Identifying the Optimal Panel Sizes for Primary Care Physicians

Determine and adjust panel sizes based on patient and practice variables

Coleen Kivlahan, MD, MSPH  
Executive Director Primary Care,  
Professor Family and Community Medicine, University of California San Francisco

Christine A. Sinsky, MD  
AMA, Medical Associates Clinic and Health Plans

How will this module help you identify and maintain the appropriate panel size for your primary care practice?

1. Five STEPS to optimize your patient panel size
2. Answer questions about assigning patients to a panel and determining the appropriate panel size for a primary care physician
3. Develop approaches to adjusting panels for patient and practice variables and developing a plan for ongoing maintenance of patient panels
Introduction

Maintaining the relationships between patients and physicians is the foundation of primary care. The ability of a physician to build and sustain these relationships depends on the patient panel size. A patient panel is a group of patients assigned to one specific physician or clinical team. The team is dedicated to the care of those within that panel.

What is the right panel size for a primary care physician (PCP)? How many patients can a family physician, pediatrician or internist manage while still providing sufficient same-day access for their patients' acute needs, planned care appointments for chronic care and prevention and between-visit care and population management? How does a practice manage access for both new and established patients, while also ensuring asynchronous access to care, such as after-hours care, email follow-up, and communication through online patient portals? There is not yet an exact science for determining the ideal patient panel size; this module presents current approaches to panel size determination and optimization.

Q&A

What are the adverse effects of panels that are not appropriately sized?

Inappropriate panel sizes can cause problems with quality, access, patient satisfaction and clinician burnout. Specifically, larger panel sizes have been shown to result in worse diabetes control and decreased rates of cancer screening. Over-empaneled physicians may have higher workloads related to patient care and excessive after-work hours spent on electronic health record (EHR)-related tasks that put them at increased risk for burnout.

Large panel sizes also contribute to challenges with patient access and could result in patients waiting longer to see their physician, seeking care outside of the practice and seeing a provider who is not their primary care provider (PCP). All of these factors further reduce continuity and quality of care and potentially increase costs.

Conversely, small panel sizes may be the result of low physician engagement, clinical performance concerns, a perception of delivering low-quality care, or poor communication skills. These attributes can potentially result in financial instability for the practice.

What are the benefits of establishing appropriately sized patient panels?

Appropriately sized panels will:

1. Prevent underutilization of physician skills and avoid limitations in access to care for patients of over-empaneled practices.
2. Avoid the stresses placed on physicians and care teams in over-empaneled practices.
3. Facilitate equitable compensation within organizations that are moving away from a production model of payment.
4. Develop sustainable models of primary care to reduce physician burnout.

Does a smaller than average panel size mean that the physician is slow or not working hard enough?

Not necessarily. A smaller than average panel size may reflect a more comprehensive scope of care (i.e., more conditions managed in the practice and fewer conditions referred for care outside of the practice), provision of greater same-day access for established patients and/or a patient population with more complex needs. The amount of support a provider receives from the rest of the care team can also influence the size of the panel and how well it is managed. For example, a physician with less ability to delegate components of the work, because of fewer support staff, lower skill levels of the support staff and/or a local policy and compliance environment that limits task delegation will be able to manage a smaller panel size than if she had more and higher trained support staff with local administrative support for teamwork.
Five STEPS for optimizing your patient panel size:

1. Identify your patient population
2. Choose the method for determining an optimal panel size
3. Adjust panel size based on patient and practice variables
4. Modify patient panel sizes
5. Monitor and maintain panel sizes

Identify your patient population

The first step in panel size optimization is to attribute individual patients to a single physician or clinical care team. In some organizations, patients have pre-selected their PCPs through the insurance/health plan, while in other settings, patients are permitted to change PCPs regularly or see multiple PCPs.

Use the following metrics as you begin to define the optimal panel size. Attributing patients to a single provider is not dependent on these metrics.

A. Define the look-back period (the duration of the patient’s care in the practice).
A look-back period of between 18 and 36 months is commonly accepted when assigning patients to a particular physician. A look-back period of 12 months or less runs the risk of missing healthy patients who may only see the physician once a year for preventative purposes, while a look-back period greater than three years may include patients who are no longer active within the practice.
B. Determine the number of qualifying visits.
To be assigned to a particular physician, many practices require a two-visit minimum in the look-back period. This module gives two examples of how to figure out the number of qualifying visits. In some payment models, patients are assigned to practices or physicians based on their health plan, but may not have any visits or contacts in the look-back period. Your attribution model should still consider these patients.

C. Attribute each patient to a specific physician
Document the physician identified as the PCP for all primary care patients in the EHR. The following example illustrates ways to attribute patients who may not have a single PCP identified.

Q&A

What is the “Four-Cut Method” for attributing a patient who has seen multiple physicians to a specific physician?

The Safety Net Medical Home Initiative model includes a look-back period of 24-36 months and a two-visit requirement for inclusion in the physician's panel. To assign patients to a specific physician's panel, the model uses the “Four-Cut Methodology”:

1st cut: Patients who saw only one provider in the past year are assigned to that provider.

2nd cut: Patients who saw multiple providers but saw one provider for the majority of services in the past year are assigned to that majority provider.

3rd cut: Patients who saw two or more providers for the same number of visits in the past year are assigned to the provider who performed the last physical exam.

4th cut: Patients who saw multiple providers with no majority of visits with a single provider are assigned to the last provider seen.

What is the “Modified Four-Cut Method”?

The University of California, Los Angeles (UCLA) has an attribution approach that uses other sources of information to inform the Four Cut Methodology. Their “modified” model includes the types of visits and feedback from the physician about who they believe is the primary responsible provider. The process occurs in 3 steps:

1. Define the overall primary care population base for all practices and all PCPs in the UCLA health system. Define the population using one of the following:
   Patients with two or more PCP in-person ambulatory office visits in the past 36 months (CPT® evaluation and management [E&M] codes 99201-99215, 99381-99397, or G0438/G0439)
   or
   Patients with one or more PCP in-person ambulatory office visit with preventive service in the past year (CPT E&M codes 99381-99397 or G0438/G0439)
   and
   All patients assigned by a health plan, even if they had no visits.

   Note: This is a hybrid approach. The default is a model that includes patients with at least two visits within a 36-month look-back period, with the goal of capturing patients who may infrequently visit while also excluding patients who only had one visit, since these patients are unlikely to have a relationship with the practice. This model also assumes that the use of the CPT preventive services code/annual Medicare Wellness code indicates that the provider has a special role with that patient. Urgent care center visits may count for one but not both of the inclusion visits.

   CPT Copyright 2017 American Medical Association. All rights reserved. CPT® is a registered trademark of the American Medical Association.

2. Assign patients from the defined population base to specific active PCPs
• If a preventive service (99381-99397 or G0438/G0439) is present in the past 12 months, assign to the physician from the most recent visit.
• If E&M services (99201-99215) are present, excluding urgent care visits, assign to the physician with the most visits. If there is a tie, assign to the physician seen at the most recent visit.
• If no visits in the look-back period, assign to the health plan-assigned physician.

3. Run and disseminate monthly analysis of patient attribution to all primary care physicians and administrators.

Are there other methodologies that organizations use for attribution?

Yes. Here is an example of an attribution model used in another organization:

**Step 1:** Patient-declared PCP is the first determinant of attribution to a panel.

**Step 2:** If the patient has not chosen a PCP, an algorithm is used for attribution (Figure 1).

**Figure 1. Patient Attribution Model**

---

**Step 3:** Use a continuity index to evaluate the PCP’s annual performance and to monitor how well the provider team is managing the panel.

*Continuity Index:* The continuity index is the percentage of a PCP’s panel members’ primary care visits that are with their assigned PCP (i.e. and not to another PCP). When the continuity index is above 75 percent, the PCP will earn 100 percent of the panel payment, with a linear decrease in payment for values below 75 percent. This applies to physicians specializing in pediatrics, family medicine and internal medicine. Pediatricians with a continuity index of 70 percent or and above will earn 100 percent of the panel payment, with a similar linear decrease in payment for values below 70 percent.

D. Establish the frequency of panel size assessment.

There are no specific guidelines on how often to measure panel sizes; some organizations track panel size monthly, while others assess this on an annual basis.

---

I have residents in my practice who are attributed patient panels. How do I account for this?

Include patients of resident trainees in the overall practice population identification; however, the attribution strategy will decide the empanelment process. For example, UCLA uses the EHR PCP field to
determine PCP empanelment. This method excludes those patients who have a resident PCP when they are assigned to a supervising faculty physician for billing purposes.

Choose the method for determining an optimal panel size

While there is no standard benchmark panel size, and no ideal method of setting a manageable panel size, there are several methods described in the literature to figure out optimal panel size.

The most common methods for risk-adjusting patient panels based on demographics and diagnosis include age/gender adjustment, the Hierarchical Condition Category (HCC), Charlson Comorbidity Index score, the Chronic Illness and Disability Payment System and Medicaid Rx (MRX). The HCC uses age, sex and diagnosis data generated from claims data to predict cost and utilization.

Q&A

Why is risk adjustment of panels important?

Risk adjustment is important because doctors care for patients of varying complexity. Morbidity is not distributed randomly in practices, so risk-adjustment methods can be applied to assemble panels with relatively lower or higher risk. Not adjusting for risk can impact clinical outcomes reporting and pay-for-performance metrics.

How do I choose a risk-adjustment model to help determine optimal panel size?

Here are some options to consider:

- You can identify risk-adjustment factors and apply them to all patients using parameters such as age, gender, HCC scores, comorbidity counts, etc. However, there are no standard weighting or multiplier factors for each parameter.
- You can acquire one of the many commercial or proprietary risk adjustment products on the market and apply it to your patients (e.g., Milliman, Veririsk Health, Truven).
- Your EHR may have a built-in risk-adjustment model.

Apply the selected a risk-adjustment model to all physicians' panels and continually update the risk adjustment based on EHR patient-level data.

What factors does a primary care risk-adjustment model include?

The most commonly used risk-adjustment factors are age, gender and types of conditions present for each patient. These factors reflect the clinical components of risk, but do not capture non-clinical factors, like social, behavioral and economic risk. They also do not capture the current workload of primary care physicians and teams, including non-visit work (e.g., refills, patient portal messages, etc.).

The non-visit (asynchronous) workload is significant for all patients regardless of overall health status. This workload should be considered in your risk adjustment for panel size and measured as part of the total primary care workload.

Are there more comprehensive models of risk adjustment?

More comprehensive risk-adjustment models include age/gender stratification, selected chronic conditions with high risk for primary care utilization (such as diabetes, asthma, chronic obstructive pulmonary disease [COPD], arrhythmias, congestive heart failure [CHF], pulmonary embolism [PE], major
depression, unstable angina and respiratory arrest), clinical risk groups (CRGs), maternity status, payer status (commercial/Medicaid/Medicare), disability and end-stage renal disease markers.

How do I decide which risk assessment tool is best for my needs?

Consider the following questions when evaluating various risk-assessment products or vendors:

**Product**
1. **Solution Breadth**: Are all patients and conditions covered? Are all components of system functionality included? Does the vendor offer services to complement the software?
2. **Ease of Use**: Do queries take a long time to run? Is it difficult to map data? Is it difficult to write or generate reports?
3. **Flexibility**: Is the data model rigid or can it be modified? Can data mappings be altered? Is the user able to customize reports? Is the vendor responsive and timely about programming customizations?
4. **Understanding and Simplicity**: Is the user interface clear and straightforward? Are reports easy to understand? Are results of predictive models actionable? Do user views deliver a lot of information at a glance? Are data and definitions clear and easy to understand?
5. **Provider and Payer Integration**: Are customers able to import meaningful claims and clinical data that is not already captured?
6. **Nontraditional Data Sources**: Has the vendor moved beyond claims and standard clinical data to incorporate elements such as social determinants of health (SDOH) or remote patient monitoring? Can other data sources be imported and used within the system? Are there custom data fields available for reporting?
7. **Reporting and Descriptive Analytics**: Does the vendor have prebuilt reports, regulatory reporting capabilities or ad hoc reporting capabilities? Are both administrative and clinical reports accessible? Can the customer perform data visualization activities?
8. **Predictive Analytics**: Does the system include standard groups and risk scores? Does the vendor provide an internal risk score? Are there both clinical and financial predictive models? Does the system address the predictive capabilities of a model with lagged data sources? Is it able to integrate with third-party risk models? Is the predictive model going to be intuitive to clinicians?
9. **Provider Action**: Can clinicians take clear actions based on the predicted risk? Is there decision support for this? Does the solution forward integrate with often-encountered EHRs?
10. **Patient Involvement**: Are patient outreach tools included? Can patients view their information on a portal? Are there educational and coaching resources? Are a variety of modes of communication with patients supported?

**Vendor**
11. **Contracting**: Are the contracting terms favorable? Are there conditions for buying the product?
12. **Customer Satisfaction**: Is the system reliable? Does the vendor provide timely support? Is the implementation process smooth? Does the vendor provide training?

Are there downsides to using these common methods?

Yes, there can be downsides. These methods may not consider patients who may have multiple symptoms and frequent primary care visits without a clear, identifiable diagnosis. In addition, asynchronous workload, the influence of SDOH and available resources are not factored into these models. For example, a patient diagnosed with cancer and undergoing chemotherapy may have many costly office visits, but most of the visits are with sub-specialty providers and would therefore not be included in risk assessment models for primary care patient panel attribution.
What could happen if I don't use a risk-adjustment tool?

Physicians whose patient population consists of more complex patients or patients with significant adverse SDOH may be expected to provide more care without proper resources. This may lead to physician burnout. Alternatively, a physician could decide to exit or limit their practice to maintain quality of care.

Apply the selected risk adjustment model to all physicians' panels and continually update based on EHR patient-level data. Once risk assessment of the practice's patient population has been completed, there are three methods that can be used to estimate optimal panel size for an individual provider within the practice:

1. **Visit-Based Method (also known as the Murray method)**

   The visit-based method matches office visit capacity (supply) to the panel size (demand). A practice first multiplies the number of work days per year by the number of visits per day to calculate supply. The demand is then calculated by multiplying the average number of visits per patient per year obtained from utilization data for the practice by the existing panel size.

   For example, take a physician who works in the clinic four days per week, 47 weeks per year, for a total of 188 clinic days per year. That physician sees an average of 20 patients per day, yielding a supply or capacity of 3,760 visits per year. If this physician's patients had 2.5 visits per year on average, the suggested panel size would be 1,504.

   \[
   \text{PCP's available visits per day} \times \frac{\text{PCP work days per year}}{\text{average visits per patient per year}} = \text{optimally sized panel}
   \]

   This method is widely used to match the panel size to number of face-to-face visits per year. However, it does not account for many of the activities that occur outside of the visit such as email, telephone/virtual visits and completing EHR work. For this reason, it is ideal to ask the physician to indicate the number of patient visits per day that feels sustainable. This number may vary greatly from physician to physician and is dependent on the efficiency of the practice's workflow, the degree of task sharing among team members, the number and level of training of support staff, the complexity of the patient population and the proportion of virtual care vs. in-person care that is typically provided.

2. **Time-Based Method**

   The time-based method is another technique for determining an appropriate panel size that estimates the overall PCP work effort required to deliver comprehensive care. This model shifts away from using capacity for visits to calculate panel size, and instead takes into account the total hours necessary to provide patient care as well as the effectiveness of the rest of the care team. For example, PCPs are able to manage larger panels when they delegate work to other members of the care team, such as visit note documentation, pre-visit planning, medication reconciliation, inbox management, and routine immunizations.

   Researchers used theoretical modeling to conclude that, in a lightly supported model, a full-time primary care physician may be able to manage approximately 1,400 patients per year. When that same physician is able to share tasks with other members of the care team in an advanced team-based model of care, the panel size might increase to 2,000 patients.

3. **Normative Benchmarking**

   Normative benchmarking uses existing panel sizes in different healthcare settings as benchmarks. While many studies have published average panel sizes for primary care practices, there is no single method of panel size determination, and thus the amount of time physicians spend providing care can vary widely.
A note of caution

Even when adjusted for the case-mix complexity of their patient populations, the comparative workload of physicians may not be fully captured by panel size because of the work involved in seeing other physicians' patients (non-attributed). Physician A may see many non-attributed patients from their colleagues, while Physician B may see fewer non-attributed patients. The more non-attributed patients in a physician’s panel, the greater the workload relative to calculated panel size. That is, a manageable panel size for Physician A will be lower than that for Physician B.

Adjust panel sized based on patient and practice variables

It is important to adjust the effective panel size based on patient complexity and practice variables to allow for greater equity in panel size expectations across different physician practices. At present, there is no standard algorithm to mathematically adjust risk based on practice variables. Figure 2 depicts patient, practice and physician variables that can influence how a practice arrives at the optimal panel size.

Q&A

Which patient variables impact a optimal panel size?

The age, gender, medical and social complexity (e.g., income, education, home ownership, insurance status) of the patient population affects the work needed for management and predicts health care utilization patterns. A population of healthy, socially and financially stable patients will require fewer in-person and virtual visits than a population of complex, high-need patients.

Which practice variables impact a manageable panel size?

A physician who manages patients in the hospital as well as the clinic, who provides regular same-day access and who performs a comprehensive scope of services will have a smaller panel than a physician whose work is confined to the ambulatory clinic and who has a lower threshold for referral. A practice with a well-designed and optimally implemented EHR may allow its physicians to safely manage larger panels.

Other variables that may positively impact appropriate panel size include: number of exam rooms, documentation assistance, number and skill level of support staff, stability of the care team and the presence of an extended care team (e.g., behavioralist, social worker, dietician, etc.). Factors that may
negatively impact appropriate panel size include highly risk-averse compliance policies affecting staff duties and high rates of physician and staff burnout.

Which physician variables impact a manageable panel size?

Some physicians may be comfortable with a more rapid pace of patient care, while others prefer a slower pace. Some physicians are comfortable sharing elements of care with team members, such as medication reconciliation, visit note documentation and inbox management, while other physicians choose to perform the majority of tasks themselves.

How can I adjust for the non-face-to-face workload (asynchronous work)?

Some organizations are utilizing their EHR data to compare the balance of face-to-face workload and asynchronous work. One study showed that healthy patients have a 1:1 ratio of PCP face-to-face time with non-face-to-face time, while patients with three or more chronic diseases have a ratio of 1:3.1

It is important to consider the growing burden of asynchronous work on PCPs when computing panel size adjustments. To address this, University of California San Diego (UCSD) Health developed a physician workload index to adjust the raw attributed panel patient counts for individual physicians.1

This workload index includes office visits and non-clinical PCP activities, such as telephone encounters, refill encounters and electronic messages. The EHR is the source of data for these activities for each patient. Each encounter activity type is assigned workload points. The faculty compensation committee was surveyed about the relative workload associated with each activity to assign points. Table 1 shows the points assigned to different activities.

<table>
<thead>
<tr>
<th>Encounter Type</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prenatal visit</td>
<td>1</td>
</tr>
<tr>
<td>Office visit</td>
<td>1</td>
</tr>
<tr>
<td>Telephone</td>
<td>0.25</td>
</tr>
<tr>
<td>Electronic Message</td>
<td>0.1</td>
</tr>
<tr>
<td>Letter</td>
<td>0.1</td>
</tr>
<tr>
<td>Refill</td>
<td>0.05</td>
</tr>
</tbody>
</table>

What other factors should be considered in risk adjustment?

Consider demographic factors that may not be represented in claims data. For example, a patient may need a translator for calls and visits. Visits that need an interpreter often take two to three times longer than anticipated.

Each physician's average workload points per patient per year is calculated. This average is then compared to the practice's average to calculate a relative workload index for each physician. The raw attributed patient count is then multiplied by the relative workload index to compute a workload-adjusted panel size. UCSD's model is an example of how the asynchronous work involved in caring for a patient panel can be used to adjust the attributed panel size to account for variation in patient complexity (Table 2).
UCSF also developed a panel adjustment method based on primary care workload that includes both visit and asynchronous care recorded in the EHR. The UCSF method uses a statistical model involving machine learning and “big data” analytics to generate a complexity weight for each patient. UCSF implemented this method to generate monthly reports of weighted panel sizes for each PCP and for each practice. Figure 3 displays four UCSF primary clinics that serve distinct populations. The geriatric clinic, for example, has 41 percent of its patients in the highest work cluster, which resulted in an adjusted panel that was nearly double the raw panel size, while women’s health, with only 4 percent high-workload patients, saw a drop in their adjusted panel size (1,485) to a level below its raw panel size (1,616). The general medicine practice saw a modest increase from a raw panel size of 1,345 to an adjusted panel of 1,505.

The adoption of this model by PCPs at UCSF has been high, and the report extracted in Table 3 illustrates some of the metrics included in the balanced scorecard for annual bonuses, as well as a tool for monthly adjustment of access at the practice level.
Modify patient panel sizes

Once you have attributed the patient population and identified a targeted, adjusted panel size, there may be imbalanced panels across physicians in your practice. Leverage the practice's data to assess how panel size is impacting patient access, experience and quality. You may also want to consider the following as proxy indicators of suboptimal panel size:

- Burnout scores
- Less than full-time effort (e.g., part-time)
- Total time spent in the EHR
- After-hours documentation including on weekends and during vacation
- Chart closure rates

Finally, physicians have different comfort levels with patient panel size and daily visit volume. Acknowledging and respecting these preferences can pay important dividends to the organization in terms of physician well-being, retention and willingness to support the larger mission of the organization.
Q&A

What if I am an over-empaneled physician?

You may want to develop a plan to increase the amount of team support or reduce your patient panel size.

For example, additional staff, such as nurses, medical assistants, documentation assistants, health coaches and/or behavioral health specialists can help the physician manage a larger panel. Introducing concepts of workflow efficiency and team-based care such as pre-visit laboratory testing, expanded rooming and discharge protocols, pre-visit planning, team documentation, preauthorization support and synchronized prescription renewal will help the care team be more efficient.

To reduce panel size, the physician’s practice can temporarily close to new patients. In addition, offer patients who cannot be seen in their requested time frame the choice to establish care with a physician or team member who is not over-empaneled.

What are the downsides to closing a practice to new patients?

If exceptions to a closed panel allow for the physician to see new patients, the panel soon becomes filled with patients requiring even more time and communication. It can be made clear to all that there are no exceptions when a panel is closed and that new patients should wait in a queue with current patients. It is often difficult for the over-paneled physician to turn down a request from colleagues to take on new patients, so leadership support is helpful.

What can I do to increase my patient panel size if I am under-empaneled?

Strategies to increase panel size include partnering with an over-empaneled physician to assume responsibility for some of the over-empaneled physician’s patients and direct scheduling of patients transitioning from the emergency department or hospital to home. Providing same-day access to unassigned patients can also help grow a panel.

Monitor and maintain panel sizes

Some organizations choose to monitor panel sizes on a periodic basis, particularly if compensation or other resources are dependent on panel size. Sharing monthly reports can help the organization understand if strategies to manage access and workload are effective. This frequency gives practice leaders an opportunity to adjust schedules and staffing and detect early signs of burnout or poor physician engagement.

Conclusion

As demand for primary care and accountability for population health through empanelment increases, determining the optimal patient panel size and appropriate management of panel size to an optimal target is essential. While the science of panel size optimization is in its infancy, panel size has significant downstream effects on care quality, patient and PCP satisfaction and access. Creating the optimal panel for physicians can contribute to the success of a primary care practice. Consider patient complexity, practice support networks and physician preferences for practice scope and pace when
Learning Objectives:
At the end of this activity, you will be able to:
1. Describe the benefits associated with appropriately sized panels
2. Identify the metrics that define the optimal panel size for your practice
3. List the different methods available to determine optimal panel size
4. Discuss how to adjust, modify, and maintain the optimal panel size for your practice

Author affiliations:
Coleen Kivlahan, MD, MSPH, Executive Director Primary Care, Professor Family and Community Medicine, University of California San Francisco; Christine A. Sinsky, MD, AMA, Medical Associates Clinic and Health Plans

Faculty:
Coleen Kivlahan, MD, MSPH, Executive Director Primary Care, Professor Family and Community Medicine, University of California San Francisco; Christine A. Sinsky, MD, AMA, Medical Associates Clinic and Health Plans

References and additional resources

figuring out optimal panel size. Efficient workflows and advanced models of team-based care can expand panel capacity while also improving physician well-being and reducing burnout.

Copyright 2018 American Medical Association