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Physician Engagement in Malpractice Risk Reduction: A UPHS Case Study

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Background: The University of Pennsylvania Health System (UPHS) implemented a risk reduction strategy in response to high malpractice costs and the broader implications these trends had for patient safety and quality. A key component of this strategy was the Risk Reduction Initiative (RRI), which uses a bottom-up approach to actively engage physicians in risk mitigation and malpractice reduction within their respective departments.

Methods: The value of clinical communities in achieving common goals has been previously recognized in quality improvement efforts. Using a physician-directed approach, the RRI program requires each clinical department to propose and execute an intervention in response to prior malpractice claims data or recognition of an area of high risk. Based on the success of the intervention, clinical departments were eligible to receive a financial rebate for use in future quality improvement projects.

Results: Clinical departments have led the development and implementation of interventions that have shown demonstrable improvements in quality and safety and thereby received full financial rebates. On a system level, the inclusion of physicians in risk mitigation efforts has resulted in significant benefits from both quality improvement and financial standpoints. The number of malpractice claims and malpractice cost have decreased since the inception of the program.

Conclusion: Since the program inception, 250 proposals have been submitted and $14 million in rebates have been awarded. Although it is difficult to directly measure the combined impact of these bottom-up, physician-directed interventions, empowering frontline physicians to become actively involved in risk mitigation is a promising method for reducing malpractice claims and costs.

Medical malpractice claims and lawsuits continue to comprise a considerable portion of health care costs. The high frequency of malpractice claims suggests the existence of systemic quality concerns as opposed to isolated errors.[1,2] In this environment, physicians often resort to practicing defensive medicine in fear of litigation, which further increases health care costs and is detrimental to the overall quality of the health care system.[3] Approximately 1%–2% of hospitalized patients in the United States experience negligent injuries,[4,5] and approximately 2% of these negligent injuries result in malpractice claims.[6] Studies examining the reasons why patients and families pursue claims have identified several different themes. Concerns with the standard of care being delivered, such that those who felt they had received substandard levels of care wanted to prevent similar incidents from happening in the future, and inadequate explanation for the incident were two commonly cited reasons. Other reasons included financial compensation for lost wages, pain, and suffering, and the expectation that individuals and organizations should be held accountable.[7,8]

The University of Pennsylvania Health System (UPHS) experienced a period of economic difficulty in the late 1990s and early 2000s. Although it made a return to profitability in 2004, it continued to experience a high number of malpractice claims and payouts. This trend of increasing claims payouts was occurring throughout the state of Pennsylvania and represented a significant financial risk.[9] Health systems traditionally take on risk mitigation using a unidimensional approach. Issues of quality and safety have typically been led by centralized offices such as those of the chief medical officer and chief quality officer. Deviating from this conventional approach, UPHS developed the Risk Reduction Strategy (RRS), a way of responding to the high number of claims and payouts by expanding the role of patients and physicians in risk mitigation (Figure 1).

The RRS serves as an overarching framework encompassing multiple programmatic elements designed to abate the volume and expense of malpractice claims through the following objectives: improve overall quality and safety outcomes, enhance the patient experience through the use of early intervention strategies, lessen the negative impact on providers through training and support, and reduce malpractice exposure and risk. One component of this framework was the establishment of the Office of Patient Affairs, which aims to ensure optimal patient experience by intervening during or soon after the process of care when patients and family are unsatisfied with the care being received. These complaints are then analyzed by the Patient

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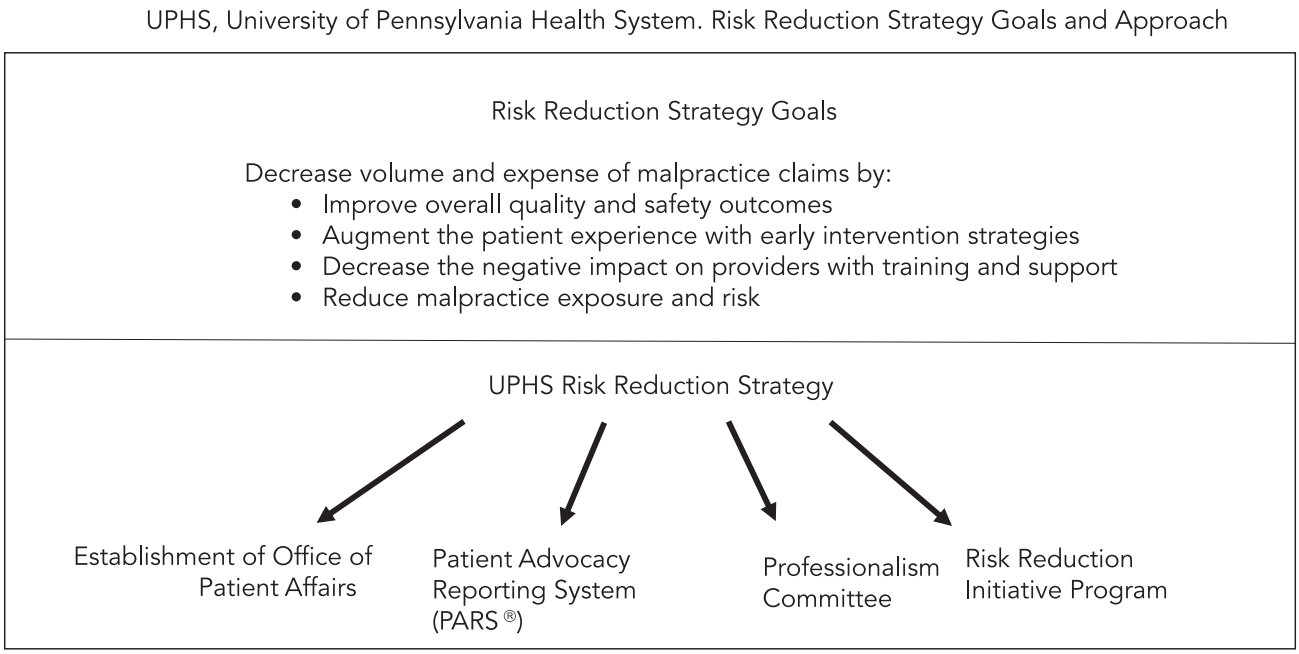

Figure 1: This illustration helps provide context to the goals of the Risk Reduction Strategy and the other initiatives taking place alongside the Risk Reduction Initiative (RRI) program. The Office of Patient Affairs and PARS® are patient-facing initiatives to gather and analyze patient complaints. The Professionalism Committee and the RRI program are provider-facing programs to address unprofessional behavior and target clinical areas of high risk, respectively.

Advocacy Reporting System (PARS®) program, a product of the Vanderbilt University Center for Patient and Professional Advocacy.[10] PARS uses a complaint severity index to actively identify the physicians whose patients have reported higher levels of dissatisfaction by employing a proprietary algorithm to score unsolicited patient complaints based on the number and severity of the negative feedback. Physicians who are 1.5–2 standard deviations above the mean undergo a three-step intervention process on decreasing their risk potential, beginning with peer awareness intervention, escalating to authority intervention, and then to disciplinary action if there is an absence of improvement. In conjunction with PARS, a unique Professionalism Committee (PC) was developed at UPHS as an additional resource to effectively manage professionalism issues beyond patient complaints. The structure of the PC serves to identify the role of behavioral health issues rooted in unprofessional behavior related to patient/staff complaints or general behavioral concerns. The PC chair meets with the reported individual and adjudicates a recommendation based on his or her professional expertise, which could result in no intervention, psychotherapy treatment such as cognitive behavioral therapy, or elevation of the issue to the Medical Executive Committee for formal investigative action or potential corrective action.[11]

The final component of the RRS framework is the Risk Reduction Initiative (RRI) program, which was developed in 2008. In contrast to traditional hierarchal approaches, the RRI seeks to mitigate risk through the formation of clinical communities—networks that operate through the use of peer influence as a compelling channel for problem solving and large-scale change.[12,13] By enhancing communication among frontline physicians and staff, the development of clinical communities creates new horizontal channels between people and groups who may be facing similar challenges but otherwise might not interact.[14–16] The RRI was devised with the intention to simultaneously build these clinical communities and direct their focus toward achieving departmental goals through physician-directed initiatives. Each clinical department was expected to identify a particular clinical issue based on prior malpractice claims or quality data and propose an intervention to mitigate the associated malpractice risk. These interventions are designed and implemented by actively involved clinician leads within each department. Based on successful completion of the proposed interventions, a percentage of the primary layer of malpractice premium is returned to the departments as an unbudgeted reward. The driving themes of the RRI program effectiveness are dissemination of best practices, focus on high-risk areas, and reduction of clinical variations in care in order to enhance the quality of care delivered. In

this article, we review the development, implementation, and results of the RRI program.

METHODS

Setting

Given that UPHS is an integrated academic medical center, the majority of physicians are employed by Penn Medicine, and all of the physicians on staff at the Hospital of the University of Pennsylvania are part of an integrated practice plan model, the Clinical Practices of the University of Pennsylvania (CPUP) and are insured for professional liability through a wholly owned risk retention group. The governance structure of CPUP includes subcommittees comprised of clinical department chairs and other senior faculty, as well as departmental and central administrators. The Professional Liability Subcommittee additionally includes representatives of the Office of the General Counsel, Risk Management, Risk Financing, and the Quality and Safety Infrastructure of UPHS.

Structure of the Risk Reduction Initiative

In part due to the recognition of the present and potential pecuniary risk posed by malpractice claims and payouts, the Professional Liability Subcommittee developed the RRI program to engage the faculty in risk mitigation within their respective departments. A financial rebate is available in order to further galvanize participation from the clinical community. The funds available for each department following completion of the RRI proposal(s) are calculated based on a percentage of that department's primary insurance premium, and the size of the potential rebate in turn influences the expectation of project scope and anticipated workload. For example, the Departments of Medicine and Surgery are eligible for the largest rebate and thus have an expectation to submit and complete multiple proposals each year.

Step 1. Proposal Development

The first step in the RRI process involves retrospective review of the department's claims history by clinical leads. Common themes are identified through analysis of issues giving rise to claims and root cause analysis in order to pinpoint areas for intervention. In the absence of a claims history, the departments are asked to focus on known high-risk areas within the specialty; these areas often are identified through consultation with the leadership of quality and general counsel. A proposal describing the intended project(s) and the metrics of success is then submitted to the Professional Liability Subcommittee for rigorous evaluation based on scope, impact, sustainability, and feasibility using the submission form developed by the subcommittee. The template for the form can be seen in Sidebar 1 Scope of the project is conveyed through descriptions of the initiative and analysis of how it will reduce the frequency and severity of adverse events and/or claims from the baseline. Impact is measured by the number of faculty, staff, nonfaculty staff, and patients being affected by this proposal. Sustainability and feasibility are assessed according to the professional judgment of the subcommittee members based on extensive clinical and administrative expertise. Each submission is evaluated holistically to determine if it should be approved for implementation or if continued discussion is warranted to ameliorate the proposal design and fine-tune the prospective metrics of success. When the project proposals are finalized and accepted, the departments have an allotted period of time, approximately six to nine months, to execute the intervention and collect the necessary data to establish its efficacy.

Sidebar 1. Risk Reduction Initiative Proposal Submission Template

A. Brief description of initiative/activity
B. Analysis of how this will reduce the frequency and severity of adverse events
C. Number of faculty, house staff, and nonfaculty staff who are affected
D. Applicability at/to more than one entity
E. Number of individual patients who will be affected
F. Potential impact on the entity and CPUP's profile
G. Measure of success of the initiative
H. Ability to operationalize the initiative in other departments

* CPUP, Clinical Practices of the University of Pennsylvania.

Step 2. Local Evaluation of RRI Proposals

The composition of the subcommittee, including departmental and central administrators, along with several physicians, comprises a diversity of thought and expertise that allows for a comprehensive assessment of the changes implemented throughout the health system. At the end of the fiscal year (FY), a final progress report describing accomplishments to date is submitted to the subcommittee for thorough evaluation, including the observed values opposed to the proposed metrics. Measures of success may be conveyed through participation rates, improvement in survey assessments, or creation of a protocol, among other quality measures appropriate to the risk mitigating activity. These metrics are subsequently used to determine eligibility to benefit through the incentive component previously described. The consensus of the Professional Liability Subcommittee determines whether satisfactory completion of each proposal has been achieved, which is dependent on how well the project was executed along with outcomes data from the project(s). Initially, process metrics were heavily emphasized; this has since evolved to include outcome metrics to better track the effect of the interventions. Unforeseen barriers such as lack of information technology (IT) resources to meet technological demands are taken into account during evaluation if the expected course of action was not accomplished for reasons that the department could not control. After the projects are evaluated, a unanimous de-

cision on the appropriate percentage of monetary funds to be awarded to each department is determined. The unbudgeted financial reward is intended to support future quality improvement projects within departments.

Step 3. Global Assessment of the RRI Intervention

While the local evaluation of proposals provides insight into individual project progress, financial data related to the change in associated costs were analyzed for trends to gauge overall program efficacy. We performed a regression analysis of malpractice costs both prior to the implementation of the RRI and during the postintervention period and tested for significance. We chose not to overlay any direct data from the RRI onto malpractice costs so as to avoid overstating the effects of this program in a highly dynamic health system. Furthermore, to detect for trends of project feasibility and sustainability of proposals submitted since FY 2010, a survey was sent to the quality leadership of each department to report back the status of each project.

RESULTS

Development and Implementation of Department-Specific and Universal Themes

As each department has identified areas on which to focus its RRI proposals, a variety of clinical themes have been brought to the forefront of the quality arena. Multiple initiatives to increase standardization around high-risk patient conditions have been developed, such as a guideline of care for morbidly obese pregnant patients and for the care of obstructive sleep apnea patients in the perioperative setting. Furthermore, a number of efforts to investigate the gaps in existing operational work flows that lead to avoidable delays have been undertaken.

When areas of focus have been identified, the RRI proposals for the subsequent year(s) are often dedicated to the implementation of an intervention to address the aforementioned process issues. Some work flow impediments have been identified to be systemwide issues, particularly around areas of delayed diagnosis and timely follow-up on laboratory results. This finding has led to the evolution of universal RRI themes that the Professional Liability Subcommittee has mandated be addressed by all clinical departments, with a preset percentage of the rebate award tied to successful completion of those projects. However, the clinical leads from each department continue to dictate the majority of the RRI areas of focus.

Below, we highlight four projects that convey the diversity of clinical issues and approaches to reducing risk and increasing quality and safety. The first three case reports, some of which have been adopted by other departments, have been awarded 100% of the financial incentive. The final clinical objective illustrates the concept of the universal theme, for which all UPHS departments are now required to undertake as a percentage of all RRI efforts.

Use of In Situ Simulations

The "difficult airway" rapid response is an example of unanticipated airway management that requires intensive emergency resources. A major adverse consequence of improper airway management is anoxic brain injury, which is associated with a high risk for malpractice litigation. Improved team communication, coordination, and resource allocation are critical to successful airway management and also enhance the quality of care.[17] As the occurrence of these critical events is seldom, UPHS's Department of Anesthesiology and Critical Care implemented an in situ simulation to improve future care and reduce the risk for patients requiring "surgical airway" rapid response outside the traditional operating room. The proposal was introduced in order to familiarize the staff with resources of the airway rapid response system in the general clinical ward setting, acquaint the staff with team crisis resource management principles, and identify systems-based issues in local clinical units. Several qualitative measures and primary goals were proposed and accomplished with implementation of this proposal, such as educating staff on the airway response and difficult airway system. Clinical staff from different divisions were exposed to this simulation, along with an extensive debriefing exercise with key participants. Surveys were administered to the nurses pre- and postsimulation regarding comprehension of the availability, utilization, and components of the difficult airway rapid response system. Participants were also asked to provide individualized written suggestions for systems-based modifications of processes to improve the conduct of critical airway responses. Finally, sessions were videotaped for internal quality improvement analysis to identify any systems-based deficiencies in the organization.

Culture of Safety

Obstetrics claims pose a significant risk profile to the health system. Given that obstetrics and gynecology is known to be a high-risk specialty in terms of malpractice claims filings,[18] enhancing teamwork and the culture of safety could be particularly beneficial to this specialty's risk profile. To strengthen the culture of safety, the Department of Obstetrics and Gynecology proposed an initiative to change the perceptions and attitudes about patient safety and teamwork among providers and staff. First, the department administered the Agency for Healthcare Research and Quality patient safety climate survey to establish a baseline on attitudes and perceptions of safety on the service. Following the survey, small-group sessions to review case studies were devised to consistently stimulate discussion on patient safety culture within the department. An additional layer of this approach included the formation of a multidisciplinary OB Patient Safety Committee to develop new strategies for improving patient safety and preventing adverse outcomes. To address the constant influx of new house staff, attend-

ing physicians, nurses, and staff, a patient safety orientation program was created. The metrics of success were based on at least a 10% improvement in the safety climate survey administered one year later, high participation rates in new reduction in the number of claims on the obstetrics service, and the adverse outcome index monitored by the National Perinatal Information Center/Quality Analytic Services. The increased focus on the creation and maintenance of a strong safety and quality culture has since been adopted by the Department of Dermatology.

Disclosure of Medical Error

Lack of explanation for a medical error is often cited as a motivating factor for pursuing litigation by patients and families.[7,8] Malpractice risk increases with poor communication and transparency; however, there is surprisingly little formal training on error disclosure, much less curricula in which residents receive comprehensive feedback.[19,20] The implementation of a disclosure program has been shown to reduce claims and cost.[21] The UPHS Department of Surgery addressed communication issues between providers and patients through the creation of courses for residents and faculty on the topics of physician-patient communication and disclosure of medical error. One course developed to educate residents on appropriate medical error disclosure was based on the model developed by James E. Pichert and Gerald B. Hickson of the Vanderbilt University Center for Patient and Professional Advocacy on disclosure of adverse outcomes.[22] Participants first reviewed Web-based didactic materials before taking part in a simulated disclosure scenario using standardized patients. The scenarios that the residents took part in were filmed and reviewed in order to qualitatively assess and identify areas of improvement in each individual's communication skills. This intervention demonstrated improvement in areas of interpersonal and communication skills for residents. At least 80% of the invited surgeons were required to complete this course for this RRI to be eligible for a full premium rebate award. As principles of disclosure are relevant to all clinical disciplines, the Department of Surgery has provided support and advice to the Departments of Medicine, Obstetrics and Gynecology, and Neurosurgery regarding similar interventions.

Universal Theme: Results Pools

One universal clinical theme to which the subcommittee has required all affected clinical departments to allocate their efforts is the management of laboratory results and the membership of the pools of physicians and supporting staff who receive these results, hereinafter referred to as "results pools." Oversight of these results pools and ensuring proper follow-up are critical to avoiding treatment delays and late diagnosis. This clinical theme and effort is a multiyear project with several aspects: validation of accurate provider pools and membership, establishment of local clinical leadership and accountability, robust reporting to track timing of results being read and providing feedback to providers, and launching an oversight group that includes a partnership between clinical providers and administrative leadership.

System-Level Outcomes

Since the introduction of the RRI in 2009, 250 proposals have been received and $14 million in rebates have been awarded to clinical departments. The primary measure of the success of the initiative is the reduction in malpractice costs from approximately 4% of total UPHS patient service revenues in 2009 to 2% in 2016 (Figure 2). A piecewise linear model with autoregressive random errors was used to adjust for correlation between repeated measures. The breakpoint (know) was set at FY 2009. The raw data points are displayed in Figure 2, and the fitting values are indicated by blue solid lines. The slope of the preintervention period is positive (0.09%), indicating increasing malpractice costs, but is not statistically significant to the breakpoint (95% confidence interval [CI] $= -0.19\%, -0.37\%$; $p = 0.49$). The interaction test suggested a marginally significant change in the slope after the RRI program started (change in slope: −0.35%; 95% CI $= -0.72\%$–0.03%; $p = 0.06$), and the slope turns negative (−0.26%). Not shown in the figure, the average annual volume of claims was reduced by approximately 33% during the same seven-year period (2009–2016).

The responses received from the sustainability survey on RRI proposals since FY 2010 are shown in Table 1. Out of the responses received, 77.4% of the proposals accepted in the past six fiscal years were reported to be either successfully implemented or an ongoing initiative. From FY 2010 to FY 2016, there has been a predominantly downward trend in the percentage of proposals that were deemed to be unsuccessful for a variety of reasons, such as project design flaws or lack of IT resources, with only 4.5% of the responses received for FY 2016 reporting an unsuccessful rate of completion. The "Other" response option reflected in Table 1 required respondents to further clarify the status of the proposal with free text. Respondents' reasons for suspension of proposals were of two general types: prioritization of other RRI proposals and extensive delay in securing the necessary infrastructure. However, the trend for the "Other" status has largely been downward as the RRI has progressed, along with the percentages of unsuccessful and terminated projects.

DISCUSSION

In this article, we have described how UPHS developed the RRI as part of a larger strategy to reduce malpractice claims and costs through risk mitigation, quality improvement, and patient experience efforts. With the implementation of this program, we have observed improved outcomes on multiple levels. Improvements in systemic metrics, such

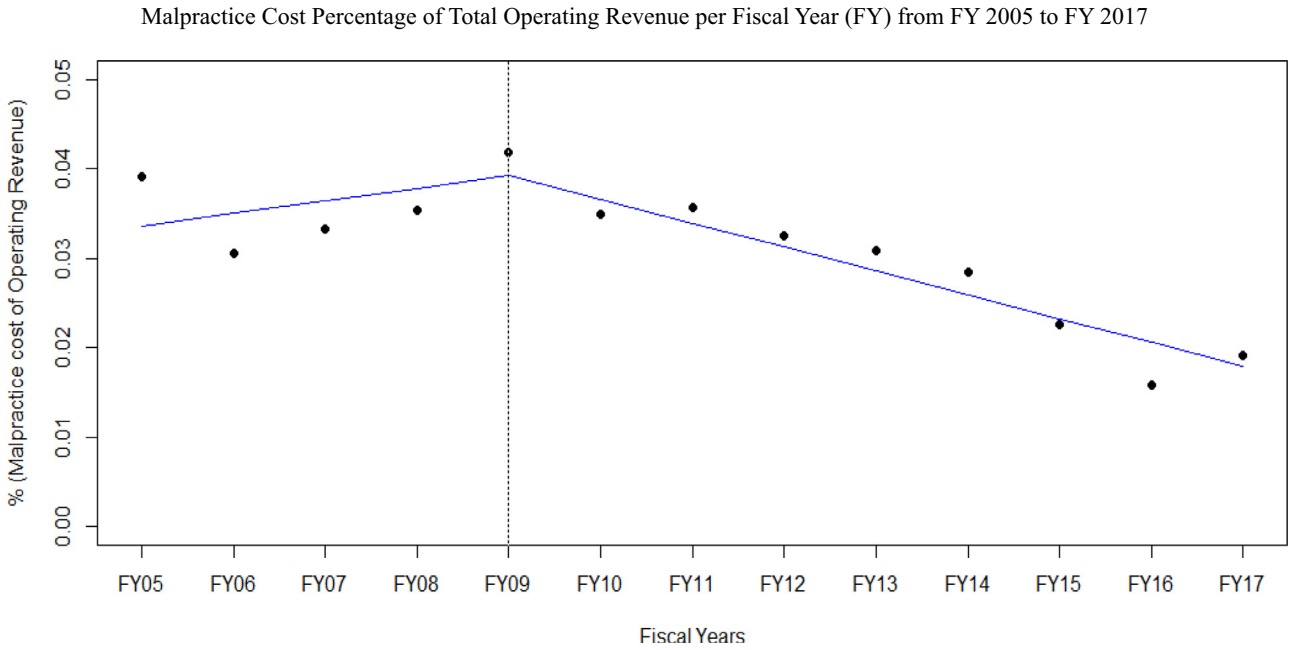

Figure 2: The vertical line indicates the onset of the Risk Reduction Initiative program in 2009, after which, as suggested by the interaction test, there was a marginally significant change in the slope as it turned negative.

Table 1. Responses from Clinical Departments on the Current Status of RRI Proposals from FY 2010 to FY 2016

Proposal Current Status	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016
Successful/Ongoing	61.5%	65.5%	88.5%	78.6%	82.1%	81.5%	86.4%
Not Successful/Terminated	11.5%	10.3%	3.8%	3.6%	3.6%	3.7%	4.5%
Other*	26.9%	24.1%	7.7%	17.9%	14.3%	14.8%	9.1%
Total Number of Projects†	34 (26)	36 (29)	29 (26)	32 (28)	32 (28)	31 (27)	25 (22)

* The "Other" category required respondents to further clarify the status with free text; responses consisted of reasons for project suspension. The reasons stated could be categorized into either pending the completion of another RRI proposal or in the stages of accruing necessary departmental resources to continue.

† Status responses were not received for all projects from FY 2010 to FY 2016. The number in parentheses is the number of projects for which status responses were received for the listed year.

RRI, Risk Reduction Initiative; FY, fiscal year.

as the number of claims filed and associated costs, lessen the financial risk to the health system and allow scarce resources to be redirected to more mission-based activities. We also have highlighted the diverse set of approaches to reduce claims through unique proposal development based on department-specific risks. The case reports detailed represent only a small percentage of the proposals developed and results achieved since the RRI program inception. The vast majority of proposals have been successfully implemented and/or have been sustained as ongoing risk reduction initiatives. The trends of decreasing percentages of terminated projects and increasing percentages of successful projects over the evolution of the program are indicative of improvement in the framework. As a result of the success of the physician-directed risk mitigation efforts, the subcommittee has since allocated a portion of RRI efforts for the implementation of projects on a systemwide scale, particularly those that contribute to risk in all or most clinical departments, such as management of laboratory results. The inclusion of these universal clinical themes under the purview of the RRI indicates that a physician-directed approach to these clinical issues has been effective in the broader UPHS environment.

To our knowledge, there is not another hospital risk reduction program that empowers physician involvement in risk mitigation and malpractice reduction efforts to this extent. Hospitalwide risk reduction programs have used an array of approaches to target malpractice claims and related financial costs. For example, the University of Michigan Health System has reported a three-step program to de-

crease costs and claims by actively acknowledging medical errors, aggressively defending cases without merit, and extensively studying all adverse events to facilitate improvement.[23] The health system observed significant improvement in its malpractice-related outcomes with the implementation of this program. A California-based physician cooperative focused on creating a robust intervention to increase transparency between the provider and patient when a mistake has been made to reduce malpractice volume and costs.[24] Other risk reduction programs approach malpractice reduction with interventions to target the reasons why patients and families sue.[7,8] The variety of approaches indicates that there are several methods to successfully execute a hospital risk reduction program to reduce malpractice costs. However, most of these programs are generally pursued as top-down approaches. Here, as described herein, UPHS has implemented an initiative that can not only can improve systemwide outcomes but also empowers frontline physicians to develop and lead risk mitigation projects.

Indeed, the central lesson learned from the RRI program has been the value of physician involvement in malpractice risk reduction. Physicians tend to resist efforts that they interpret as threatening their sense of competence and autonomy.[25,26] Thus, engaging physicians in the development of risk mitigation projects has been an effective way to secure buy-in from this community for a systemwide commitment to malpractice risk reduction. The development of clinical communities has helped with the success of the program and its evolution. The horizontal links established between frontline clinicians have aided joint collaboration to address more complex clinical risks that affect multiple departments. At the discretion of the department chair and quality leads, house officers also may be involved in proposal development and implementation. In addition, we believe that the representation of senior clinicians on the subcommittee and the appointment of a physician as the chair of this subcommittee may have been key components in the successful engagement of physicians in this initiative. As the involvement of senior physician membership tends to signal high priority, it may have increased the contribution of the frontline physicians and staff who are participating.[13] The clinical community structure has been previously identified as a successful vehicle for quality improvement efforts in health systems.[27] We have observed the value of clinical communities in the implementation of risk mitigation initiatives as well as quality improvement initiatives through the RRI program. The buy-in from physicians provides an unparalleled commitment to addressing medical malpractice risk on a departmental and systems level at UPHS.

Another lesson learned was the value of the subcommittee in promoting quality improvement efforts. The initial focus of the Professional Liability Subcommittee was on the risk financing aspect of malpractice. It since has evolved to serving as a centralized entity for malpractice risk and claims reduction through risk mitigation and quality improvement efforts. The subcommittee also has developed a Web-based platform where a compilation of successful prior risk reduction proposals has been assembled to further transcend organizational silos and serve as a conduit for institutional knowledge distribution. Aveling et al. describe the necessity of a "vertical core" in clinical communities, an entity to lead and mobilize activities; this mirrors the responsibilities of the subcommitee.[12] With the horizontal links between clinicians and the vertical structure of the subcommittee, we have been able to share best practices through multiple channels, which has facilitated replication of successful interventions in various departments.

Finally, the use of financial incentives may have served as an additional motivation for clinical leads to be involved in production of high-quality proposals and interventions. The RRI proposals that were well thought out and implemented were more likely to be awarded the maximum rebate. Furthermore, we observed that the final percentage of funds earned by each department after final review appealed to the competitive nature of physicians. Funds were distributed to departments to use for future quality improvement projects and not used as personal incentives. The generalizability of the financial incentive may be affected by the absence of a wholly owned malpractice insurer or self-insured program, as the financial incentive for faculty may need to be altered if the hospital is commercially insured.

Limitations

The RRI is a key component of the larger RRS, therefore many of the results and outcomes could be attributed to the larger RRS framework, claims management strategies, or general malpractice environment locally and/or statewide.[28] There are several additional factors that complicate our ability to assess the level of success of the RRI program on malpractice risk reduction. For example, the line of feedback through collection of patient complaints and addressing unprofessional behavior could have alleviated a portion of the risk. It is likely that multiple ongoing interventions had an additive effect that was greater than the sum of the individual intervention(s). The impact of the intervention also could be influenced by the level of buy-in from a particular department and its respective faculty, thus the RRI could have varying effects depending on the department. Our multipronged approach to physician inclusion makes it difficult to ascertain the level of impact of each specific method of physician inclusion. Moreover, the evaluation of a large-scale program in which interventions are developed autonomously in departments is a challenge to directly measure, a potential limitation of such a bottom-up approach. Nevertheless, the overall UPHS malpractice claims experience has improved. The evolution of this program was affected by the diverse expertise and experience of the subcommittee. It is possible that the RRI structure is uniquely suited to the UPHS en-

vironment or at least an academic medical center that is self-insured or has a wholly owned risk retention group or captive; however, the approach of physician engagement and the principles of clinical communities in malpractice risk reduction and risk mitigation are likely to be effective elsewhere.

Conflicts of Interest. All authors report no conflicts of interest.

SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jcjq.2018.03.009.

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