

1-13-2017

# Physician Service Attribution Methods for Examining Provision of Low-Value Care

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## Recommended Citation

Chang, Eva PhD, MPH; Buist, Diana SM PhD, MPH; Handley, Matthew MD; Pardee, Roy JD, MA; Gundersen, Gabrielle MPH; and Reid, Robert J. MD, PhD (2016) "Physician Service Attribution Methods for Examining Provision of Low-Value Care," *eGEMs (Generating Evidence & Methods to improve patient outcomes)*: Vol. 4: Iss. 1, Article 29.

DOI: <https://doi.org/10.13063/2327-9214.1276>

Available at: <http://repository.edm-forum.org/egems/vol4/iss1/29>

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The Electronic Data Methods (EDM) Forum is supported by the Agency for Healthcare Research and Quality (AHRQ), Grant 1U18HS022789-01. eGEMs publications do not reflect the official views of AHRQ or the United States Department of Health and Human Services.

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## Abstract

**Objectives:** There has been significant research on provider attribution for quality and cost. Low-value care is an area of heightened focus, with little of the focus being on measurement; a key methodological decision is how to attribute delivered services and procedures. We illustrate the difference in relative and absolute physician- and panel-attributed services and procedures using overuse in cervical cancer screening.

**Study Design:** A retrospective, cross-sectional study in an integrated health care system.

**Methods:** We used 2013 physician-level data from Group Health Cooperative to calculate two utilization attributions: (1) panel attribution with the procedure assigned to the physician's predetermined panel, regardless of who performed the procedure; and (2) physician attribution with the procedure assigned to the performing physician. We calculated the percentage of low-value cervical cancer screening tests and ranked physicians within the clinic using the two utilization attribution methods.

**Results:** The percentage of low-value cervical cancer screening varied substantially between physician and panel attributions. Across the whole delivery system, median panel- and physician-attributed percentages were 15 percent and 10 percent, respectively. Among sampled clinics, panel-attributed percentages ranged between 10 percent and 17 percent, and physician-attributed percentages ranged between 9 percent and 13 percent. Within a clinic, median panel-attributed screening percentage was 17 percent (range 0 percent–27 percent) and physician-attributed percentage was 11 percent (range 0 percent–24 percent); physician rank varied by attribution method.

**Conclusions:** The attribution method is an important methodological decision when developing low-value care measures since measures may ultimately have an impact on national benchmarking and quality scores. Cross-organizational dialogue and transparency in low-value care measurement will become increasingly important for all stakeholders.

## Acknowledgements

This work was funded by a Partnership for Innovation grant from the Group Health Foundation.

## Keywords

Quality measurement, Learning Health System, Informatics

## Disciplines

Health and Medical Administration | Health Information Technology

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# Physician Service Attribution Methods for Examining Provision of Low-Value Care

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## ABSTRACT

**Objectives:** There has been significant research on provider attribution for quality and cost. Low-value care is an area of heightened focus, with little of the focus being on measurement; a key methodological decision is how to attribute delivered services and procedures. We illustrate the difference in relative and absolute physician- and panel-attributed services and procedures using overuse in cervical cancer screening.

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**Conclusions:** The attribution method is an important methodological decision when developing low-value care measures since measures may ultimately have an impact on national benchmarking and quality scores. Cross-organizational dialogue and transparency in low-value care measurement will become increasingly important for all stakeholders.

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## Introduction

Much effort has been focused on developing quality measures to assess system- and provider-level performance quality of care in the United States. For example, the National Committee for Quality Assurance (NCQA) has been reporting iterations of the Healthcare Effectiveness Data and Information Set (HEDIS) quality of care measures since 1991.<sup>1</sup> More recently, the Affordable Care Act of 2010 has mandated the expansion of performance measurement and reporting for health systems, health plans, and physicians alike.<sup>2,3</sup> Most publically reported quality measures have focused on plan-level measures, with more recent focus on physician-specific attribution.<sup>2,4,5</sup>

In recent years, there also has been a growing focus on measuring and reducing the use of low-value care (defined as “care that does not improve patient outcomes and can harm patients”), in part because of recent initiatives like the American Board of Internal Medicine Foundation’s Choosing Wisely campaign.<sup>6</sup> Researchers, health systems, health plans, and other stakeholders have been operationalizing various Choosing Wisely recommendations to develop measures to assess physician, health plan, and regional variation in low-value care delivery.<sup>7-9</sup> Many of these measures are intended to identify and compare variations in care and to incentivize systems and providers to improve care. As low-value care measures increasingly are being used for health care decision-making at all levels, greater transparency in their development and specifications is needed.<sup>10</sup>

A key measurement issue in constructing performance measures of low-value care is the determination of the appropriate denominator and its associated attribution issues.<sup>11</sup> Primary care is organized around continuous relationships between patients and providers that cross disease

boundaries,<sup>12</sup> and the appropriate denominator is most often the patient population the provider is responsible and accountable for. While the process of “empanelment”<sup>13</sup> or “rostering”<sup>14</sup> makes these linkages explicit, researchers and operations leaders often rely on administrative algorithms using past utilization data as implicit proxies.<sup>5,15-17</sup> The validity of these denominators is important since inaccuracies in automatically generated patient lists may undercut efforts at quality improvement.<sup>18</sup> While there has been some research on the influence of various patient attribution methods on a variety of performance measures,<sup>2,4,16</sup> to our knowledge, this issue has not been explored on measures of low-value care.

Integrated care delivery systems have been paneling patients with primary care providers for decades; this practice is growing rapidly with accountable care organizations (ACOs). Empanelment explicitly enables care accountabilities among patients and providers.<sup>19</sup> These panels also serve as the denominators for accurately measuring physician practice patterns, establishing accountability for quality and cost. Complexities for services attribution arise when patients seek care from multiple primary care physicians, mid-level providers, and specialists. Despite explicit empanelment, the shared responsibility of patients results in attribution issues depending on whether low-value care measures of physicians are based on services performed for their paneled patients by other providers (panel attribution) or based on services they explicitly perform on their paneled patients (physician attribution).

This work was motivated as part of a quality improvement effort to provide transparent feedback specifically focused on low-value care services to primary care providers in our integrated delivery system.<sup>20,21</sup> We developed different measurement strategies to evaluate provider variability in a



variety of low-value services with different provider attribution methods. We use cervical cancer screening overuse to illustrate how panel- and physician-attribution percentages affected absolute and relative screening-test percentages at Group Health. We present one mid-size clinic to illustrate how attribution affected physician-level screening percentages and six Group Health clinics to illustrate the effect across clinics.

## Methods

### Data and Sample

Group Health Cooperative is a nonprofit, integrated health care financing and delivery organization in Washington state and Northern Idaho that serves approximately 630,000 members. Just over 400,000 members receive care through Group Health's Integrated Delivery System that includes 25 Group Health-owned facilities and more than 900 Group Health primary- and specialty-care physicians.

During the study period, Group Health primary care providers had an average panel size of 1,800 and were part of a team that included 5.6 physicians, 5.6 medical assistants, 2.0 licensed practical nurses (LPNs), 1.5 physician assistants or nurse practitioners, 1.2 registered nurses (RNs), and 1.0 clinical pharmacist for 10,000 members.<sup>22</sup> Our members are asked to identify a personal primary care provider when they join Group Health, which they can change at any time for any reason.<sup>23</sup> Members are encouraged to seek care within their medical home, which includes a cluster of primary-care and mid-level providers.

We used the 2010–2013 Group Health utilization data and included paneled, primary care physicians employed by Group Health Physicians in 2013 with care prospectively attributed to a primary care paneled physician or the physician who provided the care under study.

### Physician-Level Cervical Cancer Screening Percentages

The U.S. Preventive Services Task Force and the American College for Obstetricians and Gynecologists Choosing Wisely list recommend that Papanicolaou (Pap) tests for cervical cancer screening be completed no more frequently than every three years for average-risk women ages 21–65 years since more frequent screenings expose women to inconvenience and harm, worsens access, and increases costs.<sup>6,24</sup> This was an important shift for women and providers who followed guidelines for annual screening for decades. At Group Health, updates on guidelines for Pap tests and other evidence-based clinical preventive services are implemented (and updated regularly) both through alerts in the electronic health record and through a centralized outreach function.

We identified all Pap tests in 2013 (“index Pap”). We identified “over-Pap” as all index Pap tests among women ages 21–65 years who had a previous Pap test within 15–30 months before their index Pap test. We selected this interval to avoid inclusion of 6–12 month follow-up exams for high-risk women or women with abnormal Pap tests, and to be conservative with patients who might get their Pap tests earlier than the specified 36 months.

We evaluated two attribution definitions. The first, *panel-attributed over-Pap percentage*, credited the over-Pap to the physician whose panel the women belonged to at the time of the Pap test; it was calculated as the number of over-Paps divided by the number of total Pap tests performed within the physician panel. The second, *physician-attributed over-Pap percentage*, credited the over-Pap to the physician who performed it, and was calculated as the number of over-Paps divided by the total number of Pap tests performed by the physician. Paneled physicians were included if they had  $\geq 5$  over-Paps for the panel- or physician-attributed measures.

## Analysis

We calculated median panel- and physician-attributed over-Pap percentages. We aggregated physician-level percentages by clinic to compare clinic-level over-Pap percentages among 6 of our 25 primary care clinics to illustrate how percentages varied by number of Pap tests completed within each clinic and by number of paneled physicians within the clinic. We rank-ordered physicians' percentages of low-value care within the clinics to compare provider ranking on the two different measures. All analyses used SAS Version 9.2 (Cary, N.C.).

## Results

The number of Pap tests completed in 2013 ranged from 500 to 3,000 Pap tests among the 6 sample clinics (Table 1). Across clinics, we observed differences between panel- and physician-attribution methods. In nearly all cases, panel attribution yielded higher median over-Pap percentages. Median panel-attributed percentages ranged from 10 percent to 17 percent compared with 9 percent to 13 percent for physician-attributed percentages. Clinics changed in their ranking of over-Paps depending on which

attribution method was used; for example, Clinic 3 had the highest physician-attributed over-Pap percentage and Clinic 4 had the highest panel-attributed over-Pap percentages. There was no consistent relationship between panel- or physician-attribution over-Pap percentages by the number of Pap tests performed or number of paneled physicians.

Within one clinic, the median panel-attributed percentage was 17 percent—ranging from 0 percent to 27 percent, and the median physician-attributed percentage was 11 percent—ranging from 0 percent to 24 percent. Panel attribution percentage was generally higher than physician attribution, and percentages varied by method. Physician ranking within a clinic varied depending on the attribution method (Figure 1). For example, physician 15 ranked first with 27 percent panel-attributed over-Paps (Figure 1a), but ranked fifth with 15 percent physician-attributed over-Paps (Figure 1b); whereas, physician 14 ranked second regardless of attribution method. Physician 1 had 0 percent for panel-attributed over-Paps but 12 percent for physician-attribution.

**Table 1. Panel and Physician Attribution Over-Pap Rates for Select Clinics**

CLINIC	NUMBER OF PAP TESTS PERFORMED AT THE CLINIC	NUMBER OF PHYSICIANS <sup>b</sup>	OVER-PAP PERCENTAGES, MEAN (RANGE) <sup>a</sup>	
			PANEL ATTRIBUTED <sup>c</sup>	PHYSICIAN ATTRIBUTED <sup>d</sup>
1	500-999	6-10	16% (0-20)	11% (8-20)
2	500-999	6-10	11% (0-27)	9% (0-26)
3	1,000-1,499	11-15	12% (6-32)	13% (0-28)
4	1,000-1,499	11-15	17% (0-27)	11% (0-24)
5	2,000-2,499	21-25	16% (5-28)	11% (0-29)
6	2,500-3,000	36-40	10% (0-38)	9% (0-26)

Notes: <sup>a</sup>An "over-Pap" was defined as "a Pap test that falls between 15 months and 30 months from a prior Pap test among women 21 to 65 years."

<sup>b</sup>Number of paneled physicians with the clinic as a primary clinic and who had ≥5 panel- or physician-attributed Pap tests.

<sup>c</sup>Panel-attributed percentages are the number of over-Paps performed or attributed among women within the physician's panel divided by the total number of Pap tests performed or attributed to the women within the physician's panel.

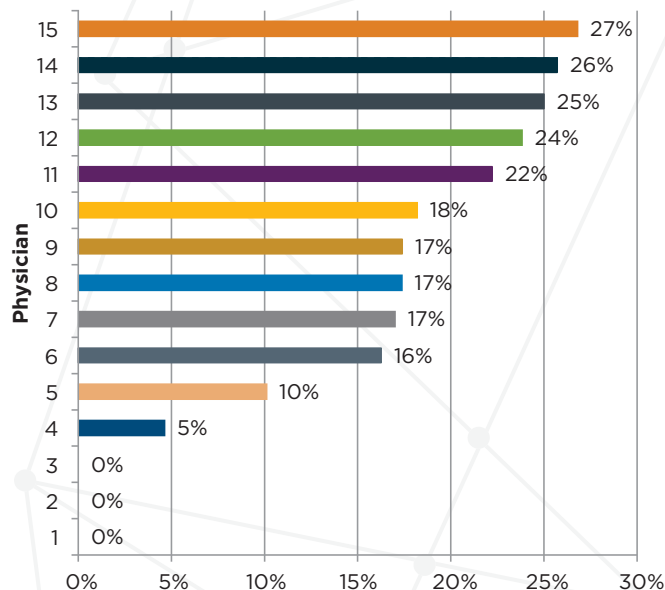
<sup>d</sup>Physician-attributed percentages are the number of over-Paps performed or attributed to a given physician divided by the total number of Pap tests performed or attributed to the physician.



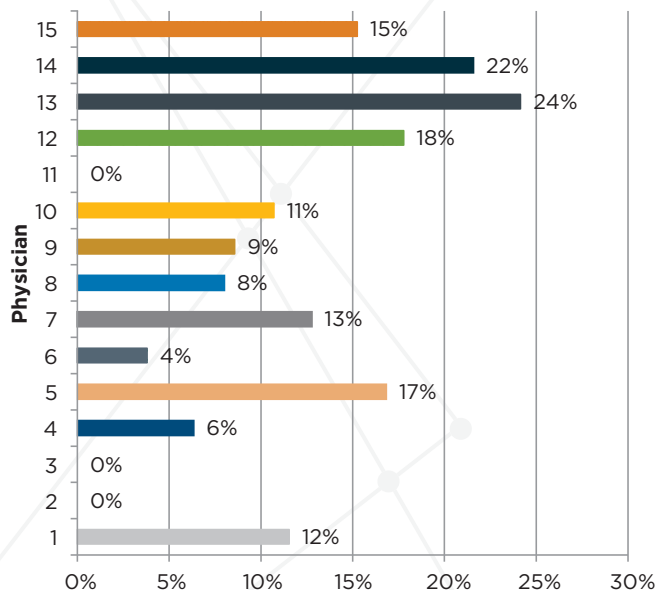


**Figure 1. Panel and Physician Attribution Percentages of Over-Pap Tests for One Clinic in an Integrated Delivery System**

**Figure 1a. Panel-Attributed Over-Pap Percentages at One Clinic**



**Figure 1b. Physician-Attributed Over-Pap Percentages at One Clinic**



Notes: An “over-Pap” was defined as “a Pap test that fell between 15 months and 30 months from a prior Pap among women ages 21 to 65 years.” Paneled physicians were included if they had ≥5 panel- or physician-attributed Pap tests. Panel-attributed percentages are the number of over-Paps performed on women within the physician’s panel divided by the total number of Pap tests performed on women within the physician’s panel. Physician-attributed percentages are the number of over-Paps performed by a given physician divided by the total number of Pap tests performed by the physician.

**Discussion**

There is substantial interest in generating low-value care measures for quality measures, research, and interventions.<sup>7-9,11</sup> This report highlights the importance of identifying the appropriate measure for monitoring and reporting low-value care by comparing physician versus panel attribution methods using an example of low-value Pap testing. We anticipate that not all will agree with our definition of over-Pap; however, we operationalized a definition comparable to what is being used by a number of collaborative groups.<sup>25</sup> We used our definition to illustrate the variation in attribution, and the lack of specification in definition does not detract from the changes in ranking due to different

attribution methods. Our findings are consistent with previous work that found that attribution has an impact on pay-for-performance and cost-profiling even without misclassification issues in determining panel and service assignment identified from analysis of fee-for-service patients.<sup>5,16</sup> Methodological decisions affect relative and absolute performance at both the physician and clinic levels and may ultimately have an impact on national benchmarking and quality scores.

On average, our delivery systems’ panel-attributed percentages were higher than the physician-attributed percentages; we believe these differences are largely due to practice patterns within care teams or patients seeking care from physicians they



are not paneled to. For example, nonpaneled, mid-level providers (nurse practitioners and physician assistants) within Group Health care teams may order and perform Pap tests, and women may also have Pap tests in the Women's Health department. During this study period, few mid-level providers had panels since they were part of primary care physician medical home teams. Therefore, our measures only included variability in Pap overuse in physicians. These Pap tests are counted in the panel-attributed percentage, but not in the physician-attributed percentage. Alternatively, Pap tests performed on nonpaneled patients will not be counted in the panel-attributed percentage. Future work could look into better understanding how different utilization behavior among patients (e.g., paneled and nonpaneled) may have an impact on attribution. Measure developers should be aware of potential system-specific accounting styles since they may significantly influence performance scores.

It may be challenging for some health care organizations to attribute patient care to providers or panels across multiple settings. However, it is becoming increasingly possible as care models such as ACOs and patient-centered medical homes emerge to track patients across care settings. There are a variety of patient attribution methods being used and being developed.<sup>2,4,5,7</sup> While the attribution methods we demonstrate in this report are not currently used for national quality measurement, new Centers for Medicare and Medicaid Services (CMS) delivery and payment initiatives are using various methods to prospectively attribute patients to practices and physicians. The Comprehensive Primary Care Initiative and the Medicare Shared Savings Program both use claims data to identify a plurality of primary care services to determine attribution, while Pioneer ACO and Next Generation ACO are testing a combination of claims-based attribution with voluntary alignment, or beneficiaries

are asked to confirm their care relationships with an ACO.<sup>26-29</sup> Current evaluation of these initiatives assess changes in outcomes (including low-value care) are specific to attributed patient populations.<sup>26,30</sup> Strong interest in low-value care and its measurement suggests that low-value care measures will soon be used to determine payments.<sup>31</sup>

Our findings suggest that how services are attributed to practices (i.e., should primary care practices be accountable for services provided by specialists) and health care systems may also effect practice- and system-level performances on specific cost, quality, and utilization metrics. Decisions regarding attribution methodology will depend on the question the health care system is answering and on the locus of implementation and change. Panel-attributed percentages capture information about how well the physician is providing care to a discrete group of patients. Since most health care organizations do not produce panel-attributed rates, panel-attributed measures cannot be used yet for benchmarking or comparison with other health care organizations. As noted earlier, these measures also require the ability to track patients across multiple care settings. However, this method is more patient-centered and provides valuable information on panel management by following the provision of care to patients for whom the physician is accountable. Group Health physicians receive quality and performance metrics using panel-attributed measures. In contrast, physician-attributed percentages capture information on all of the actual services the physician has performed. Similarly used in fee-for-service claims data analyses, these measures are particularly useful for benchmarking with and comparing low-value care rates to other health care organizations and physicians. The data and analytic requirements for physician-attributed measures are also less intense since measurement may be limited to specific physician and care



settings. While physician-attributed percentages include patients who use services regardless of their empanelment, there is a potential to overinflate low-value care (and underestimate underuse) since patients who do not or rarely use health care services are not included. Finally, this method is less favored by physicians because physicians are held responsible for “coverage” patients—patients where the physician is not responsible for the patient’s overall primary care.<sup>15,18</sup>

## Conclusion

This study demonstrates how different attribution strategies can have an impact on physician and practice performance on one low-value care measure. Future studies should test how attribution methods have an impact on performance using other low-value care measures and using data from other health care organizations. As measurement strategies of low-value care are continually being tested within health care organizations, cross-organizational dialogue and transparency in low-value care measurement will become increasingly important for all stakeholders—patients, physicians, systems, and payers. This work adds to the emerging body of literature on defining and measuring low-value care and may help other health care organizations develop robust low-value care measures for quality monitoring and decision-making.

## Acknowledgements

This work was funded by a Partnership for Innovation grant from the Group Health Foundation.

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