



Impact on the Performance of Health Workers Adopted Performance-Related Contracts in the Provision of Basic Public Health Service At Village and Township Levels

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Abstract

Background: This paper focus on the impact on the performance of health workers at village and township levels in the provision of a government stipulated package of basic public health service, which adopted the performance-related contracts mode.

Methods: The concept of balanced scorecard was adopted and developed to gather the 11 evaluation indicators distributed in four quadrants. These were implemented using on-site questionnaire and interview design. Four thousand and twenty-one respondents at 30 administrative villages including 2674 respondents at 20 pilot villages and 1347 at 10 control villages were investigated. Meanwhile, 62 administration officials from three counties and nine townships were interviewed.

Results: Eight of 11 evaluation indicators were obviously better in pilot counties than in Control County, The remaining three indicators respectively represented that equal, inferior to control county, and could not clear judge.

Conclusion: The performance of health workers at village and township levels in the provision of basic public health service in pilot counties, which adopted the performance-related contracts mode, is better than before and control county.

Keywords: Public health, Performance-related contracts, Balanced scorecard

Introduction

In China, most community and primary healthcare services used to be paid directly by the Government, including funding, organizing service delivery and supervision (1, 2). As there were no effective incentives to encourage healthcare workers to provide these non-profitable preventive and primary care services (3, 4), most doctors and hospitals turned largely to provision of episodic curative care, focused on earning a living from procedures or sale of prescribed medications,

which on a fee for service basis. All of these problems cause a serious threat to the health of the residents (5-8). By 2000, WHO ranked China 188 in 191 countries in terms of the fairness of financial contributions to healthcare (9, 10).

In April 2009, the Chinese government launched a new round of health reform. One of the five priorities was to promote the equal access to Basic Public Health Service (BPHS) among all the residents (11). The new health reform policy man-

dated that governments at all levels should jointly provide at least 15 Yuan per capita per year for BPHS, and increase the fund along with economic development. At the same time the Central Government mandated that ten categories of national BPHS be made available to all residents, which includes the creation of health records for families, health education, healthcare for children under the age of three, maternal healthcare, healthcare for the elderly, immunization, reporting of infectious diseases, management of hypertension and diabetes and treatment of severe mental illness. The principle was that governments should purchase these high priority preventive and BPHS from providers for targeted population, allowing patients' access to these cares all free. Therefore, three questions were left open for resolution at lower levels of government: 1) what kind of payment mechanism could ensure that government funds for BPHS be used efficiently to increase service quantity and quality; 2) How to mobilize health workers enthusiasm; and 3) How to supervise and evaluate the efficiency and effectiveness (12, 13).

The Intervention

Although there is intense interest in and optimism about Performance-Related Contracts (PRCs) in recent years, there is little published research on

PRCs in health care (14-16), and little is known about the benefits of the PRCs mode of providing incentives for improving healthcare (17-18). China Rural Health Project (2008-2013) jointly funded by World Bank and Department for International Development of the UK, designed to support eight provinces and forty counties to test practical strategies for implementing its rural health reform. Henan, one of eight participating provinces, worked closely with five pilot counties to test a mechanism of PRCs for expanding access to the BPHS. Two highly innovative project counties in Henan have achieved some good experience on PRCs, delivery and payment reform of BPHS packages in about two years from the launch of the project in Oct 2008 to Dec 2010. By April 2011, this new PRCs mode has popularized in Henan province, covered about 100 million populations.

In pilot areas, each county developed the guidelines of public health service project management, which defined 1) the roles of the county level public health institutions, township hospitals and village clinics; Re-divided the responsibilities of different levels and clearly defined the rural public health service providers and their functions. Taking the hypertension health management as an example (Fig.1).

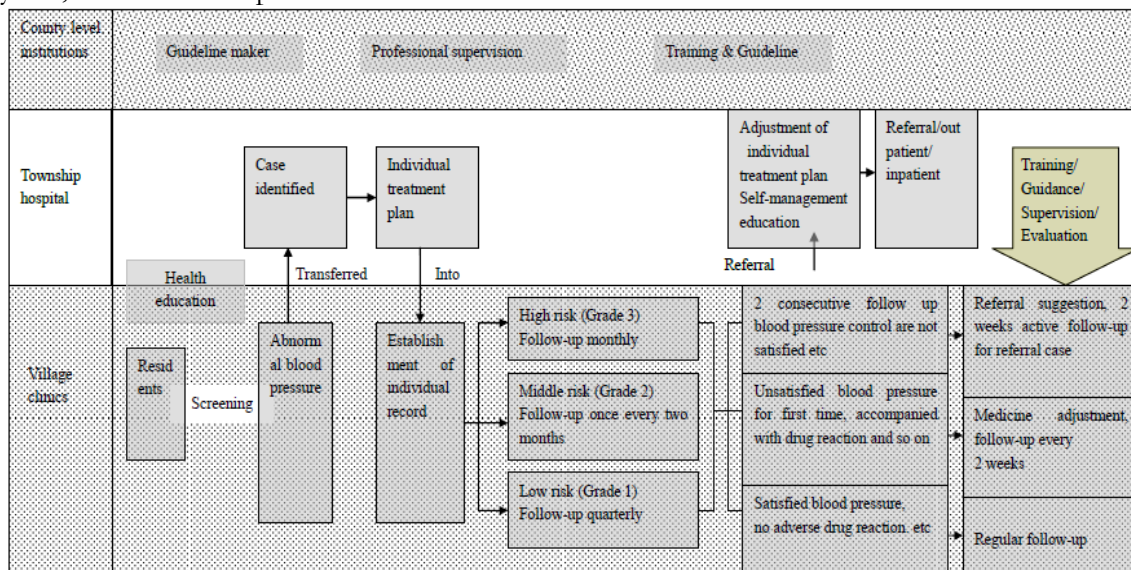


Fig. 1: Flow chart and division of responsibilities for hypertension health management services

2) The service quality standards; inviting the provincial and city experts to formulate the BPHS processes, diagnostic criteria, operation specifications and other quality standards and implementing the service qualification access system. 3) The service cost; guiding the counties to scientifically

launch cost calculation, clearly define the sharing mechanism of the service cost, supervision charge and operation charge, 4) the performance evaluation indicators; taking the hypertension health management as an example (Table1).

Table1: Performance evaluation system of hypertensive patients' health management service

First-level indicators	Second-level indicators	Third-level indicators	Indicators and requirement	Score value	
1.Service process	1.1 Organization and management	1.1.1Rate of the regular meetings held by county-level CDC institutions	100%	4	
		1.1.2 Meetings held for village doctors	≥3 times	4	
	1.2 Health management of hypertensive patients	1.2.1 Health management rate of hypertensive patients		≥80%	3
			1.2.2 Referral rate	≥90%	3
		1.2.3Usage rate of basic drugs	≥90%	3	
	1.3 Health education of hypertensive patients	1.3.1 Publicity coverage rate of hypertension prevention and treatment knowledge		≥75%	4
			1.3.2 Health lectures on hypertension prevention and treatment knowledge	≥5 times	4
	1.4 Information management of hypertensive patients	1.4.1Health records coverage rate of hypertensive patients		100%	9
			1.5.1 Coverage rate of regular training of relative village-level personnel	100%	4
		1.5.2 Coverage rate of regular entering and guiding villages		≥75%	4
			1.6.1 Coverage rate of monthly supervising and guiding village-level units	≥75%	3
		1.6 Supervision appraisal	1.6.2 Coverage rate of quarterly appraising village-level performance	≥100%	3
			1.6.3 Coverage rate of biannual paying villages service compensation expense	≥100%	3
	2.1 Health management of hypertensive patients		2.1.1Standard management rate of hypertensive patients	≥90%	8
		2.1.2Blood pressure control rate of hypertension management population	≥60%	8	
2.2 Satisfaction degree of service objects		2.2.1Degree of satisfaction with service places' environment	≥80%	5	
		2.2.2 Degree of satisfaction with the service personnel's service attitude	≥80%	5	

Table1: Cond...

	2.2.3 Degree of satisfaction with the service personnel's technology	≥80%	5
	2.3.1 Rate of rural residents' awareness of hypertension health knowledge	≥80%	9
2.3 Health education	2.3.2 Rate of rural residents' healthy behaviors to prevent and treat hypertension	≥80%	9
Total			100

5) The contract; the pilot counties signed contracts with township hospitals based on the service costs. The township hospitals, in turn, signed sub-contracts with village doctors. These contracts defined the services to be provided, quality standards to be achieved, criteria for performance evaluation, and the mode of payment and accountability. 6) Payment policy; service package costs are paid by way of “quota prepayment and performance successive payment”. The prepayment funds should be determined through negotiation with service providers in advance; all the other funds will be paid according to evaluation results. For example, on the precondition of accomplishing minimum objectives, for those gaining more than 85% of the performance evaluation mark, 100% of the remaining fund shall be paid; those gaining 85%~75%, 85% of the remaining fund shall be paid; those gaining less than 60%, the remaining fund will not be paid and will be punished. 7) The mechanism of incentive and accountability.

Reviews of intervention studies in low and middle-income countries suggest that the simple dissemination of written guidelines is often ineffective, that supervision and audit with feedback is generally effective, and that multifaceted interventions might be more effective than single interventions (19). In pilot counties, forming a rural public health service supervision appraisal system characterized by the trinity of performance appraisal, third-party supervision and accountability system, besides the economic penalty.

In this paper, we explore whether the new PRCs mode has improved the performance of health workers at village and township levels in two early implementation counties, compared to baseline

findings and between the first two pilot counties, and another similar control county, which carries out the mode of traditional administrative management in the provision of BPHS.

Methods

Comparative quantitative case studies of healthcare process indicators, before and after implementation of the PRCs intervention mode, in pilot and in control townships and villages.

Study Design

In the past few years, a growing number of healthcare providers have adopted the Balance Score Card (BSC) framework to develop a more comprehensive set of performance indicators (20-22). The BSC is a management tool, originally applied to businesses in the private sector, developed by Kaplan and Norton in 1992 (23, 24). The concept of BSC is adopted to design the evaluation framework, and aim to evaluate performance of personnel in the provision of BPHS at village and township levels (25).

Evaluation Indicators

The method of key performance indicator is used to select evaluation indicators, which include eleven indicators in four quadrants (Fig. 2).

Data Sources

The method of multi-phase level-divided population systematic random sampling was used. Combination of qualitative and quantitative methods was taken in the survey, and including in-depth interviews with BPHS providers, administrators and beneficiaries.

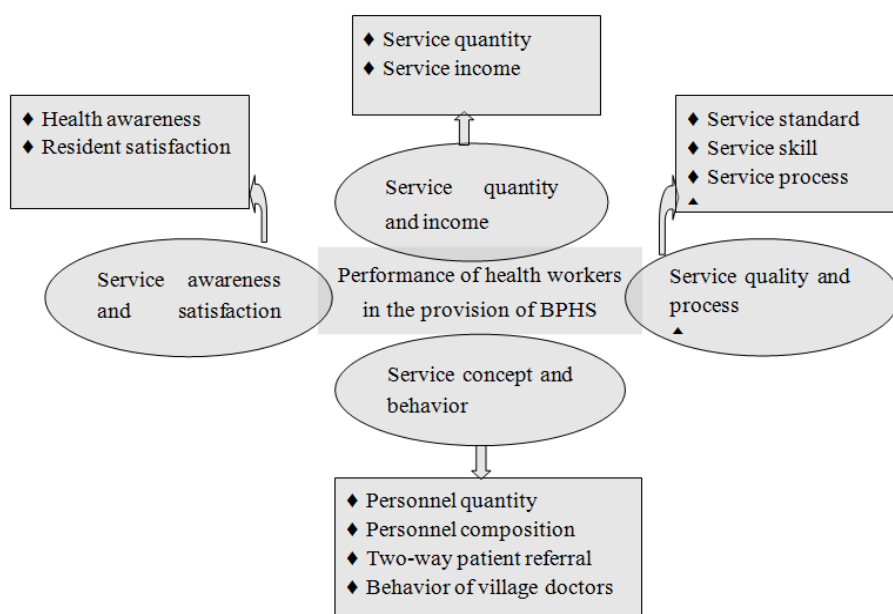


Fig. 2: Performance evaluation framework of health Workers in the provision of BPHS

There are three aspects of the data source including population covered by BPHS, BPHS providers and small-scale qualitative investigation, and has designed three kinds of survey form. First, two rural counties were selected as samples of the five Health Project XI counties in accordance with launching time of pilot counties; another county which is not a pilot county in Henan and is similar with pilot counties in terms of economic development and geographic features, was randomly selected as the control group, three sampling counties in total. Second, randomly selected 3 townships as samples out of the townships (in the sample counties) where pilot work of PRCs had been carried out at least one year in accordance with geographic features (plain, hill and mountain) and economic features in terms of per capita annual income (upper, middle and lower). Third, three villages in each sample townships were selected randomly as samples in accordance with economic features in terms of per capita annual income (upper, middle and lower). In each sample village, 184 respondents out of 8 categories national BPHS objects (excluding those

under contagious and mental disease patients management) were selected randomly from one village (3 more were selected as stand-by investigation objects in each category BPHS in every village because some potential objects may not be available or refuse to receive the investigation). Finally, total 6 pilot townships 20 villages and 3 control townships 10 villages were selected, including 4021 respondents and 62 administration officials. Table 2 is the comparison of relevant data from pilot counties and the control county.

Data control and analysis

Every survey form was checked by a team supervisor, present in the village, and missing or contradictory data were corrected immediately. Three field teams about 30 investigators and guiders completed the data collection over 14 days in mid-February 2011, during Spring Festival. This, the annual holiday period, causes the world's biggest population movement, as tradition decrees that families gather, and so almost all migrants, local and distant, return home.

Table 2: The comparison of relevant data from pilot counties and the control county

County	Population (10000 per)	Geographic	No. of townships	No. of villages	Per capita annual net income of farmers(Yuan)	Overall government Expenditure (1 m Yuan)	BPHS funds allocated per capita(Yuan)
Pilot 1	72.27	Plain	15	363	6149	907.24	15
Pilot 2	74.33	Plain mountain hill	18	373	4170	1276.66	15
Control	55.23	Plain mountain hill	16	318	4551	1410.22	15

Data were collected on paper forms and sent to the county health bureau where four experienced data entry clerks did double data entry to computer using Eptdata3.1 with range checks and algorithms to ensure internal data consistency. Errors at this stage were corrected by telephone contact with the relevant interviewer who would telephone or visit and re-interview in the home if needed. All analyses were performed using SPSS for Windows, version 12.0 and Microsoft Excel 2003.

Results

Quadrant of Service Quantity and Income Service quantity of BPHS workers at village and township levels

In pilot counties, times of supervision and inspection for medical institutions at village and township levels are averagely 3 times higher (about 9 times quarterly) than that before (only 3 times quarterly). In Control County, was about 1.5 times higher than before (only 2 times quarterly).

Service income of BPHS workers at village and township levels

The monthly income increases 20% (reached 1250 Yuan) on average in pilot counties and 15% (reached 1050 Yuan) in Control County.

Quadrant of Service Quality and Process Service standards of BPHS workers at village and township levels

Investigations show that village and township medical institutions in the two pilot counties have

clearly defined operation instructions, standards and specifications for BPHS as well as detailed regulations for supervision and evaluation. The documents mentioned above can be found in the township health centers and village clinics, and there are records of medical history of patients as well as reports of supervision and evaluation. However, service standards and specifications are also available in the control county, responsibilities for township health centers and village clinics are not clearly divided, resulting in poor implementation. The qualified management rate of health records for families in Pilot County is higher than the control county.

Service skill of BPHS workers at village and township levels

The township quarterly received 5 sessions of training on average, village quarterly received 3 sessions of training on average in pilot county, While in the control county, township quarterly received 3 sessions of training on average, the village every quarter received 2.5 sessions of training.

Service process of BPHS workers at village and township levels

Interviews with administrators at county and township levels show that the service process in pilot counties is well designed, but it is difficult to operate for the new operation philosophy of PRCs at initial stage, and there exist some problems, such as the higher cost and management ability requirements. In Control County, the ser-

vice process and management is offered through administrative orders from the superior, which usually leads to less incentive to improve their business skills and quality of service.

Quadrant of Service Concept and Behaviour Changes in quantity of BPHS workers at village and township levels

The quantity of BPHS clinical workers increases in both the pilot and control townships (Fig. 3).

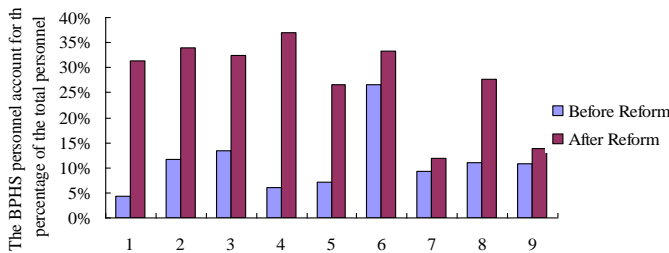


Fig. 3: Before and after the reform in the provision of BPHS personnel quantity change

Note: The first 6 townships along the horizontal coordinate are pilot townships that implement PRCs, the remaining 3 are control townships

Out of the 6 pilot townships, five have over 30% of medial workers in the provision of BPHS (the rate for the fifth township, which is at a remote mountainous area, is 26.67%). In the control county, except that the rate for the eighth township is higher than 20% (in the eighth township, which is at mountainous area, four out of 18 clinical workers in the provision of BPHS in 2009 and the number increased to 5 in 2010), the rates for the other 2 townships are lower than 15%.

Figure 4 shows that quantity of BPHS workers in 5 pilot townships increases 20% than that before the project was carried out and except that the quantity of BPHS members in 1 pilot township in mountainous area increases 6.67%, while in control townships, the average increase is not higher than 6%.

Interviews with village doctors show that they almost spend all the time and energy on the BPHS in addition to treatment of common diseases and

selling of common drugs, and have more and more meticulous work to do than ever before.

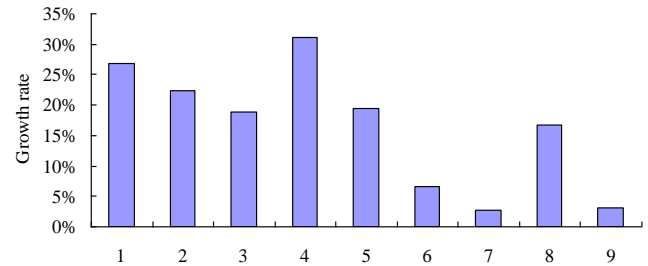


Fig. 4: Before and after the reform in the provision of BPHS personnel growth

Note: The first 6 townships along the horizontal coordinate are pilot townships that implement PRCs, the remaining 3 are control townships

Changes in composition of BPHS workers at village and township levels

Figure 5 shows that township health centers have actively put more clinical workers for BPHS. The proportion of BPHS workers in the 6 pilot townships increase rapidly, up from less than 10% to above 20%, even above 30%. Obviously pilot townships clinical workers growth rate was significantly higher than that of the control areas.

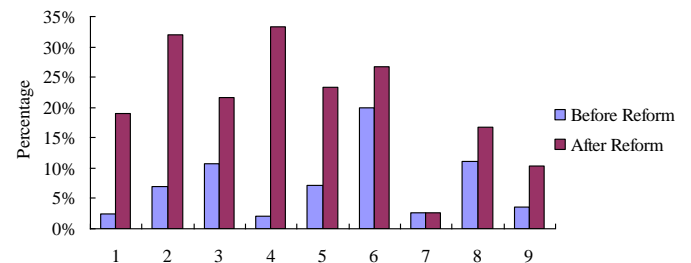


Fig. 5: Clinical technical staff in the provision of BPHS quantity changes

Note: The first 6 townships along the horizontal coordinate are pilot townships that implement PRCs, the remaining 3 are control townships

Two-way patient referral at village and township levels

Village clinics transfer more patients to township health centers than before, on average increasing from 6 to 13 patients each quarter in pilot counties, and in the control county, the increase is up

from 10 to 22. In past, village doctors usually did not actively transfer patients to health centers, as evidenced by that fact that on average only 2 patients were transferred monthly. At present, after the doctors at health centers prescribe new medicines, the patients return home where they will be helped by village doctors.

Changes in behavior of village doctors

In the 30 sample villages under investigation, times of in-house service by village doctors increase monthly from 16.13 before the project to 58.87 at present. Changes in pilot counties are more significant, increasing from 18.35 to 78.15. While in Control County, the increase is from 12.7 to 20.30.

Quadrant of Health Awareness and Satisfaction Degree

Health awareness of resident

Interviews with village and township doctors show that, at the initial stage of BPHS, villagers were suspicious of village doctors' actions such as publicity, guidance and regular physical examination free of charge, and were not cooperative when doctors actively went to their homes to offer medical help (26). However, six months after the project, villagers began to accept the services gradually. For instance, villagers aged above 35 years now actively go to village clinics free blood pressure checks during the slack farming season, a phenomenon without precedent.

Resident satisfaction

Village and township medical institutions in pilot counties have designed special and easily understandable service expertise cards to introduce BPHS to residents free of charge. Rural doctors actively introduce health knowledge to change unhealthy life style of farmers when they seek medical help. Interviews with villagers show that the satisfaction degree of residents in rural areas about BPHS increases significantly since its implementation.

Discussion

Table 3 shows the relative importance degree on the performance of health workers at village and township levels in the provision of BPHS between pilot counties and Control County. We can see that 8 of 11 evaluation indicators are obviously better in pilot counties than that in control county, the remaining three indicators respectively represent equal to control county ("0"), inferior to control county ("−") and cannot judge it ("—"). Based on the above results, we can get several significant findings on the performance of health workers at village and township levels in the provision of BPHS that adopted the performance-related contracts mode.

Firstly, The PRCs mode is proved effective in the pilot counties in Henan Province. This test conclusion is consistent with other developing countries (15). It also testified that the multifaceted interventions might be more effective than single interventions to improve health workers' performance in low and middle-income countries (19). Secondly, Compared with the control county, both the quantity and their share of clinical workers engaged in BPHS at township and village levels have changed greatly. The health workers can get more income by actively providing preventive healthcare service, which is very different from that brought by administrative instructions only, showing that the influence of the introduction of contract mechanism upon the BPHS system is active and positive.

Thirdly, the capability and performance of health workers at township and village levels have been improved significantly. Guided by a mechanism that is clear in job division, quality standard, performance payment, award and punishment policy, the services of the health workers at the two levels have been standardized, resulting in stronger sense of responsibility, more personal benefits, and higher enthusiasm for public health service.

Fourthly, the health awareness and satisfaction degree of residents have been improved continuously.

Table 3: The comprehensive comparisons on the performance of village and township levels health workers in provision of BPHS

No.	Performance evaluation indicators	Control county	Pilot counties
Quadrant of Service and Income			
1	Service quantity of BPHS workers at village and township levels	0	+
2	Service income of BPHS workers at village and township levels	0	+
Quadrant of Service Quality and Process			
3	Service standards of BPHS workers at village and township levels	0	+
4	Service skill of BPHS workers at village and township levels	0	+
5	Service process of BPHS workers at village and township levels	0	—
Quadrant of Service Concept and Behavior			
6	Changes in quantity of BPHS workers at village and township levels	0	+
7	Changes in composition of BPHS workers at village and township levels	0	+
8	Two-way patient referral at village and township levels	0	-
9	Changes in behavior of village doctors	0	+
Quadrant of Health Awareness and Satisfaction Degree			
10	Health awareness of residents	0	0
11	Resident satisfaction	0	+
sum up		0	"+"(8); "0"(1); "-"(1); "—"(1)

Note: The control county serve as a basic point, and all evaluation indicators are set to "0". if an indicator in pilot counties is better than that in control county "+" is used; if inferior to control county, "-" is used; if both almost have not any different, "0" is adopted; if there is not clear judge, "—" is used.

Benefit by free services, on-site services, health promotion and health guidance, the residents are more active in terms of participation in prevention and healthcare, resulting in stronger health awareness and higher satisfaction degree. Henan Province's exploration in the PRCs of BPHS still faces problems and challenges despite of achievements that have been made. First, some evaluation indicators need to be added, such as the matching of service income with service quantity, service quality and accessibility; second, the ability and benefit of health workers engaged in BPHS in remote mountainous areas need to be improved.

Conclusions

From what has been discussed above, we can draw the conclusion that the performance of

health workers at village and township levels in the provision of BPHS in pilot counties, which adopted the PRCs mode, is better than before and control county.

List of abbreviations

BPHS: Basic Public Health Service
 PRCs: Performance-Related Contracts
 BSC: Balanced Score Card

Ethical considerations

Ethical issues (Including plagiarism, Informed Consent, misconduct, data fabrication and/ or falsification, double publication and/ or submission, redundancy, etc) have been completely observed by the authors.

Acknowledgements

The authors declare that they have no competing interests.

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