

Assessing Performance of Resident Doctors in Training in Northwestern Nigeria

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Abstract

Background: Residency training is a postgraduate medical education where graduate doctors are mentored toward becoming independent specialists. In Nigeria currently, the Medical Residency Training Act (MRTA) 2017 guides residency training under the regulation of three postgraduate medical colleges: the National Postgraduate Medical College of Nigeria (NPMCN), West African College of Surgeons (WACS), and West African College of Physicians (WACP). For the respective colleges, resident doctors are expected to attempt Part One and Part Two fellowship examinations after completing their junior and senior residency training, respectively, within stipulated durations. **Objectives:** The aim of this study is to assess resident doctors' performance in training and predictive factors. **Methodology:** Electronic questionnaires was distributed to respondents through their contacts or emails. Data was collected within a period of one month, from July 10 to August 6, 2020. Data was analyzed using mean, standard deviation, simple tables as well as *t*-test and Chi-square test. The level of significance was set at 0.05 for decision purposes. **Results:** A total of 120 participants were involved in the study. The mean age of respondents was 38.0 ± 3.8 years, with a majority of 88 (83.3%) males and 107 (89.2%) married. On the first attempt, 48 (65.8%), 37 (60.6%), and 15 (57.7%) respondents were successful in NPMCN, WACS, and WACP Part One fellowship examinations, respectively. There was no significant difference in the success in Part One between the three postgraduate medical colleges. There was significant difference in the duration between the first attempt and success in Part One examinations for the three colleges, respectively (NPMCN – $P = 0.001$, WACS – $P < 0.001$, WACP – $P = 0.036$). **Conclusion:** There was a comparable success in Part One fellowship examination between the three postgraduate medical colleges, with over half of respondents recording success in their first attempt. However, there were significant delays between the first attempt and success in Part One examination for the three postgraduate medical colleges.

Keywords: Part One examination, performance, residency training

INTRODUCTION

Residency training is a global practice where graduate doctors are mentored to become independent specialists in specific fields by undergoing further clinical tutelage and mentorship by specialists in accredited hospitals.^[1,2] The resident doctors are expected to acquire expertise in knowledge, skills, and research in their chosen fields within the stipulated duration. Examinations are conducted at the entrance, intervals, and exit of residency training to assess progress made by resident doctors in accordance with stipulated guidelines by the postgraduate medical colleges. In addition, senior residency training requires the completion of dissertation research submitted to the specific college at the end of residency training.^[3]

In Nigeria, residency training in various fields is carried out in accredited hospitals under the regulation of postgraduate medical colleges. These colleges include the National Postgraduate Medical College of Nigeria (NPMCN), West African College of Surgeons (WACS), and West African College of Physicians (WACP).^[4] They accredit hospitals for

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training, conduct Primary, Part One, and Part Two fellowship examinations as well as update courses.^[4]

The Medical Residency Training Act (MRTA) 2017 currently stipulates guidelines for residency training in Nigeria.^[5] Training hospitals, postgraduate medical colleges, and other relevant stakeholders utilize the MRTA toward coordinating and controlling training. The MRTA specifies eligibility for admission into training, the maximum duration of stay in residency across all specialties from the attempt of Part One or Two examinations, respectively, sponsorship entitlements of resident doctors in training, and criteria for exit from residency training.^[5]

Many works of literature have found stress and mental burnout as common problems affecting doctors in residency training due to the demanding nature of their program.^[6,7] These have negative effects on their health, well-being, interactions, learning as well as performance in residency training^[8-12] however, only a few studies have tried to assess the performance of resident doctors in training.^[13,14] The criteria used in assessing residents' performance include success in designated examinations, number of manuscripts published during training, duration spent in residency training, among others.^[15-17] The success rates in the Part One examination from studies in Nigeria have been between low and average,^[18,19] especially when compared to similar examinations from North America.^[20,21] Furthermore, many studies have indirectly associated performance in training with residents' dissatisfaction, mental burnout, and incessant industrial actions, among others.^[10,22,23] Other factors that have been associated with performance in residency training include residents' behavior, level of knowledge and demographic characteristics, inadequacy of hospital infrastructure, and work schedules.^[13,24]

To the best of our knowledge, there are no studies that attempted to assess the performance of resident doctors in training in Nigeria using multiple outcome variables. Therefore, the research aimed to assess resident doctors' performance using two outcome variables: number of attempts at Part One examination before success and delay from the commencement of residency to passing Part One examination in the respective postgraduate medical colleges.

METHODOLOGY

Study design and setting

This study was part of a larger study on the satisfaction and performance of resident doctors in Northwestern Nigeria. The Northwestern region in Nigeria comprises Kaduna, Kano, Sokoto, Katsina, Kebbi, Jigawa, and Zamfara States. The study was a descriptive cross-sectional study involving resident doctors in senior residency training in accredited hospitals in Northwest Nigeria. The centers involved in the study include three Federal Teaching Hospitals (Ahmadu Bello University, Aminu Kano, and Usmanu Danfodiyo University-Teaching Hospitals), two Federal Medical Centers (of Gusau and

Katsina) four Federal Specialist Hospitals (National Eye Center Kaduna, National Ear Care Center Kaduna, National Orthopaedic Hospital Dala, and Federal Neuropsychiatry Hospitals Kaduna).

Study population

The study was conducted among senior registrars who had passed the part One examination in at least one of the Postgraduate Medical Colleges (NPMCN, WACS, and WACP). However, those who had an interruption in their senior residency training for other activities for more than 12 months were exempted from the study.

Study instrument

A semi-structured self-administered electronic questionnaire for this study was designed using Kobo Tool Kit Version 1.25.1 manufactured by Kobo Toolbox, Cambridge. It was divided into three sections A, B, and C. Section A enquired about sociodemographic and residency training characteristics of participants, including age, gender, year of commencement of residency, and passing Part one examination. Section B assessed performance in residency training using two outcome variables as highlighted above, while Section C reviewed factors associated with performance in residency training using the Likert scale.

This questionnaire was adapted,^[1,10,25] validated, and pretested on 10%^[12] of the sample size (at Ahmadu Bello University Teaching Hospital Zaria and Aminu Kano Teaching Hospital Kano) before administration.

Ethical consideration

Ethical approval was sought from Health Research and Ethics Committee, Ahmadu Bello University Teaching Hospital Zaria (ABUTHZ/HREC/W39/2020). Informed consent was obtained from individual respondents before filling the questionnaire as participation in the study was strictly voluntary. Measures were taken to ensure confidentiality, anonymity, and security of respondents' data in the design of the questionnaire and storage of data obtained from respondents. Only the researchers had access to the data store, which was passworded.

Data collection and analysis

The questionnaire was distributed to senior registrars who met the inclusion criteria through their contacts or emails. The sample size calculated from the pass rate of previous studies^[16,19] was 117. A total of 163 questionnaires were administered, out of which 120 respondents completed and submitted, giving a response rate of 73.6%. Proportionate allocation of questionnaires to training hospitals based on their estimated number of senior registrars was done. Within the training hospitals, however, convenience sampling was used to assign questionnaires to respondents who met the inclusion criteria of the study due to lack of physical contact during the peak of the COVID-19 pandemic at the time the study was carried out. Furthermore, the formal list and contacts of all senior registrars within the scope of the study could not be

obtained within the limited time of the study. The questionnaire was administered and filled within a period of four weeks, from July 10 to August 6, 2020.

Data was analysed using the IBM Statistical Product and Service Solutions version 25.0 manufactured by IBM, Chicago, USA. This was summarized using tables and simple charts. Test for normality of distribution of data was done using the Shapiro–Wilk test. Linear regression and bivariate Chi-square analysis were used to test the association between residents’ success in Part One examinations and demographic and residency training variables at 0.05 level of significance. A multinomial logistic regression was used to further test for those factors whose *P* values were 0.1 or less on bivariate Chi-square analysis. The difference between two means was tested for statistical significance using paired *t*-test.

RESULTS

Sociodemographic and residency training characteristics of respondents

A total of 120 questionnaires were filled and submitted. The mean age of respondents was 38.0 ± 3.8 years. The majority, 88 (73.3%) of respondents, were males. Also, most respondents, 107 (89.2%), were married and had children (103, 85.8%) at home [Table 1].

The mean duration from medical school graduation to commencement of residency training was 5.3 ± 3.0 years, while the mean duration in residency training was 5.9 ± 1.9 years. About three-fifth (73, 60.8%) of respondents were primary residents of the training institutions, while one-third (40, 33.3%) were supernumerary doctors undergoing residency training in centers they were not primarily employed [Table 1]. One-third (40, 33.3%) of respondents were successful in the Part One examination in two postgraduate medical colleges [Table 1].

The highest and least numbers of respondents were from faculties of obstetrics and gynecology (20, 16.7%) and dental surgery (1, 0.8%), respectively [Figure 1].

Success in postgraduate medical colleges

Over half of the respondents were successful in their first attempt of Part One examinations in NPMCN (48, 65.8%), WACS (37%, 60.6%), and WACP (15%, 57.7%) [Figure 2]. There was no significant difference between success in WACS and WACP when compared to NPMCN, respectively [Figure 2].

Duration in residency training before attempt and success in Part One examination

For the three postgraduate medical colleges, respondents stayed significantly longer duration from the average minimum duration required to actual duration before the attempt of Part One examinations [Table 2]. Similarly, there was a significant difference between duration at first attempt and success at Part One examinations by respondents for the respective colleges [Table 3].

Predictive factors for the performance of respondents in residency training

Variables were independently tested for significant association with the performance output of respondents (number of attempts before success at Part One examinations and duration before success in Part One examinations).

Linear logistic regression showed that the younger age of respondents was significantly associated with fewer numbers of attempts before success in Part One examinations for all the three colleges: NPMCN (*P* = 0.006), WACS (*P* = 0.041), and WACP (*P* = 0.036).

Table 1: Sociodemographic and residency training-related characteristics of respondents

Variables (<i>n</i> =120)	Frequency, <i>n</i> (%)
Gender	
Male	88 (73.3)
Female	32 (26.7)
Marital status	
Married	107 (89.2)
Single	10 (8.3)
Divorced	3 (2.5)
Type of resident doctor	
Primary	72 (60.0)
Supernumerary	40 (33.3)
Honorary	6 (5.0)
On posting	2 (1.7)
Children at home	
Yes	103 (85.8)
No	17 (14.2)
Type of training hospital	
Federal teaching hospital	104 (86.7)
Federal medical center	6 (5.0)
Specialist hospital	10 (8.3)
Success at Part one	
NPMCN only	33 (27.5)
WACS only	31 (25.8)
WACP only	16 (13.4)
NPMCN and WACS	30 (25.0)
NPMCN and WACP	10 (8.3)

NPMCN: National Postgraduate Medical College of Nigeria, WACS: West African College of Surgeons, WACP: West African College of Physicians

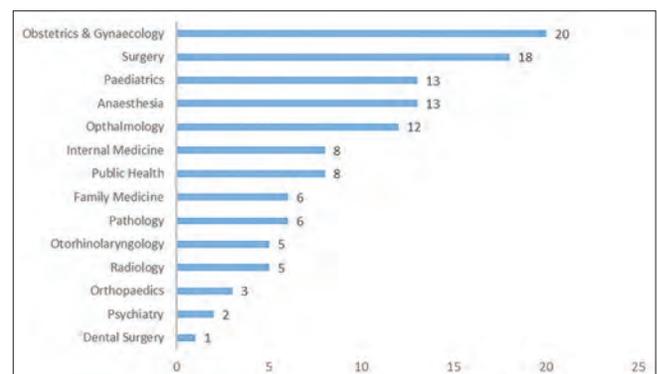


Figure 1: Faculty of specialty of respondents (*n* = 120)

Table 2: Delay in attempt of Part One examinations by respondents for the respective colleges

Postgraduate college	Mean±SD (months)		Paired t-test		
	Minimum duration required	Duration at attempt of Part One examinations	t	df	P
NPMCN (n=73)	26.96±5.18	33.75±8.12	-9.24	72	<0.001
WACS (n=61)	31.53±5.63	36.68±8.51	-6.02	60	<0.001
WACP (n=26)	28.50±7.13	33.38±7.30	-2.87	25	0.009

NPMCN: National Postgraduate Medical College of Nigeria, WACS: West African College of Surgeons, WACP: West African College of Physicians, SD: Standard deviation

Table 3: Delay in success in Part One examinations from the first attempt by respondents for the respective colleges

Postgraduate college	Mean±SD (months)		Paired t-test		
	Duration at first attempt of Part One examinations	Duration at success in Part One examinations	t	df	P
NPMCN (n=73)	33.75±8.12	36.12±8.46	-3.33	72	0.001
WACS (n=61)	36.68±8.52	41.10±10.59	-4.42	60	<0.001
WACP (n=26)	33.38±7.30	39.25±14.50	-2.23	25	0.036

NPMCN: National Postgraduate Medical College of Nigeria, WACS: West African College of Surgeons, WACP: West African College of Physicians, SD: Standard deviation

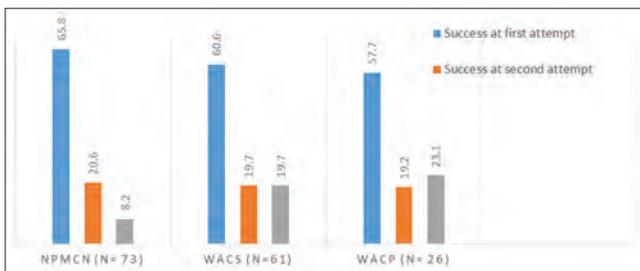


Figure 2: Percentage of respondents successful in Part One examinations at first, second, or more attempts for respective postgraduate medical colleges

For WACS, bivariate analysis showed a significant association of number of attempts before success at Part One examinations with work schedule ($P = 0.02$), adequate sponsorship ($P = 0.01$), and spousal approval ($P = 0.046$) [Table 4]. However, there was no significant association with these on multinomial logistic regression (work schedule [$P = 0.13$], adequate sponsorship [$P = 0.15$], and spousal approval [$P = 0.99$]).

Other variables which were not significant but had $P \leq 0.1$ were included in the multivariate analysis, and none was significant.

DISCUSSION

Residency training is a very specific program that requires heavy investment in human and financial capital as well as infrastructure. As such, mechanisms are put in place to ensure doctors in residency training acquire the required knowledge, skills, and competence within a stipulated period without significant delays in completion of their postings, successes in their examinations, and submission of their dissertations. With the Nigerian Government's recent commitment to providing adequate funding for full implementation of MRTA 2017, resident doctors who are unable

to complete their junior and senior residency training within stipulated duration may be exited from the program.^[5]

The success pattern of three postgraduate medical colleges (NPMCN, WACS, and WACP) in this study was very similar, with over half of respondents passing at the first sitting. This finding was consistent with an earlier study on ophthalmology residents, where 60% of them were successful in their first attempt at Part One examinations.^[18] The finding also seems to agree more with a study in the United States where pass rates from similar examination approach 80%^[20] but inconsistent with another study which showed the pass rate in the Part One examinations for Faculty of Surgery in WACS ranging from 19.5% to 28.7% from 1988 to 1997.^[19] The differences observed may be due to the fact that this study did not assess the pass rate as only those who were already successful in the Part One examination were eligible to participate in the study. Also, there could be an underrepresentation of respondents who had multiple attempts at Part One examinations before success in this study. The lack of significant difference in the success observed between the three colleges indicates similarity in examination standards.

The significant difference between the minimum required duration and duration at attempt at Part One examinations by resident doctors for the three respective colleges implied that resident doctors spent significantly longer than the required duration to attempt Part One examinations in their respective colleges. These delays could be due to training hospitals' preference of service delivery over the training of resident doctors and/or lack of awareness (by resident doctors) on eligibility requirements for the Part One examinations early enough.^[26] Another possible reason could be that while the period for Part One examination is fixed, admission into the residency program does not follow any regular pattern for many training hospitals. This implied that some resident doctors

Table 4: Predictive factors of performance in residency training using Chi-square test

Predictive factors	Frequency of attempts before success in Part one examination								
	NPMCN (n=73), n (%)			WACS (n=61), n (%)			WACP (n=26), n (%)		
	1	>1	P	1	>1	P	1	>1	P
Gender									
Male	32 (43.8)	20 (27.4)	0.23	31 (50.8)	18 (29.5)	0.75	6 (23.1)	3 (11.5)	0.70
Female	16 (21.9)	5 (6.9)		7 (11.5)	5 (8.2)		10 (38.5)	7 (26.9)	
Marital status									
Married	43 (58.9)	22 (30.1)	0.84	34 (55.7)	21 (34.4)	0.82	13 (50.0)	8 (30.8)	0.94
Not married	5 (6.9)	3 (4.1)		4 (6.6)	2 (3.3)		3 (11.5)	2 (7.7)	
Children at home									
Yes	42 (57.5)	21 (28.8)	0.68	31 (50.8)	21 (34.4)	0.30	14 (53.8)	8 (30.8)	0.61
No	6 (8.2)	4 (5.5)		7 (11.5)	2 (3.3)		2 (7.7)	2 (7.7)	
Type of resident									
Primary	30 (41.1)	17 (23.3)	0.87	21 (34.4)	14 (23.0)	0.69	11 (42.3)	4 (15.4)	0.34
Supernumerary	15 (20.5)	7 (9.6)		13 (21.3)	8 (13.1)		3 (11.5)	4 (15.4)	
Honorary	3 (4.1)	1 (1.4)		4 (6.6)	1 (1.6)		2 (7.7)	2 (7.7)	
Faculty									
Medical specialty	18 (24.7)	7 (9.6)	0.42	*			**		
Surgical specialty	30 (41.1)	18 (24.7)							
Type of training hospital									
Teaching hospital	43 (58.9)	21 (28.8)	0.49	33 (54.1)	17 (27.9)	0.20	11 (42.3)	9 (34.6)	0.21
Others	5 (6.8)	4 (5.5)		5 (8.2)	6 (9.8)		5 (19.2)	1 (3.8)	
Interval between graduation to start of residency (years)									
≤5	33 (45.2)	14 (19.2)	0.36	26 (42.6)	18 (29.5)	0.41	8 (30.8)	5 (19.2)	0.98
6-10	14 (19.2)	9 (12.3)		12 (19.7)	5 (8.1)		6 (23.1)	4 (15.4)	
11 and above	1 (1.4)	2 (2.7)					2 (7.7)	1 (3.8)	
Reading pattern									
Consistently	30 (41.1)	16 (21.9)	0.78	26 (42.6)	11 (18.0)	0.23	12 (46.2)	6 (23.1)	0.55
Infrequent	14 (19.2)	8 (11.0)		10 (16.4)	11 (18.0)		2 (7.7)	3 (11.5)	
Rarely	4 (5.5)	1 (1.4)		2 (3.3)	1 (1.6)		2 (7.7)	1 (3.8)	
Relevant literature available									
Yes	11 (15.1)	9 (12.3)	0.23	8 (13.1)	7 (11.5)	0.41	3 (11.5)	2 (7.7)	0.94
No	37 (50.1)	16 (21.9)		30 (49.1)	16 (26.2)		13 (50.0)	8 (30.8)	
Use of college curriculum as guide									
Yes	27 (37.0)	16 (21.9)	0.52	21 (34.4)	13 (21.3)	0.92	6 (23.1)	6 (23.1)	0.26
No	21 (28.8)	9 (12.3)		17 (27.9)	10 (16.4)		10 (38.5)	4 (15.4)	
Regular seminars and drills									
Yes	47 (64.4)	23 (31.5)	0.23	37 (60.7)	22 (36.1)	0.72	14 (53.8)	7 (26.9)	0.27
No	1 (1.4)	2 (2.7)		1 (1.6)	1 (1.6)		2 (7.7)	3 (11.5)	
Difficult coping with work and study									
Yes	32 (43.8)	11 (15.1)	0.06	23 (37.7)	16 (26.2)	0.48	12 (46.2)	7 (26.9)	0.78
No	16 (21.9)	14 (19.2)		15 (24.6)	7 (11.5)		4 (15.4)	3 (11.5)	
Work distract part one preparation									
Yes	28 (38.4)	16 (21.9)	0.63	16 (26.2)	17 (27.9)	0.02	9 (34.6)	4 (15.4)	0.42
No	20 (27.4)	9 (12.3)		22 (36.1)	6 (9.8)		7 (26.9)	6 (23.1)	
Experience mental burnout regularly									
Yes	30 (41.1)	13 (17.8)	0.38	23 (37.7)	14 (23.0)	0.98	10 (38.5)	8 (30.8)	0.35
No	18 (24.7)	12 (16.4)		15 (24.6)	9 (14.8)		6 (23.1)	2 (7.7)	
Competing financial demands									
Yes	34 (46.6)	16 (21.9)	0.55	28 (25.9)	17 (17.9)	0.98	9 (34.6)	8 (30.8)	0.21
No	14 (19.1)	9 (12.3)		10 (27.9)	6 (9.8)		7 (26.9)	2 (7.7)	
Adequate sponsorship									
Yes	9 (12.3)	3 (4.1)	0.46	7 (11.5)	4 (6.6)	0.01	7 (26.9)	2 (7.7)	0.22
No	39 (53.4)	22 (30.1)		31 (50.8)	19 (31.1)		9 (34.6)	8 (30.8)	

Contd...

Table 4: Contd...

Predictive factors	Frequency of attempts before success in Part one examination								
	NPMCN (n=73), n (%)			WACS (n=61), n (%)			WACP (n=26), n (%)		
	1	>1	P	1	>1	P	1	>1	P
Teaching juniors and or medical students									
Yes	47 (64.4)	23 (31.5)	0.23	36 (59.0)	21 (34.4)	0.60	14 (53.8)	9 (34.6)	0.85
No	1 (1.4)	2 (2.7)		2 (3.3)	2 (3.3)		2 (7.7)	1 (3.8)	
Experience serious health problems									
Yes	8 (11.0)	3 (4.1)	0.60	8 (13.1)	2 (3.3)	0.21	3 (11.5)	2 (7.7)	0.94
No	40 (54.8)	22 (30.1)		30 (49.2)	21 (34.4)		13 (50.0)	8 (30.8)	
Spousal approval and support									
Yes	39 (53.4)	20 (27.4)	0.89	33 (54.1)	15 (24.6)	0.05	12 (46.2)	8 (30.8)	0.77
No	9 (12.3)	5 (6.9)		5 (8.2)	8 (13.1)		4 (15.4)	2 (7.7)	
Needed family and social support									
Yes	37 (50.7)	14 (19.1)	0.06	32 (52.5)	15 (24.6)	0.09	10 (38.5)	7 (26.9)	0.69
No	11 (15.1)	11 (15.1)		6 (9.8)	8 (13.1)		6 (23.1)	3 (11.5)	

*All are surgical specialties, **All are medical specialties. NPMCN: National Postgraduate Medical College of Nigeria, WACS: West African College of Surgeons, WACP: West African College of Physicians

become due for examinations at odd months when examinations do not hold, therefore causing unavoidable delays. In addition, inadequate motivation, preparedness, or finance may make some resident doctors delay attempting Part One examinations when due.

Similarly, the significant difference between duration before first attempt and success at the Part One examinations implied that resident doctors, on average, spent a longer duration from their first attempt to success in the Part one examination. It, therefore, implied that with strict implementation of MRTA 2017, a significant proportion of resident doctors would have to quit residency because they are unable to pass Part One or Part Two examinations, 12 or 18 months after their first attempts, respectively.^[5]

This study justified the preference of many training institutions for the admission of younger resident doctors into residency training as they significantly performed better in the Part One examination. Although not significantly associated with success in Part One examinations, the study found that most resident doctors were unable to read consistently, do experience mental exhaustion after work, do not have relevant literature in their departmental library, and do not receive prompt and adequate sponsorship in residency training. These factors do have negative effects on various aspects of their performance in residency training, as highlighted by previous studies.^[10,27] However, spousal approval and availability of needed family support which affected performance positively were observed among majority of resident doctors in this study.

CONCLUSION

The success of resident doctors in the Part One examination in the three postgraduate medical colleges was comparable and significantly associated with a younger age for the three postgraduate colleges. Over half of the respondents were

successful in Part One examination in their first attempt for the three postgraduate medical colleges. There was a significant delay in an attempt at the Part One examination in the respective colleges. There was also a significant delay in success in the Part One examination from the first attempt in the respective colleges.

Recommendations

We recommend that training hospitals and the postgraduate medical colleges critically study the practical obstacles that affect the performance of resident doctors in training and take proactive steps in mitigating them. We also recommend that postgraduate medical colleges insist that training hospitals strictly comply with their syllabuses of training and should not unnecessarily delay residents with postings that are not part of the college requirements.

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Conflicts of interest

There are no conflicts of interest.

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