experience. These provider systems range from small practices to large IDs with multiple clinic locations. We created provider systems by grouping providers within Tax Identification Numbers (TINs),

additionally grouping TINs into the level at which the system contracts with the health plan. Each attribution rule is defined by: 1) provider type (any physician, PCPs only), 2) encounter type (any visits, E&M visits only), 3) unit of measure (number of visits, allowed charges for visits), and 4) required concentration of care (majority, plurality with a minimum fraction of 35%). Criteria 1 and 2 define the scope of data needed, criterion 3 defines the metric used, and criterion 4 defines the decision rule. Together, these criteria define 16 attribution rules. For example, a patient could be attributed to the provider system from which they receive the majority of E&M visits with a PCP. In the case of a tie, attribution was made to the provider system providing the greater fraction of the alternate unit. For example, if an attribution rule was tied at 50% of visits in 2 provider systems, the tie was broken by allowed charges.

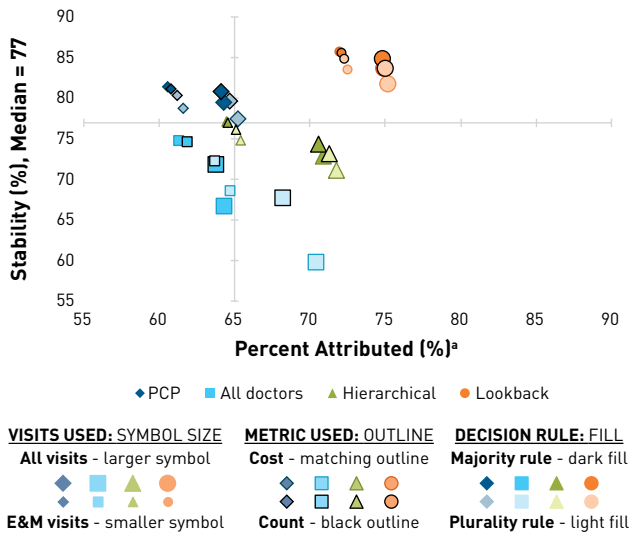
We tested 2 additional sets of 8 attribution rules that increase the fraction attributed. These rules first used a PCP-only method and, for those not initially attributed, a supplementary method. In the hierarchical method, if a member was not initially attributed, the analogous all-physician method was used. In the lookback method, if a member was not initially attributed (2011), we looked back to the member's experience in the prior year (2010) to see if they had coverage and would be attributed in the prior year. If so, this method carried that attribution forward to 2011. Altogether, we evaluated 32 attribution rules.

RESULTS

Fraction Attributed and Stability

Figure 1 displays the results for the 32 rules, showing fraction attributed and stability of attribution, with details available in the eAppendix [eAppendices available at ajmc.com]. Fraction attributed is simply the percentage of patients attributed. Stability is the percentage of patients attributed in the current and prior years that stayed in the same system in both years. Figure 1 plots the fraction of patients attributed against the stability of attribution for the all-physician (squares), PCP (diamonds), hierarchical (triangles), and lookback (circles) attribution rules, including enrollees with both partial and full years of coverage. eAppendix Figure 1 shows that while enrollees with partial years have a lower fraction attributed, the relative performance of the attribution rules is consistent between partial-year and full-year enrollees. The type of visit used for attribution is indicated by the size of the symbol, with larger symbols indicating the use of all visits and smaller symbols indicating the data were restricted to E&M visits. If the attribution units were cost (allowed charges), the outline of the symbol matched the color of the fill; black outlines indicate that the count of visits was used. Where the decision rule was based on majority of cost or counts, the symbol is filled with a darker shade; lighter fill indicates a plurality rule. Figure 1 shows that the

FIGURE 1. Fraction of Patients Attributed and Stability of Attribution



E&M indicates evaluation and management; PCP, primary care physician.
 *Median is 65%.

lookback rules clearly dominate in both fraction attributed and stability. For these rules, the choice of cost versus count or majority versus plurality makes little difference in their performance. Restricting our attribution process to E&M visits only results in a minor reduction in the fraction attributed for lookback methods.

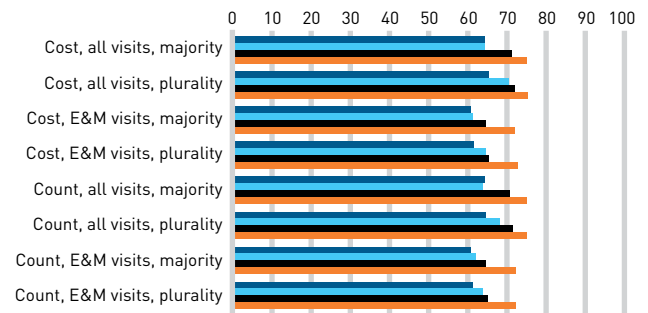
Of course, it may be possible that only a single year of experience is available with which to determine attribution, precluding the lookback method. In this event, the PCP rules provide more stability relative to the alternatives, although they result in a smaller fraction of patients attributed. In contrast, the hierarchical rules provide a larger fraction attributed than the PCP rules, at the cost of some stability of attribution. As for the lookback rules, the choice of cost versus count or majority versus plurality makes little difference to either the PCP rules or the hierarchical rules.

Although we also find a relatively larger fraction of the patients attributed using all-visit rules rather than PCP rules, this is at a greater cost of stability relative to the performance of both the PCP and hierarchical rules. These rules also exhibit the greatest sensitivity to the other criteria, including the choice of cost versus count or majority versus plurality.

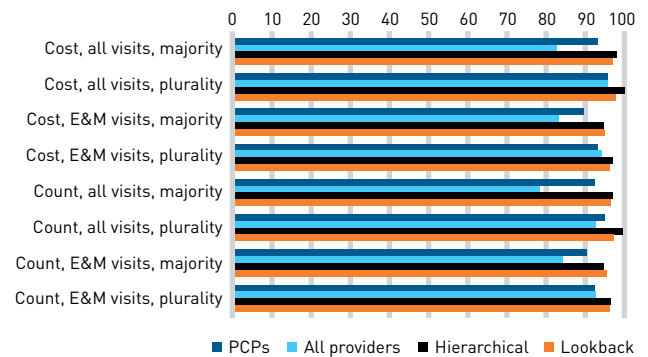
Both provider systems and insurers may be interested in the fraction of allowed charges for attributed patients (sum of plan and patient payments) rather than the fraction of patients attributed. **Figure 2** compares, for all attribution rules, the fraction of patients in the attributed population (top panel; previously displayed on the horizontal axis of Figure 1) with the fraction of allowed charges for the attributed population (bottom panel). We found that the

FIGURE 2. Fraction of Patients Attributed and Fraction of Allowed Charges From Attributed Population

A. Percent of patients attributed



B. Percent of allowed charges from attributed patients



E&M indicates evaluation and management; PCP, primary care physician.

attributed population generates a very large fraction of the allowed charges for all methods, with the lookback and hierarchical methods capturing 95% or more of allowed charges, regardless of the other methodological criteria.

Most of the meaningful differences in both percent of patients attributed and charges from attributed patients are driven by the class of attribution rule chosen, although the difference in percent of charges from attributed patients is not meaningfully different between the lookback and hierarchical classes. There are 2 additional factors beyond class of attribution rule that drive meaningful differences: 1) The hierarchical methods are sensitive to whether all visits or only E&M visits are used; this is most meaningful in the fraction of patients attributed. Using all visits generates a larger fraction of attributed patients and allowed charges. 2) The all-provider methods are sensitive to the choice of plurality versus majority rules, with the greater instability across all-provider methods seen in percent of charges from attributed patients relative to percent of patients attributed. All-provider plurality rules have a larger fraction of patients and allowed charges in the attributed

population than do all-provider majority rules. Given that the other 3 classes of attribution methods rarely capture fewer than 90% of allowed charges in the attributed population, the instability of this metric for all-provider rules is the most striking result in Figure 2.

Impact of Health Status on Attribution

Health status of patients may substantially change the performance of an attribution method. Related work¹³ using a PCP-based method shows that a patient with a more complex health status is more likely to be attributed, but also more likely to switch attributed providers from year to year, possibly due to primary care and specialty relationships spanning multiple provider systems. To assess the performance of the attribution rules by health status, we repeated the calculation of fraction attributed and stability of attribution for patients by health status.

We computed categorical measures of health status (resource utilization band) and indicators of chronic conditions (diabetes, depression, high cholesterol, and high blood pressure) with the Johns Hopkins ACG System,¹² based on diagnosis and pharmacy history. With these indicators, we measured health status in 2 ways: by the presence or absence of at least 1 chronic condition and whether or not the ACG system categorizes the member as high/very high risk (“complex health status”) relative to lower-risk categories.

Whether segmenting the population by the presence of chronic conditions (eAppendix Figure 2) or by health status complexity (eAppendix Figure 3), these tables show a higher fraction attributed for sicker patients across all attribution rules. In contrast, the tables show attribution stability is higher for patients with 1 or more chronic conditions across all attribution rules relative to those with no chronic conditions (Figure 3), but relatively consistent when comparing those with high complexity in health status to those with low complexity in health status (Figure 4). Thus, we see a marked difference between the impact of chronic conditions (typically managed in a primary care setting) and complex health status (a mix of chronic and acute conditions) on stability of attribution.

DISCUSSION

This study compared the performance of retrospective attribution rules used to assign patients to provider systems. We evaluated rules based on the fraction of patients attributed and stability of attribution. Results showed that the lookback method, especially when all visits were used to compute the measure, clearly dominated all alternatives. If 2 years of data are not available to compute attribution, the preference for breadth of attribution or stability of attribution will drive the decision to hierarchical methods or PCP methods, respectively. One would expect provider systems to favor the more stable PCP rules and the insurer to favor the hierarchical rules providing broader accountability to the provider system.

Provider systems may be interested in the stability of their attributed patient population as a fraction of their total patient population rather than as a fraction of the insurer’s enrolled population. We examine this in detail in our eAppendix, finding that results are driven by size of the provider system (IDS, large physician-only system, or small physician-only system). The fraction of patients served by a system that are attributed to that system—and the fraction of revenue generated by those attributed patients—declines markedly with system size. Smaller systems see more turnover in their attributed population from year to year. Even the largest vertically integrated systems see significant “leakage,” as only 47% to 61% of their attributed patients’ revenue is received by the system.

Limitations

This study has a key limitation: an external validity threat. National trends in provider concentration, value-based contracting, and healthcare utilization may be different than those in Minnesota. However, we believe Minnesota is on the leading edge in the trends of provider concentration and value-based contracting, so our results have relevance to national trends.

CONCLUSIONS

Our results allow us to make a clear recommendation of attribution rules, based on the fraction attributed and stability of the attribution. We recommend lookback rules using all PCP visits for attribution when 2 years of population history are available; we recommend a lookback method when multiple years of data are available. When there is a single year of history, the contractual parties must negotiate to determine whether the greater stability of all-visit PCP rules or the greater fraction attributed under all-visit hierarchical rules is the determining factor. ■

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eAppendix

Detailed Attribution Summary Statistics

This section provides a detailed look at the numbers behind Figures 1 and 2 in the manuscript. **eAppendix Table 1** shows detailed attribution summary statistics of patients attributed by attribution method (basis of manuscript Figure 1, and Figure 2 Part A). For all but the lookback methods, the fraction attributed is subdivided into the members who were previously attributed to the same clinic system, those who were attributed to a different clinic system and switched affiliation, and those who were not attributed in the prior year. The latter category includes both patients who had newly established relationships, and those who were newly enrolled in coverage in the current year. Stability of attribution was measured for those attributed in the current and prior year as the fraction that stayed in the same system in both years. **eAppendix Table 2** shows the percentage of health expenditures (allowed charges) from attributed patients according to the subdivisions of eAppendix Table 1, by attribution method (basis of manuscript Figure 2 Part B). Patients attributed by PCP- and hierarchical-based methods account for the largest percentage of expenditures, but stably attributed patients under PCP-based methods account for larger percentage of expenditures than hierarchical or all physician attribution methods.

Impact of Partial Years of Enrollment

In practice, retrospective attribution is performed on the entire insured population, including members who may have partial years of exposure due to recent enrollment or termination. **eAppendix Figure 1** is analogous to the manuscript's Figure 1, but divides the population into members with a partial year of enrollment and those with a full 12 months of enrollment. While those with a partial year of enrollment have a lower probability of physician visits due to the shorter exposure time, and thus have lower attribution rates, the relative performance of the attribution rules is consistent in the partial-year and full-year populations.

Trinomial Attribution Variable

Members can be unattributed for 2 reasons: either they have fragmented care and do not meet the majority or plurality rule required for attribution, or they do not seek the type of care on

which attribution is based in the year. **eAppendix Table 3** shows the breakdown between the 2 types on unattributed members, creating a trinomial rather than a binary measure of attribution status, for all but the lookback attribution methods.

Impact of Health Status on Attribution

Health status of the members may substantially change the performance of an attribution method. Related work¹ using a PCP-based method shows that members with more complex health status are more likely to be attributed, but also more likely to switch attributed providers from year to year, possibly because they have a greater chance of divided loyalties due to primary care and specialty relationships spanning multiple provider systems. To assess the performance of the attribution rules by health status, we repeated the calculation of fraction attributed, stability of attribution and association with healthcare utilization for members by health status. We measure health status in 2 ways: by the presence or absence of at least 1 chronic condition, and whether or not the ACG system categorizes the member as high/very high risk (“complex health status”). Whether segmenting the population by the presence of chronic conditions (**eAppendix Table 4**, the basis of Figure 3 in the manuscript) or by health status complexity (**eAppendix Table 5**, the basis of Figure 4 in the manuscript), these tables show a higher fraction attributed for sicker members across all attribution rules. In contrast, the tables show attribution stability is higher for members with 1 or more chronic conditions across all attribution rules, but consistently lower for members with complex health status among PCP-based attribution rules. Thus, we see a marked difference between the impact of chronic conditions (possibly managed in a primary care setting) and complex health status (a mix of chronic and acute conditions) on stability of attribution.

Attribution from the Provider’s Perspective

Our summary statistics focus on the percentage of patients who are attributed in any 1 year, and who have a stable relationship with their providers from year to year. However, a provider system would be interested in only the patients they encounter, and the fraction of patients for whom they are responsible under a shared savings or pay for performance program. They are not concerned about the stability of attribution of the average patient, but the stability of their patients’ relationship with their provider system. We would expect patient loyalty to a

provider system to vary depending on the size and structure of the provider system, with large multispecialty provider systems most likely to create strong patient attachment over time¹ due to their ability to provide a broad spectrum of healthcare services. To explore this alternative perspective, we have created a series of additional summary statistics, displayed in **eAppendix Table 6**, making the assumption that the population covered by this health plan is representative of the general under-65 population in the area, and that the distribution of revenue from this payer is representative of all payers for the under-65 population. The first 2 statistics capture measures of the attributed patient population as a fraction of the provider system's total patient population, and the third measures the fraction of care delivered by the provider system for patients attributed to that system:

1. Patients attributed to the provider system as a fraction of all patients receiving care from that provider system. Here the "Total" column is the sum of the "Returning" and "New" columns.
2. The fraction of the provider system's revenue from attributed patients, ie, allowed charges paid to the provider system for their attributed patients as a fraction of all dollars paid to the provider system. Here the "Total" column is the sum of the "Returning" and "New" columns.
3. Fraction of the attributed patient's revenue under the provider system's control, ie, for the provider system's attributed patients, allowed charged paid to the provider system as a fraction of all dollars paid for covered services received by the patient. Here the "Total" column is the average of the "Returning" and "New" columns.

eAppendix Figure 4 helps to clarify the distinction between the first 2 statistics and the third statistic. In this Venn diagram, we see the universe of allowed charges for the care of the covered population, some of which is paid to the provider system under consideration, and some of which is paid to other systems. The patients attributed to the provider system under consideration receive care from that system and from other systems. Statistic 2 is $(\text{area B}) / (\text{area A} + \text{area B})$, the fraction of the provider system's allowed charges from attributed patients; Statistic 1 is defined analogously using patient counts rather than dollars. Statistic 3 is $(\text{area B}) / (\text{area B} + \text{area C})$, the fraction of the attributed patient's allowed charges under the provider system's control.

We expect these statistics to vary significantly across provider system size and structure, so the statistics are computed in total and then separately for vertically integrated hospital and physician provider systems, for large physician-only systems (number of providers in the system above the median), and for small physician-only systems (number of providers in the system below the median). We further break down these statistics into the attributed patients who are newly attributed to the provider system, versus the patients who were also attributed to that system in the previous year. The “Returning” column in eAppendix Table 6 is analogous to the “Previously in System” column in eAppendix Table 4, and the “New” column in eAppendix Table 6 is analogous to the sum of eAppendix Table 4’s “Switched Systems” and “Newly Attributed” columns. Due to space constraints, here we do not identify why the “New” patients are new to the system.

These results show that the attributed population comprises a larger fraction of the provider system’s total patient population as the size of the provider organization increases. This gradient is strong when the fraction is computed by patient count (first set of columns); less strong but still monotonic when the fraction is computed by dollars (second set of columns). We also find that the attributed patient population is weighted more towards patients newly attributed to the system when the provider system is small, suggesting that smaller systems see greater turnover in their attributed population; this in conjunction with the small fraction attributed means smaller systems will have less success in reaping the future benefits of investments in population health.

In the final set of columns in eAppendix Table 6, we see the average fraction of total attributed patient care dollars controlled by the provider system. As expected, the larger clinic systems, especially those vertically integrated with hospitals, control a greater fraction of the care accessed by their attributed patients. However, even for the large integrated delivery systems, on average there is a large plurality or small majority of care provided outside of their system.

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eAppendix Table 1. Detailed Attribution Statistics – Attributed Patients

				% Attributed patients					
				Previously in System	Switched Systems	Newly Attributed	Total	% Stable ^a	
PCP	Cost	All visits	Majority	31.9%	8.2%	24.2%	64.3%	79.5%	
			Plurality	32.0%	9.3%	23.9%	65.2%	77.5%	
		E&M	Majority	29.8%	6.8%	24.1%	60.6%	81.4%	
			Plurality	29.8%	8.0%	23.8%	61.6%	78.8%	
	Count	All visits	Majority	32.4%	7.6%	24.1%	64.1%	80.9%	
			Plurality	32.5%	8.3%	24.0%	64.7%	79.7%	
		E&M	Majority	29.9%	6.9%	24.0%	60.8%	81.2%	
			Plurality	30.0%	7.3%	23.9%	61.2%	80.4%	
	All physicians	Cost	All visits	Majority	25.1%	12.5%	26.6%	64.3%	66.8%
				Plurality	27.1%	18.2%	25.1%	70.4%	59.9%
			E&M	Majority	27.0%	9.1%	25.1%	61.3%	74.8%
				Plurality	27.8%	12.7%	24.2%	64.7%	68.6%
Count		All visits	Majority	27.0%	10.5%	26.3%	63.8%	71.9%	
			Plurality	29.0%	13.8%	25.5%	68.2%	67.8%	
		E&M	Majority	27.7%	9.4%	24.9%	61.9%	74.7%	
			Plurality	28.4%	10.9%	24.4%	63.7%	72.3%	
Hierarchical		Cost	All visits	Majority	33.7%	12.5%	24.8%	70.9%	72.9%
				Plurality	33.7%	13.6%	24.4%	71.8%	71.2%
			E&M	Majority	31.1%	9.2%	24.2%	64.5%	77.2%
				Plurality	31.0%	10.4%	23.9%	65.4%	74.9%
	Count	All visits	Majority	34.1%	11.8%	24.7%	70.6%	74.4%	
			Plurality	34.3%	12.5%	24.5%	71.3%	73.2%	
		E&M	Majority	31.2%	9.3%	24.1%	64.6%	77.0%	
			Plurality	31.3%	9.8%	24.0%	65.1%	76.2%	
	Lookback	Cost	All visits	Majority	42.5%	8.2%	24.2%	74.9%	83.8%
				Plurality	42.0%	9.3%	23.9%	75.2%	81.9%
			E&M	Majority	41.2%	6.8%	24.1%	72.0%	85.8%
				Plurality	40.7%	8.0%	23.8%	72.5%	83.6%
Count		All visits	Majority	43.0%	7.6%	24.1%	74.8%	84.9%	
			Plurality	42.8%	8.3%	24.0%	75.0%	83.8%	
		E&M	Majority	41.2%	6.9%	24.0%	72.1%	85.6%	
			Plurality	41.1%	7.3%	23.9%	72.3%	84.9%	

E&M indicates evaluation and management; PCP, primary care physician.

^a% Stable = (Previously in system)/(Previously in system + Switched systems)

eAppendix Table 2. Detailed Attribution Statistics – All Costs

				% All costs				
				Previously in System	Switched Systems	Newly Attributed	Total	% Stable ^a
PCP	Cost	All visits	Majority	48.1%	16.3%	26.1%	90.5%	74.7%
			Plurality	48.5%	19.3%	25.5%	93.4%	71.5%
		E&M	Majority	47.4%	13.0%	26.7%	87.1%	78.5%
			Plurality	47.8%	16.3%	26.3%	90.3%	74.6%
	Count	All visits	Majority	50.1%	14.0%	26.0%	90.0%	78.2%
			Plurality	50.4%	16.6%	25.7%	92.7%	75.2%
		E&M	Majority	48.4%	12.8%	26.6%	87.8%	79.1%
			Plurality	48.5%	14.7%	26.4%	89.6%	76.8%
All physicians	Cost	All visits	Majority	31.9%	17.0%	26.8%	75.7%	65.2%
			Plurality	37.2%	29.7%	25.3%	92.3%	55.6%
		E&M	Majority	38.3%	14.3%	27.2%	79.7%	72.9%
			Plurality	42.0%	23.3%	25.9%	91.2%	64.3%
	Count	All visits	Majority	34.7%	13.1%	25.6%	73.4%	72.5%
			Plurality	41.0%	22.4%	25.8%	89.1%	64.7%
		E&M	Majority	40.1%	14.8%	26.7%	81.6%	73.1%
			Plurality	43.1%	20.4%	26.2%	89.8%	67.8%
Hierarchical	Cost	All visits	Majority	49.8%	21.8%	24.3%	95.9%	69.6%
			Plurality	50.2%	24.4%	23.7%	98.3%	67.3%
		E&M	Majority	49.2%	16.5%	25.6%	91.3%	75.0%
			Plurality	49.4%	19.6%	25.0%	93.9%	71.6%
	Count	All visits	Majority	51.8%	18.9%	24.4%	95.0%	73.3%
			Plurality	52.1%	21.7%	24.0%	97.7%	70.6%
		E&M	Majority	50.2%	16.1%	25.4%	91.7%	75.7%
			Plurality	50.2%	18.1%	25.1%	93.4%	73.5%
Lookback	Cost	All visits	Majority	52.6%	16.3%	26.1%	95.0%	76.3%
			Plurality	51.1%	19.3%	25.5%	95.9%	72.5%
		E&M	Majority	53.2%	13.0%	26.7%	92.9%	80.4%
			Plurality	51.7%	16.3%	26.3%	94.2%	76.0%
	Count	All visits	Majority	54.7%	14.0%	26.0%	94.6%	79.7%
			Plurality	53.4%	16.6%	25.7%	95.7%	76.3%
		E&M	Majority	53.8%	12.8%	26.6%	93.2%	80.8%
			Plurality	52.8%	14.7%	26.4%	93.9%	78.2%

E&M indicates evaluation and management; PCP, primary care physician.

^a% Stable = (Previously in system)/(Previously in system + Switched systems)

eAppendix Table 3. Summary of Trinomial Attribution Variable

			No Care	Fragmented Care	Attributed	
PCP	Cost	All visits	<u>Majority</u>	26.9%	0.8%	72.3%
			<u>Plurality</u>	26.9%	0.1%	73.0%
		E&M	<u>Majority</u>	30.7%	0.8%	68.5%
			<u>Plurality</u>	30.7%	0.1%	69.2%
	Count	All visits	<u>Majority</u>	26.9%	0.9%	72.2%
			<u>Plurality</u>	26.9%	0.4%	72.7%
		E&M	<u>Majority</u>	30.7%	0.7%	68.6%
			<u>Plurality</u>	30.7%	0.3%	69.0%
All physicians	Cost	All visits	<u>Majority</u>	20.7%	8.3%	71.0%
			<u>Plurality</u>	20.7%	1.7%	77.6%
		E&M	<u>Majority</u>	27.0%	4.5%	68.6%
			<u>Plurality</u>	27.0%	0.7%	72.3%
	Count	All visits	<u>Majority</u>	20.7%	8.6%	70.8%
			<u>Plurality</u>	20.7%	3.6%	75.7%
		E&M	<u>Majority</u>	27.0%	3.7%	69.3%
			<u>Plurality</u>	27.0%	1.6%	71.4%
Hierarchical	Cost	All visits	<u>Majority</u>	20.7%	0.8%	78.5%
			<u>Plurality</u>	20.7%	0.1%	79.3%
		E&M	<u>Majority</u>	27.0%	0.8%	72.2%
			<u>Plurality</u>	27.0%	0.1%	73.0%
	Count	All visits	<u>Majority</u>	20.7%	1.0%	78.3%
			<u>Plurality</u>	20.7%	0.4%	78.9%
		E&M	<u>Majority</u>	27.0%	0.6%	72.4%
			<u>Plurality</u>	27.0%	0.3%	72.7%

E&M indicates evaluation and management; PCP, primary care physician.

eAppendix Table 4. Attribution Summary Statistics by Number of Chronic Conditions

			No Chronic Conditions					One or More Chronic Conditions					
			% Attributed					% Attributed					
			Previously in System	Switched Systems	Newly Attributed	Total	% Stable ^a	Previously in System	Switched Systems	Newly Attributed	Total	% Stable ^a	
PCP	Cost	All visits	Majority	28.7%	9.3%	20.5%	58.5%	75.5%	61.0%	13.3%	6.9%	81.2%	82.1%
			Plurality	28.8%	10.2%	20.3%	59.3%	73.9%	61.2%	15.5%	5.8%	82.5%	79.7%
	E&M	Majority	25.2%	7.6%	21.9%	54.7%	76.9%	58.9%	11.2%	8.2%	78.3%	84.1%	
		Plurality	25.3%	8.5%	21.7%	55.5%	74.8%	58.9%	13.6%	7.1%	79.6%	81.2%	
	Count	All visits	Majority	28.9%	8.9%	20.6%	58.4%	76.6%	62.2%	12.1%	6.9%	81.1%	83.7%
			Plurality	29.0%	9.3%	20.4%	58.8%	75.8%	62.4%	13.5%	6.2%	82.0%	82.2%
	E&M	Majority	25.3%	7.7%	21.8%	54.8%	76.7%	59.2%	11.4%	8.0%	78.5%	83.9%	
		Plurality	25.3%	7.9%	21.8%	55.0%	76.2%	59.5%	12.3%	7.5%	79.2%	82.9%	
All physicians	Cost	All visits	Majority	24.6%	15.0%	21.0%	60.7%	62.2%	45.6%	19.3%	11.6%	76.4%	70.3%
			Plurality	25.9%	19.5%	19.7%	65.1%	57.0%	50.0%	30.7%	5.5%	86.2%	61.9%
	E&M	Majority	23.9%	10.5%	21.9%	56.3%	69.4%	52.3%	14.4%	10.1%	76.9%	78.4%	
		Plurality	24.2%	13.4%	21.2%	58.8%	64.4%	54.2%	21.9%	6.4%	82.6%	71.2%	
	Count	All visits	Majority	25.8%	13.2%	21.0%	60.0%	66.2%	49.7%	15.5%	11.0%	76.3%	76.2%
			Plurality	26.9%	15.5%	20.5%	62.9%	63.4%	54.4%	22.4%	7.0%	83.9%	70.8%
	E&M	Majority	24.2%	10.8%	21.8%	56.8%	69.2%	53.8%	15.0%	9.2%	78.1%	78.1%	
		Plurality	24.6%	11.7%	21.5%	57.8%	67.8%	55.6%	18.5%	7.2%	81.3%	75.0%	
Hierarchical	Cost	All visits	Majority	30.8%	14.7%	19.7%	65.2%	67.6%	63.8%	19.6%	4.3%	87.7%	76.5%
			Plurality	30.9%	15.7%	19.4%	65.9%	66.3%	63.9%	21.8%	3.2%	88.9%	74.5%
	E&M	Majority	26.6%	10.6%	21.3%	58.4%	71.6%	61.2%	14.7%	6.5%	82.5%	80.6%	
		Plurality	26.6%	11.5%	21.0%	59.1%	69.8%	61.0%	17.2%	5.5%	83.7%	78.0%	
	Count	All visits	Majority	31.0%	14.1%	19.8%	64.9%	68.7%	65.0%	18.1%	4.4%	87.4%	78.2%
			Plurality	31.1%	14.7%	19.6%	65.4%	67.9%	65.1%	19.7%	3.6%	88.4%	76.8%
	E&M	Majority	26.6%	10.7%	21.2%	58.5%	71.4%	61.5%	14.9%	6.3%	82.7%	80.4%	
		Plurality	26.7%	10.9%	21.2%	58.8%	70.9%	61.7%	16.0%	5.8%	83.4%	79.5%	
Lookback	Cost	All visits	Majority	43.6%	9.3%	20.5%	73.4%	82.4%	74.6%	13.3%	6.9%	94.7%	84.9%
			Plurality	43.2%	10.2%	20.3%	73.7%	80.9%	73.7%	15.5%	5.8%	95.1%	82.6%
	E&M	Majority	40.7%	7.6%	21.9%	70.2%	84.3%	74.1%	11.2%	8.2%	93.5%	86.9%	
		Plurality	40.3%	8.5%	21.7%	70.5%	82.6%	73.1%	13.6%	7.1%	93.9%	84.3%	
	Count	All visits	Majority	43.9%	8.9%	20.6%	73.3%	83.2%	75.7%	12.1%	6.9%	94.7%	86.2%
			Plurality	43.8%	9.3%	20.4%	73.5%	82.5%	75.3%	13.5%	6.2%	95.0%	84.8%
	E&M	Majority	40.7%	7.7%	21.8%	70.2%	84.1%	74.3%	11.4%	8.0%	93.6%	86.7%	
		Plurality	40.6%	7.9%	21.8%	70.3%	83.7%	74.0%	12.3%	7.5%	93.8%	85.8%	

E&M indicates evaluation and management; PCP, primary care physician.

^a% Stable = (Previously in system)/(Previously in system + Switched systems)

eAppendix Table 5. Attribution Summary Statistics by Complexity of Health Status

			Not Complex Health Status					Complex Health Status					
			% Attributed					% Attributed					
			Previously in System	Switched Systems	Newly Attributed	Total	% Stable ^a	Previously in System	Switched Systems	Newly Attributed	Total	% Stable ^a	
PCP	Cost	All	Majority	40.1%	10.0%	16.0%	66.1%	80.0%	61.5%	17.6%	4.7%	83.8%	77.7%
		visits	Plurality	40.2%	11.1%	15.7%	67.0%	78.3%	62.0%	21.6%	2.4%	86.0%	74.1%
		E&M	Majority	37.2%	8.4%	17.2%	62.8%	81.6%	59.1%	14.2%	6.9%	80.2%	80.7%
	Count	All	Majority	40.5%	9.5%	16.1%	66.0%	81.1%	63.6%	15.4%	4.7%	83.7%	80.5%
		visits	Plurality	40.6%	10.0%	15.9%	66.5%	80.2%	64.3%	18.3%	2.9%	85.4%	77.9%
		E&M	Majority	37.2%	8.5%	17.2%	62.9%	81.4%	59.8%	14.5%	6.3%	80.6%	80.5%
All physicians	Cost	All	Majority	33.1%	16.7%	17.0%	66.8%	66.5%	39.3%	18.3%	15.8%	73.3%	68.3%
		visits	Plurality	34.9%	22.9%	14.6%	72.4%	60.3%	46.9%	34.3%	6.1%	87.3%	57.8%
		E&M	Majority	34.6%	11.8%	17.4%	63.8%	74.5%	48.5%	15.2%	12.2%	75.9%	76.1%
	Count	All	Majority	35.1%	14.3%	16.9%	66.4%	71.0%	44.5%	13.7%	14.5%	72.7%	76.5%
		visits	Plurality	36.9%	17.6%	15.7%	70.2%	67.7%	52.7%	24.8%	7.2%	84.7%	68.0%
		E&M	Majority	35.2%	12.1%	17.1%	64.4%	74.3%	51.0%	16.0%	10.5%	77.4%	76.1%
Hierarchical	Cost	All	Majority	42.5%	15.8%	14.4%	72.7%	72.9%	63.6%	23.4%	3.0%	90.1%	73.1%
		visits	Plurality	42.5%	17.0%	14.0%	73.6%	71.5%	64.0%	27.3%	0.8%	92.1%	70.1%
		E&M	Majority	38.8%	11.5%	16.2%	66.6%	77.2%	61.3%	18.1%	5.4%	84.7%	77.2%
	Count	All	Majority	42.9%	15.1%	14.5%	72.5%	73.9%	65.8%	20.6%	3.2%	89.7%	76.2%
		visits	Plurality	43.0%	15.8%	14.3%	73.1%	73.1%	66.4%	23.8%	1.3%	91.5%	73.6%
		E&M	Majority	38.9%	11.6%	16.2%	66.7%	77.0%	61.9%	18.3%	4.8%	85.0%	77.2%
Lookback	Cost	All	Majority	54.6%	10.0%	16.0%	80.7%	84.5%	74.3%	17.6%	4.7%	96.6%	80.8%
		visits	Plurality	54.1%	11.1%	15.7%	80.9%	83.0%	73.2%	21.6%	2.4%	97.2%	77.2%
		E&M	Majority	52.7%	8.4%	17.2%	78.3%	86.3%	73.4%	14.2%	6.9%	94.5%	83.8%
	Count	All	Majority	52.1%	9.6%	16.9%	78.6%	84.5%	72.2%	18.4%	4.7%	95.3%	79.7%
		visits	Plurality	55.1%	9.5%	16.1%	80.6%	85.3%	76.5%	15.4%	4.7%	96.6%	83.2%
		E&M	Majority	54.9%	10.0%	15.9%	80.8%	84.6%	75.9%	18.3%	2.9%	97.1%	80.6%
		Plurality	52.7%	8.5%	17.2%	78.3%	86.1%	73.9%	14.5%	6.3%	94.7%	83.6%	
		Plurality	52.6%	8.8%	17.1%	78.4%	85.7%	73.5%	16.5%	5.1%	95.2%	81.7%	

E&M indicates evaluation and management; PCP, primary care physician.

eAppendix Table 6. Attribution Measures from the Provider Perspective

			1. Attributed Patients as a Fraction of System's Total Patients			2. Revenue from Attributed Patients as a Fraction of System's Total Revenue			3. Fraction of Attributed Patients' Total Revenue Paid to System			
			Returning	New	Total	Returning	New	Total	Returning	New	Total	
PCP	Cost	All visits	IDS	0.332	0.263	0.596	0.365	0.252	0.617	0.521	0.483	0.505
			Large	0.175	0.169	0.344	0.189	0.192	0.380	0.295	0.304	0.299
			Small	0.048	0.069	0.117	0.060	0.116	0.176	0.126	0.167	0.150
			All	0.240	0.207	0.447	0.299	0.229	0.527	0.441	0.407	0.426
		Plurality	IDS	0.321	0.261	0.582	0.350	0.247	0.597	0.519	0.470	0.498
			Large	0.163	0.161	0.324	0.184	0.189	0.374	0.290	0.289	0.290
			Small	0.048	0.070	0.118	0.065	0.129	0.195	0.125	0.168	0.151
			All	0.227	0.201	0.427	0.287	0.225	0.512	0.436	0.392	0.415
	E&M	Majority	IDS	0.326	0.269	0.595	0.355	0.247	0.601	0.498	0.461	0.482
			Large	0.189	0.185	0.374	0.183	0.172	0.355	0.272	0.279	0.275
			Small	0.074	0.094	0.168	0.075	0.119	0.194	0.111	0.139	0.126
			All	0.251	0.222	0.474	0.292	0.219	0.512	0.419	0.387	0.405
		Plurality	IDS	0.314	0.267	0.580	0.340	0.246	0.585	0.495	0.456	0.477
			Large	0.175	0.176	0.351	0.179	0.173	0.351	0.269	0.266	0.267
			Small	0.073	0.095	0.168	0.082	0.128	0.210	0.108	0.130	0.120
			All	0.236	0.215	0.451	0.281	0.219	0.500	0.413	0.377	0.396
	Count	All visits	IDS	0.334	0.260	0.594	0.364	0.242	0.606	0.510	0.486	0.500
			Large	0.170	0.157	0.326	0.190	0.172	0.362	0.280	0.287	0.283
			Small	0.051	0.067	0.118	0.063	0.102	0.165	0.115	0.161	0.140
			All	0.236	0.198	0.434	0.298	0.216	0.513	0.426	0.401	0.415
Plurality		IDS	0.330	0.259	0.589	0.355	0.242	0.597	0.508	0.478	0.495	
		Large	0.177	0.165	0.343	0.189	0.174	0.362	0.278	0.281	0.279	
		Small	0.050	0.066	0.116	0.062	0.099	0.161	0.116	0.153	0.136	
		All	0.240	0.203	0.443	0.292	0.216	0.508	0.424	0.394	0.410	
E&M	Majority	IDS	0.323	0.267	0.589	0.349	0.238	0.588	0.494	0.462	0.481	
		Large	0.179	0.174	0.354	0.187	0.171	0.357	0.268	0.273	0.271	
		Small	0.075	0.096	0.171	0.086	0.134	0.220	0.107	0.138	0.124	
		All	0.243	0.215	0.457	0.290	0.214	0.503	0.412	0.383	0.399	

	IDS	0.320	0.266	0.586	0.343	0.240	0.583	0.493	0.459	0.479
	Large	0.189	0.185	0.374	0.185	0.174	0.359	0.266	0.270	0.268
	Small	0.075	0.095	0.169	0.086	0.136	0.222	0.106	0.139	0.124
	<i>All</i>	<i>0.248</i>	<i>0.221</i>	<i>0.469</i>	<i>0.286</i>	<i>0.216</i>	<i>0.501</i>	<i>0.410</i>	<i>0.380</i>	<i>0.397</i>

Table A6: Attribution Measures from the Provider Perspective, cont.

			1. Attributed Patients as a Fraction of System's Total Patients			2. Revenue from Attributed Patients as a Fraction of System's Total Revenue			3. Fraction of Attributed Patients' Total Revenue Paid to System			
			Returning	New	Total	Returning	New	Total	Returning	New	Total	
				IDS	0.295	0.305	0.600	0.346	0.311	0.657	0.655	0.572
All Physicians	All visits	Majority	Large	0.124	0.214	0.338	0.207	0.308	0.515	0.498	0.391	0.428
		Small	0.035	0.115	0.150	0.158	0.239	0.397	0.483	0.313	0.364	
		<i>All</i>	<i>0.186</i>	<i>0.245</i>	<i>0.431</i>	<i>0.287</i>	<i>0.309</i>	<i>0.596</i>	<i>0.599</i>	<i>0.478</i>	<i>0.530</i>	
		Plurality	IDS	0.268	0.278	0.546	0.311	0.279	0.591	0.622	0.534	0.577
	Cost	Large	0.112	0.198	0.311	0.190	0.286	0.476	0.442	0.334	0.370	
		Small	0.034	0.107	0.141	0.139	0.214	0.353	0.408	0.262	0.305	
		<i>All</i>	<i>0.166</i>	<i>0.223</i>	<i>0.390</i>	<i>0.260</i>	<i>0.281</i>	<i>0.540</i>	<i>0.553</i>	<i>0.424</i>	<i>0.478</i>	
		Majority	IDS	0.314	0.291	0.605	0.355	0.278	0.634	0.554	0.483	0.520
	E&M	Large	0.127	0.174	0.301	0.162	0.203	0.365	0.365	0.304	0.329	
		Small	0.049	0.113	0.161	0.078	0.127	0.206	0.217	0.183	0.195	
		<i>All</i>	<i>0.199</i>	<i>0.219</i>	<i>0.418</i>	<i>0.277</i>	<i>0.247</i>	<i>0.525</i>	<i>0.493</i>	<i>0.403</i>	<i>0.446</i>	
		Plurality	IDS	0.288	0.275	0.563	0.322	0.260	0.582	0.534	0.459	0.498
Count	All visits	Large	0.119	0.171	0.291	0.155	0.196	0.351	0.334	0.271	0.296	
		Small	0.044	0.106	0.150	0.070	0.126	0.196	0.194	0.174	0.181	
		<i>All</i>	<i>0.182</i>	<i>0.209</i>	<i>0.391</i>	<i>0.253</i>	<i>0.233</i>	<i>0.486</i>	<i>0.464</i>	<i>0.370</i>	<i>0.413</i>	
		Majority	IDS	0.314	0.299	0.613	0.365	0.298	0.662	0.625	0.573	0.600
	All visits	Large	0.137	0.200	0.336	0.210	0.277	0.487	0.445	0.398	0.417	
		Small	0.042	0.111	0.153	0.155	0.218	0.372	0.411	0.304	0.341	
		<i>All</i>	<i>0.201</i>	<i>0.234</i>	<i>0.435</i>	<i>0.300</i>	<i>0.288</i>	<i>0.588</i>	<i>0.560</i>	<i>0.486</i>	<i>0.521</i>	
		Plurality	IDS	0.298	0.278	0.576	0.336	0.272	0.608	0.592	0.535	0.565
	All visits	Large	0.125	0.181	0.307	0.197	0.257	0.454	0.407	0.352	0.374	
		Small	0.040	0.102	0.142	0.141	0.193	0.334	0.355	0.254	0.288	
		<i>All</i>	<i>0.186</i>	<i>0.214</i>	<i>0.399</i>	<i>0.277</i>	<i>0.264</i>	<i>0.541</i>	<i>0.521</i>	<i>0.440</i>	<i>0.478</i>	

E&M	Majority	IDS	0.308	0.283	0.592	0.345	0.262	0.608	0.546	0.479	0.515
		Large	0.131	0.173	0.303	0.168	0.201	0.369	0.341	0.297	0.316
		Small	0.049	0.107	0.156	0.078	0.125	0.203	0.198	0.179	0.186
		All	0.198	0.214	0.413	0.272	0.237	0.509	0.474	0.395	0.434
	Plurality	IDS	0.300	0.274	0.574	0.328	0.253	0.581	0.531	0.467	0.501
		Large	0.124	0.165	0.290	0.163	0.194	0.357	0.327	0.277	0.297
		Small	0.049	0.106	0.155	0.077	0.124	0.201	0.194	0.167	0.177
		All	0.190	0.206	0.396	0.260	0.228	0.488	0.458	0.375	0.415

Table A6: Attribution Measures from the Provider Perspective, cont.

Hierarchical			1. Attributed Patients as a Fraction of System's Total Patients			2. Revenue from Attributed Patients as a Fraction of System's Total Revenue			3. Fraction of Attributed Patients' Total Revenue Paid to System			
			Returning	New	Total	Returning	New	Total	Returning	New	Total	
Cost	All visits	Majority	IDS	0.328	0.261	0.589	0.362	0.247	0.609	0.523	0.481	0.505
			Large	0.128	0.145	0.272	0.162	0.188	0.351	0.306	0.321	0.314
			Small	0.030	0.065	0.095	0.032	0.093	0.124	0.144	0.217	0.192
			All	0.196	0.183	0.379	0.276	0.221	0.497	0.446	0.408	0.428
		Plurality	IDS	0.318	0.259	0.577	0.349	0.243	0.592	0.521	0.469	0.498
			Large	0.126	0.146	0.272	0.161	0.186	0.347	0.300	0.306	0.303
			Small	0.030	0.065	0.095	0.031	0.092	0.123	0.138	0.212	0.187
			All	0.192	0.183	0.375	0.268	0.218	0.486	0.440	0.393	0.418
	E&M	Majority	IDS	0.324	0.266	0.589	0.354	0.241	0.596	0.498	0.454	0.480
			Large	0.131	0.142	0.273	0.151	0.153	0.304	0.277	0.278	0.278
			Small	0.048	0.085	0.134	0.047	0.100	0.146	0.116	0.155	0.140
			All	0.203	0.188	0.391	0.270	0.205	0.475	0.421	0.379	0.402
		Plurality	IDS	0.312	0.264	0.576	0.340	0.241	0.581	0.496	0.451	0.476
			Large	0.131	0.145	0.276	0.149	0.154	0.304	0.272	0.265	0.268
			Small	0.048	0.085	0.132	0.047	0.098	0.145	0.115	0.147	0.135
			All	0.198	0.189	0.387	0.262	0.205	0.467	0.416	0.369	0.394
Count	All visits	Majority	IDS	0.332	0.258	0.589	0.363	0.240	0.603	0.513	0.484	0.501
			Large	0.132	0.142	0.273	0.165	0.173	0.338	0.291	0.310	0.300
			Small	0.033	0.064	0.096	0.033	0.083	0.116	0.130	0.214	0.181
			All	0.200	0.180	0.380	0.278	0.210	0.488	0.431	0.405	0.420

E&M	Plurality	IDS	0.327	0.257	0.584	0.355	0.239	0.594	0.511	0.477	0.497
		Large	0.130	0.141	0.271	0.163	0.172	0.334	0.289	0.300	0.295
		Small	0.032	0.064	0.096	0.033	0.083	0.116	0.128	0.202	0.174
		All	0.197	0.180	0.377	0.272	0.209	0.481	0.429	0.396	0.414
	Majority	IDS	0.321	0.263	0.584	0.350	0.233	0.583	0.496	0.456	0.479
		Large	0.133	0.143	0.275	0.155	0.153	0.309	0.272	0.274	0.273
		Small	0.050	0.087	0.136	0.051	0.106	0.157	0.115	0.154	0.139
		All	0.203	0.188	0.390	0.270	0.200	0.470	0.415	0.376	0.397
	Plurality	IDS	0.318	0.262	0.580	0.343	0.236	0.579	0.494	0.455	0.477
		Large	0.131	0.142	0.273	0.152	0.154	0.306	0.269	0.270	0.270
		Small	0.049	0.086	0.135	0.051	0.106	0.157	0.113	0.154	0.138
		All	0.201	0.187	0.387	0.265	0.202	0.466	0.413	0.373	0.395

Table A6: Attribution Measures from the Provider Perspective, cont.

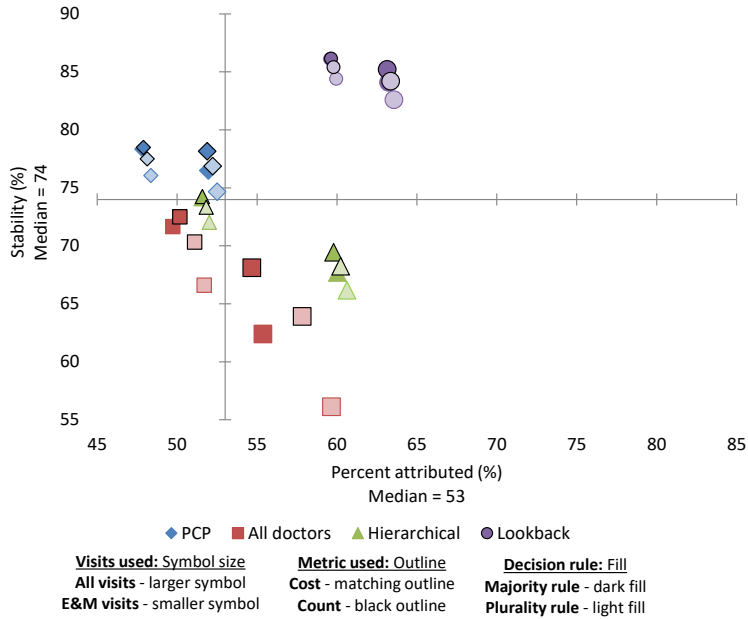
Lookback			1. Attributed Patients as a	2. Revenue from Attributed	3. Fraction of Attributed
			Fraction of System's	Patients as a Fraction of	Patients' Total Revenue
			Total Patients	System's Total Revenue	Paid to System
			Total	Total	Total
Cost	All visits	IDS	0.586	0.606	0.501
		Large	0.332	0.371	0.296
		Small	0.111	0.154	0.147
		All	0.435	0.516	0.421
	Plurality	IDS	0.578	0.593	0.497
		Large	0.317	0.368	0.291
		Small	0.112	0.170	0.151
		All	0.421	0.507	0.415
	Majority	IDS	0.586	0.591	0.478
		Large	0.360	0.342	0.274
		Small	0.164	0.182	0.124
		All	0.461	0.498	0.401
E&M	IDS	0.576	0.581	0.477	
	Large	0.342	0.341	0.269	
	Small	0.163	0.177	0.120	
	All	0.444	0.491	0.397	

		IDS	0.584	0.595	0.496
	Majority	Large	0.316	0.353	0.280
		Small	0.111	0.141	0.134
	All visits	<i>All</i>	<i>0.423</i>	<i>0.502</i>	<i>0.411</i>
		IDS	0.582	0.592	0.494
	Plurality	Large	0.334	0.357	0.280
		Small	0.110	0.141	0.134
Count		<i>All</i>	<i>0.434</i>	<i>0.502</i>	<i>0.409</i>
		IDS	0.581	0.578	0.477
	Majority	Large	0.341	0.343	0.269
		Small	0.166	0.184	0.118
	E&M	<i>All</i>	<i>0.446</i>	<i>0.490</i>	<i>0.396</i>
		IDS	0.580	0.577	0.477
	Plurality	Large	0.362	0.347	0.269
		Small	0.165	0.186	0.123
		<i>All</i>	<i>0.460</i>	<i>0.492</i>	<i>0.396</i>

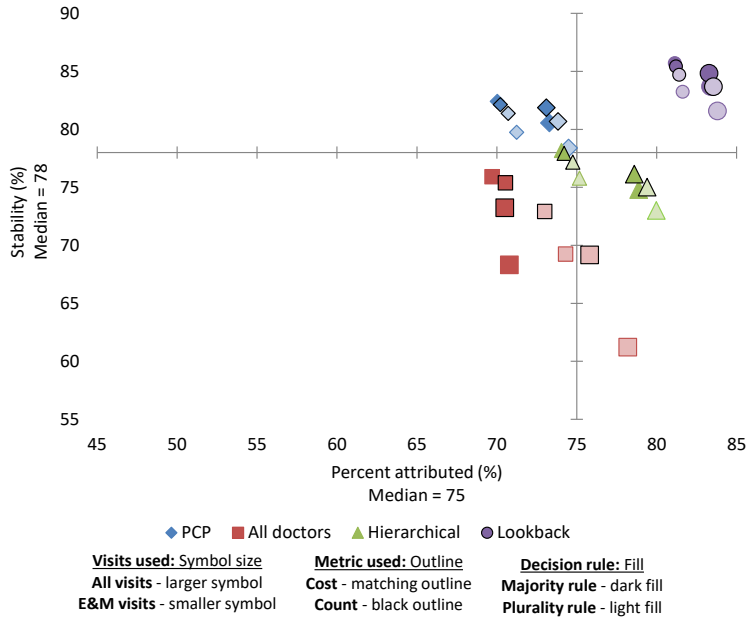
E&M indicates evaluation and management; IDS, integrated delivery system.

eAppendix Figure 1. Fraction of Patients Attributed and Stability of Attribution by Length of Enrollment

A. Enrollees with 12 months of exposure



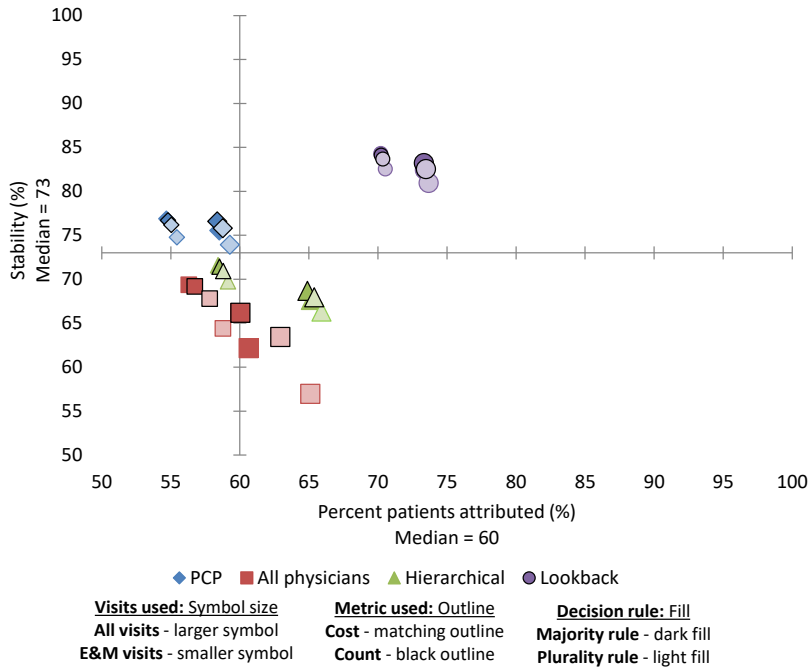
B. Enrollees with less than 12 months of exposure



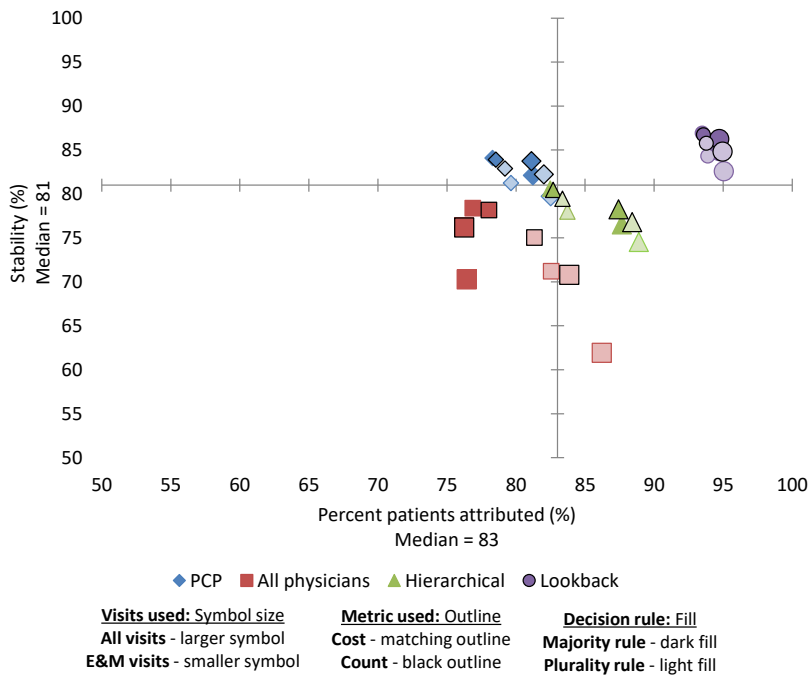
E&M indicates evaluation and management; PCP, primary care physician.

eAppendix Figure 2. Fraction of Patients Attributed and Stability of Attribution, by Chronic Condition Status

A. No chronic conditions



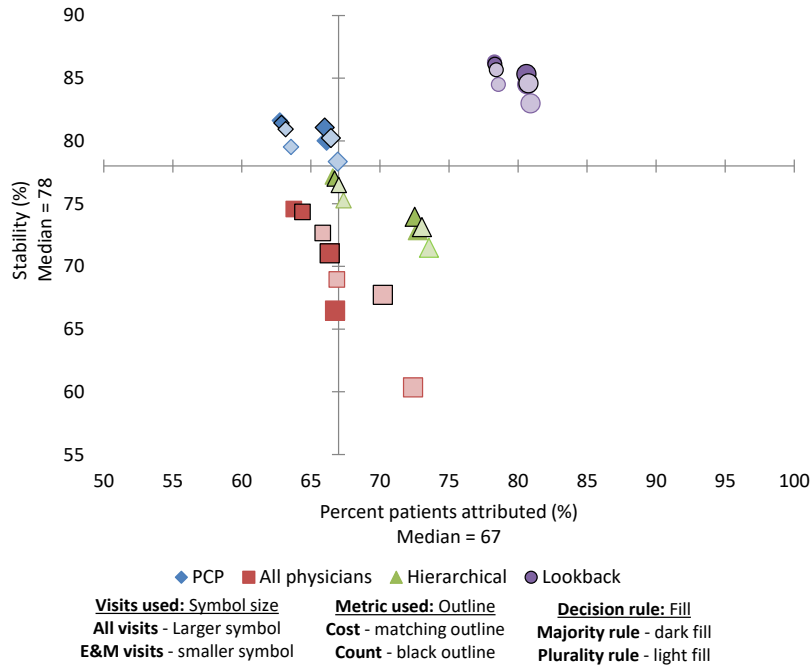
B. One or more chronic conditions



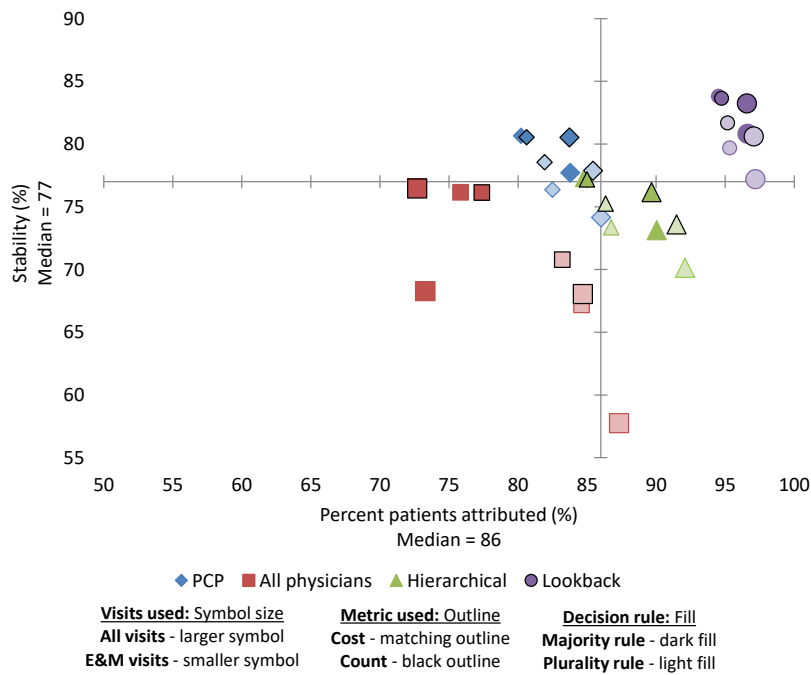
E&M indicates evaluation and management; PCP, primary care physician.

eAppendix Figure 3. Fraction of Patients Attributed and Stability of Attribution, by Health Complexity Status

A. Low complexity



B. High complexity



E&M indicates evaluation and management; PCP, primary care physician.

eAppendix Figure 4. Division of Allowed Charges from the Perspective of a Provider System

