A Survey of Internal Medicine Residents and Faculty About the Duration of Attendings' Inpatient Rotations

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OBJECTIVE: Some training programs are shortening the duration of attendings' rotations from 4 weeks to 2 weeks. Our objective was to determine the effect of 2-week inpatient rotation on self-reported impact on medical education, patient care practices, and faculty performance by internal medicine residents and teaching faculty.

DESIGN: Cross-sectional study using an anonymous mailed and emailed survey.

SETTING: University-based internal medicine residency program in Buffalo, New York that recently introduced 2-week rotations.

PARTICIPANTS: One hundred nineteen residents (99 responded, 83%) and 83 teaching faculty (76 responded, 92%).

MEASUREMENTS: Perceived impact on medical education, patient care, and attending performance on 7-point Likert scales ranging from negative (−3) across neutral (0) to positive (+3) ratings.

RESULTS: In general, residents and attendings felt that the short rotation negatively affects the attending's ability to evaluate residents and some aspects of patient care, but that it has no negative impact on residents' or medical students' learning. Attendings thought the 2-week rotation positively affects their private life and overall productivity. Subgroup analysis indicated that residents who graduated from U.S. medical schools were more pessimistic about the 2-week rotation compared to their international counterparts. Attendings who had completed at least one short rotation had consistently higher ratings of the 2-week rotation.

CONCLUSION: Residents and attendings' perceptions suggest that the shorter attending inpatient rotation might have negative impact on medical education and patient care but positive effects on the attending's work productivity and private life. This tradeoff requires further evaluation including objective medical education and patient care outcomes.

KEY WORDS: residency; faculty; medical education; patient care; inpatient.

J GEN INTERN MED 2004;19:1133–1139.

The Accreditation Council for Graduate Medical Education (ACGME) requires internal medicine residency programs to provide 36 months of supervised training, one third of which must be in inpatient settings.¹ An issue left to the discretion of individual training programs is the duration of inpatient rotation for attendings. A number of programs have reduced or are considering limiting attendings' rotations to 2-week duration while maintaining the residents' and medical students' rotations at the traditional 4 weeks or 1 month (written personal communication, T. Ibrahim, MLA, Alliance for Academic Internal Medicine, August 19, 2003). The driving force for this change has been attending "burnout" due to the amount of documentation and the required time for inpatient care.

The supporters of the shorter arrangement argue that 2-week rotation not only avoids burnout but yields greater flexibility and productivity for the attending's other responsibilities. In addition, the attending maintains greater enthusiasm for teaching house staff and students, who in turn are exposed to a broader range of management styles. Opponents of the shorter rotation argue that 2 weeks are insufficient for the attending to develop a good rapport with, role model, and accurately evaluate the residents and students. Furthermore, a shorter rotation may have negative impact on continuity of care and patients' outcomes.

Because there is no published evidence, we surveyed internal medicine residents and teaching faculty in a university training program that recently introduced shorter attending rotations. We asked about the perceived effect of 2-week compared with 4-week inpatient attending rotation on medical education, patient care, and attending performance.

METHODS

Participants

All residents and attendings in the principal University at Buffalo internal medicine residency program (except three of the authors, the program director, and five chief residents who had not completed ward rotations during the ongoing academic year) were eligible for this study. The residents rotate through a hospital consortium with two not-for-profit private hospitals, a Veterans Affairs hospital, and a county hospital. The faculty attend at one of the affiliated hospitals on general internal medicine, nephrology (a required rotation), coronary care unit (CCU), or medical intensive care unit (MICU) rotations. The department of medicine began to introduce the short 2-week inpatient rotations for attendings in July 2002. The University at Buffalo Human Subjects Institutional Review

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Board approved the study and all participants provided informed consent.

Data Collection

In May 2003, we distributed the survey by either postal mail or electronic mail. We determined the mailing method in random fashion because it was uncertain which method would provide greater response rates. For nonresponders, we sent two reminders 10 days apart using the same mailing method and, finally, a third reminder using the alternate mailing method. There were no significant differences in the responses between email and postal mail for any of the survey questions and we present the results for the two methods combined. We will report data on response rates and methodological aspects in a separate manuscript. The survey took place during the last 6 weeks of the academic year. The cover letter explained that participation was voluntary and that responses would be treated confidentially. Residents and attendings were blinded to any specific hypothesis of the study, and the survey was unannounced.

Survey Measures

The survey consisted of 28 questions for residents and 23 questions for attendings addressing demographic variables, the 2-week attending inpatient rotation (Table 1), and other academic issues. We developed the questions on the basis of the hypothesized effects of attending inpatient rotation length and formal and informal discussion with residents, attendings, and internal medicine residency program directors who did not participate in this survey. We addressed face validity through review and feedback to the questions by the participating attendings, the program director, and two recent residency graduates. The questions assessed the participants' experience over the previous 12

months with attending 2-week and 4-week inpatient rotations (questions 1 and 2), the potential effects on residents' and students' training (questions 3 to 5), on patient care practices (questions 6 to 8), on the attending's professional and private life (questions 9 to 11; only for attendings), and the participants' overall ratings (questions 12 and 13). For all of these questions, we used 7-point Likert scales with 3 verbal anchors at the extremes of the scale and for a neutral response: -3 (negative), +3 (positive), and 0 (neutral).

Statistical Analysis

For each of the specific questions, we calculated the mean and standard deviation (SD) on the 7-point Likert scale for residents and attendings separately. For most of the analyses, we treated the responses as continuous variables and we evaluated whether means were statistically different from 0 using a one-sample *t* test. For the comparison of the residents' and attendings' answers to each question we used the Mann-Whitney U test. The nonparametric Mann-Whitney U test is used commonly for this type of survey data and compares whether two independent samples of ordinal responses are from the same distribution. This test does not require normal distributions.

To evaluate whether the answers to the outcome questions in Table 1 were independently associated with any of the baseline characteristics of the respondents, we performed a bivariate analysis using Spearman rank correlation coefficients and χ^2 tests. We then performed a multivariable analysis using an ordinal model where the independent variables were the baseline characteristics that were significantly correlated in the bivariate analysis with the answer to any of the demographic survey questions (U.S. vs. international graduate, total number of weeks on inpatient rotations, and number of weeks on attending

Table 1. Questions Addressed to Attendings Regarding the Length of Attending Rotation*

1. Total number of weeks spent on inpatient services per year.
2. Number of these weeks spent on inpatient services per year as part of 2-week blocks.
3. How do you think this arrangement (2 instead of 4 weeks) might alter the residents' learning?
4. How do you think this arrangement (2 instead of 4 weeks) might alter your ability to evaluate the residents?
5. How do you think this arrangement (2 instead of 4 weeks) might alter the medical students' learning?
6. How do you think this arrangement (2 instead of 4 weeks) might alter the medicine team's work process in terms of making sure the daily work gets done?
7. How do you think this arrangement (2 instead of 4 weeks) might alter outcomes of patients cared for by the team?
8. How do you think this arrangement (2 instead of 4 weeks) might alter the medicine team's work process in terms of continuity of care for the patient and length of stay?
9. How do you think this arrangement alters (or might alter) your building relationships with patients?
10. How do you think this arrangement alters (or might alter) your private life?
11. How do you think this arrangement alters (or might alter) your work productivity overall? Please consider all aspects of your work including outpatient, administration, research, and teaching.
12. Overall, how do you view attending inpatient rotations of 2-week duration compared with 4-week duration?
13. Overall, how do you think residents view attending inpatient rotations of 2-week duration (compared with 4-week duration)?

* Except for questions 9 to 11, residents received all of these questions, but the questions for residents were altered to reflect the residents' rather than the attendings' views.

short inpatient rotations for residents; age, specialty, location of graduation, hospital site, total number of weeks on inpatient rotations, and number of weeks on attending short inpatient rotations for attendings). We considered two-sided P values and $P < .05$ as statistically significant. We used SPSS, version 11.0 (SPSS Inc., Chicago, Ill) for all analyses.

Table 2. Participants' Baseline Characteristics

Variable	Respondents	
	Residents (<i>N</i> = 99) <i>n</i> (%)	Attendings (<i>N</i> = 76) <i>n</i> (%)
Gender		
Male	73 (73.7)	59 (77.6)
Female	26 (26.3)	17 (22.4)
Medical graduation		
U.S. graduate	30 (30.3)	48 (63.2)
International graduate	69 (69.7)	28 (36.8)
PGY level		
PGY-1	40 (40.4)	N/A
PGY-2	29 (29.3)	N/A
PGY-3	28 (27.3)	N/A
PGY-4	2 (3.0)	N/A
Type of residency		
Categorical	86 (86.9)	N/A
Preliminary	13 (13.1)	N/A
Primary specialty and subspecialty		
Cardiology	N/A	7 (9.2)
GIM	N/A	48 (63.2)
Geriatrics	N/A	3 (3.9)
Pulmonary-critical care	N/A	11 (14.5)
Renal	N/A	7 (9.2)
Other major academic responsibility		
Research	N/A	17 (22.4)
Administrative	N/A	19 (25.0)
Teaching	N/A	40 (52.6)
Hospital site		
Not-for-profit private hospital 1	N/A	21 (27.6)
County hospital	N/A	23 (30.3)
Not-for-profit private hospital 2	N/A	7 (9.2)
Veterans Affairs hospital	N/A	25 (32.9)
Ever on a short attending inpatient rotation*	93 (93.9)	51 (67.1)
Mean age, y (SD)	30.1 (4.01)	45.6 (8.76)
Mean years since graduation (SD)	4.6 (3.52)	19.4 (8.34)
Mean years as teaching attending (SD)	N/A	12.6 (8.91)
Mean total number of weeks in inpatient rotation (SD)	23.5 (2.04)	9.7 (6.13) [†]
Mean number of weeks in short inpatient rotation [†] (SD)	11.6 (1.90)	4.4 (4.66)

* For residents: a rotation during which the attendings rotated in 2-week blocks during the last 12 months; for attendings: a rotation of 2-week blocks during the last 12 months

[†] One attending did not answer this question.

PGY, postgraduate year; GIM, general internal medicine; SD, standard deviation; N/A, not applicable.

RESULTS

Ninety-nine of the 119 eligible residents (83%) and 76 of the 83 eligible attendings (92%) completed the survey with an overall response rate of 87%. Attendings' response rates were similar across hospitals. Table 2 depicts the respondents' baseline characteristics. Table 3 shows the mean and SD of the answers for the residents and attendings separately, with the P value indicating the level of significance for ratings in favor or not in favor of the shorter rotation. It also shows the P value for the difference between the mean scores for attendings and residents.

While residents thought the shorter rotation had a small positive effect on their learning, attendings thought it did not affect residents' learning, but the difference was not statistically significant. Both groups felt that the short rotation negatively affects the attending's ability to evaluate the resident, the team's work process, the continuity of care, and the length of stay. Residents thought the shorter rotation negatively affects patients' outcomes, whereas the attendings thought it had no effect on this outcome. Attendings also perceived that the shorter rotation negatively affects their building of relationships with patients, but positively affects their private life and overall productivity. Overall, residents had no strong preference for or against the shorter rotation, and attendings rated the shorter rotation positive. The attendings' prediction of the overall rating by residents tended to be lower than the residents' actual rating. Residents' prediction of the overall rating by attendings tended to be higher than the attendings' actual rating.

In subgroup analyses, we found that U.S. graduate residents provided significantly lower ratings for the shorter rotation compared with international graduate residents for the effects on residents' learning, students' learning, and the overall rating (Table 4). In addition, we observed that attendings who had experienced a 2-week rotation had consistently higher ratings for the shorter rotation than those who never experienced it (Table 5). These differences were statistically significant for the effects on residents' learning, residents' evaluation, students' learning, team's work process, private life, overall productivity, and the overall view.

Recurrent themes of the residents' narrative comments indicated that the impact of the shorter attending rotation depends on "who the attending is" and that the exposure to "many perspectives" and "different styles" is a possible advantage (Table 6). Participants in both groups suggested that the beginning of the rotation, "which you have to do more often with 2-week blocks," might lead to "less continuity of care for patients." Attendings also described the short rotation as "the best that can be done" and a "necessity" to the point that "[I will] never go back to 4-week attending rotation."

DISCUSSION

This survey indicates that, based on residents and attendings' perceptions, the shorter attending inpatient

Table 3. Univariate Analysis of the 7-Point Likert Scale Answers for Residents and Attendings

Question	Residents		Attendings		P Value [†]
	Mean (SD)	P Value*	Mean (SD)	P Value*	
Effect on residents' learning	0.34 (1.48)	.023	0.14 (1.62)	.439	.497
Effect on residents' evaluation	-1.08 (1.09)	<.001	-1.03 (1.10)	<.001	.841
Effect on students' learning	-0.22 (1.52)	.148	-0.08 (1.44)	.634	.490
Effect on team's work process	-0.34 (.94)	<.001	-0.53 (1.09)	<.001	.290
Effect on patients' outcomes	-0.28 (.95)	.004	-0.11 (1.01)	.369	.032
Effect on continuity of care and LOS	-0.54 (1.07)	<.001	-0.51 (1.05)	<.001	.390
Effect on relationships with patients	N/A	N/A	-0.53 (1.00)	<.001	N/A
Effect on attendings' private life	N/A	N/A	1.53 (1.39)	<.001	N/A
Effect on overall productivity	N/A	N/A	1.18 (1.42)	<.001	N/A
Overall view of the short rotation	-0.24 (1.53)	.119	0.72 (1.94)	.002	<.001
Attendings' perception of residents' view			-0.72 (1.12)	<.001	.085 [‡]
Residents perception of attendings' view	1.34 (1.20)	<.001			.072 [§]

* P value for the t test for the difference of the mean from 0.

[†] P value for Mann-Whitney U test for difference between attendings' and residents' scores.

[‡] P value compares residents' overall view and attendings' perception of residents' overall view.

[§] P value compares attendings' overall view and residents' perception of attendings' overall view.

LOS, length of stay; SD, standard deviation, N/A, not applicable.

rotation might have negative impacts on medical education and on patient care but positive effects on the attending's work productivity and private life.

Our study has several strengths. Although previous studies have evaluated attendings' burnout,²⁻⁴ we did not find published evidence about the optimal duration of attendings' rotation and how the duration relates to burnout or might interfere with clinical education and patient care. Thus, our survey provides new information about the perceived impact of the length of attending inpatient rotation on medical education, patient care, and the attending's performance. The excellent survey response rate reduces the possibility of response bias.⁵ In addition, we conducted our study in the last 6 weeks of the academic year during which shorter rotations were introduced in the training program. Thus, a majority of respondents had experienced longer and shorter rotations (94% of residents and 67% of attendings experienced both). At the same time, because 33% of attendings had not experienced the shorter rotation,

we could assess how the actual experience with the short rotation can affect attendings' perceptions.

Our study has several limitations. We surveyed only one university-based internal medicine residency program and, although the results were similar across the four hospitals with their different practice settings, it is possible that program-specific circumstances were responsible for the findings. For example, because we observed differences between U.S. and international graduates, the generalizability of our results to other internal medicine residency programs with higher or lower proportions of international graduates is limited.⁶ In spite of the face validity of the questions in our survey, we could not assess their criterion validity and their correlation with actual educational and patient care outcomes. In addition, it would have been interesting to assess students' perceptions of the effect of the 2-week inpatient rotation on the outcomes of interest in general, and on their own learning experience in particular. However, the design of our students' curriculum did

Table 4. Univariate Analysis of the 7-Point Likert Scale Answers for Residents by Place of Medical Graduation

Question	U.S. Graduate		International Graduate		P Value [†]
	Mean (SD)	P Value*	Mean (SD)	P Value*	
Effect on residents' learning	-0.20 (1.35)	.423	0.58 (1.48)	.002	.016
Effect on residents' evaluation	-1.23 (1.04)	<.001	-1.01 (1.12)	<.001	.299
Effect on students' learning	-0.80 (1.47)	.006	0.03 (1.48)	.871	.018
Effect on team's work process	-0.57 (0.82)	.001	-0.25 (0.98)	.040	.149
Effect on patients' outcomes	-0.33 (0.76)	.023	-0.26 (1.02)	.038	.687
Effect on continuity of care and LOS	-0.73 (0.91)	<.001	-0.45 (1.13)	.002	.238
Overall view of the short rotation	-0.70 (1.26)	.005	-0.04 (1.60)	.822	.045
Attendings' perception of residents' view	1.43 (1.01)	<.001	1.29 (1.28)	<.001	.650

* P value for the t test for the difference of the mean from 0.

[†] P value for Mann-Whitney U test for difference between U.S. and international residents.

LOS, length of stay; SD, standard deviation.

Table 5. Univariate Analysis of the 7-Point Likert Scale Answers for Attendings by Prior Experience with the Short Inpatient Rotation

Question	Prior Short Rotation		No Prior Short Rotation		P Value [†]
	Mean (SD)	P Value*	Mean (SD)	P Value*	
Effect on residents' learning	0.39 (1.64)	.094	−0.36 (1.50)	.241	.033
Effect on residents' evaluation	−0.82 (1.14)	<.001	−1.44 (0.87)	<.001	.015
Effect on students' learning	0.22 (1.43)	.287	−0.68 (1.28)	.014	.010
Effect on team's work process	−0.37 (1.13)	.023	−0.84 (0.94)	<.001	.045
Effect on patients' outcomes	0.02 (1.03)	.892	−0.36 (0.95)	.071	.074
Effect on continuity of care and LOS	−0.35 (1.00)	.015	−0.84 (1.11)	<.001	.062
Effect on relationships with patients	−0.41 (0.94)	.003	−0.76 (1.09)	.002	.179
Effect on attendings' private life	1.82 (1.20)	<.001	0.92 (1.58)	.008	.014
Effect on overall productivity	1.57 (1.29)	<.001	0.40 (1.38)	.161	<.001
Overall view of the short rotation	1.10 (1.98)	<.001	−0.04 (1.65)	.904	.013
Attendings' perception of residents' view	−0.61 (1.13)	<.001	−0.96 (1.06)	<.001	.240

* P value for the t test for the difference of the mean from 0.

† P value for Mann-Whitney U test for difference between attendings with and without prior experience with short inpatient rotation. LOS, length of stay; SD, standard deviation.

Table 6. Selected Attendings' and Residents' Narrative Comments

Attendings' comments

- Advantage: increases residents' and students' exposure to different clinical styles. Keeps the attending engaged and enthusiastic. By the fourth week of a 4-week rotation, there can be an element of attending fatigue. Gives patients who are on service during the transition the benefit of a "second opinion" or approach.
- Disadvantage: difficulty for the attending to assess student/resident performance, loss of time for the team while the second attending is learning about the patients. Less continuity of care for patients.
- I will never go back to 4-week attending rotation.
- It does take a lot of time in the beginning of the rotation to get to know all the patients, which you have to do more often with 2-week blocks, but once I tried the 2-week blocks I thought it made a significant impact on the rest of my work and home life.
- The residents do get a more varied exposure to different styles and opinions.
- Two weeks is like working 19 continuous days for the attending. It does give less time to assess the resident especially if the resident takes too long to settle in.
- Two-week rotations are a necessity—simply because attendings have been asked to do more (documentation, evaluation, more comprehensive rounding, continued outpatient/administrative/teaching work) while attending on the wards. What was once enjoyable is now a KILLER. But, in this world, it's the best that can be done.
- Modern medical practice requires excellent communication, and a "fresh" approach often benefits everyone. Adaptability is important as well. Fatigue would also play less of a role, and this can be a factor if the attending is up every night for 4 weeks straight.

Residents' comments

- In 2-week rotations, attendings "may have less time to integrate with team in terms of giving in-depth evaluation."
- Where there is overlap > or < workups are done and discussions are different creating confusion and doubts in the minds of new house officers and students. (Which attending is right? Will patients suffer?) Getting used to a new attending takes time and effort from the house officer, which could have been devoted to patients' care.
- Positive points: can have teaching from attendings with different strengths. If one attending is not giving teaching or guidance we only have 2 weeks to deal with it; Negative points: attendings less involved with teaching, more involved with "getting to know" patients on team as rotation is shorter. Attendings just trying to make it through 2 weeks, not as active as with 4-week block.
- Advantages do include increased attending exposure, exposure to different teaching styles and focus, as well as avoiding "attending burnout" where the attending loses their patience with the residents and the residents grow tired of working with the same attending.
- Well, it is always good to have different attendings, but sometimes there is conflict between the approach of each attending, which makes it hard for the team and sometime extends the hospital stay for the patient.
- I guess its very hard to answer these questions as so much depends on whom is in first 2 weeks and who in the next so it can be either bad or good and similarly if you get not very interesting attending u will waste whole rotation so in a way 2 weeks is better gamble I guess.
- I think this system has the greatest negative impact on the third-year medical students—and at a time when they are deciding on career paths.
- The problem with attending changes is that the plan changes. With more frequent changes come more plans and a lot of treatments taken to half course.
- The real issue is to have a common attending for both work rounds as well as teaching rounds and then to press upon more bedside teaching, topic discussions by attendings, as well as small presentations by the team members every day.

not allow an unblinded study of this nature. Recall bias presents another potential limitation of our survey. It is possible that respondents who recently completed the 2-week rotation responded differently from those who completed the rotation in the more distant past. However, residents completed about half of their inpatient rotations (i.e., 11.6 out of 23.5 weeks) in short rotations during the preceding 12 months and these short rotations are assigned by the program in no specific order. Similarly, attendings who had prior experience with short rotations attended during short rotations for a mean of 6.5 weeks out of a total of 9.7 weeks in no specific order. Finally, the interpretation of the scores and the score differences on the 7-point Likert scale is not straightforward. Health status research has quite consistently shown that differences of 0.5 on 7-point scales present the minimal important difference in clinical contexts.^{7,8} Distribution-based methods have revealed that differences of approximately 0.5 standard deviations between scores are of moderate clinical relevance.⁹ Using these measures for interpretation, most of our findings suggest practical or functional relevance.

In spite of the negative perceived impact on evaluation of residents and patient care outcomes, the overall rating of attendings was positive. To conclude that this positive overall rating reflects a complete summary of the balance between academic responsibility and patient care on one side and private life and overall productivity on the other side, one has to assume that our questionnaire covered all the specific aspects related to this issue. We believe this interpretation is premature and the topic requires further studies with objective outcome measures for medical education and patient care, because the preferred arrangement does not necessarily provide better medical education.

The discrepancy in the views of U.S. and international graduates regarding three of the questions relating to the impact on medical education might be explained by cultural differences affecting residents' preferences (Table 4). Residents could have perceived the introduction of the short rotation as a change intended to facilitate the attending's work life. As most international graduates come from educational systems with more pronounced hierarchy, they might have felt a greater need to please the program in spite of reassurance about confidentiality of their answers. In addition, international graduates have experienced different educational systems during medical school education, often systems with rotations that are far longer than 4 weeks. Thus, they may not perceive the difference between 4 and 2 weeks as equally important as their U.S. counterparts. The discrepancy in the views of the attendings based on their prior experience (Table 5) with the 2-week rotation could reflect either a negative prejudice by those who did not experience the shorter rotation or a more informed opinion by those who experienced the shorter rotation.

Our findings have important implications for academic practice. Residency programs that already operate with

2-week attending rotations should consider conducting further evaluations of their programs. Although the shorter rotation may have positive impacts on the attending's private life and overall productivity, it has potentially negative impacts on some aspects of medical education, such as students' learning and evaluation of residents, and on patient care. When adopting shorter rotations to improve the attendings' work productivity and private life, residency programs should seek solutions to ensure high-quality training and patient care. One such solution adopted at one medical center is to assign two attendings for the month to one team: for the first 2 weeks, one of the attendings is the official management attending while the other is the teaching attending (written personal communication, T. Ibrahim, MLA, Alliance for Academic Internal Medicine, August 19, 2003). After 2 weeks, the attendings switch roles. Other approaches include replacing the traditional academic ward attendings who have multiple contemporaneous responsibilities, including outpatient responsibilities, with academic hospitalists. In fact, the implementation of hospitalist programs is associated with improved patient outcomes and teaching.¹⁰⁻¹²

In summary, our results suggest that the shorter attending rotation may have negative impact on some aspects of medical education and patient care, while improving the attending's productivity and private life. Further research is needed to objectively evaluate the impact of shorter the attending rotation on medical education and patient important outcomes.

The office Graduate Medical Education of the University at Buffalo funded this study. The funding source was not involved in the design of the study; in the collection, analysis, or interpretation of data; or in the decision to submit the manuscript for publication. Investigators received salary support from institutional sources.

The authors thank the internal medicine residents and faculty at the University at Buffalo and Drs. Gerald Logue and Janet Harsztrak for their support for this project. They also thank Mrs. Linda Sachs for her administrative assistance and Dr. Gregory Wilding for his statistical assistance.

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