PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	An evaluation of community pharmacists' readiness to implement the Falsified Medicines Directive (Directive 2011/62/EC): An English cross-sectional survey with geospatial analysis.
AUTHORS	Barrett, Ravina

VERSION 1 – REVIEW

REVIEWER	Chuo Yew TING 1. Pharmaceutical Services Division, Sarawak State Health Department, Ministry of Health, Malaysia. 2. Department of Social and Preventive Medicine, Faculty of Medicine, University of Malaya.
REVIEW RETURNED	05-Sep-2019

GENERAL COMMENTS	STUDY TITLE: An evaluation of community pharmacists' perception of falsified medicines: An English cross-sectional survey (Manuscript ID: bmjopen-2019-033405) OVERALL This is an important study to evaluate the perception and readiness to implement the European Falsified Medicine Directive (FMD) among community pharmacists in England. The author surveyed nationally representative samples and found the majority of the respondents were not ready for the implementation of European FMD. FORMAT The way of presenting in-text reference citations and the Tables is not the same as those articles published in BMJ Open. Please refer to the articles in the Archive and revise the current in-text citations and the format of the Tables. TITLE As the study objective is to evaluate the perception and readiness to implement the European FMD rather than perception towards falsified medicines, please revise the title so that it reflects the study objectives. ABSTRACT Pg. 2, line 35: Please consider changing the sentence "English pharmacists are not ready to implement FMD…" to "The majority of English pharmacists are not ready to implement FMD…". INTRODUCTION

	The introduction is well written with clear descriptions on background and justification of the study. Pg. 4, line 38, 40: Please use full term for NHS and GP for its first appearance in the manuscript. Pg. 4, line 46: "…evaluate perceptions and the readiness to implement FMD by 9 February 2019 by community pharmacists in England.." Please delete the extra full stop at the end of the sentence. METHOD The study design is appropriate. The author provides clear description on sampling method that will enable the results to be generalized to study population. Please provide clear descriptions on the instrument used to measure the "perceptions and the readiness to implement FMD" as well as the "cognitive and behavioural mechanisms underlying it". Is the instrument adopted or adapted? How is it validated? Is the instrument pre-tested or pilot tested? What is the reliability of the instrument? How is the perception to implement FMD measured? How is the cognitive and behavioural mechanisms measured? Pg. 5, line 15-16 "Assuming confidence level of 95%, confidence interval of 10%, a sample size of 95 is calculated." Please provide the sample size calculation formula that was employed, and the minimum sample size required. Moreover, since the author mentioned hypothesis testing, please provide minimum sample size required to generate results for hypothesis testing with power 0.8. Pg. 5, line 18-20: "Analyses were undertaken using SPSS v 25 (13) to present proportions, descriptive statistics and hypothesis testing at 95% CI and 5% significance" Above descriptions of data analysis is too brief and general. Please provide clear descriptions on the data analysis that were employed to generate results on "perceptions and readiness to implement FMD", and "cognitive and behavioural mechanisms underlying it". Pg. 5, line 19: Author mentioned about hypothesis testing, but no hypothesis is mentioned in Introduction. RESULTS It is pretty confusing when I read the results. This is because the primary study objectives is to evaluate the perception and readiness to implementation of European FMD, yet, part of the results presented are not aligned with the study objectives. For instances, the author mentioned about the "percentage of medicines are believed to be falsified in the UK", "most likely sources of falsified medicine", "the most commonly falsified medicines in the UK", "what would raise suspicious of an SF", "which national agency would they contact", "community pharmacists' opinion regarding falsified medicines, presented in table 2". These results are more related to the perception and practices towards falsified medicines, rather than perception towards implementation of European FMD.

	Nevertheless, there were no results on the secondary study objective ("cognitive and behavioural mechanisms underlying it") presented. The comments given by the respondents were mostly related to falsified medicines but not implementation of European FMD. Hence, please revise the study title, study objectives, method (particularly instrument), results, discussions and conclusion to make sure they align well. Table 1, 2, 3: The title of the tables should be at the top of the tables. Please consider referring to the tables in this article (https://bmjopen.bmj.com/content/9/8/e029739) to revise the format of the table's presentation. For Table 1, the "n=102" should be mentioned in the title. Please provide 95% CI in addition to the p value. Pg. 6, line 24-28: "The deadline for full implementation is 9 February 2019. This requires every prescription only medicine and some pharmacy medicines to be scanned at point of dispensing (to check against a central database that they are not falsified, recalled or expired) at community pharmacy level across the EU, before supplying to the patients. We enquired how ready respondents were to implement this." Please consider moving these sentences to the Method section. It is redundant in Results section. Pg. 6, line 29-30: "40 (39.2%) said not at all, 29 (28.4%) said not really, 14 (13.7%) were undecided, 12 (11.8%) said somewhat and 4 (3.9%) said very much, 3 (2.9%) missing, P<0.000 One sample chi square test." The "One sample chi square test" should already been mentioned in the Method (Refer to the comments under METHOD). It is redundant in Results section. This applies to all paragraphs in Results. DISCUSSION The discussion points provided are valuable. However, as mentioned previously, some of the discussion points are not relevant to the study objectives. This can be corrected by aligning the study title, objectives, method, results and discussion. Pg. 12, line 44: "Low respondent numbers and some missing information may make our findings unreliable". Please be more specific on the study limitation. The word "unreliable" is too general and such statement basically means all your findings are unreliable, which is not correct. Please inform exactly how would the low response rate influence your findings and what are the measures that you had taken to minimize the bias (eg. you had anticipated low response rate and collected samples that fulfil minimum sample size). Even though you got low response rate, but if the sample size is sufficient to draw findings with sufficient power (>0.8), then the sentence "Low respondent numbers …make our findings unreliable" is not totally true. REFERENCE

	1. The journal name should be italic 2. Please provide doi for the references (if available) and also

REVIEWER	Alessandra Ferrario Harvard Medical School and Harvard Pilgrim Health Care Institute
REVIEW RETURNED	20-Sep-2019

GENERAL COMMENTS	Thank you for the opportunity to review this study. Substandard and falsified medicines and the implementation of the FMD directive are important and topical issues. I have some concerns about the methods, the timeliness of the findings and how these may affect the results and the conclusions that can be drawn. I summarized my main comments below. Thank you. Introduction Please provide some background on the arrangements for the implementation of the FMD in the UK. The study focuses on one pharmacy chain. The pharmacists' responsibilities are to 1) check that the antitampering device placed on the package by the manufacturer is intact before dispensing and 2) scan the 2D barcode and communicating with the National Medicine Verification System to change the status of the pack from 'active' to 'inactive-dispensed'. The first requires visual inspection while the second requires a scanning tool (either through a mobile phone app or a separate scanner). Given this survey focuses on chain pharmacies, I would have thought it is the responsibility of the chain pharmacy to provide the scanning tools to the pharmacists working in its premises? Since you are focusing on a chain pharmacy, can you please explain what the arrangements are there in terms of procuring the scanning devices? Methods What was the reason to focus only on one of the two major pharmacy chains and not both? I struggle with the timeframe of the study as it starts from before the directive was implemented to after the directive has come into force. So the answers of some respondents report on status during the preparatory phase while the answers of other respondents refer to the status after the directive came into force. Yet all the data are aggregated for the analysis. I think this is confusing. Results Table 2: It is very had to read in portrait format as number spread over multiple lines. You may also want to consider using a different way to visualize the data. For example, you could use horizontal 100% bars to represent the percentages from 'strongly disagree' to 'strongly agree'. Table 3: Requires turning the page to read. Some cells with description are not full expanded and parts of text are hidden. p. 9 row 28 "Five (4.9%) had identified SF, 86 (84.3%) had never, 11 (10.8%) missing, P<0.000" p.12 row 38 "Analysing the data by geographical distribution shows more SF were identified in deprived areas, but otherwise uninteresting findings (table 3)." There were only 5 pharmacists reporting having identified SF, the sample size is too small to do make any inferences about the geographical distribution of SF reports. Discussion and Conclusions There are other reports which confirm that a number of pharmacies were not ready to meet the 9 February 2019 deadline for

	implementation of the FMD directive. https://www.chemistanddruggist.co.uk/news/contractors-unprepared-fmd-no-deal-brexit-doubt?cid=AFF-CDNEW-RELATEDARTICLE-POSITION1; https://www.chemistanddruggist.co.uk/news/boots-lloyds-pharmacy-miss-fmd-deadline However, they also point out that work was ongoing to become compliant. Now it is September 2019, the situation may be completely different than it was back in late 2018 or early 2019. I very much welcome the aim of this study to assess preparedness but I wonder how much these findings apply to today's situation in such a rapidly changing environment. A lot of progress is likely to have happened since now in terms of procuring the scanners and populating the National Medicine Verification System.

REVIEWER	Damian Świeczkowski BA, MPharm First Department of Cardiology, Medical University of Gdansk, Poland
REVIEW RETURNED	24-Sep-2019

GENERAL COMMENTS	More information about how the questionnaire was developed (at least face and content validity). More information about how comments were analyzed (qualitative approach).

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1	
Reviewer Name: Chuo Yew TING	
Institution and Country:	
1. Pharmaceutical Services Division, Sarawak State Health Department, Ministry of Health, Malaysia.	
2. Department of Social and Preventive Medicine, Faculty of Medicine, University of Malaya.	
Please state any competing interests or state 'None declared': None declared.	
Please leave your comments for the authors below	
STUDY TITLE:	
An evaluation of community pharmacists' perception of falsified medicines: An English cross-sectional survey (Manuscript ID: bmjopen-2019-033405)	
OVERALL	
This is an important study to evaluate the perception and readiness to implement the European Falsified Medicine Directive (FMD) among community pharmacists in England. The author surveyed	Thank you for your kind review.

nationally representative samples and found the majority of the respondents were not ready for the implementation of European FMD.	
FORMAT	
The way of presenting in-text reference citations and the Tables is not the same as those articles published in BMJ Open. Please refer to the articles in the Archive and revise the current in-text citations and the format of the Tables.	These have now been amended and updated to the journals specification.
TITLE	
As the study objective is to evaluate the perception and readiness to implement the European FMD rather than perception towards falsified medicines, please revise the title so that it reflects the study objectives.	Title now amended to: "An evaluation of community pharmacists' readiness to implement the Falsified Medicines Directive (Directive 2011/62/EC): An English cross-sectional survey with geospatial analysis."
ABSTRACT	
Pg. 2, line 35: Please consider changing the sentence "English pharmacists are not ready to implement FMD…" to "The majority of English pharmacists are not ready to implement FMD…".	Thank you, done.
INTRODUCTION	
The introduction is well written with clear descriptions on background and justification of the study. Pg. 4, line 38, 40: Please use full term for NHS and GP for its first appearance in the manuscript.	Thank you, now corrected.
Pg. 4, line 46:"…evaluate perceptions and the readiness to implement FMD by 9 February 2019 by community pharmacists in England.." Please delete the extra full stop at the end of the sentence.	Thank you, done.
METHOD	
The study design is appropriate. The author provides clear description on sampling method that will enable the results to be generalized to study population.	Thank you for your kind review.
Please provide clear descriptions on the instrument used to measure the "perceptions and the readiness to implement FMD" as well as the "cognitive and behavioural	We have taken on board your criticisms about the objectives and more clearly delineated them throughout the study (including in results and discussion). We have removed the wording "perceptions and the readiness to implement FMD" and "cognitive and behavioural mechanisms underlying it". The full instrument has been included as an Appendix. New wording introduced in the

mechanisms underlying it". Is the instrument adopted or adapted? How is it validated? Is the instrument pre-tested or pilot tested? What is the reliability of the instrument?	method to addresses questionnaire testing and validation. The whole instrument was specifically created for this study, a sub-scale (statements 16 - 26) was previously validated. The sub-scale (10-items) was validated (72.2% Cronbach alpha, estimate of the reliability) in the paper: Barrett R, Al-Mousawi HA. Development and initial validation of a postal survey evaluation of community pharmacists' opinion regarding falsified (counterfeit) medicines in Hampshire (UK). J Pharm Pharmacogn Res 2018;6:242–249 PubMed .
How is the perception to implement FMD measured? How is the cognitive and behavioural mechanisms measured?	We have taken on board your criticisms about the objectives and more clearly delineated them throughout the study (including in results and discussion). We have removed the wording "perceptions and the readiness to implement FMD" and "cognitive and behavioural mechanisms underlying it".
Pg. 5, line 15-16 "Assuming confidence level of 95%, confidence interval of 10%, a sample size of 95 is calculated." Please provide the sample size calculation formula that was employed, and the minimum sample size required.	Sample size calculation was conducted using: https://www.abs.gov.au/websitedbs/D3310114.nsf/home/Sample+Size+Calculator. Using the assumptions (Population Size=11619, Confidence Interval=10.067%, Standard Error=5.136%, Relative Standard Error=10.27%), a desired Sample Size=95 participants who should complete and return the survey. To achieve this, we invited 501 pharmacies because previous experience has achieved a response rate ranging 13% to 25% in similar studies with lower response rates during Christmas. Therefore, we sent the first wave of mail in early October and a follow up in Jan (after Christmas) to achieve maximal responses.
Moreover, since the author mentioned hypothesis testing, please provide minimum sample size required to generate	We use hypothesis testing on the sample data we have captured. We have removed all chi-square analysis (except table 6), because we believe that they add little value to the hypothesis testing. For the binomial tests, we have provided 95% Confidence Interval. We could not do power calculations before the study, because we did not know the incidence of prepared pharmacies vs. unprepared pharmacies (and this is true for many other variables we found). We also can not do post hoc power analysis because we do not have a bench mark to compare against for the UK population. In the future we could do a follow-on study and then use the prevalence rates we have captured in this study to compare with.
Pg. 5, line 18-20: "Analyses were undertaken using SPSS v 25 (13) to present proportions, descriptive statistics and hypothesis testing at 95% CI and 5% significance" Above descriptions of data analysis is too brief and general. Please provide clear descriptions on the data analysis that were employed to generate results on "perceptions and readiness to implement FMD", and "cognitive and behavioural mechanisms underlying it"	We have taken on board your criticisms about the objectives and more clearly delineated them throughout the study (including in results and discussion). We have removed the wording "perceptions and the readiness to implement FMD" and "cognitive and behavioural mechanisms underlying it".
Pg. 5, line 19: Author mentioned about hypothesis testing, but no hypothesis is mentioned in Introduction.	Apologies, corrected.
RESULTS	

It is pretty confusing when I read the results. This is because the primary study objectives is to evaluate the perception and readiness to implementation of European FMD, yet, part of the results presented are not aligned with the study objectives. For instances, the author mentioned about the “percentage of medicines are believed to be falsified in the UK”, “most likely sources of falsified medicine”, “the most commonly falsified medicines in the UK”, “what would raise suspicious of an SF”, “which national agency would they contact”, “community pharmacists’ opinion regarding falsified medicines, presented in table 2”. These results are more related to the perception and practices towards falsified medicines, rather than perception towards implementation of European FMD. Nevertheless, there were no results on the secondary study objective (“cognitive and behavioural mechanisms underlying it”) presented. The comments given by the respondents were mostly related to falsified medicines but not implementation of European FMD. Hence, please revise the study title, study objectives, method (particularly instrument), results, discussions and conclusion to make sure they align well.	We have taken on board your criticisms about the objectives and more clearly delineated them throughout the study (including in results and discussion). We have removed the wording "perceptions and the readiness to implement FMD" and "cognitive and behavioural mechanisms underlying it".
Table 1, 2, 3: The title of the tables should be at the top of the tables. Please consider referring to the tables in this article (https://bmjopen.bmj.com/content/9/8/e029739) to revise the format of the table’s presentation.	Apologies, corrected.

For Table 1, the “n=102” should be mentioned in the title. Please provide 95% CI in addition to the p value.	Apologies, table is now renamed as: "Table 1 Characteristics of survey respondents (n=102)." It is unconventional to have confidence intervals around the demographics. This is also a description of our sample, we are not making any inferences. As a result, no CI are provided in table 1. We have removed all chi-square analysis now, because we believe that they add little value to the hypothesis testing. As a result, we have removed the p-values from table 1.
Pg. 6, line 24-28: “The deadline for full implementation is 9 February 2019. This requires every prescription only medicine and some pharmacy medicines to be scanned at point of dispensing (to check against a central database that they are not falsified, recalled or expired) at community pharmacy level across the EU, before supplying to the patients. We enquired how ready respondents were to implement this.” Please consider moving these sentences to the Method section. It is redundant in Results section.	Apologies, moved to introduction (Third paragraph).
Pg. 6, line 29-30: “40 (39.2%) said not at all, 29 (28.4%) said not really, 14 (13.7%) were undecided, 12 (11.8%) said somewhat and 4 (3.9%) said very much, 3 (2.9%) missing, P<0.000 One sample chi square test.” The “One sample chi square test” should already been mentioned in the Method (Refer to the comments under METHOD). It is redundant in Results section. This applies to all paragraphs in Results.	We mention hypothesis testing in the method. In the results, we are specifying the exact method we employed and the associated p-value, which is normal practice (see: Yong Zhang, Shanshan Wang, Pei Chen, Xiaoshu Zhu, Zongheng Li Tai Chi for stroke rehabilitation: protocol for a systematic review BMJ Open Jun 2016, 6 (6) e010866; DOI: 10.1136/bmjopen-2015-010866 and Zhi-Guan Huang, Yun-Hui Feng, Yu-He Li, Chang-Sheng Lv Systematic review and meta-analysis: Tai Chi for preventing falls in older adults BMJ Open Feb 2017, 7 (2) e013661; DOI: 10.1136/bmjopen-2016-013661). No changes have been made.
DISCUSSION	
The discussion points provided are valuable. However, as mentioned previously, some of the discussion points are not relevant to the study objectives. This can be corrected by aligning the study title, objectives, method, results and discussion.	Apologies, corrected.

Pg. 12, line 44: “Low respondent numbers and some missing information may make our findings unreliable”. Please be more specific on the study limitation. The word “unreliable” is too general and such statement basically means all your findings are unreliable, which is not correct. Please inform exactly how would the low response rate influence your findings and what are the measures that you had taken to minimize the bias (eg. you had anticipated low response rate and collected samples that fulfil minimum sample size). Even though you got low response rate, but if the sample size is sufficient to draw findings with sufficient power (>0.8), then the sentence “Low respondent numbers …make our findings unreliable” is not totally true.	Thank you for your kind guidance. We have amended the 'strengths and limitations' section.
REFERENCE	
1. The journal name should be italic	Apologies, done. Now all references are in line with journal recommendations (https://authors.bmj.com/writing-and-formatting/formatting-your-paper/)
2. Please provide doi for the references (if available) and also	Many references pertain to government and supra-government documents and policy statements - these have been referenced appropriately. DOI's do not have to be provided as per the journals format (see - https://authors.bmj.com/writing-and-formatting/formatting-your-paper/). These have not been provided.
Reviewer: 2	
Reviewer Name: Alessandra Ferrario	
Institution and Country: Harvard Medical School and Harvard Pilgrim Health Care Institute	
Please state any competing interests or state ‘None declared’: None declared	
Thank you for the opportunity to review this study.	Thank you for your kind review.
Substandard and falsified medicines and the implementation of the FMD directive are important and topical issues.	
I have some concerns about the methods, the timeliness of the findings and how these may affect the results and the conclusions that can be drawn. I summarized my main comments below. Thank you.	

Please provide some background on the arrangements for the implementation of the FMD in the UK.	Now done.
The study focuses on one pharmacy chain. The pharmacists' responsibilities are to 1) check that the antitampering device placed on the package by the manufacturer is intact before dispensing and 2) scan the 2D barcode and communicating with the National Medicine Verification System to change the status of the pack from 'active' to 'inactive-dispensed'. The first requires visual inspection while the second requires a scanning tool (either through a mobile phone app or a separate scanner).	Thank you for your kind guidance-We have used it to emphasize the importance of the visual inspection, which is an integral aspect of the professional check. Inserted in our 'Introduction': *"This requires every prescription only medicine and some pharmacy medicines to be scanned at point of dispensing (to check against a central database that they are not falsified, recalled or expired) at community pharmacy level across the EU, before supplying to the patients. The pharmacists' responsibilities are to 1) check that the anti-tampering device placed on the package by the manufacturer is intact before dispensing and 2) scan the 2D barcode and communicating with the National Medicine Verification System to change the status of the pack from 'active' to 'inactive-dispensed'. The first requires visual inspection while the second requires a scanning tool."*
Given this survey focuses on chain pharmacies, I would have thought it is the responsibility of the chain pharmacy to provide the scanning tools to the pharmacists working in its premises?	Yes, it is the responsibility of the chain. However, this is a regulatory change that needs to be supported and facilitated by the national competent agency (i.e. the MHRA) as it bares the ultimate responsibility to implement this directive on behalf of the government. The MHRA is obliged to explain to the government why it has not met these deadlines. Equally, it is the governments' ability to follow EU directives, especially if it makes public statements to this effect: *"The United Kingdom is committed to meeting the 9 Feb 2019 deadline for the launch of EU FMD safety features Delegated Regulation, and we expect all stakeholders in the UK supply chain to be aiming to comply with these new requirements, indeed we know much of the UK supply chain is already prepared"* (source- https://www.gov.uk/guidance/implementing-the-falsified-medicines-directive-safety-features). This message is reiterated in several places including the latest newsletter from Jan 19: (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/789955/Safety_Features_Newsletter_-_13_Jan_2019.pdf).
Since you are focusing on a chain pharmacy, can you please explain what the arrangements are there in terms of procuring the scanning devices?	Unfortunately, this information is unavailable to me in the public domain. A freedom of information request is likely to be rejected on grounds of commercial sensitivity.
Methods	

What was the reason to focus only on one of the two major pharmacy chains and not both?	This was a random process, which is now explained in our method: *"We selected them randomly between contractor code (FAQ87 to FYR36), which resulted in recruiting a single large national pharmacy chain."* This single large national pharmacy chain has a large impact: • They have a sufficient geographical presence to serve areas of deprivation as well as affluence, • Are nationally representative and • Serve a very large percentage of the public. • Their offering has a major impact on patients and users of their services, many of whom are NHS patients (who are publicly funded via the healthcare systems). Research team: • Research budgetary constrained also meant that we would make efficient use of resources by inviting and following up non-responders from one chain, rather than inviting a larger sample from two chains, but not following up non-respondents. • This is supported by our previous experience and other publications: Cook JV, Dickinson HO, Eccles MP. Response rates in postal surveys of healthcare professionals between 1996 and 2005: an observational study. BMC Health Served Res 2009;9:160. PubMed doi:10.1186/1472-6963-9-160
I struggle with the timeframe of the study as it starts from before the directive was implemented to after the directive has come into force. So the answers of some respondents report on status during the preparatory phase while the answers of other respondents refer to the status after the directive came into force. Yet all the data are aggregated for the analysis. I think this is confusing.	Apologies, this has now been clarified. We collected all data before the deadline. We mailed the survey in October 2018 with a single follow-up of non-responders on the 11th January 2019. All our data was received before the 9th Feb, thought we waited till the end of April to see if anymore responses would be received. This typographical error is now corrected.
Table 2: It is very had to read in portrait format as number spread over multiple lines. You may also want to consider using a different way to visualize the data. For example, you could use horizontal 100% bars to represent the percentages from 'strongly disagree' to 'strongly agree'.	Table 2' is now 'Table 6 Confidence regarding handling falsified medicines, percentages have been rounded to whole numbers'. We have taken on board on your advice and created figure 1 showing Horizontal bars. This has allowed us to remove six columns from the table, making it easier to read.
Table 3: Requires turning the page to read. Some cells with description are not full expanded and parts of text are hidden.	Table 3 is now 'Table 10 Respondent's demographics vs IMD decile (1 poorest, 10 richest) distribution'. We have pivoted the table and re-arranged some data, so that it is in portrait view and much easier to read. We have increased the font size for visual ease and percentages have been rounded to whole numbers.

p. 9 row 28 “Five (4.9%) had identified SF, 86 (84.3%) had never, 11 (10.8%) missing, P<0.000” p.12 row 38 “Analysing the data by geographical distribution shows more SF were identified in deprived areas, but otherwise uninteresting findings (table 3).” There were only 5 pharmacists reporting having identified SF, the sample size is too small to do make any inferences about the geographical distribution of SF reports.	Four were from deprived postcodes (decile 1-3), whereas one was from an affluent area (decile 7). We agreed, five is a very small number. However, we do not know the frequency at which they detected SFs. While five is small, it is 1% of the invited sample and 4.9% of all respondents. Upscaling these numbers to a national level, would translate to 570 detections of SF's, without accounting for the cost of mitigating the damage to patients that may come from these SF medicines. (While making the following assumptions: -Assuming that the pharmacist only identify a single SF medicine, -11,619 pharmacies nationally, -5% identified SF) We also do not know if there is likely to be a cluster effect (isolated to a specific area) or a nationwide effect of these detections. Anyhow, these are 570 medicines that did not cause public-harm, which as researchers and health care practitioners, we arell interested in achieving. Above points are now clarified in the ‘Discussion, sec d’.
Discussion and Conclusions	
There are other reports which confirm that a number of pharmacies were not ready to meet the 9 February 2019 deadline for implementation of the FMD directive. https://www.chemistanddruggist.co.uk/news/contractorsunprepared- fmd-no-deal-brexit-doubt?cid=AFF-CDNEW-RELATEDARTICLE-POSITION1; https://www.chemistanddruggist.co.uk/news/boots-lloyds-pharmacy-miss-fmd-deadline However, they also point out that work was ongoing to become compliant. Now it is September 2019, the situation may be completely different than it was back in late 2018 or early 2019. I very much welcome the aim of this study to assess preparedness but I wonder how much these findings apply to today’s situation in such a rapidly changing environment. A lot of progress is likely to have happened since now in terms of procuring the scanners and populating the National Medicine Verification System.	You raise some valid points. FMD implementation is still not a universal offering in England, Wales, Scotland and Northern Ireland. In your guidance, you assume that the FMD will be implemented in the UK. I hope this is true. The Association of the British Pharmaceutical Industry says (A body that represents industry in the UK: https://www.abpi.org.uk/what-we-do/working-with-government-and-parliament/falsified-medicines-directive-fmd/faqs-on-fmd-and-dr-for-pharmaceutical-manufacturers/how-will-brexit-affect-the-fmd-and-its-processes/): *"When the UK exits the EU, the Withdrawal Bill will convert existing EU law into UK law and preserve the laws we have made in the UK to implement our EU obligations. This means that the duties of the regulations under the FMD would continue to apply, unless specifically revoked. Furthermore, on 19th March 2018, David Davis confirmed that the UK and EU have agreed a fixed implementation period of 21 months, lasting until December 2020. During this time, access to each other’s markets will continue on current terms, including all aspects of FMD, providing certainty for businesses and citizens across the EU and UK, and time to prepare for the future. However, in preparation for a no-deal Brexit the Government has released a Statutory Instruments (SI) The Human Medicines (Amendment etc.) (EU Exit) Regulations 2019 draft legislation outlining the changes to be made to regulations around the use of medicines in the UK, in the event of a No-Deal EU Exit. Its related Explanatory Memorandum (Article 7.14) makes clear that the requirements placed on all actors in the UK supply chain from 9 February 2019 by virtue of the Human Medicines (Amendment) Regulations 2019/62, regarding the safety features aspects of the Falsified Medicines Directive, will be removed by this instrument, because UK stakeholders would no longer be able to comply with the requirement to verify and authenticate all relevant medicines. For example, the unique identifier in a 2D data*

	matrix code for products coming from the EU will have beedecommissioned (made inactive) on export from the EU and before entry to the UK as a third country. Furthermore, this instrument ensures that there will be no obligations on the UK supply chain to affix the safety features or to scan packs of medicines. Packs already affixed with FMD safety features will continue to be accepted in the UK, provided that they are in line with other UK packaging requirements. In the interests of public safety, the Government will evaluate the options for a future UK falsified medicines framework, taking into account the investment already made by stakeholders."
Thank you.	
Reviewer: 3	
Reviewer Name: Damian Świeczkowski BA, MPharm	
First Department of Cardiology,	
Medical University of Gdansk, Poland	Thank you for your kind review.
More information about how the questionnaire was developed (at least face and content validity).	We piloted the questionnaire via six steps. Questionnaire validation (pretesting) was achieved by researchers critically appraising the scale in a research-team focus-group. This comprised two external practicing community pharmacists, other academics with recent community and hospital practice experience and student members. Necessary changes and improvements were made. This allowed for detection and deletion of ambiguous words, misinterpretation of questions, poor questions, and sensitive questions. Amendments and improvements were made to the format, structure, and content. To improve internal validity and reliability, the survey instrument was piloted with another external community pharmacists, and cognitive testing (read aloud) was conducted on the final instrument. The feedback confirmed that the questions were interpreted properly. We further refined the questionnaire with a research-team focus-group with help from the research design service associated with the National Institute for Health Research. It took less than 10 minutes to complete the final survey. Manuscript now updated on the 'Methods'>questionnaire sub-heading.
More information about how comments were analyzed (qualitative approach).	We used the Braun & Clarke's method of thematic analysis. We have now referenced them: • Book: Braun V, Clarke V. Successful qualitative research: a practical guide for beginners. Los Angeles:SAGE 2013. • Article: Braun V, Clarke V. What can "thematic analysis" offer health and wellbeing researchers? Int J Qual Stud Health Well-Being

2014;9:26152. PubMed doi:10.3402/qhw.v9.26152

VERSION 2 – REVIEW

REVIEWER	Chuo Yew Ting Ministry of Health, Sarawak State Health Department, Pharmacy Practice and Development Division, Malaysia.
REVIEW RETURNED	28-Oct-2019

GENERAL COMMENTS	STUDY TITLE: An evaluation of community pharmacists' readiness to implement the Falsified Medicines Directive (Directive 2011/62/EC): An English cross-sectional survey with geospatial analysis (Manuscript ID: bmjopen-2019-033405.R1) OVERALL There is a significant improvement in the flow of the manuscript as the study objectives, method, results, and discussions are well aligned. However, it is not common to see a single study with one primary objective and eight secondary objectives. Readers are expecting the author to examine or at least inform the relationship between the results of secondary objectives with the primary objective. Hence, in the next revision, the author is expected to elaborate on how the findings of the secondary objectives would affect the community pharmacists' readiness to implement the FMD. Without such discussion, readers could not understand why the author put all the secondary objectives in a single study which has no relationship with the primary objective. FORMAT Improved and satisfactory. TITLE Improved and satisfactory. ABSTRACT "Conclusion: ....We further validated a confidence scale…" Validation of a scale requires rigorous and systematic procedures, not just pre-testing of the scale. In specific, there are no reliability testing of the scale (eg. Cronbach's alpha, test-retest reliability) and the validity testing of the scale (construct validity, criterion validity/discriminant validity/convergent validity). Hence, please consider omitting this statement from the abstract. "Results:…Prevalence of falsified medicines (SFs) was estimated at 1 to 5%,…" In the abstract, the SFs refer to falsified medicines. However, in the manuscript, SF refers to substandard and falsified. Please rectify to make sure the use of the abbreviation is consistent throughout the

	manuscript. INTRODUCTION Satisfactory. METHOD "Questionnaire validation (pretesting) was achieved by researchers critically appraising the scale in a research-team focus-group." Some scholars may argue the suitability of the term "validation" used in the study. This is because as mentioned previously, there was no proper validation of the scale carried out by the author. Hence, to be safe, please consider changing to "Questionnaire was pre-tested by researchers critically appraising…." RESULTS Improved and satisfactory. DISCUSSION The discussion points provided are valuable. However, as mentioned previously, the majority of the discussions are not related to the primary objective of the study. Hence, the author needs to bridge the secondary objectives with the primary objective in the next revision. Failure to justify the relationship between the secondary objectives with the primary objective would cause some of the secondary objectives which are not related to the primary objective to be omitted. "h) Examine geospatial location…..Analysing the data by geographical distribution shows more SFs were identified in deprived areas (table 10)." There is basically no discussion for the findings on secondary objective h). Please elaborate on how would such finding affect the readiness of community pharmacists to implement the FMD. This applies to the whole discussion section. REFERENCE Improved and satisfactory.

VERSION 2 – AUTHOR RESPONSE

Reviewer: 1	
Reviewer Name: Chuo Yew Ting	
Institution and Country: Ministry of Health, Sarawak State Health Department, Pharmacy Practice and Development Division, Malaysia.	
Please state any competing interests or state 'None declared': None declared	
Please leave your comments for the authors below	
STUDY TITLE:	
An evaluation of community pharmacists' readiness to implement the	
Falsified Medicines Directive (Directive 2011/62/EC): An English cross-sectional survey with geospatial analysis (Manuscript ID: bmjopen-2019-033405.R1)	

OVERALL	
There is a significant improvement in the flow of the manuscript as the study objectives, method, results, and discussions are well aligned. However, it is not common to see a single study with one primary objective and eight secondary objectives. Readers are expecting the author to examine or at least inform the relationship between the results of secondary objectives with the primary objective. Hence, in the next revision, the author is expected to elaborate on how the findings of the secondary objectives would affect the community pharmacists' readiness to implement the FMD. Without such discussion, readers could not understand why the author put all the secondary objectives in a single study which has no relationship with the primary objective.	Thank you.
FORMAT	
Improved and satisfactory.	Thank you.
TITLE	
Improved and satisfactory.	Thank you.
ABSTRACT	
"Conclusion: ....We further validated a confidence scale…"	See next.
Validation of a scale requires rigorous and systematic procedures, not just pre-testing of the scale. In specific, there are no reliability testing of the scale (eg. Cronbach's alpha, test-retest reliability) and the validity testing of the scale (construct validity, criterion validity/discriminant validity/convergent validity). Hence, please consider omitting this statement from the abstract.	We did validate this scale. Abstract wording remains unchanged. The following wording is now inserted into the 'Results' and 'Discussion' section to clarify. Results section: Validity and reliability are two fundamental elements in the evaluation of a measurement instrument. Validity is concerned with the extent to which an instrument measures what it is intended to measure. Reliability is concerned with the ability of an instrument to measure consistently. It should be noted that the reliability of an instrument is closely associated with its validity. An instrument cannot be valid unless it is reliable.[21] Cronbach's alpha, the most widely used objective measure of reliability. There are different reports about the acceptable values of alpha, ranging from 0.70 to 0.95.[22–24] Previously, we reported a 0.728 Cronbach's Alpha (on Standardized Items) of the 11 Item (Q16-26) scale.[9] Reliability Statistics were re-calculated here and a Cronbach's Alpha (on Standardized Items) of the scale was 0.675 in this study (n=100, 2 missing). This is very close to 0.70 and we accept this sufficiently demonstrates validity. We did a further Scale analysis with a Cronbach's Alpha Split-half in Part 1 (The items are: Q16, Q17, Q18, Q19, Q20, Q21.) and Part 2 (The items are: Q22, Q23, Q24, Q25, Q26.). We found the Cronbach's Alpha for Part 1 to be 0.672, and for Part 2 was 0.753. The Correlation Between Forms was 0.074, the Spearman-Brown Coefficient of Equal Length was 0.138, and Unequal Length was 0.138, the Guttman Split-Half Coefficient was 0.138.

	Discussion: In this study, heterogeneous constructs or some missing data may have contributed to the lower value of Cronbach's Alpha.
"Results:…Prevalence of falsified medicines (SFs) was estimated at 1 to 5%,…"	
In the abstract, the SFs refer to falsified medicines. However, in the manuscript, SF refers to substandard and falsified. Please rectify to make sure the use of the abbreviation is consistent throughout the manuscript.	Corrected - now consistent throughout the manuscript. SF refers to substandard and falsified.
INTRODUCTION	
Satisfactory.	Thank you.
METHOD	
"Questionnaire validation (pretesting) was achieved by researchers critically appraising the scale in a research-team focus-group."	
Some scholars may argue the suitability of the term "validation" used in the study. This is because as mentioned previously, there was no proper validation of the scale carried out by the author. Hence, to be safe, please consider changing to "Questionnaire was pre-tested by researchers critically appraising…."	Validation carried out and now detailed in manuscript. Wording changed as per reviewer's advice.
RESULTS	
Improved and satisfactory.	Thank you.
DISCUSSION	
The discussion points provided are valuable. However, as mentioned previously, the majority of the discussions are not related to the primary objective of the study. Hence, the author needs to bridge the secondary objectives with the primary objective in the next revision. Failure to justify the relationship between the secondary objectives with the primary objective would cause some of the secondary objectives which are not related to the primary objective to be omitted.	We have provided this needed bridge in the introduction, discussion and conclusion. We have tried to be as minimalistic with the added words, while satisfying the need to have an overarching theme. It has added to the word-count which is unfortunate. We have moved material into Appendix B & C to improve flow and keep the word-count low.
"h) Examine geospatial location…..Analysing the data by geographical distribution shows more SFs were identified in deprived areas (table 10)."	See next.
There is basically no discussion for the findings on secondary objective h). Please elaborate on how would such finding affect the readiness of community pharmacists to implement the FMD. This applies to the whole discussion section.	We have now changed this to: "We achieved a well distributed sample, with good geographical representation. Analysing the data shows the following in deprived areas vs affluent counterparts: inadequate equipment (22.9% vs 22.5%), lower knowledge [Seen the 'Postcard Guidance for Patients' leaflet? (2% vs. 4%)], unawareness of technologies (87% vs 82%), slightly higher rates of training (4% vs 2%), higher rates of identifying SFs (9% vs 2%) (table 3, Appendix C) , though none were statistically significant. Service inequalities by location were minimal, except for the detection rates of SFs. This is surprising in a single organisational structure and may hint towards greater disparity in the wider pharmacy-population. These premises may require more resources, time and support to meet compliance standards. This sub-analysis provides a snapshot of the deprivation landscape now and provides a benchmark for future evaluation to see if these pharmacies (and the communities they serve) get left-

	behind."
REFERENCE	
Improved and satisfactory.	Thank you.

VERSION 3 – REVIEW

REVIEWER	CHUO YEW TING Ministry of Health, Sarawak State Health Department, Pharmacy Practice and Development Division, Malaysia.
REVIEW RETURNED	06-Dec-2019

GENERAL COMMENTS	No further comments and the manuscript is considered ready for publication.