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RESEARCH ARTICLE

Perceived value of ward-based pharmacists from the perspective of physicians and nurses

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Abstract *Background* Clinical pharmacy in a hospital setting is relatively new in Sweden. Its recent introduction at the University Hospital in Uppsala has provided an opportunity for evaluation by other relevant professionals of the integration of clinical pharmacists into the health-care team. *Objectives* The objectives of this descriptive study were to evaluate the perceived value of wardbased clinical pharmacists from the perspective of hospital based physicians and nurses and to identify potential advantages and disadvantages related to the new inter professional collaboration. Another objective was to evaluate the experiences of general practitioners on receiving medication reports from ward-based clinical pharmacists. *Setting* Two acute internal medicine wards at the University Hospital in Uppsala, where a previously reported randomized controlled trial investigating the effects of ward based clinical pharmacists on re-visits to hospital was undertaken. *Methods* Data were collected by questionnaires containing closed- and open-ended questions. The questionnaires were distributed during the nine-month study period of the randomized controlled trial by an independent researcher to 29 hospital-based physicians and 44 nurses on the study wards and to 21 general practitioners who had received two or more medication reports. Answers were analysed descriptively for the closed-ended questions and by content analysis for the open-ended questions. *Main outcome measure* The main outcome measure was the physicians' and nurses' level of satisfaction with the new collaboration with clinical pharmacists, from a hospital and primary care perspective. *Results* Seventy-six percent of the hospital-based physicians and 81% of the nurses completed the questionnaire. Ninety-five percent of the physicians and 93% of the nurses were very satisfied with the collaboration. Out of the 17 general practitioners (81%) that completed the questionnaire 71% wanted to continue to receive medication reports in a similar way in the future. Increased patient safety and improvements in patients' drug therapy were the main advantages stated by all three groups of respondents. Eighteen percent of the hospital-based physicians and 21% of the nurses thought that the collaboration had been time-consuming to certain or to a high extent. *Conclusions* The majority of the respondents, both GPs and hospital based physicians and nurses, were satisfied with the new collaboration with the ward based pharmacists and perceived that the quality of the patients' drug therapy and drug-related patient safety had increased.

Keywords Clinical pharmacy · Collaboration · Inter-professional relationships · Multidisciplinary team · Nurses · Physicians · Sweden

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Impact of findings on practice

- Clinical pharmacists can collaborate with physicians and nurses in the health-care team to improve quality of prescribing and increase patient safety.
- Collaboration with clinical pharmacists on acute medical wards is perceived as beneficial by doctors and

nurses, both for themselves as practitioners and for the patients.
- Implementation of the collaborative practice model as a standard, on for instance geriatric wards, is probably sustainable.

Introduction

The current aging population suggests that the number of patients who take several drugs for chronic disease states will increase. This, in combination with new inventions and advances in medicine and drug therapies, indicates that the processes for providing safe and effective drug therapy for patients will grow in complexity [1]. Complex systems for drug therapy increase the risk that patients will receive suboptimal, inappropriate, or unnecessarily expensive therapy for acute and chronic diseases. Fortunately, it appears that these issues are increasingly being observed and addressed by health-care providers and politicians [1]. Because their specific education and training cover all relevant aspects of drug therapy, pharmacists are well suited to play a vital role in addressing these issues [2]. Pharmacists are increasingly being seen as natural members of health-care teams in hospital and primary care settings in many countries, especially in Anglo-Saxon countries where clinical pharmacy and pharmaceutical care are well accepted concepts. Several recent studies have shown that multi-professional collaboration including pharmacists, results in beneficial effects [3–16]. These studies have focused on the effects of collaboration on patient safety (for example reduction in medication errors and adverse events) [5, 10, 11, 13], health-economic aspects (for example reduction in drug costs and health-care utilization) [3, 4, 6, 8, 12, 16] and appropriateness of prescribing [6, 7, 9, 14, 16]. A Cochrane report in 2009 stated that the concept of collaboration, that is the process in which different professional groups work together, if successfully implemented, will have a positive impact on health care [17].

Inter-professional collaboration

The introduction of clinical pharmacy means that professionals who are traditionally part of health-care teams, primarily physicians and nurses, will start to interact with a new professional—the pharmacist—in their daily routine. The implications of the interactions between physicians and pharmacists have been studied extensively [2, 4, 18–24]. The implications for nurses have been explored less extensively [4, 25]. A descriptive study from Australia using interviews showed that pharmacists and physicians often have limited understanding of and confidence in the breadth of knowledge of each other. This study also found that their expectations of one another and perceptions of patient needs differed [21]. Holland et al. [24] found that collaborations between pharmacists and physicians in close liaison with each other were most commonly linked with positive patient outcomes. This was thought to be due to the development of professional relationships, mutual trust and recognition of each others' competences and skills. Importantly, the team-members also felt that they shared a common focus—the patient. McPherson et al. [20] also mention good communication, appropriate training and access to needed resources as important factors for successful collaboration. When a successful inter-professional team is formed, it can improve patient outcomes and the cost effectiveness of care in all health-care settings, according to the researchers [20].

In a previously reported randomised, controlled trial (RCT) at the University Hospital of Uppsala, hospitalised patients aged 80 years or older received either standard care or a comprehensive pharmacist service [3]. From October 1 2005 to June 30 2006, 400 patients from two acute internal medicine wards were included. Among the main elements of the enhanced pharmacist service to the intervention group were (1) compilation of a comprehensive list of current medications on admission, ensuring that the medication list received by the ward was correct; (2) review of each patient's drugs, followed by discussion with the patient's physician on drug selection, dosages, and monitoring needs; (3) patient education during admission and discharge counselling; and (4) preparation of a *Medication report* containing all changes in drug therapy during the hospital stay (e.g. rationale for changes, therapeutic goals, monitoring needs and recommendations for further changes), which was sent to the patient's general practitioner (GP) on the day of discharge. Patients in the control group received standard care without pharmacist involvement in the health-care team.

The three study pharmacists were integrated in the health-care team and had access to all relevant patient information. The pharmacists had post-graduate clinical pharmacy training (one had an MSc in clinical pharmacy and two a ten-week course in clinical pharmacy) and clinical experience to various degrees as clinical pharmacy is a new discipline in Sweden and the subject is not generally taught within the pharmacy degree. The inclusion of ward-based clinical pharmacists resulted in a positive outcome for the patients in the intervention group in that the number of total hospital visits during the follow-up year was reduced by 16%; drug related re-admissions were reduced by 80% (45 vs. 9) and visits to the emergency department by 47%.

We know from this previously reported RCT that the incidence of drug-related morbidity can be reduced as an effect of cross-competence enhancement, where each profession's unique knowledge and experience is used in close collaboration within the health care team [3]. In this

descriptive study, we aimed to investigate whether the already established team members, physicians and nurses, perceived that the new collaboration with clinical pharmacists improved drug-related patient safety and the quality of drug therapy and also the extent to which they felt that they, and the patients, benefited from the competence of added clinical pharmacists. Since the direct involvement of pharmacists in patient care is still unusual in hospitals in Sweden, this offers a unique opportunity to study the effects of integrating a new member in an already established team.

The objectives of this survey based study were to evaluate the perceived value of ward-based clinical pharmacists, from the perspective of hospital based physicians and nurses, and to capture the perceived advantages/disadvantages related to the new inter professional collaboration—for the practitioners themselves and for the patients under their care. Another objective was to evaluate the experiences of general practitioners on receiving medication reports from ward-based clinical pharmacists.

Methods

Study design and setting

This descriptive study presents the experiences of physicians and nurses involved in a previously reported RCT [3] of ward based clinical pharmacists at two internal medicine wards at Uppsala University hospital.

Sample and procedure

The study subjects were hospital-based physicians and nurses and GPs in the county of Uppsala.

Hospital-based physicians

The questionnaires were distributed to all the physicians ($n = 29$) who had treated one or more patients in the intervention group. Physicians who ended their service on the ward before the end of the study period received a questionnaire 2 days prior to their departure. The remaining physicians received the questionnaire at the time that the last patient included in the study was discharged. They were asked to complete the questionnaire and post it in a pre-paid envelope addressed to the researcher responsible for the data collection (MH) at Uppsala University.

Nurses

All day-time nurses ($n = 44$) working on the study wards in March 2006, 6 months into the study period, received a questionnaire. The nurses were asked to leave the completed questionnaires in a sealed box in the staff room. 2 weeks later, the box was collected by the researcher.

General practitioners

All GPs ($n = 21$) who had received two or more medication reports from the pharmacists were identified and sent a questionnaire, an information letter and a pre-paid envelope, addressed to MH at Uppsala University, at the end of the study period.

Questionnaires

Data were collected by study-specific questionnaires, containing both closed- and open-ended questions. The questionnaires were designed to capture the perceived advantages and disadvantages of integrating clinical pharmacists in the health-care team, for the practitioners themselves and for the patients under their care. For most of the closed-ended questions, the answers were to be given on a four-grade verbal scale, ranging from "yes, very much so" to "no, not at all". One question was answered with a dichotomized response alternative, "yes" or "no". The aim of the open-ended questions was to investigate aspects of the advantages and disadvantages that had not been covered in the closed-ended questions, and to give the respondents the opportunity to emphasize matters they considered particularly important. A letter outlining the purpose of the study and stating that participation was voluntary and that data would be treated confidentially was distributed to all participants together with the questionnaires. MH, who was responsible for the data collection, worked independently of the pharmacists and the questionnaires were analysed before the outcome of the RCT was known.

Data analyses

Answers to the closed-ended questions were analysed descriptively. Answers to the open-ended questions were analysed by content analysis. Content analysis can be used to draw valid conclusions from a text by objective and systematic identification of text characteristics. Therefore, answers to open-ended questions are suitable for this technique [26]. The content analysis was performed according to the following process: all answers (whole sentences or parts of sentences) relevant to a particular question were defined as recording units and were viewed simultaneously. Recording units were grouped into mutually exclusive categories reflecting central messages. The categories were named according to their central content. In the presentation of the categories, each category is exemplified with a statement.

Results

Hospital-based physicians

Of the 29 questionnaires distributed to hospital-based physicians, 22 (76%) were completed. Of these 22, 17 were from men and 5 were from women. These participants had been working as physicians for between 9 months and 32 years (median 3.3 years). The majority of the hospital-based physicians were very satisfied with the collaboration (95%) and considered the pharmacists' suggestions regarding patients' drug therapy to be relevant (Table 1). In general, they did not consider the collaboration time-consuming. The majority thought that both drug-related patient safety and their own knowledge of drug therapy for elderly patients had improved as a result of the collaboration. All physicians but one wanted to continue the collaboration in the same or a similar way.

The responses of the hospital-based physicians to the open-ended questions were mostly positive (Table 2). They valued the discussions with the pharmacists about drug therapy, and appreciated their different perspective and knowledge. They did not state any potential disadvantages for patients as a result of the collaboration.

Nurses

In all, 34 of the 44 nurses (81%) completed the questionnaire. Five questionnaires were completed by nurses who had not been responsible for any intervention group patients. Hence, 29 questionnaires were included in the study. The nurses had been working in the relevant ward for between 1 month and 6 years (median 2.0 years). To ensure respondent confidentiality, gender was not asked for, as very few nurses were male. The majority of nurses were very satisfied with the collaboration (93%) and considered the pharmacists' suggestions regarding patients' drug therapy to be relevant (Table 3). In general they did not consider the collaboration time-consuming. The majority thought that both drug-related patient safety and their own knowledge of drug therapy for elderly patients had improved as a result of the collaboration. All nurses but one wanted to continue the collaboration in the same or a similar way.

The nurses' responses to the open-ended questions were also mostly positive (Table 4). They stated that they had received support in their daily work from the pharmacists and they perceived that drug-related patient safety had been improved. They also mentioned that the face-to-face discussions with the pharmacists had increased their knowledge of drug treatment. They did not mention any potential disadvantages for patients as a result of the collaboration, although there were some practical concerns regarding increased time and limited space on the wards.

General practitioners

Seventeen of the 21 GPs (81%) returned the questionnaires. Of these, 10 were women and 7 were men. They had been working as physicians for between 2 and 33 years (median 19.5 years). The majority of GPs (71%) wanted to continue to receive medication reports in the same or a similar way in the future (Table 5). The majority thought that the medication reports could improve drug-related patient safety and the quality of prescribing in primary care. Nine GPs (53%) stated that they had to spend additional time on the patients' drug therapy after receiving a medication report.

The GPs' responses to the open-ended questions were mixed (Table 6). Positive statements included that they felt they received more information about the changes in patients' drug therapy sooner after discharge than they normally would. Negative aspects that were mentioned were that they thought the medication report did not

Table 1 Experiences and perceptions of hospital-based physicians ($n = 22$) on the addition of clinical pharmacists to the health-care teams

	Yes, very much so	Yes, to a certain extent	No, not really	No, not at all
Are you satisfied with the collaboration with the pharmacists on the ward?	21	1	–	–
Has the collaboration been time-consuming?[a]	–	4	13	4
Have the pharmacists made relevant suggestions to the patients' drug therapy?[a]	11	10	–	–
Has your knowledge about drug therapy for elderly patients increased as a result of the collaboration with the pharmacists?	5	15	2	–
Do you think that the collaboration with the pharmacists has enhanced drug-related patient safety?	10	11	1	–
	Yes	No		
Would you like to continue to work with pharmacists in the same or a similar way in the future?	21	1		

[a] 1 missing answer

Table 2 Responses of hospital-based physicians ($n = 22$) to the open-ended questions

Question	Categories	No.[a]	Examples of statements
"Has working with the pharmacists resulted in any advantages for you as a physician that we have not asked about?"	Help and support	6	"They have the time to deal with things which I do not have, and they identify issues that I do not"
	Supplementary perspectives	5	"It stimulates interesting discussions in which two different perspectives meet; as a physician you're really forced to think and to justify your choice, which is good!"
	Informative	3	"I have learnt a lot about drugs and interactions"
"Has working with the pharmacists resulted in any disadvantages for you as a physician that we have not asked about?"	Questioned in professional role	2	"Sometimes it's difficult to reject a suggestion. You can feel somewhat questioned as a physician. It's not a big issue, though"
"Has working with the pharmacists resulted in any advantages for the patients that we have not asked about?"	Better drug therapy	8	"A thorough discussion about drug therapy is always valuable to the patients and, as physicians, we rarely have the time"
	Information	1	"It is good when patients get more information and clarification"
"Has working with the pharmacists resulted in any disadvantages for the patients that we have not asked about?"	–	0	–

[a] The number of respondents whose statements were linked to that specific category

Table 3 Experiences and perceptions of hospital-based nurses ($n = 29$) on the addition of clinical pharmacists to the health-care teams

	Yes, very much so	Yes, to a certain extent	No, not really	No, not at all
Are you satisfied with the collaboration with the pharmacists at the ward?	27	2	–	–
Has the collaboration been time-consuming?	1	5	11	12
Have the pharmacists made relevant suggestions to the patients' drug therapy?[a]	23	5	1	–
Has your knowledge about drug therapy for elderly patients increased as a result of the collaboration with the pharmacists?	4	17	5	3
Do you think that the collaboration with the pharmacists has enhanced drug-related patient safety?[a]	18	9	1	–
	Yes	No		
Would you like to continue to work with pharmacists in the same or a similar way in the future?	28	1		

[a] 1 missing answer

include enough information and that it could cause confusion for both themselves and the patients.

Discussion

All hospital-based physicians and nurses were satisfied with the collaboration with the pharmacists and all but two wished to continue in the same or in a similar way. The implications for physicians on collaboration with pharmacists have been studied extensively [2, 4, 18–23–24]. The results from our descriptive study are in line with several of the findings in the literature, for example that it is important to ensure good professional relationships, to have mutual trust and recognition of each others' competences and skills, and to promote good communication. Two physicians mentioned in the questionnaires that they felt somewhat questioned in their professional role by the pharmacists. This highlights the need to clarify the role of the pharmacist for all team members. In Sweden, the physicians have the ultimate medical responsibility and are the ones responsible for the formal decision-making on drug treatment. The role of the clinical pharmacist is more focused on providing physicians with advice on individual patients' drug treatment, in order to increase safety and efficacy, and educating patients in managing their drug treatment.

The implications of collaboration with pharmacists for nurses have to our knowledge not been the subject of much

Table 4 Responses of hospital-based nurses (n = 29) to the open-ended questions

Question	Categories	No.[a]	Examples of statements
"Has working with the pharmacists resulted in any advantages for you as a nurse that we have not asked about?"	Help and support	14	"They have been a support and an asset"
	Informative	6	"My knowledge about drugs and the elderly has increased"
	Work satisfaction	1	"It is stimulating to work with various professions"
"Has working with the pharmacists resulted in any disadvantages for you as a nurse that we have not asked about?"	Time and space	5	"The ward rounds can take longer, and there can be disagreements over the use of patient charts"
"Has working with the pharmacists resulted in any advantages for the patients that we have not asked about?"	Better drug therapy	14	"It feels as if patient safety has improved"
	Information	8	"The patients get good, clear information that the physicians do not have the time to provide"
	Satisfied patients	1	"The patients who have been in contact with the pharmacists appear to be satisfied"
"Has working with the pharmacists resulted in any disadvantages for the patients that we have not asked about?"	–	0	–

[a] The number of respondents whose statements were linked to that specific category

Table 5 GPs' ($n = 17$) perceptions of the medication reports sent by the clinical pharmacists on patient discharge

	Yes, very much so	Yes, to a certain extent	No, not really	No, not at all
Has the medication report meant that you had to spend more time on the patient's drug therapy than you otherwise would have done?	–	9	6	2
Do you think that the medication report has provided you with relevant perspectives on the patient's drug therapy?	6	9	1	–
Do you think that the medication report contains information that could improve drug-related patient safety in primary care?	7	7	3	–
Do you think that the medication report contains information that could improve the quality of prescribing in primary care?	4	9	4	–
	Yes	No		
Would you like to continue to receive medication reports from pharmacists in the same or a similar way in the future?[a]	12	3		

[a] 2 missing answers

research. In a study from California published in 1986, the nurses were more positive about pharmacists having expanded roles in a hospital setting than in the community [25]. Scullin et al. [4] found that the nursing staff perceived that substantial time savings were possible when pharmacy technicians, and to a lesser extent pharmacists, increasingly undertook tasks on the wards. The results of our study show that the nurses saw the pharmacists as supportive and informative and that they would like to continue the collaboration in the future. Some nurses on the study wards were concerned that the ward rounds were prolonged as a result of discussions on patients' drug therapy initiated by the pharmacists. It was suggested that the pharmacists could leave written recommendations to the physician instead, or could discuss the issues outside the ward rounds. Although these suggestions were understandable from the nursing perspective, they were not adopted because they would remove some of the learning opportunities for the team members on the notion that face-to-face discussions benefited both professional collaboration and patient outcomes.

All hospital-based physicians but one, and all nurses but one, thought that drug-related patient safety had been improved as a result of the collaboration; an outcome that was in line with the results on drug-related readmissions that have previously been reported [3]. The pharmacists routinely performed medication reconciliations on admission and discharge for the patients in the intervention group

Table 6 Responses of GPs ($n = 17$) to the open-ended questions

Question	Categories	No.[a]	Examples of statements
"Have the medication reports that you have received resulted in any advantages for you as a GP that we have not asked about?"	A good eye-opener	3	"It makes me think more about age, drug interactions, and adverse effects"
	Desirable information	5	"It is an advantage to get a comprehensive list of current medications and the rationale behind the changes made, so soon after discharge from hospital"
"Have the medication reports that you have received resulted in any disadvantages for you as a GP that we have not asked about?"	Time-consuming	3	"Unfortunately, it has taken time that was intended for other matters"
	Lack of information	3	"Too little information in the written reports"
	Impedes the patient relationship	1	"Some confusion could occur in the contact with the patient"
"Have the medication reports that you have received resulted in any advantages for the patients that we have not asked about?"	Better drug therapy	7	"Due to short lengths of stay, hospital-based physicians are not always able to manage all medications"
"Have the medication reports that you have received resulted in any disadvantages for the patients that we have not asked about?"	Confusing	1	"Relevant changes have been made in the drug therapy, but it might be hard for the patients to understand"

[a] The number of respondents whose statements were linked to that specific category

and brought to the team's attention any omitted/incorrectly added drugs on the hospital drug charts, non-adherence to the drug regimens by the patients, and misunderstandings or practical problems related to the patients.

Twelve out of 17 GPs stated that they would like to receive medication reports in the future. The results from the GPs were positive but not as positive as those of the hospital physicians and nurses. This is in line with the finding that a trusting and close relationship such as that forged when working together in a team on a daily basis is favourable for inter-professional collaboration [24]. Since the pharmacists did not communicate with the GPs other than by fax and an occasional phone call, the relationships were not as direct. It was perceived by nearly all respondents that the pharmacists made relevant suggestions to the patients' drug therapy to a high or a certain degree. The three pharmacists involved in the RCT all had post-graduate education and training in clinical pharmacy, something that is regarded as important factors to ensure adequate quality of the additional health care providers' services in the team [20].

Apart from identifying aspects not covered by the closed-ended questions, the aim of the open-ended questions was to find out which elements in particular the respondents found valuable or problematic and to identify possibilities for improvement. The responses in our study were grouped into categories; from these, it was apparent that the majority of the statements from the hospital-based staff were positive with respect to the collaboration, while the GPs' statements were more mixed. In the study from Northern Ireland by Scullin et al., 23 hospital-based junior physicians completed a questionnaire which was designed to investigate their opinion of clinical pharmacist input into patient care. All their responses were positive about the service, in particular with regard to the reduction in errors, improved monitoring of patients' drug therapy and the benefits of pharmacists counselling the patients on discharge. Eighty-seven percent of the physicians in that study agreed that the pharmacists saved physicians time [4]. These results, however, are not readily comparable to ours since the questionnaires differed, particularly with respect to the differences in the closed ended questions, which steered respondents in the studies to focus on different aspects of clinical pharmacy.

As previously reported, the physicians followed and implemented 75% of the suggestions made by the pharmacists in our RCT [3]. Data on acceptance-rate to pharmacists' recommendations is often presented, not as an assessment on patient outcome but as an indication on how well the team functions -had the physicians followed and implemented only a small part of the recommendations that could indicate that an inter-professional team was not successfully established. In a Danish RCT, fewer than half of the recommendations were accepted [27]. The researchers in that study suggested that if the recommendations had been given face-to-face, thus providing an opportunity for discussion, rather than in writing, the rate would have been higher. This was shown in a recent study from Austria, where the acceptance rate for the pharmacist's suggestions was nearly 90% [28]. The model used in that study appeared to be similar to the one used in our RCT; all issues raised by the pharmacist were discussed by the inter-disciplinary team during ward rounds. This supports the decision not to adopt the model suggested by the

nursing staff to utilize written suggestions or discuss issues outside of rounds, as it seems to decrease the number of pharmacists' recommendations that become implemented, likely due to reduced team collaboration.

However, the formation of the inter-professional team in our study was challenging. Teams were initially formed on the two study wards during a pilot study, preceding the RCT. In total, nearly 30 physicians worked on the wards during the nine-month inclusion period, some for very short periods of time. The frequent change in personnel made it difficult to build professional relationship. However, the residence time for the nurses and nursing staff was more stable and they played an important role in introducing new physicians to the team model. Another important factor was that the few more permanent, senior physicians on the wards would act as role models for the new physicians. Formation of a strong inter-professional team may also have contributed to the high response rate for hospital based physicians, nurses, and general practitioners in primary care.

However, our study also had several limitations. Characteristics of the pharmacists that may have influenced the attitude of the physicians and nurses, such as age, gender, experience, level of friendliness and prestige, [29] were not analysed. These factors may have affected the replies, in terms of satisfaction and willingness to continue with the collaboration, and also the response rate. There was only one assessor utilized in the categorization of data in the content analysis for open-ended questions and hence the validity in terms of inter-rater reliability could not be determined and therefore no reliability assessment, for example a calculation of the inter-rater agreement, could be performed. Another limitation is that the questionnaires utilized for surveying physicians and nurses had not been validated prior to this study. However, the low internal drop-out rate and the relevant answers to the open-ended questions indicated that the questionnaire was easy to understand and at least possessed face validity. The small number of clinical pharmacists performing the interventions and the involvement of only two wards in the study are facts that may limit generalization.

Conclusions

The majority of the respondents, both GPs and hospital based physicians and nurses, were satisfied with the new collaboration with the ward based pharmacists and perceived that the quality of the patients' drug therapy and drug-related patient safety had increased.

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Conflicts of interest None.

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