

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Moving towards a better path? A mixed-method examination of China's reforms to remedy medical corruption from pharmaceutical firms
AUTHORS	Shi, Jianwei; Liu, Rui; Jiang, Hua; Wang, Chunxu; Xiao, Yue; Liu, Nana; Wang, Zhaoxin; Shi, Leiyu

VERSION 1 – REVIEW

REVIEWER	Rose-Ackerman, Susan Yale University, USA
REVIEW RETURNED	18-Jul-2017

GENERAL COMMENTS	The paper is a useful discussion of the incentives for corruption in Chinese health care and the difficulties of reform. Data on the topic is obviously difficult to assemble, but the authors have done an adequate job of combining interviews with a review of the case law. My main critique is that they do not adequately consider the underlying incentives for corruption in pharmaceutical procurement that are unique to the Chinese case. The authors cite my paper with Y. Tan on the topic, but the authors could have gone farther to confront our claims which they may have a good ability to assess and critique. We argue that even with a weak domestic insurance market, there is room for corrupt payoffs to be added into the price of drugs from MNCs because patients are willing to pay more for such drugs than for ones from domestic suppliers. Perhaps the authors can document both the level of private insurance and the financial pressure on hospitals that fueled corruption. They critique corruption in the centralized system that was meant to limit hospital level corruption but apparently did not. I would like stronger evidence about the reasons for the failure. All in all this is a useful paper in a difficult to research field that comports with the conclusions of my own earlier research although in neither case can we provide strong statistical evidence for our claims.
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REVIEWER	Sebastian Salas-Vega London School of Economics and Political Science, UK
REVIEW RETURNED	20-Aug-2017

GENERAL COMMENTS	• Let me first thank the authors for their submission. The manuscript is both timely and important – it addresses an issue that follows on recent health system reforms in China, and underlies the efficient operation of the country's prescription drug market.
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	<p>General</p> <ul style="list-style-type: none"> • The paper would benefit from language editing. Please consider professional editing services. I wouldn't ordinarily comment on this, but in this case I believe that it may significantly improve the quality and impact of the paper.(minor comment) I do not comment on any language-related error, but there are many. <p>Abstract</p> <ul style="list-style-type: none"> • The methods section is very unclear. The authors explain that they "examined the effect of the existing measures on opposing medical corruption based on the Donabedian model." How and why were these selected? Are you referring to policy measures? The authors go on to explain that they "analysed quantitative data from "China Judgements Online" to support the evaluation." In what way was the quantitative analysis used to support the evaluation? What is "China Judgments Online," and how does it tie with the paper's objective and the earlier qualitative analysis (interviews)? Methods should be better explained.(minor) • The results section is organized so as to focus on the "three main categories of countermeasures to oppose medical corruption in China." I'd suggest adding 1 sentence at the beginning of the results section to briefly list the three "main categories" of countermeasures, before then describing each type of countermeasures using the framework described in the methods section. This will help provide more structure to the text.(minor) • What were the criteria that allowed you to identify just "three main categories of countermeasures to oppose medical corruption in China?" Was this based on a review of policies on countermeasures for medical corruption? This and other related issues should be clarified in the methods section.(minor) • Authors mention that "the level of fines and criminal penalties for medical corruption behaviors were insufficient." How did the authors come to this conclusion? Unless there is clear, irrefutable evidence to support this statement, you should refrain from making value judgment—focus on the evidence. Similar concerns elsewhere: e.g. "were implemented well?" Perhaps just say, "were implemented." • In the conclusions section, the authors argue that existing countermeasures are far from ideal. They also say that they "cannot fundamentally reduce the medical corruption." How did you come to this conclusion? The link with previous paragraphs is weak. • Change "Strength and Limitations" to "Strengths and Limitations" <p>Introduction</p> <ul style="list-style-type: none"> • The authors state, "To compensate for the retrenchment of government health outlays, many public hospitals in China began to earn revenue illegally by making alliances with the pharmaceutical firms to procure pharmaceuticals and medical equipment." <ul style="list-style-type: none"> o First, procurement of pharmaceuticals and medical equipment is not in itself indicative of corruption or mal-intent. It might be considered corrupt if special arrangements are made that steer away from free market principles and with the intention of illicit self-gain. Please be more specific into how this is indicative of corruption. o This statement is also quite provocative—please provide references to support. • The authors indicate that there are three major forms of medical corruption (line 84). Can they authors please just clarify where this list came from? Item #2 seems to stand out to me: unlike #1 and #3, #2 wouldn't be expected to affect the care that's given to patients.
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	<p>The authors may want to consider any distinction between forms of corruption that is or is not medically-relevant in their manuscript – given the target journal, I'd suggest focusing on the former. If the authors disagree and believe item #2 is medical relevant, I'd suggest re-working this section to make its relevance to medicine clearer.</p> <ul style="list-style-type: none"> • The authors state that the Chinese government began implementing a wave of activities to combat medical corruption as part of its 2005 health care reforms. <ul style="list-style-type: none"> o The first example that they give of a “solution” is of laws and regulations published in 1993 and 1996. This contradicts the earlier statement that the government began to address this issue in 2005. o Also, how are governmental efforts to address medical corruption addressed in more recent reforms (e.g. 2009)? o Please make sure to address this issue elsewhere in the paper, e.g. line 199. • The authors begin line 131 by referring to their “literature review,” and describing findings on information that has been accumulated on how to “develop regulations and countermeasures that restrain medical corruption in various countries.” <ul style="list-style-type: none"> o Typically, you wouldn't refer to background research in this way – it may confuse readers by suggesting that this manuscript reports on that review, and also raising questions over the methods that were carried out as part of that review. The authors may wish to instead to refer to their interpretation of the literature, e.g. “Much information has been accumulated on how to develop regulations and countermeasures ...”. The authors should provide references to support this statement. <p>Methods</p> <ul style="list-style-type: none"> • Line 144, the Donabedian model does not only provide information about the “countermeasure programs” – please better describe the Donabedian model and how it can be useful for this sort of study. • Also, please be careful with the use of ambiguous terms & phrases, e.g. “countermeasure programs.” • It is not clear how the Donabedian framework lent itself to the three main discussion questions, or how these questions, in particular, were developed/chosen. Please provide a clearer explanation. • How were the 12 voluntary participants selected? What qualifies them as experts to comment on this issue? Might it be helpful to include experts in health policy from universities in other major Chinese cities, e.g. Beijing? • Line 175: “though the sample size was relatively small.” Can the authors please explain this statement? Do they think that the cases that were captured through review of this database are only a small portion of medical corruption cases? If so, why? The authors should discuss any bias in the reporting of cases through this database, perhaps as a limitation – e.g. small cases of corruption (these should be defined) might not be reported or acted upon. What are the implications of this? • The authors methods limit cases to those that deal with “procurement of medicines and devices. It's fine to include that inclusion criterion, but it should be described in the introduction – e.g. the authors should say that (line 135) “this study sought to assess whether China's reforms to curb medical corruption [in the procurement of medicines and devices] were effective.” • Line 185: please use author initials to tell readers who was a “health policy expert” and responsible for reviewing the verdicts. • Please describe whether institutional ethical approval was obtained for this research project, or if it wasn't necessary.
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	<p>Results</p> <ul style="list-style-type: none"> • Line 229: “Experts said that by far, this policy helped proper prescription of drugs and further reduce the space for medical corruption.” There is in fact evidence suggesting that this policy has helped rationalize drug prescribing. However, there is also a parallel line of evidence suggesting that these reforms may have led to a less reliable drug supply system in China – village clinics, for instance, may no longer provide essential medicines at zero mark-up due to the lack of profit (Liu 2013; Mao 2015). How corruption is defined is important here – is it “corrupt” to no longer provide a good/service because it offers little/no profit to the provider? The authors may want to consider this in their discussion of findings. • Line 235: “Since the provincial selection was set by leaders in the health bureau without use of the necessary scientific processes and criteria, many pharmaceutical firms may have interfered in the process, leading to corruption.” How so? <p>Discussion</p> <ul style="list-style-type: none"> • The authors should widen their discussion of study limitations – right now, only a few sentences are dedicated to discussing study limitations (~line 360). It is a useful and timely study, and the results have important implications for policy and clinical practice. However, do the authors think that their interview of 12 experts captured all potential causes or sources of medical corruption in China? Would a study with more participants, and participants from other areas (e.g. industry, government, providers), be even more insightful? Please see other comments for additional thoughts of limitations to potentially discuss. • Line 337: “Overall, the reason for improper use of drugs should also be attributed to physicians and patients.” Is this a fair statement, and one that is supported by the evidence? Physicians and providers may be profit-driven, and their behaviors may reflect this. However, should we attribute any similar level of concern over the development of policy, and regulatory oversight? E.g. the manuscript refers to issues with purchasing committees (line 255), exchanging quality for price (~line 268), failure to release the records of illegal commercial bribery (line 284). These are arguably important facilitators, or indeed examples, of medical corruption. Yet, they have very little to do with physicians themselves or providers. Other stakeholders in the health care system (regulators, policymakers) also have a role to play in helping to improve the conditions for ethical and efficient medical practice that is free of corruption. The authors may want to consider this during future revisions. • Line 353: “Under the “Guanxi” society where relationship plays an important role in China, the reporting system for medical corruption is not well executed.” Can you please explain the logic behind this statement? <p>Conclusions</p> <ul style="list-style-type: none"> • Line 367: “In analysing the current regulations...” Did the authors analyze the current regulations? Or did you instead analyze qualitative material on the subject by Chinese health policy experts? I believe the latter is a more accurate description.
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VERSION 1 – AUTHOR RESPONSE

To Reviewer 1:

Dear Professor,

We appreciate your positive and helpful review. Based on your suggestions, we have now revised the manuscript by analyzing underlying incentives for corruption in pharmaceutical procurement that are unique to the Chinese case. The changes are highlighted in yellow in the revised paper. Our point-by-point responses are given below. We hope that the revised manuscript meets the requirements of the journal.

Reviewer Name: Susan Rose-Ackerman, Henry R. Luc Professor of Law and Political Science

Institution and Country: Yale University, USA

Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below

Comment: The paper is a useful discussion of the incentives for corruption in Chinese health care and the difficulties of reform. Data on the topic is obviously difficult to assemble, but the authors have done an adequate job of combining interviews with a review of the case law. My main critique is that they do not adequately consider the underlying incentives for corruption in pharmaceutical procurement that are unique to the Chinese case. The authors cite my paper with Y. Tan on the topic, but the authors could have gone farther to confront our claims which they may have a good ability to assess and critique. We argue that even with a weak domestic insurance market, there is room for corrupt payoffs to be added into the price of drugs from MNCs because patients are willing to pay more for such drugs than for ones from domestic suppliers.

Perhaps the authors can document both the level of private insurance and the financial pressure on hospitals that fueled corruption. They critique corruption in the centralized system that was meant to limit hospital level corruption but apparently did not. I would like stronger evidence about the reasons for the failure.

All in all this is a useful paper in a difficult to research field that comports with the conclusions of my own earlier research although in neither case can we provide strong statistical evidence for our claims.

Answer: Thank you for your helpful comment. Your article provides good insight for our manuscript. In this article, we focused on assessing China's existing regulations for medical corruption and whether the corruption has been alleviated, mainly by qualitative interviews and also, supplemented by the analysis of quantitative data from "China Judgements Online" to support the evaluation. Based on your comment, we realized a shortcoming of our paper was the lack of in-depth discussion on the underlying incentives for corruption in pharmaceutical procurement that were unique to the Chinese case in this study. According to your suggestion, we have further improved the discussion section by analysing stronger evidence about the reasons for the failure of curbing medical corruption in current China. Potential reasons including the financial pressure on hospitals and insurance situation in China were discussed intensively. Please see lines 369 to 390 in the discussion section.

The root of difficulties to curb medical corruption may primarily lie in the financial pressure on public hospitals. The privatization of healthcare financing combined with price regulation put most public hospitals in China at serious financial risk. Under this condition, hospitals/physicians' remuneration is set at a low level in China. Meanwhile, the financial subsidies for the public health institutions were not sufficient. For instance, the EDL was established to curb medical corruption and health institutions are required to obey the "zero-profit drug" policy on essential drugs. Moreover, fiscal policy required local government to provide enough subsidies to the public health institutions. However, the fiscal subsidies were not sufficient or not provided by the local government in many of cities or areas in China. All in all, although many countermeasures were proposed and implemented, under the background of financial pressure, the consistent low compensation still may lead to hospitals/physicians taking bribes from pharmaceutical companies, since the illegal profit is much higher than the cost of penalty.

The insurance market in China is now composed of the social medical insurance provided by the government(90% coverage) and the private insurance(<10% coverage). However, many of the drugs, especially the imported drugs from multinational corporations, are not on the NRDL and are not covered by the social medical insurance and exacerbated by the weak private insurance in China. Therefore, there is room for corrupt payoffs to be added into the price of many of the drugs. Usually, patients are willing to pay more for foreign drugs than for ones from domestic suppliers.

Therefore, these issues must be tackled by China's health reform to improve the proper financial incentives for hospitals/physicians and perfect the health insurance system.

To reviewer 2:

Dear Professor,

We greatly appreciate your helpful and insightful comments and suggestions, which we have used to improve the manuscript. Based on your comments and suggestions, we have revised each section with great care. Changes are highlighted in yellow in the revised paper. Our point-by-point responses are given below. We hope that the revised manuscript meets the requirements of the journal.

Sincerely,

Reviewer Name: Sebastian Salas-Vega

Institution and Country: London School of Economics and Political Science, UK

Please state any competing interests or state 'None declared': None

Please leave your comments for the authors below

- Let me first thank the authors for their submission. The manuscript is both timely and important – it addresses an issue that follows on recent health system reforms in China, and underlies the efficient operation of the country's prescription drug market.

General

- The paper would benefit from language editing. Please consider professional editing services. I wouldn't ordinarily comment on this, but in this case I believe that it may significantly improve the quality and impact of the paper.(minor comment) I do not comment on any language-related error, but there are many.

Answer: Thanks for your suggestion. We have now edited the language and revised all possible errors.

Abstract

• The methods section is very unclear. The authors explain that they “examined the effect of the existing measures on opposing medical corruption based on the Donabedian model.” How and why were these selected? Are you referring to policy measures? The authors go on to explain that they “analysed quantitative data from “China Judgements Online” to support the evaluation.” In what way was the quantitative analysis used to support the evaluation? What is “China Judgments Online,” and how does it tie with the paper’s objective and the earlier qualitative analysis (interviews)? Methods should be better explained.(minor)

Answer: Based on your comment, we have revised the methods section to make it more clear. By using Donabedian model, we aimed to guide the evaluation of three kinds of countermeasures to oppose medical corruption in China. The design of the evaluation questions were based on this framework. According to the Donabedian model, information about the effects of countermeasure/policies can be drawn from three categories: structure, process, and outcomes. Questions designed for experts were related to the design of the regulations (structure), their implementation (process), and their effectiveness (outcomes). Indeed, our previous expression is not precise. To make it more clear, we have now changed this sentence into “Using semi- structured key informant interviews, we designed the evaluation questions and examined the effect of the existing different kinds of countermeasures to oppose medical corruption based on the Donabedian model”(line 38-40).

Regarding the “China Judgements Online”, we are sorry that we didn't explain it fully in detail in the abstract section because of the word limit as required by this journal. “China Judgements Online” is an online database of case verdicts from the whole China. The database was established in 2010 by the Supreme People's Court and contains case verdicts from every field, including medical corruption. To quantitatively examine whether the existing countermeasures on curbing medical corruption that mostly executed before 2013 were effective, we extracted and analyzed case verdicts related to medical corruption in China that occurred from January 1, 2013 to December 31, 2016 (Please see lines 181-192 in the methods section in the manuscript). By analyzing the characteristics and seriousness of the medical corruption verdicts in the whole China in recent years, especially the tendency of released verdicts from 2013 to 2016, we intended to support the qualitative analysis. However, we admit that since the sample was relatively small, it may not be representative of effect of the existing countermeasures on curbing medical corruption in China. Additionally, the quantitative result only reflects the combined effect of all the countermeasures and can't reveal the separate effect of each measure. Thereby, we also add the deficiency of the quantitative analysis in the limitation section. Please see lines 391 to 395.

To make the purpose of quantitative analysis more distinct, we now extend the sentence in the abstract section into “Using the quantitative data from the online database of the “China Judgements Online”, which lists the case verdicts related to medical corruption, we also showed the tendency, characteristics and seriousness of medical corruption in recent years.”(Line 40-42 in the abstract section).

• The results section is organized so as to focus on the “three main categories of countermeasures to oppose medical corruption in China.” I'd suggest adding 1 sentence at the beginning of the results section to briefly list the three “main categories” of countermeasures, before then describing each type of countermeasures using the framework described in the methods section. This will help provide more structure to the text.(minor)

Answer: According to your suggestion, we have changed the first sentence in this section into “Since 1990s, China has implemented three main categories of countermeasures to oppose medical corruption: fines and criminal penalties, health policy regulations and reporting scheme policy.” Please see line 43-45.

- What were the criteria that allowed you to identify just “three main categories of countermeasures to oppose medical corruption in China?” Was this based on a review of policies on countermeasures for medical corruption? This and other related issues should be clarified in the methods section.(minor)

Answer: Thank you for your suggestion. The three categories of countermeasures to curb the corruption are not based on the Donabedian model. Through literature review, we collected several forms of countermeasures. Further by consulting with the experts and asking "What do you think are the regulations for medical corruption in China?", we tried to preserve the completeness of the countermeasures for curbing medical corruption. Then, we classified the countermeasures into three categories, with the help from experts, based on the rigidity of implementation. Fines and criminal penalties were executed by the law sectors in which the punishments were very strict. Health policy regulations were issued by the national or local health departments and usually provided guidance. The reporting scheme for the medical corruption was not strict and its execution was loosely implemented. While we previously did not explain the criteria due to the word limit in the abstract, it is now explained in detail in the methods section in the manuscript. Please see lines 152-156. We do agree that the purpose of proper classification is to make the paper clearer. However, because we have analyzed each of them, we think that the classification of the countermeasures will not influence the results.

- Authors mention that “the level of fines and criminal penalties for medical corruption behaviors were insufficient.” How did the authors come to this conclusion? Unless there is clear, irrefutable evidence to support this statement, you should refrain from making value judgment—focus on the evidence. Similar concerns elsewhere: e.g. “were implemented well?” Perhaps just say, “were implemented.”

Answer: Thanks for your comment. We realized that our expression was relatively arbitrary and we should refrain from making value judgements. We have edited the paper on this issue. For instance, we now have made the expressions into “the level of fines and criminal penalties for medical corruption behaviors may not be sufficient(line 45-46); "Second, health policy regulations are also insufficient because although the National Reimbursement Drug List(NRDL) and Essential Drug List(EDL) were implemented, they were incomplete and created more opportunities for corruption."(line 46-48). We checked other similar expressions and have revised the paper.

- In the conclusions section, the authors argue that existing countermeasures are far from ideal. They also say that they “cannot fundamentally reduce the medical corruption.” How did you come to this conclusion? The link with previous paragraphs is weak.

Answer: Indeed, we made the same mistake of arbitrary expression in this section. To make the expression more reasonable, we now changed the sentence in the conclusions section into "Although existing countermeasures have exerted certain effects according to the Chinese experts, much improvement is needed". Please see lines 55 to 57 in the abstract section.

- Change “Strength and Limitations” to “Strengths and Limitations”

Answer: Thanks for your kind remind. It has been revised.

Introduction

- The authors state, “To compensate for the retrenchment of government health outlays, many public hospitals in China began to earn revenue illegally by making alliances with the pharmaceutical firms to procure pharmaceuticals and medical equipment.”
 - o First, procurement of pharmaceuticals and medical equipment is not in itself indicative of corruption or mal-intent. It might be considered corrupt if special arrangements are made that steer away from free market principles and with the intention of illicit self-gain. Please be more specific into how this is indicative of corruption.
 - o This statement is also quite provocative—please provide references to support.

Answer: Following your suggestion, we have made the statement clearer. Usually, under the background of privatization of healthcare financing, combined with price regulation, public hospitals in China are at serious financial risk and burden. Meanwhile, since it is competitive and costly for pharmaceutical companies, to compete with other companies, they would prefer establishing special arrangements for the hospitals to reach a win-win situation because, the penalty cost is much lower than the illegal profit. In the manuscript, we have explained this relationship more specifically to make it more understanding and neutral. Please see lines 85-88. Also, we put more references here to support it.

- The authors indicate that there are three major forms of medical corruption (line 84). Can they authors please just clarify where this list came from? Item #2 seems to stand out to me: unlike #1 and #3, #2 wouldn't be expected to affect the care that's given to patients. The authors may want to consider any distinction between forms of corruption that is or is not medically-relevant in their manuscript – given the target journal, I'd suggest focusing on the former. If the authors disagree and believe item #2 is medical relevant, I'd suggest re-working this section to make its relevance to medicine clearer.

Answer: Thank you for your comment. There may be a misunderstanding of our statement for this sentence. Actually, we agree with your comment and #2 is not the discussed form of medical corruption in this study. The whole manuscript we are discussing is about the #1 and #3 forms of medical corruption. We put it in the beginning in order to firstly display all the kinds of medical corruption for readers and then lead the reader's attention to the #1 and #3. It's our fault that this expression may misleading. Currently, we have now changed the expression. Please see line 90-96.

- The authors state that the Chinese government began implementing a wave of activities to combat medical corruption as part of its 2005 health care reforms.
 - o The first example that they give of a “solution” is of laws and regulations published in 1993 and 1996. This contradicts the earlier statement that the government began to address this issue in 2005.
 - o Also, how are governmental efforts to address medical corruption addressed in more recent reforms (e.g. 2009)?
 - o Please make sure to address this issue elsewhere in the paper, e.g. line 199.

Answer: We are sorry for our clumsy expression. It's our mistake that the expression of time is not proper. The government began implementing a wave of activities to combat medical corruption as early as 1990s. Since the 2000s, health regulation policies were implemented along with its health reform. Please see lines 119 to 123.

- The authors begin line 131 by referring to their “literature review,” and describing findings on information that has been accumulated on how to “develop regulations and countermeasures that restrain medical corruption in various countries.”

o Typically, you wouldn't refer to background research in this way – it may confuse readers by suggesting that this manuscript reports on that review, and also raising questions over the methods that were carried out as part of that review. The authors may wish to instead to refer to their interpretation of the literature, e.g. "Much information has been accumulated on how to develop regulations and countermeasures ...". The authors should provide references to support this statement.

Answer: Thanks for your kind suggestion. We agree with your idea and have changed the sentence into "Though much information has been accumulated on how to develop regulations and countermeasures that restrain medical corruption in various countries[1-2,4,8,11], there is little research systematically examines the effects of these regulations on the elimination or alleviation of medical corruption from pharmaceutical firms specifically". Also, we added references to better support this statement. Please see lines 137 to 140.

Methods

- Line 144, the Donabedian model does not only provide information about the "countermeasure programs" – please better describe the Donabedian model and how it can be useful for this sort of study.

Answer: Following your comment, we have explained how we categorized the countermeasures from line 149 to line 156. Donabedian model is used in this manuscript to formulate evaluation questions and examine the effects of existing countermeasures for curbing medical corruption.

- Also, please be careful with the use of ambiguous terms & phrases, e.g. "countermeasure programs."

Answer: We checked the ambiguous terms & phrases, "countermeasure programs" has been changed into "countermeasures".

- It is not clear how the Donabedian framework lent itself to the three main discussion questions, or how these questions, in particular, were developed/chosen. Please provide a clearer explanation.

Answer: Thank you for your comment. We have improved this section. The first question "What do you think are the regulations for medical corruption in China?" is designed to make sure the forms of countermeasures we extracted from the literature review are complete. The last question of "can you identify any countermeasures in other countries that can help stop the medical corruption in China" is also moved out from the evaluation questions, since we thought it is useful for comparison with other countries and suggestion provision, but not directly with the evaluation of China. The second question: "How would you describe each kind of regulation for curbing medical corruption, including its design, execution/implementation, and effectiveness in China?", should be split into three questions about the design, execution/implementation, and effectiveness that corresponded with the structure, process, and outcomes ideology of the Donabedian framework. Please see our revision from lines 157-170.

- How were the 12 voluntary participants selected? What qualifies them as experts to comment on this issue? Might it be helpful to include experts in health policy from universities in other major Chinese cities, e.g. Beijing?

Answer: In this study, we chose experts that attended a professional forum in Shanghai about preventing and curbing medical corruption. All 16 interviewees were experts in the field of health economics and health policy. However, only 12 of the experts agreed to participate. Eight experts were from universities in the city of Shanghai, and four experts were officers in drug procurement agencies in Shanghai and Beijing. We have to acknowledge that this kind of selection may lead to the selection bias, since the sample was not large. In the limitation section, we have added this. Please see line 391 to 392.

- Line 175: "though the sample size was relatively small." Can the authors please explain this statement? Do they think that the cases that were captured through review of this database are only a small portion of medical corruption cases? If so, why? The authors should discuss any bias in the reporting of cases through this database, perhaps as a limitation – e.g. small cases of corruption (these should be defined) might not be reported or acted upon. What are the implications of this?

Answer: We are sorry for our misunderstanding expression. The sample size here refers to the number of verdicts about medical corruption released by "China Judgements Online. We have added the shortcomings of the small sample size to the limitation section. Please see line 392-395.

- The authors methods limit cases to those that deal with "procurement of medicines and devices. It's fine to include that inclusion criterion, but it should be described in the introduction – e.g. the authors should say that (line 135) "this study sought to assess whether China's reforms to curb medical corruption [in the procurement of medicines and devices] were effective."

Answer: Following your suggestion, we have revised this sentence completely.

- Line 185: please use author initials to tell readers who was a "health policy expert" and responsible for reviewing the verdicts.

Answer: Based on your comment, we have added the author initials of two authors, please see line 201.

- Please describe whether institutional ethical approval was obtained for this research project, or if it wasn't necessary.

Answer: Thanks for your suggestion. It is not necessary to obtain the institutional ethical approval in our institution with this kind of study.

Results

- Line 229: "Experts said that by far, this policy helped proper prescription of drugs and further reduce the space for medical corruption." There is in fact evidence suggesting that this policy has helped rationalize drug prescribing. However, there is also a parallel line of evidence suggesting that these reforms may have led to a less reliable drug supply system in China – village clinics, for instance, may no longer provide essential medicines at zero mark-up due to the lack of profit (Liu 2013; Mao 2015). How corruption is defined is important here – is it "corrupt" to no longer provide a good/service because it offers little/no profit to the provider? The authors may want to consider this in their discussion of findings.

Answer: Thanks for your comment. In this study, we stated that "Experts said that by far, this policy helped proper prescription of drugs and further reduce the space for medical corruption to a certain extent." But later, we also proposed that the limited kinds of the essential medicines may lead to a less reliable drug supply system. You proposed that "there is also a parallel line of evidence suggesting that these reforms may have led to a less reliable drug supply system in China".

This is true, but this phenomenon is not induced by the zero mark-up directly. It is a result of the poorly implemented fiscal policy. Along with the essential medicines at zero mark-up, there is the policy that the local government should provide fiscal subsidies to the hospitals and village clinics. But in fact, the fiscal subsidies were not sufficient or even not provided by the local government in many parts of China (Li YH. Evaluation on the implementation of zero-profit essential medicines in health care institutions of one province in China. Master's thesis. Dalian Medical University (China). 2015). In this case, because of the poorly implemented supporting measures, the purpose of the zero mark-up policy to curb medical corruption cannot be achieved. Following your suggestion, we have added the proper interpretation of the root of medical corruption in the discussion section. Please see lines 373-381.

• Ling 235: "Since the provincial selection was set by leaders in the health bureau without use of the necessary scientific processes and criteria, many pharmaceutical firms may have interfered in the process, leading to corruption." How so?

Answer: We intended to express that since the supervision of the system is not strict, therefore it may be easy for the pharmaceutical firm to interfere in the provincial selection. For example, the selection of drugs was corrupt because pharmaceutical firms were able to bribe experts (Line 252-254).

Discussion

• The authors should widen their discussion of study limitations – right now, only a few sentences are dedicated to discussing study limitations (~line 360). It is a useful and timely study, and the results have important implications for policy and clinical practice. However, do the authors think that their interview of 12 experts captured all potential causes or sources of medical corruption in China? Would a study with more participants, and participants from other areas (e.g. industry, government, providers), be even more insightful? Please see other comments for additional thoughts of limitations to potentially discuss.

Answer: Thank you for your consideration. We have added the shortcomings of selection of interviewees in the limitations section. Please see lines 391-392.

• Line 337: "Overall, the reason for improper use of drugs should also be attributed to physicians and patients." Is this a fair statement, and one that is supported by the evidence? Physicians and providers may be profit-driven, and their behaviors may reflect this. However, should we attribute any similar level of concern over the development of policy, and regulatory oversight? E.g. the manuscript refers to issues with purchasing committees (line 255), exchanging quality for price (~line 268), failure to release the records of illegal commercial bribery (line 284). These are arguably important facilitators, or indeed examples, of medical corruption. Yet, they have very little to do with physicians themselves or providers. Other stakeholders in the health care system (regulators, policymakers) also have a role to play in helping to improve the conditions for ethical and efficient medical practice that is free of corruption. The authors may want to consider this during future revisions.

Answer: Thank you for your kind reminder. We realized that our expression is not logical and agree with your idea that problems should be attributed at the policy level, not at the patient-level. Also, the physicians and hospitals' illegal behaviors may also be induced by the improper or poorly implemented policies. To make the whole manuscript consistent and precise, we now deleted these part.

• Line 353: "Under the "Guanxi" society where relationship plays an important role in China, the reporting system for medical corruption is not well executed." Can you please explain the logic behind this statement?

Answer: "Guanxi" describes the basic dynamic in personalized networks of influence (which can be best described as the relationships individuals cultivate with other individuals) and is a central idea in Chinese society. We used "Guanxi" here to support that within the incomplete system in China, people would prefer break the policy or turn a blind eye to their unethical or illegal behaviors than if this may help someone. However, this term may be obscure to the western readers, thereby, we changed this sentence into "since its execution is not supervised, the reporting system for medical corruption is not properly executed"(line 365-366).

Conclusions

• Line 367: "In analysing the current regulations..." Did the authors analyze the current regulations? Or did you instead analyze qualitative material on the subject by Chinese health policy experts? I believe the latter is a more accurate description.

Answer: Following your proper suggestion, we have revised the sentence into "In analyzing the qualitative material on the subject by Chinese health policy experts and quantitative data from the online database"(line 398-400).

VERSION 2 – REVIEW

REVIEWER	Susan Rose-Ackerman Yale University, USA
REVIEW RETURNED	16-Oct-2017

GENERAL COMMENTS	This is an adequate paper on a difficult topic to research. The authors have responded to my earlier review, but, of course, the paper has limitations that are inherent in the nature of the topic and the limited data available. I recommend publication because I believe that the issues of corruption in Chinese healthcare are well captured by their interviews and case law analysis. These issues are important and worth presenting to health care policymakers in China and elsewhere. They cannot measure the extent of the problem, but they can show that there are strong incentives for corruption. The paper should be seen as a first step toward a more in-depth analysis of the topic.
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REVIEWER	Dr Sebastian Salas-Vega London School of Economics and Political Science, UK
REVIEW RETURNED	30-Nov-2017

GENERAL COMMENTS	This version is much improved over the initial submission. Thank you for addressing my comments. Two additional comments: 1) With respect to my first comment for the introduction, I suggested that your group add references to support the statement "... many public hospitals in China began to earn revenue illegally through alliances with the pharmaceutical firms to procure pharmaceuticals and medical equipment." This was not done in the revised manuscript. I would urge the authors to provide evidence to support their statement, as it's quite provocative. 2) The authors should improve the abstract. For example, they should more clearly connect the methods and results that are described. As it stands, the abstract isn't very clear on how the authors came across the four results that are described.
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VERSION 2 – AUTHOR RESPONSE

Reviewer: 1

Reviewer Name: Susan Rose-Ackerman

Institution and Country: Yale University, USA

Please state any competing interests or state 'None declared': none declared

Please leave your comments for the authors below

This is an adequate paper on a difficult topic to research. The authors have responded to my earlier review, but, of course, the paper has limitations that are inherent in the nature of the topic and the limited data available. I recommend publication because I believe that the issues of corruption in Chinese healthcare are well captured by their interviews and case law analysis. These issues are important and worth presenting to health care policymakers in China and elsewhere. They cannot measure the extent of the problem, but they can show that there are strong incentives for corruption. The paper should be seen as a first step toward a more in-depth analysis of the topic.

Response

We greatly appreciate your understanding about the difficulty concerning the data collection and the nature of the topic. In terms of collecting more objective and quantitative data later, we plan to conduct a more in-depth study on the topic. Thank you again for your comments!

Reviewer: 2

Reviewer Name: Dr. Sebastian Salas-Vega

Institution and Country: London School of Economics and Political Science, UK

Please state any competing interests or state 'None declared': None declared

Response

We appreciate your positive and helpful review. Based on your suggestions, we have now further revised the manuscript by adding related references and improving the Abstract. The changes are highlighted in yellow in the revised paper. Our point-by-point responses are given below. Thanks again for your comment and suggestions!

Reviewer's Comment #1

This version is much improved over the initial submission. Thank you for addressing my comments.

Two additional comments:

1) With respect to my first comment for the introduction, I suggested that your group add references to support the statement "... many public hospitals in China began to earn revenue illegally through alliances with the pharmaceutical firms to procure pharmaceuticals and medical equipment." This was not done in the revised manuscript. I would urge the authors to provide evidence to support their statement, as it's quite provocative.

Response

Thank you for reminding us of this recommendation. Related references have been added to support the statement and are listed below.

[3]Rose-Ackerman S, Tan YQ. Corruption in the procurement of pharmaceutical and medical equipment in China: The incentives facing multinationals, domestic firms and hospital official. UCLA Pac Basin Law J, 2014; 32(1):1-53.

[7]Zhang Y, Yu YS, Tang ZH, Chen XH, Zang GQ. Crack down on medical corruption: An urgent matter in China. Eur J Intern Med, 2014; 25(1):e2-e3.

[8]Editor. Doctors and pharma in China. Lancet, 2013;382:102.

Reviewer's Comment #2

The authors should improve the abstract. For example, they should more clearly connect the methods and results that are described. As it stands, the abstract isn't very clear on how the authors came across the four results that are described.

Response

Based on your comment, we have revised the Abstract section to make it more clear, especially the methods and results segments. Please see revised Abstract.