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A Department-Sponsored, Hospital-Based Pathology Education Symposium Is a Cost-Effective Method to Provide Laboratory Staff With Highly Rated Continuing Education Experiences

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• **Context.**—Continuing education improves the quality of medical care and is a required part of most health care professions. Although a variety of educational modules are available online or at external conferences, completion of these activities can be expensive and time-consuming. In addition, externally produced modules may have limited applicability to a local practice.

Objective.—To assess the ability of an economically efficient, locally produced, department-wide pathology educational seminar to efficiently meet education requirements for a large number of employees in a large health system.

Design.—A multiday continuing education symposium was produced annually from 2013 through 2019 at no cost to participants. Metrics related to attendance, number of educational sessions available for registration, and participant satisfaction were tabulated, trended, and compared with similar metrics tabulated from an external continuing

education conference that was offered from 2011 through 2012.

Results.—The production of an internal, hospital-based educational symposium increased employee attendance (mean of 635 attendees per year versus 247 at the external program; $P < .001$) while reducing mean annual cost per attendee (\$51 versus \$140, $P < .001$). The number of sessions produced for the internal symposium was 39 per year on average, compared with 12 per year at the external program. Technical staff, residents, fellows, and faculty all contributed to internal educational programming, helping to build a team culture in the department. Overall employee satisfaction was 96.2%.

Conclusions.—An internal educational pathology symposium led to cost-efficient distribution of continuing education credits to a large number of technical staff, with a high degree of reported employee satisfaction.

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Health care is a constantly evolving field, and the clinical laboratory is an area of rapid change. In order to ensure the highest quality of care, laboratory staff need to be familiar with the principles underlying laboratory testing and the strengths and weaknesses of current as well as emerging laboratory methods. In addition, some laboratory positions require certification and/or licensure. Maintenance of these certifications and licensures can be a job requirement, and continuing education activities are the primary basis of most laboratory certification maintenance programs (Table 1).¹⁻³

Largely because of the well-recognized benefits of current medical knowledge, continuing education is perceived as valuable and is an expected part of professional development.⁴ However, maintaining certification and licensure is

an employee responsibility, and participation in maintenance of certification can be a significant expense. Specifically, renewal costs range from \$50 to \$125 per employee, exclusive of the expense of continuing education programs, travel and equipment necessary to access continuing education, and the dedication of time to participate.^{1,3} These expenses can result in employee frustration, poor overall job satisfaction, and, if not addressed, lapse of certification or licensure.

Interactions with teammates is a beneficial component of professional development and can lead to collaboration on future projects and ideas.⁵ Providing an opportunity for staff who may be physically separated (eg, staff who work in different laboratories) to connect face-to-face is important to fostering employee satisfaction and a sense of community. In addition, many priorities of a health care organization—such as promoting teamwork and improving morale—can be addressed through provision of high-quality, collaborative educational activities.⁶ At our hospital, departmental leadership supported the development of a comprehensive, annual educational symposium offered at no cost to our employees. Herein, we describe the evolution of this program during a 7-year period, with an emphasis on the cost-effectiveness of this mechanism to maintain certification and promote employee satisfaction.

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Table 1. Continuing Education Requirements for Maintenance of Certification^a

Certification	Year Requirement Began	Total Points Required	Point Distribution Requirement	Certifications Held in the US (2018)
American Society of Clinical Pathology Phlebotomy Technician	2004 (United States)/2012 (international)	9	1 point: laboratory safety, patient safety, or quality assurance 2 points: in phlebotomy Remaining points: laboratory specialty, management, education, or related laboratory field	64 086
Donor Phlebotomy Technician	2004 (United States)	9	1 point: laboratory safety, patient safety, or quality assurance 2 points: donor phlebotomy Remaining points: laboratory specialty, management, education, or related laboratory field	389
Medical Laboratory Assistant	2004 (United States)	9	1 point: laboratory safety, patient safety, or quality assurance 2 points: area in which individual is certified Remaining points: laboratory specialty, immunology, molecular diagnostics, management, education, or related laboratory field	112
Medical Laboratory Technician	2004 (United States)/2012 (international)	36	1 point: laboratory safety, patient safety, or quality assurance 2 points each: blood bank, chemistry, hematology, microbiology Remaining points: laboratory specialty, immunology, molecular diagnostics, management, education, or related laboratory field	99 211
Medical Laboratory Scientist/Medical Technologist	2004 (United States)/2012 (international)	36	1 point: laboratory safety, patient safety, or quality assurance 2 points each: blood bank, chemistry, hematology, microbiology Remaining points: laboratory specialty, immunology, molecular diagnostics, management, education, or related laboratory field	266 278
Histotechnician/ Histotechnologist	2004 (United States)/2012 (international)	36	1 point: laboratory safety, patient safety, or quality assurance 2 points: histology Remaining points: laboratory specialty, management, education, or related laboratory field	30 430

Table 1. Continued

Certification	Year Requirement Began	Total Points Required	Point Distribution Requirement	Certifications Held in the US (2018)
Technologist in Cytogenetics	2004 (United States)/2012 (international)	36	1 point: laboratory safety, patient safety, or quality assurance 2 points: cytogenetics Remaining points: laboratory specialty, management, education, or related laboratory field	4396
Cytotechnologist	2004 (United States)/2012 (international)	36	1 point: laboratory safety, patient safety, or quality assurance 2 points: cytology Remaining points: laboratory specialty, management, education, or related laboratory field	16 189
Technologist in Blood Banking, Chemistry, Hematology, Microbiology, Molecular Biology, Immunology ^b (United States only)	2004 (United States)/2012 (international)	36	1 point: laboratory safety, patient safety, or quality assurance 2 points: area certified Remaining points: laboratory specialty, management, education, or related laboratory field	24 252 (total)
Pathologists' Assistant	2005 (United States)	45	1 point: laboratory safety, patient safety, or quality assurance 20 points: anatomic pathology Remaining points: anatomic pathology, management, education, or related laboratory field	2414
Specialist in Blood Banking, Chemistry, Hematology, Microbiology, Molecular Biology, Immunology ^b (United States only), Cytotechnology, Cytometry, Laboratory Safety (United States only), Virology (United States only)	2006 (United States)/2012 (international)	36	1 point: laboratory safety, patient safety, or quality assurance 10 points: area certified Remaining points: laboratory specialty, management, education, or related laboratory field	15 336 (total)
Diplomate in Laboratory Management	2006 (United States)	36	1 point: laboratory safety, patient safety, or quality assurance 10 points: laboratory management Remaining points: laboratory specialty, management, education, or related laboratory field	1079
American Medical Technologists Phlebotomy Technician	2006	24	Phlebotomy Quality assurance/safety	NA

Certification	Year Requirement Began	Total Points Required	Point Distribution Requirement	Certifications Held in the US (2018)
Medical Laboratory Assistant	2006	30	Hematology Chemistry Immunology/serology Microbiology Clinical microscopy/ urinalysis Quality assurance/safety Phlebotomy/patient test management Communication/ terminology	NA
Medical Laboratory Technician	2006	45	Hematology/coagulation Chemistry Immunology/serology Immunochemistry/blood banking Microbiology Clinical microscopy/ urinalysis Quality assurance/safety	NA
Medical Technologist	2006	45	Hematology/coagulation Chemistry Immunology/serology Immunochemistry/blood banking Microbiology Clinical microscopy/ urinalysis Quality assurance/safety	NA
Molecular Diagnostics Technologist	2006	36	Quality assurance/safety Molecular theory & laboratory procedures/ methods	NA

Abbreviation: NA, not available.

^a Duration is 3 years for all certifications.

^b Certification no longer offered.

MATERIALS AND METHODS

Demographics

In 2019, our department had approximately 1286 employees across 6 hospitals located in 3 states. The majority of these employees (n = 870) were based at the academic medical center (Table 2), with the

remaining based at smaller affiliated hospitals, including 1 children's hospital. Of the 870 employees at the academic medical center where the symposium was based, 629 (72.2%) were clinical staff who held a variety of certifications (eg, phlebotomist, medical laboratory scientist, or medical technologist). The career ladder in our department requires certification in order to progress beyond an entry-level position.

Position	Academic Medical Center	Affiliate					Total
		1	2	3	4	Children's Hospital	
Faculty	95	5	2	4	4.5	4	114.5
Phlebotomist/technician	145	39	13	40	6	17	260
Laboratory scientist, medical technologist, medical laboratory technician	306	54	31	41	28	46	506
Cytotechnologist	8	1					9
Pathologists' assistant	8	2	1		1	1	13
Histotechnician	45			5	6	4	60
Molecular/cytogenetics	55					14	69
Registered nurse	12						12
Information technologist	12			1	1	2	16
Residents	31	3					34
Clinical fellow	21					0.5	21.5
Other	132	11	7		2	19	171
Total	870	115	54	91	48.5	107.5	1286

Program Development

From 2011 to 2012, the department sponsored staff participation in an external continuing education conference. In 2012, a continuing education committee for our department was created to assist employees in developing their continuing education curriculum. The committee included members from all hospitals in our health system, as well as educational coordinators from each laboratory at the academic medical center. The core group consisted of representatives from microbiology, transfusion medicine, chemistry, hematology, immunology, and surgical pathology. Those who completed a postsymposium survey were invited to join the committee for the following year, if they wished. In addition, the committee continually evaluated its representation to assure active participation from multiple subspecialty disciplines, and sought volunteers from relevant laboratories as needed. Aspects included in the planning process were presentations, communication, location, refreshments, volunteers, and attendance tracking. Feedback from the previous year's symposium was a central part of the planning process for the subsequent year. Starting in 2013, the committee organized an annual on-site continuing education program on the main hospital campus and invited all pathology employees within the health system to participate. These sessions were available to all employees of our health system at no cost to them. Our institution's faculty, fellows, residents, and staff were invited to provide the educational sessions that focused on laboratory science, operations, and human resources. All sessions were American Society for Clinical Laboratory Science Professional Acknowledgement for Continuing Education accredited, and, starting in 2016, were also Continuing Education Broker accredited.

Curriculum

Preparing the continuing education program for the breadth of services provided by pathology created a significant challenge. Professional development should include not only advancement of clinical and scientific knowledge, but also professionalism, leadership, and communication skills training.⁷ Each year, a new educational program was developed to reflect these educational priorities. Volunteers were solicited by the continuing education committee, generally through 1 of 2 pathways. The first way was that the committee identified a topic that might be of interest to the department, and then worked through the department to find an appropriate speaker. The second way was that a speaker was identified—either through recommendation to the committee or because of interest from the speaker—and then the committee worked with the speaker to identify a topic. Once the topic and speaker had been identified, a proposal form was filled out and submitted to the committee. From these proposals, topics and speakers were selected to balance content and to avoid overlapping topics. The department sought speakers who were experts in their field, mostly from within our pathology department, but also from the broader health system. Emphasis on new topics was preferred to repeating topics from previous years, and each session was given only once per year. Once established, the program was printed and distributed to all laboratories and published on the intrastaff pathology website. Starting in 2015, a poster session was added.

Logistics

A main priority was finding a location for the symposium with lecture halls and classrooms that were near each other and the laboratories. Available rooms varied in size, so employees were asked to register electronically in advance using a free online survey software system (SurveyMonkey, San Mateo, California) the first year and a paid attendance tracking system the subsequent years (ActivTracker, Adminformatics LLC, Five Forks, South Carolina), and, based on their interest, popular presentations were assigned to larger lecture halls. Some courses were selected for livestreaming; this was accomplished with commercially available software (Mediasite Events, Mediasite, Madison, Wisconsin). In an effort to promote conversation and networking, lunch and light refreshments were provided to all attendees in a common area

that promoted interactions. These were provided at no cost to employees during designated break times in the symposium schedule. Volunteers (approximately 3 per presentation) were used to direct attendees to the proper room location, introduce speakers, assist attendees in recording their attendance, ensure lunches were efficiently distributed to attendees, and answer questions.

Data Procurement

Data regarding programming cost, attendance, educational sessions, continuing education credits, and attendee satisfaction were gathered retrospectively. Schedules, attendance, evaluation records, and invoices from each year were reviewed. Descriptions of the educational sessions from each year's published educational program were compiled to determine the number of days each symposium lasted; the number of educational sessions, webcasts, and continuing education credits; and the number of posters presented at each session.

For 2011 to 2012, attendance for the external continuing education program was determined by the number of registration fees paid. Attendance was manually tabulated in 2013, and total attendance was calculated by compiling a list of attendees at each individual educational session into a master list and then removing duplicate entries. From 2014 onward, attendance was calculated by querying the electronic attendance tracking system. Cost analyses were performed by organizing invoices from the cost center used for continuing education expenses. Costs were itemized by category for comparison and the mean cost per attendee was determined. The overall employee satisfaction was determined via a 5-point Likert scale survey that was distributed by an electronic survey system within 3 days of the completion of each year's educational program (Table 3). The categories were excellent (5), very good (4), good (3), fair (2), and poor (1). The categories excellent, very good, and good were considered to be positive responses. From 2014 onwards, the opportunity to network with coworkers was quantified by determining the number of attendees who participated in at least 1 free lunch during the course of the multiday symposium.

Statistics

Unpaired *t* tests were used to compare the externally produced program (2011–2012) with the internally produced, hospital-based educational symposium (2013–2019). Calculations were performed using GraphPad Prism v7.00 (GraphPad Software Inc, San Diego, California). *P* values <.05 were considered to be statistically significant.

RESULTS

Providing an on-site continuing education symposium more than doubled employee participation (mean = 635 participants per year from 2013 to 2019 [Table 4] versus mean = 247 participants per year at the external sessions offered in 2011 and 2012 [Table 5]; *P* < .001). The mean cost per attendee was substantially lower for the internal event (\$51) compared with the external event (\$140; *P* < .001). Prior to 2013, all of the costs of the event were realized by vendors that were unaffiliated with our medical center. The breakdown of costs by category was calculated for the internal events from 2013 to 2019. Bringing the event on site kept the majority of financial expenditures within the medical center's administrative structure (Table 6).

Curriculum Development

The courses offered by the external event in 2011 and 2012 were approximately 6 hours long. To allow for a wider variety of topics, the on-site events offered shorter, generally 1-hour, courses. This allowed for more total courses (mean of 39 per year versus 12 per year at the external events; *P* < .001). Courses were offered in a variety of subspecialty areas

Table 3. Evaluation Questions Used to Assess the Overall Pathology Symposium, As Well As Individual Sessions

Question Number	Question Content
Overall pathology symposium evaluation	
1	Where is your primary employment?
2	What best describes your position?
3	Did you attend the pathology symposium this year?
4	Rate your satisfaction with the pathology symposium this year (excellent, very good, good, fair, poor): Educational sessions Room setup Online poster session Overall satisfaction
5	What did you enjoy the most about this year's symposium?
6	What topics would you like to learn about at next year's symposium?
7	Please share any additional comments
8	Please leave your email address if you want to be involved with the symposium committee
Individual session evaluation	
1	To what extent was the speaker knowledgeable, organized, and effective during the presentation? (excellent, above average, average, fair, poor)
2	To what extent was the speaker clear and focused on the stated objectives? (excellent, above average, average, fair, poor)
3	To what extent did the speaker use teaching methods appropriately and effectively? (excellent, above average, average, fair, poor)
4	To what extent were the learning objectives achieved? (excellent, above average, average, fair, poor)
5	To what extent did the program content relate to the program objectives? (excellent, above average, average, fair, poor)
6	Rate your overall degree of satisfaction with the session (very satisfied, satisfied, neutral, dissatisfied, very dissatisfied)
7	Comments

in both anatomic and clinical pathology, including transfusion medicine, chemistry, cytology, hematology, immunology, information technology, phlebotomy, microbiology, and surgical pathology. Leadership, professionalism, and wellness presentations were also included in the course offerings (Table 7). A mean of 4 residents and 3 fellows presented each year, along with a mean of 13 staff and 12 faculty (Table 5).

Networking and Employee Satisfaction

From 2013 to 2019, a mean of 509 employees per year participated in our networking lunch event. Overall, there was a mean postsession evaluation completion rate of 44.4% (282 of 635). The mean overall satisfaction (satisfaction rated as 3 or greater) was 96.2%, and mean total satisfaction was 4.43 of 5.

Program Development Over Time

Starting in 2014, selected courses were webcast live to an affiliate hospital in another state using a commercially available service. Recordings of these sessions were available up to 6 months after the program for those who could not attend the live presentation and were American Society for Clinical Laboratory Science Professional Acknowledgement for Continuing Education accredited. From 2016 onwards, these webcasts were Continuing Education Broker accredited. Starting in 2015, a poster session was included using posters presented at previous national meetings and was approved for an additional American Society for Clinical Laboratory Science Professional Acknowledgement for Continuing Education continuing education credit. In 2017, the poster session was converted to an electronic format available on our department's website for a 2-week

period. Overall, the poster sessions had a mean of 12.6 posters and 77 participants per year.

Barriers to Attendance

The greatest barriers to attendance were interest exceeding the capacity of a room and laboratory staff who were unable to attend because of a last-minute clinical need in a laboratory. Every effort was made to anticipate sessions that were likely to be very popular and to schedule those sessions in the largest available rooms. Patient care was always the first priority, so if a participant was needed in a laboratory, the participant was asked to remain to ensure the patient's needs were met.

Inclusion of Leadership

Over the years, institutional leadership, including the department director, the hospital's chief operating officer, and the hospital president, participated by attending the symposium and by giving presentations.

Table 4. Cost of Local External Continuing Education (CE) Conference

	2011	2012	Mean
Total cost, \$	31 737	36 743	34 240
Attendance	217	277	247
Cost/attendee, \$	146	133	140
Total time, d	4	4	4
Total No. educational courses offered	12	12	12
Median CE credits/course	6.5	6.5	6.5

	2013	2014	2015	2016	2017	2018	2019	Mean
Total costs, \$	24 835	38 159	29 923	37 714	34 471	30 295	30 761	32 308
Attendance	457	609	666	705	658	665	687	635
Cost/attendee, \$	54	63	45	54	53	46	45	51
Total time, d	3	4	3	3	3	2.5	3	3.1
Total No. educational courses offered	35	42	35	41	40	38	42	39
Median CE credits/course	1.5	1.0	1.0	1.0	1.0	1.0	1.0	NA
Minimum/maximum CE credits available per attendee (live sessions)	1/18	1/22	1/18	1/18	1/17	1/15	1/18	1/18
Median courses offered per day	12	12	12	13	14	14	15	13.1
Mean attendance per course	46	63	78	82	84	77	82	73
Mean credits earned per attendee	4.5	4.6	4.1	4.9	5.1	4.3	5.1	4.7
Courses recorded/webcast	NA	5	4	7	8	7	6	6.2
CE credits awarded for recorded courses	NA	291	92	364	324	295	323	282
Posters in poster session	NA	NA	12	11	10	19	11	12.6
Participants in poster session	NA	NA	63	72	107	83	60	77
Participants in lunch networking	NA	539	456	540	541	484	496	509
Presenters								
Pathology residents	4	2	5	3	5	8	2	4
Pathology fellows	0	3	3	3	6	6	0	3
Pathology staff	17	20	12	11	5	10	19	13
Pathology faculty	10	12	10	14	14	12	12	12
Program surveys complete, No. (%)	265 (58.0)	330 (54.2)	256 (38.4)	316 (44.8)	394 (59.9)	231 (34.7)	179 (26.1)	282 (44.4)
Overall satisfaction, % scoring ≥ 3 (weighted average score on 1–5 scale)	96 (4.83)	91 (4.35)	97.6 (4.30)	95.3 (4.35)	96.2 (4.32)	98.6 (4.48)	98.8 (4.39)	96.2 (4.43)

Abbreviation: NA, not available.

Item	Cost, \$						
	2013	2014	2015	2016	2017	2018	2019
Provider fees	600	600	600	900	650	900	650
Room rental	4760 ^a	4760 ^a	4760 ^a	4760 ^a	4760 ^a	4760 ^a	3108 ^a
Food	9148 ^a	22 327 ^a	18 018 ^a	23 282 ^a	20 558 ^a	15 790 ^a	20 507 ^a
AV/recording	3369 ^a	4185 ^a	4185 ^a	6354 ^a	6354 ^a	6354 ^a	1620 ^a
Printing	5760 ^a	4087 ^a	563 ^a	563 ^a	563 ^a	563 ^a	1257 ^a
Parking/travel	600 ^a	530 ^a	530 ^a	30 ^a	30 ^a	26 ^a	853 ^a
Electronic attendance system	NA	785 ^a	715 ^a	905 ^a	730 ^a	955 ^a	2400 ^a
Bags and pens	416	801	498	801	801	801	336
Other miscellaneous costs	182	84	54	119	25	146	30

Abbreviation: AV, audiovisual; NA, not available.

^a Costs that were paid to other accounts within the academic medical center.

Table 7. Courses Presented at the 2019 Pathology Symposium^a

Course Title	Speaker	Category
Doing Our Job Versus Meeting Our Mission	Hospital executive	General
Overview of Organ and Tissue Donation	External tissue experts	Histology and blood bank
Living Mindfully	Wellness employee	Wellness
A Day in the Life of a Pathologists' Assistant	Pathology staff	Histology
Microbiology Supervillains: Insidious to the Apocalyptic	Pathology staff	Microbiology
Portrait Collection of the Hospital	Archive staff	History
Tuberculosis: The Invisible Global Health Emergency	Medical school faculty	Microbiology
Your Opinions Do Count	Pathology staff	General
Identification and Management of Potential Aggression	Psychiatry nurse	Safety and phlebotomy
Journey of a Bone Marrow Donor	Oncology staff	Blood bank
Laboratory Information Technology: Period of Rapid Change	Pathology staff	IT
Why Is Measles Back: Vaccine Safety, Effectiveness, and Hesitancy	School of Public Health faculty	Immunology and safety
The Gross Evaluation of a Transplant Heart	Pathology faculty	Histology
Use of Bioanalytical Tools to Support HIV Clinical Trials	Pathology faculty	Chemistry
It's More Fun in the Philippines	Pathology staff	Diversity
In Vitro Fertilization and Lab Testing	Pathology staff	Chemistry and hematology
Can Scientific Photographs Exist as Art?	Pathology faculty	General
Introduction to the Immunogenetics Lab	Pathology staff	Histocompatibility and blood bank
Bone Marrow Transplant Monitoring by STR Chimerism	Pathology faculty	Hematology and molecular
Telepathology Service at JHH	Pathology faculty	IT
Autoimmune Diseases	Pathology faculty	Immunology
Positively Pathology	Pathology staff	General
Weird Micro Cases: Love, Sex and (Maybe) Baby	Pathology staff	Microbiology
New Challenges in Blood Bank Testing in the Era of Monoclonal Antibody Therapies	Pathology staff and pathology resident	Blood bank
We Are Stronger Together: Build Collaborative Skills	Pathology staff	QA
Mastering CSF Morphology	Pathology faculty	Hematology
The Failure of Empathy	Pathology resident	General
Update on the Pathology Department 2019	Pathology faculty	General
Innovative Approaches for Malaria Prevention	Pathology staff	Microbiology
Specimen Integrity: Clues and Outcomes	Pathology staff	Chemistry and hematology
Opioid Epidemic	School of Public Health faculty	Chemistry
Blood Donors: Finding Them, Making Blood Products, and Protecting Their Health	Pathology faculty and blood supplier staff	Blood bank
Immunohistochemistry: Principles and Applications	Pathology staff	Surgical pathology
Undiscovered Country: Exploring Disease through Autopsy Cases	Pathology faculty	Autopsy and histology
Resolving ABO/Rh Discrepancies	Pathology staff	Blood bank
Thinking Outside the Box	University staff	General
Hematology Case Studies	Pathology staff	Hematology
ABO Type: It Takes Two to Make a Thing Go Right	Pathology faculty and pathology staff	Blood bank
Sleep Matters for Health Care Professionals	Medical school faculty	Wellness
<i>Candida auris</i> : Superbug Fungus	Pathology faculty	Microbiology
Application of the Incident Command System and Emergency Management	Hospital staff	Safety
Career Management and Development Planning	University staff	General

Abbreviations: CSF, cerebrospinal fluid; IT, information technology; JHH, Johns Hopkins Hospital; QA, quality assurance; STR, short tandem repeat.

^a Each course was worth 1 continuing education credit.

DISCUSSION

To support employee educational needs and laboratory best practices, our pathology department began a large-scale, annual educational symposium beginning in 2013. Prior to this, a limited number of employees were offered opportunities for continuing education off site. Participation at the off-site educational event was significant, but bringing the sessions onto the medical center campus in 2013 was

associated with a significant, sustained increase in participation. Moving the symposium on site also provided opportunities to technical staff, residents, fellows, and faculty to present on areas of expertise and was associated with overall significant reduction in cost. In addition, bringing the symposium on site allowed institutional leaders to attend and participate in the program, providing a unique opportunity for leaders to become more familiar with our

staff and for staff to directly interact with leadership. With the symposium occurring on site, more than 500 department members participated in networking activities, and satisfaction with the course offerings exceeded 90%.

Continuing education is essential in a dynamic environment such as health care, it is a requirement of many certification and licensure maintenance programs, and it is an important mechanism to maintain high levels of cognitive reasoning skills in health care professionals to ensure patient safety.⁸ Career satisfaction can be enhanced through formal organizational support of an employee's career development.⁹ Expense, time, and location are major barriers to employees' participation in these educational programs. Here we show that these can be overcome with on-site activities offered at prearranged times. Faculty, fellows, residents, and staff of our institution presented almost all courses, which highlighted their specialties and provided a professional growth opportunity for them as well.

Future directions for our department in an effort to support the educational endeavors of all our staff will be to become a provider of accredited continuing education for the American Society for Histocompatibility and Immunogenetics for those certified in histocompatibility. Additionally, starting in 2020, we will include a poster presentation contest as a part of the symposium. The winner will receive the opportunity to attend a national laboratory meeting of his or her choice, with the department covering the winner's expenses.

Our findings are subject to several limitations. First, this is a retrospective analysis of one large department in a single health system. Organization size, staffing levels, and resources vary from institution to institution and could produce different outcomes in response to a similar intervention. In addition, the retrospective nature of our review made it difficult to fully capture and directly compare small variations from year to year that could have been influenced by speaker quality, conflicting obligations, staffing levels, and incorporation of new ideas. We suggest that future studies of this type could benefit from a prospective approach, with more standardization for how each event is reviewed. However, it is also worth considering that the approach used in this report was flexible enough to encourage enhancement of the symposium event over time. Finally, because of limitations with available records, it was not possible for us to compute how many of our staff met all requirements using the internal symposium as the sole source of educational credits. However, we were able to determine that the average attendee earned 4.7 continuing education credits per year at the internally produced pathology symposium.

Given the size and expertise of our department, an internal, large-scale educational symposium was not only

achievable, but also well attended and cost-efficient. Similar to our experience, a previous analysis of a 1-day continuing education course on antimicrobial susceptibility testing delivered at multiple sites reported a participant satisfaction of 83% to 96%.¹⁰ Interestingly, a report¹¹ on continuing education provided by reading content and answering questions indicated discrepancies between participants' perceived efficacy and their documented competence, raising the possibility that new approaches are needed in order to have maximum impact on the learner. Use of social media for networking and collaboration is a growing trend, and sharing ideas, new findings, and interesting cases online can be effective and promote career development.¹²

Based on our experience, we suggest that pathology departments should evaluate efforts to facilitate employee continuing education. Promotion of approaches that enhance knowledge, facilitate networking, and improve compliance with certification and licensure requirements should be an important departmental priority.

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