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The Evolution of Earned, Transparent, and Quantifiable Faculty Salary Compensation: The Johns Hopkins Pathology Experience

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Abstract

Faculty value equitable and transparent policies for determining salaries and expect their compensation to compare favorably to the marketplace. Academic institutions use compensation to recruit and retain talented faculty as well as to reward accomplishment. Institutions are therefore working to decrease salary disparities that appear arbitrary or reflect long-standing biases and to identify metrics for merit-based remuneration. Ours is a large academic pathology department with 97 tenure-track faculty. Faculty salaries are comprised of 3 parts (A + B + C). Part A is determined by the type of appointment and years at rank; part B recognizes defined administrative, educational, or clinical roles; and part C is a bonus to reward and incentivize activities that forward the missions of the department and medical school. A policy for part C allocations was first codified and approved by department faculty in 1993. It rewarded performance using a semiquantitative scale, based on subjective evaluations of the department director (chair) in consultation with deputy directors (vice chairs) and division directors. Faculty could not directly calculate their part C, and distributions data were not widely disclosed. Over the last 2 years (2015-2017), we have implemented a more objective formula for quantifying an earned part C, which is primarily designed to recognize scholarship in the form of research productivity, educational excellence, and clinical quality improvement. Here, we share our experience with this approach, reviewing part C calculations as made for individual faculty members, providing a global view of the resulting allocations, and considering how the process and outcomes reflect our values.

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Introduction

Johns Hopkins University School of Medicine is a well-known, top-tier medical school which opened in 1893 in Baltimore, Maryland. Since its inception, the medical school has been intimately associated with The Johns Hopkins Hospital, a medical center complex now comprising 37 buildings, 226 clinical services, and more than 1000 inpatient beds over 44 acres in East Baltimore. Nearly 1600 physicians and more than 600 trainees studying in 29 clinical residencies and 56 fellowship programs work at the hospital. The pathology department was one of the 4 founding departments of the medical school. It currently employs 97 full-time, tenure-track academic faculty with appointments at Johns Hopkins University. Its clinical faculty provide anatomic pathology and clinical pathology (AP and CP) services to The Johns Hopkins Hospital and several of its affiliated institutions. Our compensation plan does not apply to non-tenure-track faculty or staff pathologists. All faculty in our department have an academic component to their career, and all of our pathologists have "protected time" for scholarship and are expected to publish original research and teach. The mission of Johns Hopkins Medicine is to improve the health of the community and the world by setting the standard of excellence in medical education, research, and clinical care.

Faculty appointees in the School of Medicine are "tenure track" at the ranks of instructor, assistant professor, or associate professor, and professors are tenured. Each faculty member is hired with a complement of clinical, research, teaching, and administrative responsibilities, and all faculty are promoted through the same (one-track) process which evaluates candidates based on the quality of their scholarship and their impact on a field.[1] A departmental compensation plan comprised of 3 parts (A + B + C) was instituted by former Department Director (Chair) Fred Sanfilippo, MD, PhD, in 1993. It was the first of its kind implemented at the School of Medicine and informed recommendations of a school-wide Faculty Compensation Committee that convened between 1993 and 1997. Part A is formulaic and determined by the type of appointment (MD-trained, clinical faculty; PhD-trained, clinical faculty; and research faculty); academic rank (instructor, assistant professor, associate professor, and professor); and years at rank. Clinical faculty are paid on the same scale regardless of whether they contribute to AP or CP services. Part B is supplemental salary for leadership activities not directly related to scholarship, including administrative, educational, or clinical roles which are not directly related to scholarship. Part C (also known as the Bonus/Supplemental/Incentive [BSI] component) is a bonus to reward and incentivize activities that forward the academic missions of the department and the institution. These terms are unrelated to Medicare parts A-D.[2]

The compensation plan implemented in 1993 was shaped by numerous discussions involving the department's Executive Committee and all department faculty and approved at a department-wide faculty meeting prior to its approval at the level of the School of Medicine. The 1993 policy for part C allocations rewarded performance "above expectations" in

Table 1. Recommendations of a Taskforce on Faculty Compensation.

- All clinical and basic science departments should have a transparent faculty compensation plan.
- Compensation plans should provide faculty with options for impacting their total compensation.
- All departmental compensation plans will be submitted and reviewed by the newly formed Faculty Compensation Committee.
- The Faculty Compensation Committee will be comprised of 8 members with representation for surgical, medical, hospital-based, and basic science departments as well as representation from the Office of Johns Hopkins Physicians and the Vice Dean for Faculty.
- Faculty Compensation plans should offer a minimum level of the Association of American Medical Colleges (AAMC) 25th percentile with an overall average compensation at the AAMC median.

research, teaching, patient care, and citizenship. Faculty could earn between 0 and 12 points; the monetary value of a point was assigned annually based on available funds. This plan was generally very well received as it provided feedback to faculty on their performance and rewarded outstanding accomplishments. It did, however, place authority over part C decisions solely with the department director in consultation with deputy directors (vice chairs) and division directors. Over the ensuing years, the need for transparency grew in importance, and 2 decades later, in 2013, a Johns Hopkins School of Medicine Faculty Satisfaction Survey found that school-wide nearly half of faculty were dissatisfied with the equity and transparency of their compensation.[3] In response to the survey findings, an institution-wide Taskforce on Improving Faculty Compensation was convened, which made a series of recommendations in 2015 (Table 1).[4] In keeping with these recommendations, we developed and implemented a transparent faculty part C compensation plan for our department. As with its predecessor, the updated plan uses a point system, and the value of each point is determined at the end of a fiscal year based on available funds. However, those activities that accrue points are now specifically delineated, so that each faculty member is able to calculate the impact of accomplishments on his or her bonus.

In developing the compensation plan presented here, we considered a number of broad issues. Foremost, we wanted to develop a plan to reflect the values of the department and of the institution. It goes without saying that these values are the major determinant to our work environment and bring exceptional faculty to the institution who are not here because of their compensation. We thus wanted a compensation plan that would align with and reinforce these values. Inherent in this concept is that the plan should reward activities in all areas of our tripartite mission. Research, teaching, and patient care are all incorporated in elements of the (A + B + C) compensation plan. Specifically, part C is intended to recognize and reward the myriad of individual faculty achievements and innovations that characterize large, multifaceted academic departments.[5-12] Second, transparency was paramount.[13] Even an inviolably fair

plan that perfectly balances different interests, if opaque to our faculty, would fail to effectively communicate values and would fail to address a growing need for transparency. Third, while we wanted to use objective criteria wherever possible, we also wanted to avoid a plan that would be too prescriptive, and in so doing blunt creativity, especially in activities not as readily quantified. We wanted to invite faculty to document their work in select areas, develop processes for reviewing achievement, and find opportunities to highlight successes in venues that could be instructive for trainees and junior faculty. Finally, we wanted a plan that would promote diversity and not compound gender biases.[14-16] Equal opportunity was considered in its design, and periodic reviews of dollars awarded were expected to show equitable distribution between men and women.

Having now 2 years of experience with this policy, we took the opportunity to review part C point distributions and consider how well the process and outcomes are serving the interests of the department and its faculty.

Methods

Part A Predicted Salary Regression

Linear regression formulae (coefficients), correlation ($r2$) and significance (F) values, and residuals were determined using the Analysis ToolPak add-in in Microsoft Excel for Mac (version 16.12). Salaries (dollars earned) are plotted on a linear scale without log transform. Clinical faculty were restricted to MD (or equivalent)-trained, practicing pathologists on the AP or CP services. The Department Director was excluded.

Density Plots

Density plots were generated using *R* via the Rstudio console. The (S3) generic function *density* was used with default parameters for kernel and bandwidth. For overplots, individual graphs were generated to determine axis settings (xlim, ylim), and then the par() function was used to generate the combined graphic. Transparent fills were added using the polygon() function with $\alpha = 0.5$.

Bar Plots

Bar plots to compare faculty of different academic ranks were generated in Microsoft Excel. These are not conventional box and whiskers plots; they show the average (mean) points earned rather than the median points earned for each group. "Whiskers" indicate the standard deviation. Gray boxes show boundaries of the first (lower) and third (upper) quartiles. AVERAGE(), STDEV(), and QUARTILE.INC() functions were used.

Findings

Parts A and B

Part A salary is intended to reflect 3 factors: (1) type of appointment (eg, MD-trained, clinical faculty; PhD-trained research
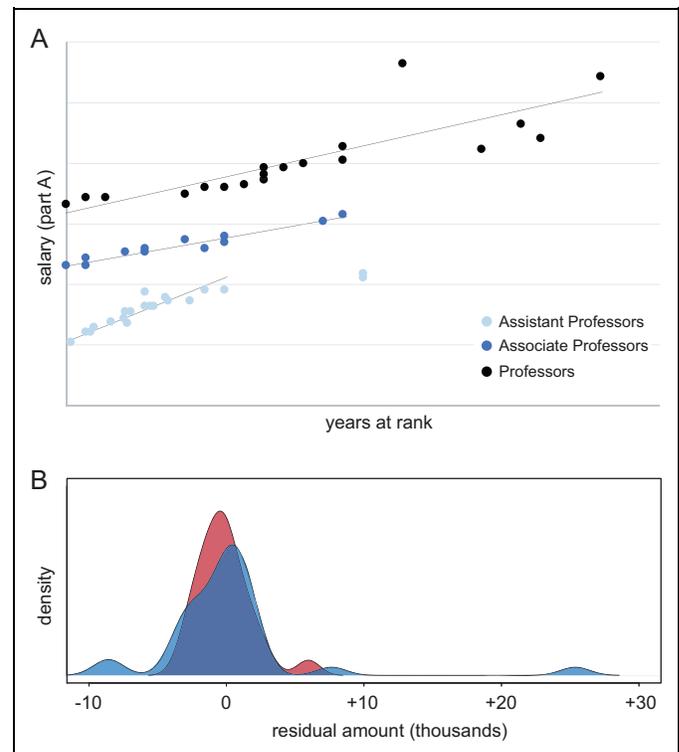

Figure 1. Base salary (part A) analysis. A, Base salaries for MD-trained, clinical faculty are shown. Faculty salaries are plotted in dollars on the y-axis versus years at rank on the x-axis. These are color coded as 3 groups corresponding to academic rank: assistant professors (light blue), associate professors (medium blue), and professors (dark blue). For each group, a linear regression shows the relationship between salary and years at rank. B, Residual amounts by gender. For each point, the distance between actual salary and salary predicted by the corresponding linear regression (ie, the residual) was determined. The density plot shows the frequency of residual amounts by gender (men, blue; women, red). A vertical line is drawn at zero; faculty paid exactly what would be predicted by their academic rank and years at rank contribute to area under the curve at this mark. Most residual variations in salary are less than $\pm \$5000$/year. Outliers on the right side of the plot are paid more than predicted; outliers on the left are paid less than predicted. These include 1 woman (residual more than $+\$5000$) and 4 men (2 residuals less than $-\$5000$; 2 residuals more than $+\$5000$). The 4 men are professors with more than 15 years at rank.

faculty), (2) academic rank (eg, assistant professor, associate professor, and professor), and (3) years at rank. To examine how well these factors alone predict actual salaries, we plotted salaries versus years at rank for different types of appointments and academic ranks. Figure 1A illustrates this for clinical faculty. Only MD-trained practicing pathologists were used in this analysis (n = 61), and the Department Director was excluded. Linear regressions were used to assess the relationship between seniority and salary. Part A dollar amounts were used directly without log transform or outlier exclusion, and we included all professors, and all assistant and associate professors at rank for less than 15 years.

Overall, regression analysis showed strong linear correlations between salary and years at rank. The correlation

Table 2. Part B.

- Deputy directors of the department
- Division directors
- Associate division directors
- Educational roles (residency program director, fellowship director, and director of the pathobiology training program)
- Institutional review board member
- Director of clinical service or specific labs
- Physician advisor*

*Helps the department meet regulatory requirements for staff and faculty appointments and acts as a liaison with other clinical departments.

Table 3. Rating Factors for Determining Part C Compensation, 1993.

1) Clinical service:
   - Clinical effort
   - Entrepreneurship
   - Attendance and participation in clinical conferences
2) Teaching:
   - Medical student teaching
   - Resident/fellow training
   - Graduate student teaching
   - Entrepreneurship
   - Interdepartmental conferences and seminars
3) Research:
   - Grants and contracts
   - Publications
   - Development of technology
   - Entrepreneurship
4) Department/institutional activity/recognition:
   - Committee work/service (departmental, institutional, extramural)
   - Participation in departmental activities
   - Special awards/recognitions/presentations
   - Extraordinary contributions to department income
   - Entrepreneurship

coefficient ($r2$) values range from 0.70 to 0.95 (0.70 [for professors], 0.89 [for assistant professors], and 0.95 [for associate professors]); F values are highly significant ($P < .0001$) for all faculty subgroups. The large majority of residual values (ie, discrepancies between predicted and actual pay) were less than 5000/year. Most (4/5) "outliers" with higher or lower salaries than predicted (residuals $> \pm \$5000$) represent historical commitments made to senior professors at rank for more than 15 years, where the linear relationship is less strong. For the second major group of faculty (PhD-trained researchers, n = 22), $r2$ values range from 0.65 (for associate professors) to 1.0 (for assistant professors), and F values range from 0.016 (for associate professors) to <0.0001 (for assistant professors; data not shown). Two "outliers" had actual salaries $> \pm \$5000$ discrepant with predicted.

To test for gender equity, we compared residual values for men and women (Figure 1B). This showed a small difference of the means ($d = -\$227.$) favoring male faculty which was not statistically significant ($P = .82$, t test). Residual values for female clinical faculty were less variable; the standard deviation for women was $\pm \$843$ as compared to men $\pm \$1812$. The latter reflects the effect of the senior professor "outliers" on both sides of predicted, all of whom are men.

Part B salary is attached to specific administrative roles, as detailed in Table 2.

Historic Process for Part C

Our original part C policy was developed in 1993 using recommendations of a dedicated subcommittee, followed by discussions with the department's Executive Committee, and the full faculty. A guiding principle of the policy was that the system be straightforward: "First, it was felt strongly that the plan should be simple in concept and implementation." Four categories of consideration were outlined (Table 3), and the director assigned points to each faculty member based on performance relative to expectation. Expected levels of productivity in a category were recognized with 1 point, and achievement above (or below) expectation would be assigned more (or fewer) points up to a total of 3 points/category, or 12 points total. The policy eschewed objective measures of accomplishment, "the distribution formula should not be tied directly to quantitative measures of activity in any area (eg, dollars of

clinical revenue generated, dollars of grant support, number of publications, number of hours teaching, etc.). It was considered far preferable to use a relatively subjective scale for each of the four major areas under consideration." Subjectivity was introduced in assessing accomplishment but also in gauging this against expectations for productivity; the policy statement specifically noted these would vary for each member of the faculty.

Part C assignments were made annually after individual one-on-one meetings between each faculty member and the department director to discuss their achievements relative to expectations and to agree on expectations for the coming year. Further, each faculty member's division chief, as well as appropriate members of the executive committee also provided scored input on each faculty member's achievements, roles, and responsibilities.

Current Process for Part C

Our current iteration of part C policy borrows 2 aspects from its predecessor: (1) using a point-based system to determine proportions for some profit sharing and (2) considering the totality of each faculty member's contributions across the distinct missions of Johns Hopkins. Our major departures from the 1993 policy are a new emphasis on quantitative, objective measures of accomplishment, and increased transparency. Part C payments are accessible to all tenure-track faculty. However, individuals who do not fund a minimum of 50% of their salary through either clinical or research activities for 2 years in a row, receive salary support in lieu of part C bonus. In practice, this jeopardizes part C for research faculty who rely on external sources for salary support and whose part A salaries become the obligation of the department when there are shortfalls.

Table 4. Part C Point Assignments for Teaching, 2015.

- National or international teaching award, 25 each.
- Teaching award presented by the School of Medicine, 10 each.
- Lecturers ranking in the top 20th percentile of the medical school, 10 per course.
- Books, 10 each.
- Completing a faculty development course to improve teaching or mentorship, 5.
- Electronic media teaching applications, 2 each.
- Invited presentations to national or international meetings,* 2 each.
- Disproportionate effort in formal teaching as determined by deputy director for education, 5.

*Restricted to junior and midcareer faculty.

Table 5. Part C Point Assignments for Research, 2015.

- First or senior author publication, impact factor (IF).
- Second author publication,* IF/2.
- Middle author publication, IF/10.
- Principal investigator (PI) of an awarded, nationally competitive research grant, 10 each.
- PI of a submitted, large (division/department-wide) funding application, 20 each.

*Restricted to junior faculty.

Minimum standards of professionalism and civility are also deemed prerequisite for part C eligibility. Faculty are provided with a worksheet each year (Supplemental File 1) for reporting points earned. Completed worksheets are reviewed for accuracy by the department assistant administrator.

Clinical work is rewarded monetarily through all salary components (A + B + C). Part A salary scales for clinical faculty are higher than for research faculty, and Part B payments for Division Directorships are almost always given to physicians and PhD-trained clinical faculty. Because we value subspecialty clinical expertise, and because clinical relative value units vary extensively across different subspecialty services, we do not use these as measures for determining part C compensation. However, we do recognize those few exceptionally productive (outlier) clinical faculty with a percentage of revenues generated (profit–loss) above a defined threshold. Although clinical revenues are not used to assign points for part C compensation, clinical activities in the areas of patient safety and quality assurance (QA) are considered in part C calculations (see below).

Teaching excellence and educational efforts are recognized using a hybrid of fixed part C monetary payments and earned part C points. Administrative educational roles within the department come with an associated part B component (Table 2). For example, the directors of our Residency Training, Fellowship Training, and Pathobiology Graduate Programs receive part B remuneration for these roles. In addition, annually, trainees in the department select recipients of the Anatomical Pathology Faculty Teaching Award, Clinical Pathology Faculty Teaching Award, and the Pathobiology Graduate Program Teaching Award. These are given as monetary awards rather than bonus points, as we did not want their value to fluctuate year to year. Other educational accomplishments earn part C points (Table 4). For example, part C points are used to recognize teaching awards received from outside the department (10-25 points each), medical school lectures ranked in the top 20th percentile (10 points each course), disproportionate educational effort (time commitment), and key contributions in lasting media including books and iPad applications (2-10 points each). Reflecting departmental priorities, authoring

review articles or book chapters is not incentivized. Participation in faculty development courses to improve teaching is rewarded (5 points each). Invited presentations at national and international meetings are credited only for assistant and associate professors to encourage their engagement in their respective fields. Faculty can objectively tally part C points earned for all teaching categories with the exception of that for *disproportionate effort in formal teaching*, which allows additional points to be assigned by the deputy director for education for those faculty whose student contact hours exceed 2 standard deviations above the departmental mean.

Research accomplishments are rewarded exclusively through the part C point system (Table 5). We recognize 2 categories of achievement, (1) primary peer-reviewed research publications and (2) grants awarded for research projects. Points are earned for publications proportional to the impact factor (IF) of the publishing journal (Thomson Reuters [Toronto, Canada] IF). This reflects the value we place on high-impact original science and allows us to contemporaneously recognize publications without a waiting period for a paper's citations to accrue. We reward first and senior authorships (point value = IF) more than middle authorships (point value = IF/10). To promote equitable collaborations, shared first and senior authorships are equivalent in weight to those that are solely first or last authored. There is a special category for second authorships for instructors and assistant professors (point value = IF/2). Principal and coprincipal investigators (PIs) of nationally competitive, peer-reviewed research grants greater than $100,000 in direct costs/year are assigned 10 points for each year of the grant. Coinvestigators and collaborators do not earn points for grant awards since these roles typically require less effort and since the awards are not credited to our department for national and institutional rankings. In recognition of the extraordinary effort required and the value of large grant awards to the department, points are also earned for PIs or overall Program Leaders on first-time *submissions* of Institutional Training (T32) grant applications, Research Program Project and Center grant applications, and Specialized Programs of Research Excellence applications. These must be submitted through our department and directly benefit trainees and teams of investigators beyond a single faculty member's research program.

Rewarding faculty achievements in QA and quality improvement (QI) is an important new addition to the new part C policy, recognizing contributions to patient safety, reduction

Table 6. Part C Point Assignments for Quality Assurance (QA) and Quality Improvement (QI), 2015.

- Significant achievement, as approved by the deputy director for QA and QI, 25.
- Mentoring a trainee project, as approved by the deputy director for QA and QI, 10.
- Contributing to practice guidelines, as approved by the deputy director for QA and QI, 5.
- College of American Pathologists (CAP) inspection team leader, 20.
- CAP inspection team member, 5.

Table 7. Part C Points Awarded, 2015 to 2017.

Category	2015-2016	2016-2017	Total
Research	2202	2034	4236
First or senior author publications	1219	1109	2328
Research funding	580	624	1204
Other authorships	403	301	704
Education	513	450	963
Teaching	160	150	310
Presentations	186	160	346
Books, media	152	110	262
Faculty development	15	30	45
Quality	155	170	325
Diversity	25	75	100
Total	2895	2729	5624

of costs, and efforts to increase value in clinical encounters (Table 6). Determining whether a project meets criteria for point allocation requires judgment, and points are therefore reviewed and approved (or withheld) by the deputy director for QA and QI and the staff Director of the Pathology Department Continuous Quality Improvement Office. All faculty can prepare a project summary for consideration (as detailed in our School of Medicine Professional Development Guide for Faculty[17]), and projects deemed excellent (25 points) are presented at our Department Grand Rounds to highlight faculty opportunities in QA and QI. Faculty who mentor clinical residents or fellows addressing a patient safety situation, conducting projects to improve outcomes, or achieving cost savings can submit descriptions of these activities (10 points). Faculty who contribute meaningfully to new practice guidelines (5 points) or who conduct lab inspections for College of American Pathologists (5-20 points) are also recognized. It should be noted that in the second year of offering quality-associated part C points, submissions of faculty quality projects tripled.

Finally, additional categories exist for rewarding and incentivizing efforts that enhance the broader academic community. The department is dedicated to promoting diversity, and considerable bonus points (25 points) can be earned for significant contributions to support diversity in the department as determined by the director of diversity for the department. Recognizing the potential of disease-specific websites to bring philanthropic donations to the department, a one-time bonus (US$2000) is given to faculty who create a new disease-specific website. Our department director also reserves the capacity, in exceptional circumstances, to add to faculty bonuses through part C. These director-assigned dollars have comprised less than 10% of the total part C dollars allocated.

Part C Point Distributions

In the first year (2015 to 2016), a total of 2895 part C points were earned: 2202 (76.1%) for research, 513 (23.3%) for education, and 180 for other categories. Similarly, in 2016 to 2017, a total of 2729 part C points were earned: 2034 (74.5%) for research, 450 (16.5%) for education, and 245 for other categories. Table 7 shows points earned in each category, and Figure 2A illustrates the distribution of total points earned over both years. Subdividing 2016 to 2017 research points: 1109 (54.5%) were earned for primary publications where the faculty member was the first or

last author of the paper; 301 (14.8%) were earned for other authorships including middle authorships; and 624 (30.6%) were earned for research grant funding. Education points from this more recent year can be similarly subdivided: 150 (33.3%) were earned for in-house teaching; 160 (35.5%) for presentations outside of Johns Hopkins; 110 (24.4%) for books and iPad applications; and 30 (6.7%) for faculty development activities. A total of 170 points were approved for QA/QI projects, and 75 points recognized faculty engagement in activities to promote diversity.

Most faculty acquired points for publishing first or last author primary peer-reviewed research papers (average = 13.4 $\pm$ 17.2, and 11.4 $\pm$ 15.2, respectively, for 2015-2016 and 2016-2017, Figure 2B). While most earned fewer than 20 IF points for these publications in total, 18 (18.5%) faculty exceeded this amount in 2016 to 2017. Five "outliers" had more than 50 points that year, with 1 individual with a single high-impact paper (*New England Journal of Medicine*) earning 72 points. Forty-one (41.2%) of our faculty received points as PIs of qualifying research grants (Figure 2C) in 2016 to 2017. Of funded investigators that year, 4 were "outliers" with more than 30 points in this category. To test whether we are rewarding essentially the same individuals across these 2 subcategories (ie, individuals obtain grants which allow them to publish more), we looked at the relationship between points awarded for research funding and points for first and last author publications (Figure 2D). These 2 variables are not entirely independent (correlation coefficient, $r2 = 0.45$). That is, productive faculty on 1 axis were likely to also be successful on the other. However, there are several whose annual accomplishments would not be recognized were we to use *either* publications or funding as a simpler surrogate for research productivity. Insufficient time has elapsed since instituting the policy to allow for longitudinal analyses to see whether publications follow influxes of research funding. Successful faculty tended to perform well over both years of the analysis ($r2 = 0.33$, Figure 2E).

No consistent differences were apparent considering average part C points as a function of the type of faculty appointment (clinical vs research), area of pathology (AP vs CP), or
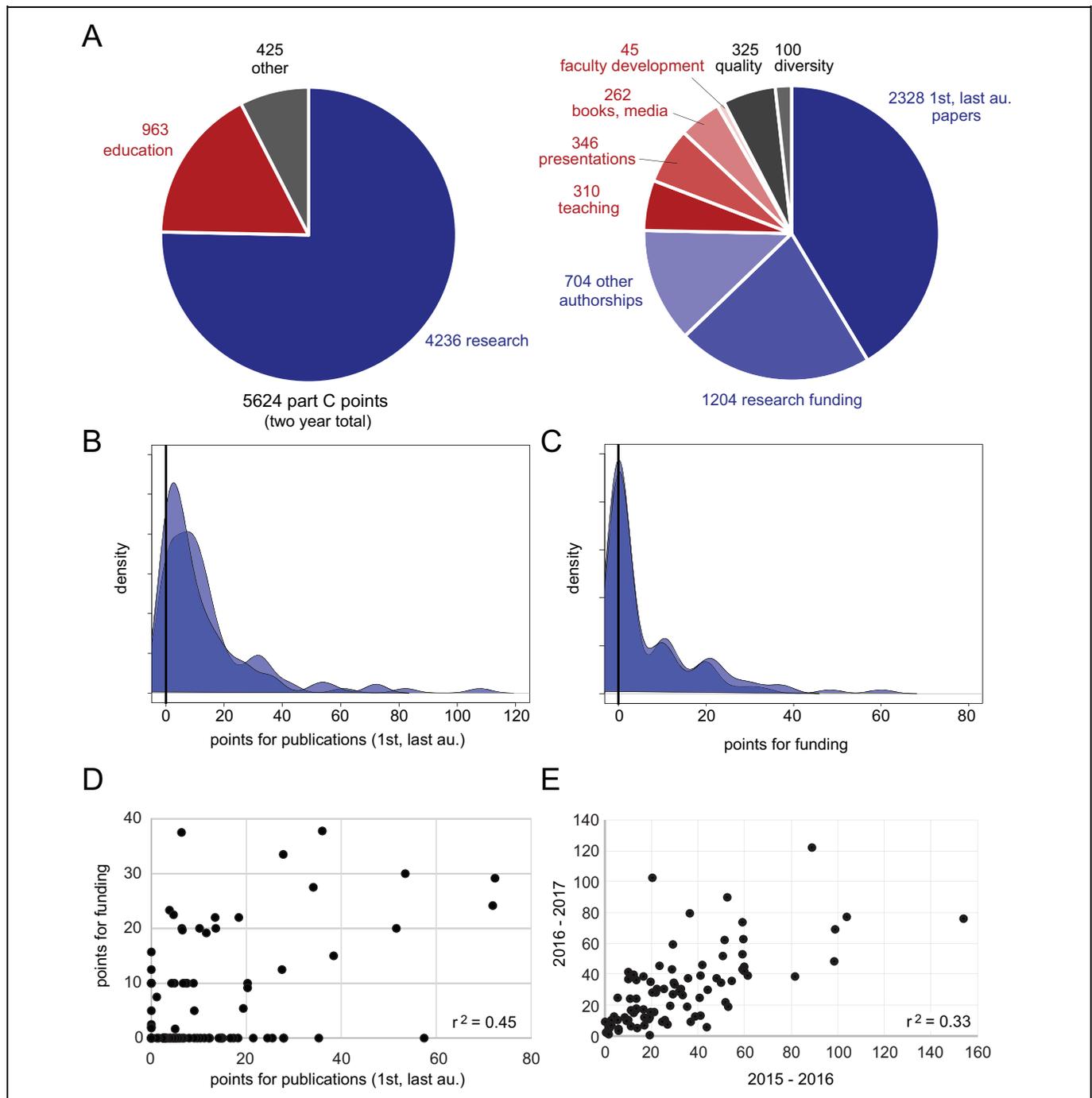
Figure 2. Bonus (part C) analysis by activity. Note that some activities, including clinical productivity, are not recognized with part C points. A, Part C points allocated over 2 years, 2015 to 2017. About 3 quarters of points were awarded for research activities (blue, 4236 points, 75.3%) with the remainder recognizing educational (963, 17.1%) and other (425) contributions. These categories are further subdivided in the pie chart on the right. Research is subdivided as: (1) points for first and last author publications (2328, 55.0% of research points), (2) points for research grant funding (1204, 28.4%), and (3) points for other authorships including middle authorships (704, 16.6%). Education is subdivided as: (1) points for in-house teaching (310, 32.2% of education points), (2) points for presentations outside of Johns Hopkins (346, 35.9%), (3) points for books and iPad applications (262, 27.2%), and (4) points for faculty development activities (45, 4.7%). Other includes 325 points awarded for quality assurance and quality improvement projects (5.8% of total) and 100 points for contributions to promote trainee and faculty diversity in the department (1.8% of total). B, Density plots showing the distribution of faculty receiving points for research publications (x-axis) each year. A vertical line is drawn at the origin. Most faculty received some points for first and last author publications. Data for 2015 to 2016 and 2016 to 2017 are superimposed. C, Density plots showing the distribution of faculty receiving points for research funding (x-axis) each year. D, Pairwise comparison of points for first and last author publications versus points for research funding, 2016 to 2017. Correlation coefficient ($r2$) = 0.45. E, Pairwise comparison of total part C points for 2015 to 2016 versus 2016 to 2017 ($r2$ = 0.33).

department division (for divisions with >5 faculty). Dually trained faculty with MD and PhD degrees received more part C points than those with either MD or PhD degrees both years, averaging 6.9 points more than the second-ranked group (MD faculty) in 2015 to 2016 and 3.5 points over the second-ranked group (PhD faculty) in 2016 to 2017.

Part C Points as a Function of Gender

We next looked at gender as a factor in part C point allocations. The 2016 Report on the Johns Hopkins School of Medicine Faculty Salary Analysis found that when A + B salary components were considered, women faculty across the entire School of Medicine were paid 1.9% less than their male colleagues in FY2015; this difference increased to 6.8% when A + B + C components were considered.[18] Thus, across the entire medical school, part C payments have been a source of significant differences between male and female faculty. Analyzing our Department's total part C point allocations under the new policy, we find nearly equal distributions of points between male versus female faculty (Figure 3A).

In 2015 to 2016, women made up 39% of our faculty (35/91) and earned 33% of part C points (943/2895). Although men thus earned more part C points per person (mean = 35 points/male vs 27 points/female), the difference was not statistically different (2-tailed *t* test, *P* = .18). Of the 186 fewer part C points earned by women faculty, the shortfall appeared multifactorial, with first and last author research publications (−90 points) and other authorships (−56 points) being the largest contributors. In 2016 to 2017, women comprised 38% of faculty (37/97) and earned 37% of part C points (1004/2729, *P* = .75), and the distribution of points to women in major categories related to research was comparable to men. Density plot overlays for men and women faculty are superimposable (Figure 3B and 3C). In both years evaluated, female faculty were represented among the "outliers" for research publications and research funding.

Over both years, women were less likely than men to earn points in education (Figure 3D), and multiple subcategories contributed to gender differences in education points earned, including those recognizing: (1) high-ranking medical school lectures, (2) national and international teaching awards, and (3) textbook authorships.

Part C Points as a Function of Academic Rank

We also reviewed academic rank as a factor in part C point allocations, comparing point distributions among the assistant professors, associate professors, and professors (Figure 4A). Not surprisingly, more part C points are earned by senior faculty. In 2015 to 2016, assistant professors (n = 21, 23% of faculty) earned 412 (14%) part C points (average = 19.6). Associate professors (n = 30, 33% of faculty) earned 984 (34%) part C points (average = 32.8); professors (n = 40, 44% of faculty) earned 1499 (52%) part C points (average = 37.5). In 2016 to 2017, these proportions shifted, and assistant

professors (n = 29, 30% of faculty) earned a larger share of points, 634 (23%, +9%) with relative reductions for associate professors (32%, −2%) and professors (45%, −7%), but the change was not significant (*P* = .25 χ² test).

We next broke down the 2 largest research categories—first and senior authorships and grant funding—to see averages and point distributions for the 3 academic ranks. In both years, the average points earned for publications was 9 to 10 points, comparable for assistant (9.2 in 2016-2017) and associate (10.0) professors and higher for professors (14.0; Figure 4B). The standard deviation associated with these point distributions increased with academic rank, such that associate professors and professors are overrepresented among the "outliers." Professors were also the most successful group garnering research funding (Figure 4C). A stepwise increase with academic rank was apparent in average points for funding. In 2016 to 2017, assistant professors, associate professors, and professors received averages of 2.6, 7.4, and 8.4 points, respectively. The upper boundary of the third quartile (Q3) also reflect this trend. Only 7/29 (24%) of assistant professors acquired points for research funding, and the Q3 upper boundary remains at zero. For associate professors, the Q3 upper boundary is 10 points (1 major grant award). For professors, the Q3 upper boundary is 17.5 points, showing a separation of 7.5 points in favor of professors over associate professors.

No consistent relationship was seen between academic rank and overall part C points earned in education. Professors tended to earn more points for high-ranking medical school lectures and for national and international teaching awards. These were balanced by points for invited presentations at national and international meetings, which are only awarded to assistant and associate professors.

Discussion

Here, we describe faculty compensation practices at Johns Hopkins' department of pathology in some detail. Our system includes 3 salary components: part A compensation (or base salary), which is determined by the type of appointment and affected by years at rank; part B salary, which is attached to defined administrative roles in the Department; and a part C BSI component. The (A + B + C) plan was developed 25 years ago by the Department's leadership with the approval of its faculty, and it continues to be in use today. We use this (A + B + C) structure to recognize all missions of the department and institution—patient care, teaching, and research. Here, we describe recent changes focused on enhancing transparent calculations of part C. Most recently, part C bonuses have amounted to 9.7% of total faculty compensation (A + B + C).

Routine clinical activities are rewarded monetarily, with higher based salary scales (part A) and opportunities to assume clinical leadership positions (part B). Clinical "outliers," extraordinarily high-volume surgical pathology faculty with busy consult services, are compensated monetarily through part C as a percentage of clinical revenue through profit generated above a defined threshold. The part C point system, which
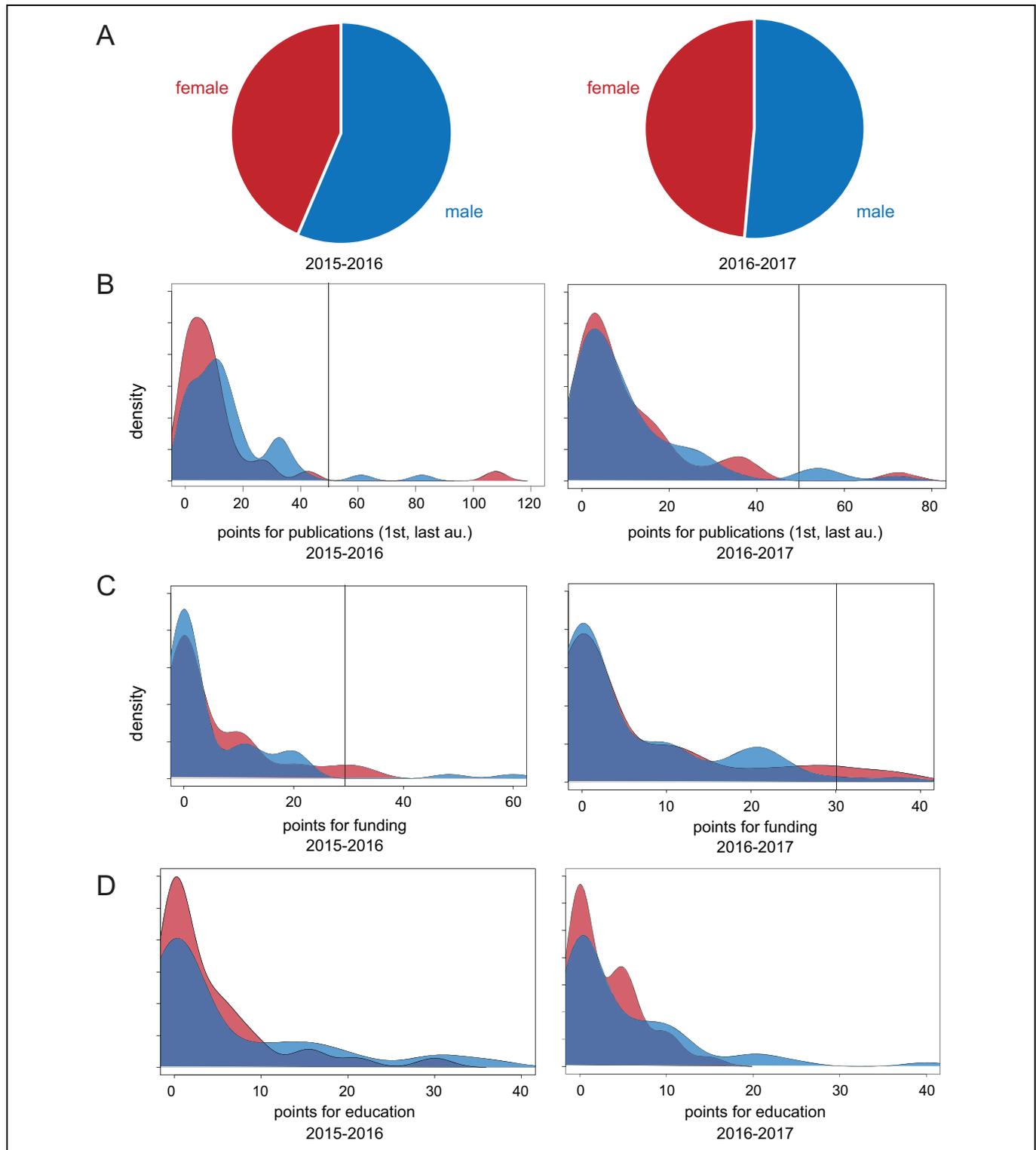
Figure 3. Bonus (part C) analysis by gender. A, Pie charts show part C point allocations for men (blue) and women (red) in 2015 to 2016 (left) and 2016 to 2017 (right). Total part C points were divided by numbers of faculty. Women made up 38% to 39% of faculty and earned 33% of part C points in 2015 to 2016 (943/2895) and 37% of part C points in 2016 to 2017 (1004/2729). B, Density plots showing the distribution of faculty receiving points for first and last author research publications (x-axis) each year by gender. In 2015 to 2016, the first and last author research publications subcategory contributed most to the gender difference. Both men and women are represented among "outliers" (>50 points, vertical line) for first and last author research publications in both years. C. Density plots showing the distribution of faculty receiving points for research funding (x-axis) each year by gender. Both men and women are represented among "outliers" (>30 points, vertical line) in both years. D, Density plots showing the distribution of points for education each year by gender.
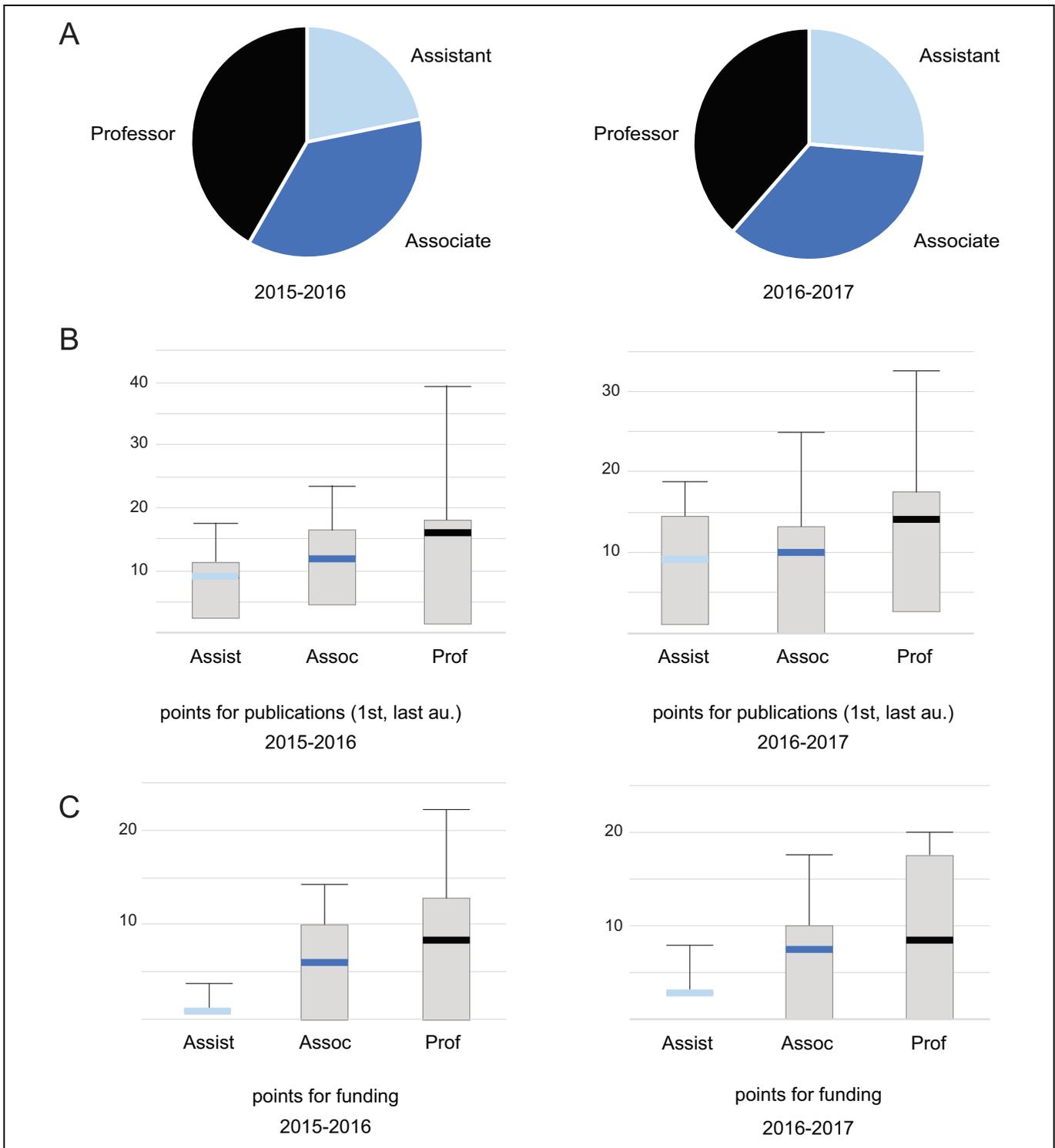
Figure 4. Bonus (part C) analysis by academic rank. A, Pie charts show part C point allocations for different academic ranks, assistant professors (light blue), associate professors (medium blue), and professors (dark blue) in 2015 to 2016 (left) and 2016 to 2017 (right). Total part C points were divided by numbers of faculty. In 2016 to 2017, assistant professors made up 30% of faculty and received 23.5% of total part C points (634/2694), associate professors made up 31% of faculty and received 32.5% of points (875), and professors made up 39% of faculty and received 44% of points (1185). B, Plots showing points for first and last author publications for faculty subdivided by academic rank. Data for 2015 to 2016 are plotted on the left; 2016 to 2017 on the right. Horizontal, colored lines show average (mean) points earned, and colors correspond to academic ranks; gray boxes demarcate boundaries of the first (lower) and third (upper) quartiles of faculty; vertical (T shape) bars extend upward to show the standard deviation. C, Plots showing points earned for research funding, as in B. More senior faculty tend to earn more points in both subcategories, and professors are overrepresented among high-earning "outliers" in both years.

awards points or "shares" in the department surplus, is used to recognize contributions in research, education, and clinical activities related to QI. Research achievements, along with education and clinical service, are also recognized through academic promotion, and thus indirectly through part A. Research activities received the majority of part C point system allocations (75% over 2015-2017). Both extraordinary or "outlier" accomplishments and more typical research achievements are recognized using the same scale of awarding points for publications and research funding. We view this emphasis on research as in keeping with our core values. Discovery is a key mission of medical schools and academic pathology; we want to foster this enterprise; and no aspect of the tripartite mission engages our faculty more universally. Education is rewarded using a hybrid approach, both fixed monetary teaching awards and part C points (16%). Although we view education as an important activity of all of our professors, its responsibilities tend to fall disproportionately on a few faculty, and annual bonuses for these most dedicated educators have increased significantly under the current plan.

Promoting diversity within our faculty was an important motivation of this policy. We continue a broad complement of efforts to attract and retain minority groups underrepresented in medicine. We now directly reward those faculty who dedicate time to recruit and support underrepresented minority trainees and faculty. In considering gender, our analysis showed no statistically significant discrepancy in part A salaries between men and women when type of appointment, academic rank, and years at rank are used to determine expected salary. We did not consider gender differences in the likelihood of academic promotion, however, which may be an important topic to consider in the future. It was gratifying to see that men and women earned nearly comparable part C points in 2016 to 2017 and that women matched the performance of their male colleagues in terms of authoring papers and winning research funding.

We have weighed several conflicts and trade-offs in developing our current part C plan:

i. *Our interest to reward many types of faculty achievements versus the risk of creating an overly complicated, cumbersome system.* An important feature of our current part C plan is that it rewards many different types of faculty activities and that all types of points are accessible to all of our faculty. The downside is that the new policy relies on faculty reporting, and there is some effort required of faculty to learn the categories used and to complete the form annually. There is also an administrative burden in soliciting, collecting, and checking forms for accuracy; answering faculty questions; and making payroll entries. We estimate these tasks require 0.125 full time equivalents of staff time. For faculty experienced with the system, point values for most activities can be calculated within less than an hour, given that lists of research publications, research funding, and educational activities are already reported

formally during our annual review process. There are a few areas where documentation itself becomes time-consuming, most notably in QA/QI initiatives. Even this necessary documentation, however, has created opportunities for communicating how quality projects can be structured and the importance of measuring baselines and outcomes. This has opened more dialogue and encouraged consultation with the deputy director for quality at the outset of faculty and mentee QI projects.

ii. *Our interest to implement a fully transparent, quantifiable scale versus the risk of stifling citizenship or industry in less tangible fields.* Transparent policies communicate by omission activities that are not rewarded. Thus, they run a real risk of devaluing activities that are not explicitly rewarded. Examples include participation on committees, mentoring trainees and junior faculty, and other types of volunteerism that are critical to the health of the department and institution. While extremely time-consuming roles, such as service on an institutional review board, are rewarded as part B compensation, the vast majority of meaningful and valued "citizenship" activities are not rewarded in the current plan. We are cognizant this may have unintended consequences. We are fortunate that our faculty are inherently generous with their time and value our broader work environment. However, we may want to consider more deliberately supporting this esprit de corps in the future.

iii. *Our interest to use objective, measurable criteria versus the desire to reward innovative, unanticipated contributions.* Any system designed to reward a large, intelligent, and creative faculty with diverse clinical, research, and educational interests cannot predict their myriad contributions to the department and to the field of pathology. For example, after our part C bonus structure was implemented, several of our faculty began participating in a successful series on "PathCasts."[19] This novel form of education was not anticipated in the bonus structure and does not earn assigned points and yet has impact equivalent to other educational activities that are rewarded. In 2016, selected faculty in our clinical labs were called upon to spend significant effort on hospital Biocontainment Unit preparedness. The capacity for the department director, to occasionally add to faculty bonuses through part C provides flexibility to recognize one-time or first-in-kind endeavors. These are ad hoc decisions at the time that they are made but could be codified in future versions of the part C point system, which should adapt to reflect the ever-changing field of pathology.

We have several purposes in reviewing and publishing these data at this time. First is to enhance transparency, in keeping with a principal motivation behind our new part C policy.

Second is that 2 years after implementing a new part C policy, it was important to evaluate how surpluses were actually being allocated. Having these data available provides opportunity to consider the efficacy of the policy and encourage broader discussions of what we most value in how faculty spend their time and efforts.[20] Finally, we wanted to provide an example to other academic pathology departments. We anticipate that our experience may be of practical utility to others and that best practices can derive from interinstitutional comparisons. While our compensation plan reflects current institutional and departmental values, these are not unique to Johns Hopkins today.

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Supplementary Materials

Supplementary material for this article is available online.

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