MEDICAL SCRIBES AND STRESS/BURNOUT AMONG PHYSICIANS*

Allen W. Cubell, MBA
Executive Director, Innovation
Penn Medicine Lancaster General Health

INTRODUCTION

Multiple studies indicate that clinician burnout in this country has reached crisis levels.[1,2] More than half of U.S. physicians experience one or more symptoms of burnout, and other health care professionals display a similarly high prevalence. Medical institutions, including our own Penn Medicine Lancaster General Health, have begun to survey clinicians, adopt wellness frameworks, and establish wellness committees.

Perhaps the most frequent cause of dissatisfaction among clinicians is the burgeoning time they spend with Electronic Health Records (EHRs). A study in ambulatory practices showed that for every hour physicians spent with patients, they spent nearly two more hours on EHRs and other administrative work. After office hours, physicians spent an additional one to two hours mostly on EHR tasks.[3] Another study found that primary care physicians spent nearly six hours, or more than half their workday, interacting with the EHR during and after clinical hours.[4] It would be better if clinicians could spend this time with patients, or have it available for personal use.

An effective scribe program can improve the wellness of providers and the efficiency of their practices. The success or failure of a program is ultimately determined by the extent to which these goals can be achieved economically, without sacrificing patients' satisfaction or the quality of medical notations in the record. This article will explore how various participants in the health care system can benefit from a scribe program.

WHAT IS A MEDICAL SCRIBE?

In July 2012, The Joint Commission released guidelines for the use of scribes in its accreditation manual for critical-access hospitals,[5] and defined a scribe as:

"an unlicensed person hired to enter information into the electronic medical record (EMR) or chart at the direction of a physician or practitioner. It is the Joint Commission's stand that the scribe does not and may not act independently but can document the physician's or practitioner's dictation and/or activities."

The commission "does not endorse nor prohibit the use of scribes," but if they are used, certain conditions must be met. Typically, the scribe documents the patient encounter in the EHR, gathers data, and helps with scheduling, after-visit instructions, and pending orders. Scribes may not examine or interview a patient, nor generate orders. They may use the pend function in most EHRs for procedural orders and follow-on medication orders, but not for new medication or chemotherapy orders.

Scribes must sign and date their entries, and the practitioner must then sign, date and time them. The scribe cannot enter the date and time for the practitioner, who is solely responsible and accountable for the record.

Medical scribes are generally pre-medical or pre-nursing students in college or a gap year, so there is high turnover. Average tenure is 18 months, according to ScribeAmerica, the largest third party medical scribe provider in North America and the vendor chosen by Penn Medicine Lancaster General Health. Some health care programs try to extend Medical Assistants (MAs). Salaries aren't far above minimum wage, so the job's appeal isn't the salary, but the incredible experience that scribes receive interacting directly with clinicians, their staffs, and patients.

AN INDUSTRY TAKES OFF

Medical scribes have been used since the 1960s,

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* See Comment at end of article by Kevin Mahoney, Executive Vice President and Chief Administrative Officer, and Executive Vice Dean of Integrative Services, Penn Medicine.

and the concept must have existed before that, but what we now think of as a "medical scribe" began with the proliferation of EHRs in the early 2000s. The first published literature on medical scribes and EHR efficiency was published in 2005, and began to shape the industry. Over the following decade, regional medical scribe companies emerged, with a few national players. Growth accelerated with the passing of the Patient Protection and Affordable Care Act signed into law on March 23, 2010. Driven by federal meaningful-use incentives and penalties, EHRs are used by more than 95% of U.S. hospitals and 56% of office-based physician practices.[6]

It is difficult to estimate the size and growth of the industry, not only because most scribe companies are subsidiaries of private corporations, but because many health systems have medical assistants, nurses, or physician assistants double as medical scribes. While this is a below-license activity, it does influence the head count of scribes working today. Insiders believe that by 2014 there were 20,000 scribes, with 100,000 projected by 2020, or potentially one scribe for every nine physicians.[7] In line with those figures, ScribeAmerica, which was founded in 2003, grew to more than 5,000 scribes in 2014, and had 15,000 employees in 2017.[8]

TYPES OF SCRIBES

There are several types of medical scribes, but this category does not include voice recognition applications like Dragon® or transcription services. Neither creates a parallel documentation path to help streamline the workflow.

1. Outsourced in-person medical scribes: In the traditional model, a hospital network or practice engages a third-party organization to recruit, train, install, and manage a pool of scribes. The scribes accompany clinicians as they see patients, gathering records and typing information into the EHR. Since all entries are made electronically, a strong Wi-Fi or cellular connection is critical. The biggest adjustment for providers is becoming accustomed to verbalizing their examinations, articulating along the way what the scribe and even the patient need to hear. The scribe typically stands in a corner with a traditional laptop on a maneuverable cart. The provider may also use a computer, but they cannot both access the same section of the EHR simultaneously.

Training the scribe is an adjustment from the outset. An experienced scribe first learns the provider's workflow and then trains the new scribe — first in a classroom and then in the exam room or at the bedside. A provider will first encounter an experienced scribe, then a new scribe, and then a backup scribe or scribes. They will alternate until the latter scribes are trained, at which point the experienced scribe departs giving the impression that personnel are turning over.

2. Insourced in-person medical scribes: When a health care organization employs scribes, the experience is the same as above, with the major exception that the organization manages the scribes. Often, health care organizations look to extend MAs to provide scribe services, even though the profile for success in the two roles can be quite different.

Health care systems need to make a strategic decision: is the use of scribes a long-term staffing option that is worth the necessary investment in training and management infrastructure, or is it an evolving capability best purchased from an outside vendor? (This article will not address that question.)

3. Outsourced virtual scribes: A virtual scribe is currently a person on the other end of a technology connection, who listens to, and often watches, the exam. To reduce costs, most vendors locate these services offshore, which makes them unacceptable for many hospital organizations. Aside from the perceived intrusion by an anonymous foreigner sitting in a darkened room somewhere, listening to, and often watching, an examination, there are legal concerns about sending patients' health information offshore.

As a result, some vendors maintain back-end operations in the United States, which raises costs, but not as much as in-person scribes. In small towns and in rural areas, this alternative may be more attractive than the in-person model, particularly where there are too few local pre-med and pre-nursing students to meet the demand for scribes.

The technology that enables this process must be HIPAA compliant and can be appealing because it seems innovative. Some services incorporate Google Glass, others use hidden camera/mic strategies, while others use laptops, tablets, or smart phones. The in-room experience may seem positive at first, but it depends on devices that are merely communication links, with all the pros and cons of any cellular or Wi-Fi connection that transmits voice and video.

PREVIOUS RESEARCH

Research into the effectiveness of scribes in

medical settings has intensified only over the last four to five years. From January 2000 through September 2014, for example, one meta-analysis found only five peer-reviewed journal articles on the subject, of which three were in the ED, one in a cardiology practice, and one in a urology clinic [9] (Table 1).

The authors concluded that available evidence suggests medical scribes may improve clinicians' satisfaction, productivity, time-related efficiencies, revenue, and patient-clinician interactions. They pointed out that the evidence had to be interpreted cautiously, since the number of studies was small, and each study had important limitations. They further emphasized that – given the nascent state of the science – methodologically rigorous and sufficiently powered studies were greatly needed.

Fortunately, more recent studies have begun to paint a clearer picture:

• In a crossover study of scribes, four physicians in an academic family medicine clinic worked alternate weeks with and without scribes for one year. Despite the limitations of the crossover design, the study found that scribes improved all measures of the physicians' satisfaction, including overall satisfaction with the clinic, adequacy of face time with patients, amount of time spent charting, quality and accuracy of charts, and the percentage of charts that were closed within 48 hours. Notably, scribes had no effect on the patients' satisfaction.

The study concluded that scribes appear to be a promising strategy to increase efficiency and reduce physician burnout. The authors note that the study was conducted at a single family medical clinic, and with relatively few physicians and scribes. They emphasized that future randomized studies should be conducted with large sample sizes and across multiple institutions to improve the generalizability of their findings.[6]

A related study that used a longitudinal observational design measured physician experience by open-ended written reflections after each four-hour clinic session. The findings suggested that the benefits of scribes in a primary care clinic go beyond reducing the clerical burden of physicians, and include improving the patient experience, quality of care, clinic operations, and joy of practice.[7]

In another study, four part-time scribes were deployed among six physicians in an academic family medicine practice. The study used survey and time-tracking data to measure the effect of scribes on physicians' office hours and productivity, the time they

Table 1. Effectiveness of Scribes

Measure	Outcome
Patient Satisfaction	No effect in 2 of 3
Clinician Satisfaction	Improved in 2 of 2
Number of Patients	Increased in 2 of 3
wRVU/hour	Increased in 2 of 2
Revenue	Increased in 1 of 1
Time-Related Efficiencies	Improved in 3 of 4
Patient-Clinician Interaction	Improved in 1 of 1

spent on documentation, their perceptions of work-life balance, and the satisfaction of both physicians and patients. The study found that the use of scribes substantially improved all metrics for physicians, without negatively affecting the patients' experience. Specifically, the physicians spent an average of 5.1 fewer hours/week on documentation, while various measures of productivity revealed increases ranging from 9.2% to 28.8%. Perhaps most importantly, when the results of the pilot study were annualized, they were projected to save $168,600 per year — more than twice the $79,500 annual cost of two full-time equivalent scribes. In this case, the chief scribe created a monthly schedule in advance, which enabled staff to determine which physicians' schedules could add extra appointment slots.[10]

PENN MEDICINE LG HEALTH PILOT STUDY

By the Spring of 2017 it had become clear to senior leadership at Penn Medicine LG Health that clinician burnout was a significant and potentially escalating problem. In 2016, LGH engaged consultants (Advisory Board) to perform a physician engagement survey. One of the survey's questions asked whether the respondent agreed with the statement: "I am experiencing more work-related stress and burnout now than I did three years ago." Fifty-six percent responded Agree/Strongly Agree (A/SA) vs. 14% Disagree/Strongly Disagree (D/SD). The percentile rank, when compared nationally against 55,000 responses at 750 facilities across the country, was >99%.

When physicians were asked to select the factors that contributed most to stress and burnout, the

top choice was: "Paper and administrative demands contribute to my stress and/or burnout," with 69% responding A/SA, while only 6% responding D/SD. Physicians also acknowledged the hospital network's efforts to address the problem, by responding 52% A/SA to the statement "Lancaster General promotes wellness initiatives" vs. only 5% responding D/SD. At the Lancaster General Health Physicians (LGHP) Town Hall meeting in November 2016, a number of physicians suggested a pilot study of scribes, which Dr. Raymond Foley then initiated.

In the summer of 2017, LGHP engaged ScribeAmerica to run a pilot program through June of 2018 across four practice areas: Two providers in Maternal Fetal Medicine (MFM), two providers in Urgent Care (UC), four providers in Family Practice (FP), and three providers in Specialty Practice (SP). The study began in August 2017, and expanded through December 2017, reaching a relatively steady state from January – June 2018. The expansion phase lasted five months because the vendor recruited and trained groups of three to four new scribes at one time who were coordinated with a group of providers, and then moved on to the next batch. Each set of providers took five to seven weeks. We assessed this pilot program by measuring the following:

- **Provider Satisfaction:** We administered a 19-question survey three times: before the pilot program, in January 2018, and in June 2018. The survey consisted of three surveys in one: 1) The Maslach Burnout Inventory (MBI); 2) A ScribeAmerica survey; and 3) The Conslato Clinical Well Being Survey.
- **Efficiency:** We assessed time spent with patients, and data from the Provider Efficiency Profile (PEP) report, including Minutes Spent in Notes & Letters, Minutes Spent on Unscheduled Days, and Minutes Spent Documenting After Hours.
- **Revenue Generation:** We reviewed wRVUs/visit and Gross Charges/visit before and during the pilot, and compared these with a control group where available.
- **Productivity:** We looked at Patients/hr and volume of visits.
- **Patient Satisfaction:** We tracked Press Ganey Likelihood to Recommend (LTR) data, and comments.
- **Quality:** We tracked Note Length, several quality metrics, and spot audits.
- **Cost/Benefit:** We tracked costs, and developed financial models.

Fig. 1. Randy L. Kochel, M.D., and his scribe Kirby at Penn Medicine Lancaster General Health Plyscians Family Medicine County Line.

FINDINGS

Provider Satisfaction: As the program began, provider satisfaction improved rapidly. In January, nine of the 19 survey questions were more positive by about one standard deviation, i.e. positive statements became more positive, or negatively worded statements became less negative. Eight were somewhat more positive, two remained flat, and none degraded. (As of the submission of this article, we had not received our final June survey results.)

The most positive nine statements were:
- LGHP listens to and cares about the factors that contribute to my stress.
- LGHP is interested in understanding and managing changes to my standard workload.
- LGHP provides support for reducing non-value added administrative/electronic tasks (paperwork, EHR, charting).
- LGHP supports my individual efforts to relieve stress and emotional exhaustion.
- I feel fatigued when I get up in the morning and have to face another day on the job.
- I've become more callous towards people since I took this job.
- I don't really care what happens to some patients.
- I am more able to sign all charts by the end of the day.
- I am more productive with respect to the number of patients seen.

Some early qualitative feedback from providers on bi-weekly sharing calls included:

- *"I'm getting out 30-60 minutes earlier than before."*
- *"I used to spend an hour or more at home closing charts."*
- *"I love my scribe."*
- *"First time I've gone home and didn't worry about my notes."*
- *"I would have spent two hours finishing my charts last night at home."*
- *"My spouse thought I was fired when I got home at 9:10 p.m."*

(Note that the participant regularly worked a 12-hour shift from 9:00 a.m. to 9:00 p.m.)

Providers expressed the most concern about: scribe turnover, communication, aligning schedules to ensure the scribe showed up, and inconsistency among scribes. Just like providers, scribes are people. Providers and their scribes spend a great deal of time together, and they must match in personality and capability. When successful, a rewarding mentor-mentee relationship can develop.

There were also occasional technical issues, including workflow, Wi-Fi or cellular signal strength, access to Epic, and maneuverability of carts.

Efficiency: The win-win potential of a scribe program comes from saving the time formerly spent performing clerical duties (Table 2). This "freed-up" time offers providers the dual benefit of both adding more personal time and increasing productivity.

There was a wide variation in results, which can be explained in two ways:

1) Providers prefer different work flows, and they complete documentation at different times, whether in the exam room, immediately after the exam, later in the day, over lunch or dinner, or after hours (defined as after 7:00 p.m.). Some documentation may be completed the next day or even days later. A provider who never worked on unscheduled days or took work home couldn't show improvement in those measures.

2) We were not able to capture all the time in the system.

Even so, the data show the potential of a scribe program to free up significant time. Providers estimate they save one to two hours per day, or 20-40 hours in a typical 20-day month. Though our three measurements don't indicate that much time being freed up, our measures don't capture all the time providers use the EHR.

Generation of Revenue: One question at the outset was whether LG Health would see a change or improvement in coding, since providers would be completing their documentation in real time vs. later in the day or even much later than that. We measured wRVU/visit and Gross Professional Fees/visit. On average, Gross Professional Fees/visit increased 7% and wRVU/visit increased 3%.

Productivity: We knew from the outset that assessing improvement in productivity, such as seeing more patients, would be a challenge. Since the primary purpose of the pilot was to determine if scribes could improve provider wellness, and we couldn't predict whether there would be a substantial amount of freed-up time, we didn't ask pilot participants to add patients to their schedules in advance. As a result, though we saw efficiency improvements as discussed earlier, we didn't see productivity improvements as measured by number of visits per month or patients seen per hour.

We learned from this experience that as the hospital initiates a formal scribe program, we must set schedules in advance to capture the improvement in productivity that should cover the cost of the scribes. (More on that in the cost/benefit section below.)

Patient Satisfaction: Press Ganey LTR was virtually unchanged when our pilot participants were compared to a control group. Possible explanations include the following:

1) There were very few responses per provider per month, so we were comparing low response rates over time;

2) Qualitative feedback usually fell into one of two categories. Some patients just didn't want an

Table 2. Sources and Amounts of Freed-Up Time		
Sources of Freed-Up Time	**Mean Change (Hours/month)**	**Max Change (Hours/month)**
Time Spent on Notes and Letters	6.0	14.0
Time Spent on Unscheduled Days	4.5	16.0
Time Spent After Hours	1.8	12.2

extra person in the room, and made comments like: "The provider now has a scribe in the room. She was professional and polite, but I didn't care for an extra person standing there." On the flip side, there were patients who believed their experience with the provider improved, and made comments like: "I like the idea of the scribe. I didn't have to wait as long as usual. I also felt the doctor spent more quality time with me."

Quality: We tracked quality using Note Length in Epic, a few specific metrics, and maintained spot checks. Note Length converged to a small extent, which we interpreted as a degree of standardization. Specific frequency metrics like the rate of colorectal and breast screening in family practices appeared unchanged. Providers continued to review all charts as they were supposed to, and when a scribe's documentation wasn't up to their standard, the provider fixed it, educated the scribe, or in rare cases, informed the vendor. In those rare cases, the vendor placed the individual on a performance improvement plan. Continued spot checks showed no concerns.

Cost/Benefit: While the primary driver of the pilot was to improve provider wellness, we had to learn how to pay for the program. To put the cost in context, if LGHP provided a scribe to every physician, with no identifiable financial benefit or offset, the operating margin of the hospital system would be halved, with an unacceptable impact on funds available for future investment. In considering how to create a win-win situation, in which the provider wins and improves wellness, while the hospital system wins by realizing a return or at least breaking even, we split benefits into two categories: 1) hard benefits that affect the annual budget; and 2) soft benefits that are real, but harder to quantify (Table 3).

Since we found productivity difficult to measure

in the pilot, despite significant gains in efficiency, when we transition to the program we plan to set goals up front and track progress accordingly. A win-win is achievable. On the one hand, providers can improve wellness by freeing up time they can use to improve their quality of life; on the other hand, the program can pay for itself by adding about two visits per eight- to nine-hour shift, plus a modest improvement in wRVU/visit from improved coding accuracy.

THE TOUGH QUESTION: WHO SHOULD GET A SCRIBE?

At this juncture analytical rigor gives way to opinion. Throughout the pilot I have been asked whether scribes should be assigned to our *most* productive or *least* productive providers, to those in certain specialties, those who threaten to leave, or those who are struggling?

After reviewing our experience in even more detail than above, I concluded that busy providers who want or need a scribe the most, and are willing to become more efficient, are likely the best candidates to generate the win-win by improving their well-being, while creating a fiscally sustainable model for the health care system.

Let's break down that answer. First, what does busy mean? It may be having more demand from patients than ability to serve them in a way that is fulfilling and produces great outcomes. In the pilot, one practice was severely under-staffed, and scribes helped providers catch up on a chart backlog very quickly.

Second, not all providers want or need a scribe. Some providers have mastered the EHR, are comfortable with it, grew up with a computer or tablet in their hands, and don't need to delegate the task. The answer for them may come from another direction.

Third, the provider must be willing to learn and

Table 3. Benefits of Scribes	
Hard Benefits	**Soft Benefits**
Provider sees 1-3 more patients/day.	Extend a career.
Multi-physician practice adds scribes instead of another provider.	Help a provider going through a difficult period.
Practice resolves backlog of charts (one-time benefit).	Reduce turnover.
Surgeon reduces office hours and adds surgical slots.	Facilitate recruiting.
Coding accuracy improves and wRVU/visit rises.	Begin a long-term career path for scribes with the hospital network.

adapt. In most practices, the provider is the bottle-neck in the operation, and a scribe won't make the practice more efficient or productive if the provider isn't open to change. Scribes can improve efficiency by looking at the workflow from a perspective that is hands-on and outside-in. Candidates should consider whether their documentation can convey the same message more efficiently, using best practices. Can they then separate themselves from their work and enjoy the new-found time?

WHAT'S IN THE FUTURE FOR MEDICAL SCRIBES?
Will they all be named Alexa or Siri?

The role of the medical scribe will evolve, and over time it may even be disintermediated by technology. In some locations scribes play a broader role, as more of a care-team assistant (CTA) than a simple scribe. In November 2016, the Children's Hospital of Pennsylvania (CHOP) found that by inserting CTAs into inpatient resident teams, they were able to minimize the administrative burden of residents, increase time in patient care, and improve job satisfaction and wellness. The new program also helped improve the timelines of discharges of hospitalized patients.[11]

As Natural Language Processing (NLP) evolves, so will the medical scribe. Though imperfect now, the technology will improve to handle more documentation duties. This could allow one scribe to serve two or three providers or to assume a broader role, helping provider care teams optimize the patient's experience and driving network performance.

Technology firms of all sizes, from nascent start-ups like HealthTensor and Robin Healthcare, to familiar Goliaths like Google, Microsoft, and Epic, are all working feverishly to enable Artificial Intelligence (AI) to reduce the burden of documentation. Google has been working on a Medical Digital Assist project that shows the promise and challenge of the task. Late in 2017 Google partnered with Stanford Medicine to use speech recognition and machine learning tools to help doctors automatically fill out electronic health records. Dr. Steven Lin, the Stanford physician spearheading the research said, "This is even more of a complicated, hard problem than we originally thought...But if solved, it can potentially unshackle physicians from EHRs and bring providers back to the joys of medicine: actually interacting with patients."

Hey Siri and Alexa, did you capture that?

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Allen W. Cubell
Executive Director, Innovation
Penn Medicine Lancaster General Health
555 N. Duke St.
Lancaster, PA 17602
(717) 544-4103
acubell2@lghealth.org

PERSPECTIVE ON PHYSICAN BURNOUT FROM PENN MEDICINE

Editor's Note: *This article about medical scribes describes one tactic for addressing the heightened stress and dissatisfaction that physicians report since the introduction of electronic health records. As Penn Medicine and LGH integrate their IT systems, LGH will be able to draw on the expertise and greater resources of Penn Medicine to make use of EHR's more efficient.*

Accordingly, I invited Penn Medicine's Kevin Mahoney, Executive Vice President and Chief Administrative Officer, and Executive Vice Dean of Integrative Services, to provide a perspective on this article.

Conventional approaches to relieving clinician discontent with electronic health records (EHRs) have centered almost exclusively on helping clinicians to become better at data entry — training them on order sets, smart phrases, preference lists and templates. Other solutions include voice recognition software, having medical assistants complete more of the documentation, asking patients to input their personal data, etc. All these measures aim to free up physicians from data entry so they can spend more time with patients. Mr. Cubell's thoughtful examination of the use of medical scribes and, in the future, Alexa or Siri, continues the focus on improving the data entry skills of physicians.

Kevin Mahoney

At Lancaster General and Penn Medicine, we face a formidable challenge and a new opportunity.

The formidable challenge is responding to rising clinician discontent with EHRs. Clinicians complain they are being turned into data clerks, that charting competes with clinical care, and that engaging with the EHR encroaches into their personal lives. There are many reasons for clinician burnout, but clumsy engagement with the EHR tops most lists.

The new opportunity is recognizing that electronic health records are no longer just part of how clinical care is documented, but are now central to how clinical care is conducted. And so, just as Penn Medicine aims to lead through its development of new approaches to treating cancer, it also aims to lead by advancing the concept and design of the IT infrastructure on which all modern health care delivery is built.

We can choose a different path, one that meets the challenge of physician discontent with the opportunity that comes from seeing EHRs as the "uber" clinical tool. Our design of other clinical tools puts clinicians and patients first. When we build operating rooms and ambulatory care centers, laboratories and formularies, new training programs and community services, we recognize them as the tools and settings of our mission. As such, we don't force clinicians to use them as is; we build them around clinicians' needs. We do so because we recognize that solving clinicians' needs is one of the surest paths toward better patient care and community health. The problem with the conventional approach toward health information technology is that to suggest that clinicians need to master the software is to admit that the software is their master.

There are fundamental differences between helping clinicians master EHRs and redesigning EHRs so they do what clinicians already need. We can move the clinicians to the software or we can move the software to the clinicians. The first approach is alluring—we know we can make progress with more training—but the path leads to a dead end because we can never get better than the software itself.

Only the second approach works toward regaining clinician trust. Only the second approach respects human capital. Only the second approach offers the advance that defines leadership. Yes, the first approach is exclusively what our peers are doing, and most consultants recommend. It is all they can recommend to 99% of their clients who don't have the wherewithal to choose another path. Penn Medicine's leadership position is based on discovering paths that lead to sustainable solutions, solving problems through creative thinking, partnership and innovation. Rethinking what is common is what we do best.

Lancaster General Health and Penn Medicine have led the way in pioneering health IT. Our culture, our expertise, and our legacy demand that we maintain our unrelenting effort to continue the redesign of our IT systems to improve clinical outcomes with less intrusion on the physician's time.

Kevin B. Mahoney
Executive Vice President & Chief Administrative Officer
Executive Vice Dean, Integrative Services
Penn Medicine