

## Mini Review

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# The PRIDx framework to engage payers in reducing diagnostic errors in healthcare

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### Abstract

**Objectives:** No framework currently exists to guide how payers and providers can collaboratively develop and implement incentives to improve diagnostic safety. We conducted a literature review and interviews with subject matter experts to develop a multi-component ‘Payer Relationships for Improving Diagnoses (PRIDx)’ framework, that could be used to engage payers in diagnostic safety efforts.

**Content:** The PRIDx framework, 1) conceptualizes diagnostic safety links to care provision, 2) illustrates ways to promote payer and provider engagement in the design and adoption of accountability mechanisms, and 3) explicates the use of data analytics. Certain approaches suggested by PRIDx were refined by subject matter expert interviewee perspectives.

**Summary:** The PRIDx framework can catalyze public and private payers to take specific actions to improve diagnostic safety.

**Outlook:** Implementation of the PRIDx framework requires new types of partnerships, including external support from public and private payer organizations, and requires creation of strong provider incentives without undermining providers’

sense of professionalism and autonomy. PRIDx could help facilitate collaborative payer-provider approaches to improve diagnostic safety and generate research concepts, policy ideas, and potential innovations for engaging payers in diagnostic safety improvement activities.

**Keywords:** diagnosis; quality improvement; diagnostic errors; patient safety; payer

## Introduction

Efforts to reduce harm from diagnostic errors have gained momentum in the past decade [1–4]. Diagnostic errors are defined as the failure to establish an accurate and timely explanation of the patient’s health problem, or communicate that explanation to the patient, and include delayed, wrong, or missed diagnoses [5]. Despite growing interest in the measurement and prevention of diagnostic errors, direct engagement of payers to advance diagnostic safety strategies has been limited [6–8]. Knowledge from public and private patient safety programs, including payer incentive programs [9–12], could be leveraged for this purpose. While U.S. insurance payer funds allocated for value-based quality incentive payments amounted to \$1.9 billion in 2019 [13, 14], no framework currently exists to suggest how payers and providers could work collaboratively to create incentives to promote diagnostic safety.

We reviewed the literature to identify strategies that payers who purchase healthcare can use to improve diagnostic safety. We then developed a multi-component framework ‘Payer Relationships for Improving Diagnoses’ (PRIDx) to integrate these strategies into a comprehensive and pragmatic approach. We also obtained feedback from subject matter experts (SME) to ensure the framework can be used to inform future payer-led approaches for enhancing diagnostic safety.

## Rationale for PRIDx framework

All payers (i.e., employers, public health plans, managed care organizations, commercial insurance carriers) can

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potentially expedite improvements in patient care [11, 13, 15–19]. Payer programs currently serve as the impetus for Hospital Value-Based Purchasing (HVBP) programs [9, 10, 12, 13, 20–23], which is often used as a barometer of healthcare quality by consumers [11, 22]. Payers also promote transparency through public reporting, which has been shown to motivate U.S. hospitals to provide safer, higher-quality, and affordable healthcare to patients [9, 10, 22]. These programs reward top hospital and clinician performers, while disincentivizing poor performers, based on adhering to, and achieving, national quality improvement benchmarks [13, 22, 24, 25].

Payers could similarly collaborate with providers to improve diagnostic safety. However, effective diagnostic improvement strategies require new types of partnerships, including external support from public and private payer organizations [26]. They further require explicit actions to create strong clinician incentives without undermining providers' sense of professionalism and autonomy. We posit that a multi-component approach using the “Payer Relationships for Improving Diagnosis (PRIDx)” framework can advance discussion on this topic. In this paper we describe the framework and illustrate ways to promote payer and clinician engagement in the design and adoption of accountability mechanisms that support diagnostic safety improvement.

## Methods

### Approach to framework development

We conducted a literature review of existing pay-for-performance programs to guide collaborative development of a framework for diagnostic safety efforts between payers and providers. The literature search included various combinations of terms (i.e., ‘diagnostic errors’ and ‘quality improvement’, ‘quality’, ‘patient safety’, ‘safety’, and

‘improvement’, and further combined these with ‘pay’, ‘payer’, ‘payment model(s)’) in PubMed, Google Scholar, and EconLit databases. The grey literature was scanned for reports not indexed in the peer-reviewed literature.

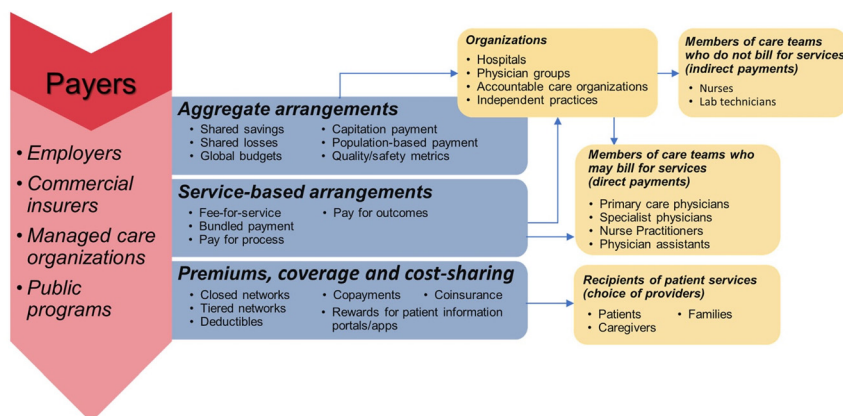
Further, SMEs (e.g., payers, clinicians, and policy stakeholders) were interviewed to: (1) refine the PRIDx framework, and (2) gain additional insight on potential payer-provider-patient collaborations to facilitate diagnostic safety in addition to findings gleaned from literature. We conducted interviews because the literature in this area is relatively sparse, and we wanted to ensure the framework was pragmatic. Interviewees were experts on innovative payment models (i.e., they possessed consulting, academic, policy, and/or clinical expertise). Our qualitative methods included a sample adequate for idea generation (n=7) [27, 28], purposive sampling, open-ended questions [27, 29], video conferencing format, deductive coding, and thematic analysis to explore the following topics: (a) current payer engagement in diagnostic safety activities (Figure 1); (b) payer motivations for engagement in diagnostic safety (Figure 2); (c) types of provider accountability that might be incentivized by payers (Figure 3); (d) probable barriers to payer involvement (gauging the acceptability of the framework ideas); (e) administrative support structures required (which could help explore unknown influencing factors); (f) ideas on executive leadership and clinician buy-in needed for adoption.

## Results and discussion

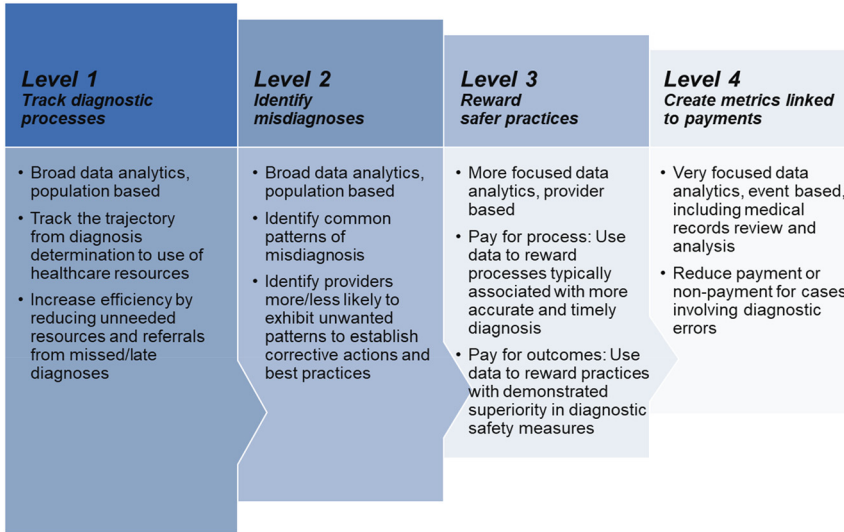
### The multi-component PRIDx framework

#### Mechanisms for involving payers in diagnostic safety

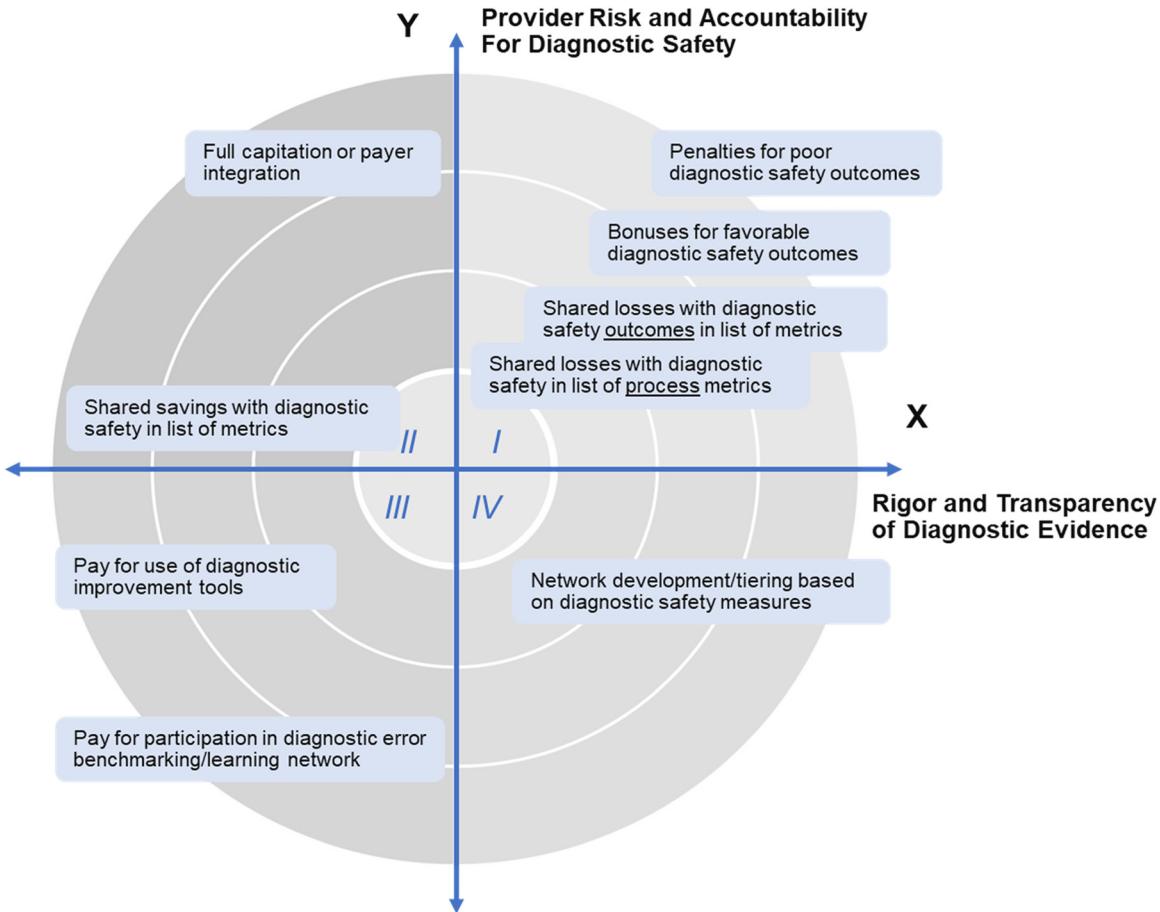
Payers can use multiple motivating techniques (i.e., incentives) to influence clinician and healthcare organization's responses to diagnostic safety [30]. Strategies must be perceived as transparent and unbiased for successful adoption [31]. The PRIDx framework is a multi-component framework (Figures 1–3) illustrating how payers can be involved in diagnostic safety by: (1) linking diagnostic safety and care provision within the payer context (2) using data analytics



**Figure 1:** PRIDx Framework Component 1 conceptualizes diagnostic safety payer links to care provision and links diagnostic safety and care provision within the payer context.



**Figure 2:** Framework Component 2 highlights four levels of how data analytics can be used to improve diagnostic safety.



**Figure 3:** Framework Component 3 proposes implementation of strategies for payer involvement in diagnostic safety.

for improving diagnostic safety, and (3) using existing tools to help improve patient outcomes. The goal of proposing this framework is to catalyze idea generation of

how payers can potentially serve as an additional lever to improve diagnostic performance and reduce diagnostic error.

### Component 1: Conceptualizing diagnostic safety payer links to care provision

The first component of PRIDx is described in Figure 1. Payers (red) have different classes of tools (blue) to influence the behavior of key stakeholders in the diagnostic ecosystem (yellow). Different tools impact stakeholder groups. For example, shared savings arrangements are typically at the organization level to ensure an actuarially reliable patient population for performance measurement. Other incentives may directly apply to members of the care team, or payer incentives may be funneled to team members through organizations. This is especially important for care team members who cannot bill independently for services, and who do not have direct interactions with payers with respect to incentivized behaviors but are crucial in ensuring diagnostic safety.

Payers influence behavior in multiple established ways – specifically, they can encourage efficiency, cost containment, and quality of care across the care continuum. In the case of diagnostic safety, strategies to reinforce the collective accountability for driving diagnostic safety improvement (e.g., clarifying the roles and responsibilities of individuals on diagnostic teams and [32] ensuring appropriate follow-up processes) [33], are needed [34]. Selected strategies include: (1) payers could potentially incentivize patient behaviors financially by using copayment structures to steer patients to providers with better performance on diagnostic safety; (2) payers could require certain at-risk patients, or patients with unusual diagnoses, to obtain second opinions [35]; (3) payers could incentivize patients to frequently use and verify diagnosis-related information in patient portals [36]; (4) incentives might be directed to encourage patients to use health IT apps on personal devices and retain information that can be shared with providers at the point of diagnosis [37].

### Component 2: The use of data analytics for improving diagnostic safety

Clear mechanisms to measure desired vs. undesired outcomes are essential when constructing incentive arrangements to change clinician behavior. One payer strategy to incentivize diagnostic safety could be the successful application of techniques to better measure diagnostic performance through data analytics [38]. Figure 2 shows a *de novo* compilation of potential use of data analytics to improve diagnostic safety, in increasing order of analytic rigor at each level.

At level 1, data tracking and understanding diagnostic processes at a population level can highlight general

patterns of performance and identify outliers (e.g., late-stage cancer diagnoses). However, there would be insufficient clinical detail in the data to reward or disincentivize a specific provider performance, and there may not be any clarity about whether there were any clear missed opportunities (e.g., if the diagnosis was missed or inaccurate). The value of level 1 lies in identifying potential high-risk focus areas for health care organizations.

More detailed data would be needed for the level 2 activity (still at the population level), which involves identifying delayed or inaccurate diagnoses at specific care episodes. This more specific data could be used to identify types of diagnostic error and clinicians with certain performance patterns. More consistent data would be needed to associate observed performance patterns with provider payment (e.g., common co-morbidities that confound a diagnosis). The value of level 2 lies in identifying broader opportunities for diagnostic improvement [39].

At level 3, provider-level data are used to incentivize care processes (e.g., preventive care) and better patient outcomes (e.g., readmissions, satisfaction). Data are used to incentivize a specific provider's performance and used to target opportunities to reward safer practices. Insights from this level could lead to investments in broad scale system and process improvements related to diagnosis [40]. For example, payers could consider implementing policies that incentivize healthcare providers to adopt established diagnostic safety tools (i.e., Safer Dx Checklist: 10 High-Priority Organizational Practices for Diagnostic Excellence, Measure Dx: A Resource To Identify, Analyze, and Learn From Diagnostic Safety Events, TeamSTEPPS for Diagnosis Improvement, among others). Payers can incentivize healthcare providers to adopt the practices recommended by these resources by incorporating these tools as structural measures into their reimbursement models [41]. These tools encourage the adoption of standardized protocols, processes, and technologies to help measure or reduce diagnostic errors, improve patient outcomes, and ultimately lower healthcare costs [42]. The value of level 3 is to inform use of incentives to improve diagnostic processes.

Level 4 of the diagram assumes availability of the most rigorous data, where payers and providers agree that diagnostic errors have been made, or patterns of unsafe diagnostic processes tied to specific clinical providers, exist. This highest level of incentive power, where financial penalties drive accountability, requires reliable and robust data sources. Based on SME interviews and current literature, such sources are likely not available, but are potentially accessible via centralized third-party healthcare data warehouses and electronic health records [43]. If accessible, the value of level 4 data lies in opportunities for



targeted, organizational diagnostic process improvement based on patient outcomes, satisfaction, and risk management cases.

### **Component 3: Implementation of strategies for payer involvement in diagnostic safety outcomes**

Component 3 builds on the prior two components [44–49]. Tradeoffs made by payers to influence care vary in sophistication, thus providing incentives to improve diagnosis will be an evolutionary process. A key principle underlying the potential success of payer strategies is the power of the incentives (i.e., financial risk and rewards to providers) [24]. Incentives must be in proportion to the rigor and transparency of data required to transform provider diagnostic performance. Without transparency, individual clinicians would be held accountable for outcomes and processes for which, (1) they have no control, (2) data are unsupportive, and (3) associations are ambiguous and biased. The implementation of payer strategies thus raises important considerations for implementation [24]. If incentives are too detailed, prescriptive, or misaligned, they may have adverse effects on clinician autonomy and intrinsic motivation, undermine providers' sense of professionalism, and lead to dissatisfaction and burnout [50]. For example, placing providers at risk of reduced payments (i.e., penalties) vs. opportunities for financial bonuses (e.g., by participation in safety learning collaboratives), can have widely variable effects, even when the dollars at risk and performance standards are the same. Figure 3 illustrates examples of payment strategies that combine concepts from Figures 1 and 2.

The payment strategies in Figure 3 show provider risk and accountability (vertical axis), plotted against the rigor and transparency of analytic evidence (horizontal axis), that would be required to make each strategy feasible and acceptable to stakeholders. For example, greater analytic rigor is required for shared loss arrangements than for financially safer shared savings (upside only) arrangements. The greatest level of analytic rigor would be required if payers implement financial penalties for specific diagnostic errors (e.g., missed cancer diagnosis) [51]. In contrast, arrangements involving more system-wide and broad accountability (i.e., capitation payments) may not require as much analytic sophistication (e.g., Level 2 of Figure 2) relative to requiring improvement of diagnostic processes (e.g., Level 4 of Figure 2). Thus, capitation and payer integration lie to the left of direct error penalties in Figure 3. Additional examples could be developed and mapped into Figure 3 to determine the impact and tradeoffs of provider risks and accountability when compared to transparency in care provision. This information can help determine the extent

and type of data analytics (Figure 2) needed to inform accountability and illustrate potential ways payer can incentivize providers (Figure 1) to minimize diagnostic errors.

Another framework, developed by the Health Care Payment Learning & Action Network (HCP-LAN) [52], illustrates this process, and informed development of the Cartesian plane summarized in Figure 3. Consistent with the HCP-LAN model, payers and providers can start slowly with designs in the lower left portion of Figure 3. They may also build on existing structures by adding diagnostic safety measures to an ongoing shared savings arrangement. As organizations mature in their skill and comfort with accountability for diagnostic safety, and as diagnostic analytic tools improve, payers can work with organizations and individual clinicians to move upward and to the right in the diagram. This is where payers can shift more risk and accountability to providers because it will be supported by more systematic evidence to justify using very direct financial reward and penalty mechanisms, if any.

### **Linking components of the PRIDx framework**

Component 1 provides a menu of established tools that payers can customize to incentivize provider-driven improvements in diagnostic safety, while Component 2 can enhance the diagnostic process redesign. One essential aspect of improving diagnostic safety is optimizing the diagnostic process itself. This involves reevaluating and redesigning the various steps and components of the diagnostic journey, such as history-taking, physical examination, testing and referral-related processes, test result interpretation, and follow-up actions [40, 53]. By incorporating evidence-based best practices and leveraging technological advancements, providers can reduce diagnostic errors and delays [54]. Component 2 aligns with Figure 2 as it focuses on transforming and optimizing the diagnostic process to enhance patient outcomes and safety.

Component 3 can use existing payer patient safety tools to improve patient outcomes in diagnostic safety. Payers can leverage financial incentives, reimbursement structures, and quality metrics to incentivize providers to prioritize diagnostic safety and enhance their diagnostic performance. This strategy is further illustrated in Figure 3, the payer involvement component of the PRIDx framework, where it emphasizes the use of incentives and rewards to influence provider behavior and promote diagnostic safety. The appropriate design and implementation of incentives are crucial to promoting patient engagement, diagnostic process redesign, and other desirable changes.

To enhance diagnostic safety, all 3 components can be considered by payers to implement multiple potential

innovation points. Incentives must be tailored to match the rigor and transparency of the data required for measuring provider diagnostic performance (Figure 2). To avoid unintended consequences, it is crucial to strike a balance in the level of detail and prescriptiveness of incentives, as well as their alignment with providers' autonomy and intrinsic motivation.

## PRIDx framework application: expert perspectives

SME interviews were conducted to validate the PRIDx framework, and rapidly gauge (as a “temperature check”) stakeholder perceptions and ideas around payer involvement – as a yet untapped lever – to catalyze diagnostic care improvements. However, the sample size was too small, and interviewee roles too heterogeneous, to generate specific or detailed themes. SME interviews provided valuable insights and ideas regarding the PRIDx framework, while reinforcing the value of strategies to engage payers in improving diagnostic safety. SMEs confirmed the potential utility and content validity of the PRIDx framework. Further, SMEs added important context for implementation and advancement of payer involvement in diagnostic safety.

As one SME expressed, payer involvement in diagnostic safety “needs to happen,” a sentiment that was similarly shared among SMEs. However, payers may be unable to implement needed incentives, or tools, in markets where providers have significant monopoly purchasing power (e.g., through consolidation) [55]. This is the case when large provider groups use their significant market share to negotiate contracts on terms that are more favorable (i.e., less demanding) to the providers, thereby limiting what payers can implement in terms of pay for performance focusing on diagnostic safety.

An important consideration routinely raised in patient safety literature is the need to build data capabilities to benchmark and move performance improvement forward (Figure 2). One SME described the current diagnostic improvement state as “data starved” in terms of actionable information on diagnostic safety. It was noted that in cases where potentially actionable data are available, it is often siloed across EHR systems, with proprietary algorithms and details that are not transparent to end users (i.e., providers), making setting diagnostic improvement targets impossible. Several SMEs highlighted the potential value of a trusted neutral third party (i.e., a federal agency) to serve as a data clearing house for information about diagnostic safety. This information could inform development and implementation of incentives around diagnostic safety.

There was general agreement about the importance of representing patients' voices in diagnostic safety. SMEs raised a concern that payer involvement in diagnostic safety efforts might be viewed as an avenue to cut costs rather than improve diagnostic accuracy because there is a prevalent patient perception that healthcare delivery engagement by payers is profit-driven vs. patient-centered.

SMEs noted strategies to identify low-performers and outliers could lead to system or provider-level improvement interventions. Further, broader payment reforms that encourage greater professionalism and collaboration may be more impactful. These may include specific service-based arrangements and lump-sum per member per month (PMPM) payments to support infrastructure needed to improve diagnosis (i.e., developing teams that use EHR data for safety improvement). Additionally, improving fee schedules to encourage greater collaborative care would also provide an indirect incentive for improving diagnostic accuracy [6]. Limitations of these interview findings include a small sample size of SMEs and a lack of generalizability among findings.

## Future considerations

The framework still needs adoption for further progress to occur and there are several unknowns and challenges to implementation that need to be overcome. For instance, we do not know how incentives to promote diagnostic safety and performance can impact clinician burnout. Additional work will be needed to study if any of these payment levers increase the risk of burnout and if these incentives lead to additional burden on clinicians. It is essential to ensure that such programs do not increase the potential for shame or embarrassment among clinicians and label certain clinicians as ‘poor diagnosticians’. Future efforts should prioritize systems-level measurement rather than individual-level data that may inadvertently stigmatize clinicians. By focusing on collective improvement and fostering a culture of learning, incentive programs can better support clinicians in making accurate and timely diagnoses while minimizing the risk of burnout and loss of intrinsic motivation.

## Conclusions

Efforts to engage public and private purchasers of healthcare in improving diagnostic safety are still nascent. We explored how current value-based purchasing models for direct engagement of payers could provide a foundation for collaborative diagnostic safety improvement efforts. Payers

have considerable power, available strategies, and self-interest, in working with providers to advance diagnostic safety. Although in theory the scope for payer involvement is broad, SME interviews and existing literature validate that in the real-world, current data infrastructure and collaborative partnerships needed to accelerate diagnostic safety improvement are still underdeveloped. Moreover, payers expressed concern about unintended consequences such as disrupting clinician autonomy.

Nevertheless, several strategies for payer and provider collaboration have limited provider financial risk and appear to be promising immediate avenues for increasing payer engagement in diagnostic safety improvement. The Payer Relationships for Improving Diagnosis (PRIDx) framework can provide a foundation to enable advances in this area.

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