Peer Review File

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Reviewer A

Overview: This editorial article aims to incorporate recent revelations of 2 articles (Orlandi et al. and Van Steenbergen et al.) into the broader scope of Value-Based Healthcare (VBHC) in thoracic surgery. Vague descriptions of each studies methodology were included to highlight the different approaches used. The authors highlight the history and ideal framework for instituting a VBHC model based on the works of Porter and Lee and this framework was then applied to Orlandi's and Steenbergen's articles to indicate their relative strengths and weaknesses. Following this, a summary of the field of VBHC was provided to shed light on areas requiring further work before the implementation of a VBHC model in thoracic surgery, that incorporates all aspects described by Porter and Lee, can take place on a system-wide scale. This editorial compares two applications that attempt to create value-based healthcare models, however both studies ignore a significant host of other value-based healthcare considerations. Furthermore, van Steenbergen's article does not propose how to actually calculate value, which calls into question the translatability of their study outside of their study's domain; there is no way to determine the value of any of their metrics in the scenario where patient outcomes improved while costs also increased. This scenario and many others are real-world situations where models like these aren't able to objectively discern between whether the original standard of care was more valuable than this new treatment option that may cost more but also improves patient outcomes. This is where metrics such as QALY and ICER, among others, become incredibly valuable. As someone who is familiar with value-based specialty care, the two reference articles have a limited perspective of value-based specialty care and are not translatable to other fields outside of thoracic surgery. The two models evaluated in this editorial are focused on the thoracic surgery specialty. As such, I will defer to content specialists in thoracic surgery on whether or not these two articles discuss relevant outcome measures. Thus, at a minimum, the title of the article should be focused on the evaluation of value-based care in thoracic surgery, utilizing the two referenced articles, similar to my recommendation below, in the "Specifics" section of my review. However, beyond that, there are serious flaws in both regarding value-based healthcare. Van Steenbergen doesn't present an equation to combine both quality and cost into one equation, so unless quality or cost are fixed, then you are unable to use a value calculation to compare their results to other value propositions. Moreover, Orlandi has a convoluted way of using 37 different quality indicators that aren't standardized and the cost component of their equation is not detailed enough, only representing direct variable costs, without factoring in location, direct fixed, or indirect costs. My other major concern is that the authors don't understand TDABC. Neither study uses TDABC cost accounting, which is the most effective way of cost accounting for direct variable labor costs. Overall, the study discussed the valuable contributions of Orlandi et al. and Van Steenbergen et al. in the

field of VBHC, while also highlighting the flaws of these studies and of VBHC literature overall. However, more elaboration is necessary to precisely outline where these papers fit into the broader scope of VBHC as well as describing where VBHC is currently at and why determining VBHC is being approached in the specific ways outlined by Porter and Lee, specifically regarding the pitfalls of using broadly available hospital costing data. Some revisions are necessary for consideration of publication along with additional input from content experts.

We would like to thank the reviewer for the extensive, valuable evaluation and thought-provoking discussion.

We would like to begin by addressing the reviewer's comments concerning VBHC and alternative cost measurement and cost-effectiveness methods. It is essential to emphasize the distinction between Health Technology Assessment (HTA) and VBHC, which are sometimes conflated and confused despite their distinct purposes and approaches (for more information we would like to refer to reference #24: 'Value-Based Health Care Meets Cost-Effectiveness Analysis' by Tsevat & Moriates). In short, HTA typically adopts a societal perspective, utilising economic evaluations to compare different interventions or new drugs in terms of their monetary value. Commonly, HTA involves the comparisons of costs and outcomes, expressing the ultimate value of a given intervention in a single number such as the cost per life-year gained. As mentioned by the reviewer, ICERS, QALYs and, for example, DALYs are often considered. In contrast, VBHC mainly adopts a medical perspective, using a patient-centric approach, aiming to improve patient-relevant outcomes and costs (patient value). Importantly, within the concept of patient value, costs and outcomes are considered separately (but as interrelated entities) and are not expressed in one metric, as discussed in lines 228-231in the manuscript. Therefore, the absence of a single metric for outcomes in Van Steenbergen et al. model, as highlighted by the reviewer, does not necessarily signify as a violation or shortcoming within the framework of the VBHC theory. However, we understand that a single metric, such as the QALYs gained, is valuable as it generalizable. Hence, we explicitly incorporated this as a strength of the PVTS score from Orlandi et al.'s model in line 225.

The reviewer has also highlighted several shortcomings of both models. Firstly, the reviewer has drawn attention to the vague description and limited translatability of the Van Steenbergen model. We therefore clarified and extended the paragraph on the methodology of Van Steenbergen and colleagues in lines 136-142. We would like to emphasize that although the methodology has been applied specifically within thoracic surgery, the detailed description provided in the published paper combined with the generic, systematic approach developed for selecting relevant outcome and cost parameters, indicates the applicability to other fields. We agree with the reviewer that the applicability and translatability of a model to other fields are crucial aspects. Therefore, we have incorporated this criterion into the text in line 109 and table 1.

Secondly, the reviewer correctly pointed out the current manuscript has a narrow and limited scope of the methodology used by Orlandi et al.. This issue arises from the absence of details on the methodology provided in the published paper by Orlandi et al., as we have

acknowledged in lines 189-190 and 225-227.

Thirdly, the reviewer noted not all indicators are standardised or validated. All indicators used by Orlandi et al. are not standardised but validated through literature studies. In contrast, the clinical indicators in the Van Steenbergen et al. model are both standardised and validated, while the cost indicators are just standardised but not validated. This is stated in criterion (k) and explained in lines 129-132, 187-189 and 206-207 in the manuscript.

Finally, we would like to address the comments regarding the absence of the use of the TDABC methodology. As supported by various studies and expert opinions, which are all referenced in the manuscript, TDABC, despite its high accuracy, is recognised as a resource-intensive approach with limited practical applicability. Both Orlandi et al. and Van Steenbergen et al. have attempted to pragmatically calculate costs without the drawbacks of TDABC. Indeed, this is not perfect nor ideal and we acknowledge the shortcomings as outlined in several parts of the manuscript. We would like to emphasize that currently, an exemplary model that fully meets all VBHC criteria, including using TDABC, has not yet been established. However, both the Orlandi et al. model and Van Steenbergen et al. model represent significant steps towards the incorporation of VBHC principles. Therefore, we recommend physicians and healthcare providers to take a pragmatic approach, initially using models such as Orlandi et al. or Van Steenbergen et al. and gradually moving towards the adoption of more advanced models, that are better suited to the realities of healthcare cost management.

Below; we will respond to the specific comments point by point.

1. **Title: Title is too broad for the content that was written and misleading. The title should be more constrained to what is actually being discussed throughout this editorial. Something more accurate may be "Evaluating the Orlandi vs van Steenbergen Models for Evaluating Value-Based Healthcare in Thoracic Surgery".**
   We incorporated the reviewer's suggestion and adjusted the title: "Measuring costs and outcomes; What are suitable models while implementing value-based healthcare in thoracic surgery?"

2. **Line 27: What is meant by the word "improve"? I believe this is the purpose of VBHC, not one of the first steps.**
   Porter & Lee introduced a comprehensive VBHC model, consisting of six components aimed at improving patient value and aiding implementation of VBHC in healthcare systems (Porter & Lee, The strategy that will fix healthcare 2013). These authors emphasise the importance of prioritising accurate measurement and improvement of outcomes before implementing other actions such as organising care into integrated practice units, expanding excellent services across geography and transitioning to bundled payments for care cycles. However, we agree with the reviewer that improving outcomes is also a goal itself. Therefore, we adjusted the sentence: "One of the first goals to fully implement VBHC is to accurately measure and improve clinical outcomes and costs".

3. **Line 29: What is meant by "effective"? I believe this can be omitted because you talk about the effectiveness via "quality based improvement" in the following line.**
   We followed the reviewer's advice and omitted the word 'effective'.

4. **Line 30: What is meant by "improvement"? Improvement of what specifically?**
   We substituted 'quality-based improvement' with 'improvement of quality of care' to provide clarity to the sentence.

5. **Line 37: I recommend replacing "Less" with something along the lines of "Few" or "Even fewer"**
   We incorporated the reviewer's advice and substituted the word 'less' with 'fewer'.

6. **Line 37-38: From what perspective are you implying when you state, "measuring costs"? Do you mean that fewer examples have measured costs from the hospital's perspective, the patient's perspective, or the payers perspective?**
   Although there are already various initiatives and methods to accurately measure outcomes, fewer initiatives and examples are available to measure the healthcare costs that are relevant for patients and are essential to improve patient value. Within VBHC, the overarching goal for all stakeholders is to improve value for patients (Porter, 2010 What is value in health care?) by incorporating the patient's perspective. We have integrated this perspective into the sentence in line 39-40: "Fewer examples of practical implementation on a large scale are available for measuring healthcare costs from a patient's perspective.".

7. **Line 40-41: I think more information could be provided and more citations could be included to illustrate the relationship between all three of the cost buckets (Direct Fixed, Direct Variable, and Indirect) and which costs fit into which bucket.**
   We agree with the reviewer and provided more details on the TDABC method, including how costs are assigned to a process in lines 45-51: "TDABC is a modification of the traditional activity-based costing method and assesses direct and indirect costs based on the time required to perform an activity per process step and the indirect costs it requires (8,9). The method first identifies all activities involved in a certain process and estimates the resource costs for each activity. Thereafter, the total resource costs are calculated and the time required for each activity is determined. Subsequently, the costs per unit of time for each activity is calculated, which is then used to assign costs to the entire process (8,9).".

8. **Line 41: I recommend rewording the phrase "the indirect costs it requires".**
   We integrated the suggestion from the reviewer and revised the phrase to 'the indirect costs associated with that activity'.

9. **Line 41-45: This one long sentence could be split into 2. I think this would help the flow of the paragraph better as well. It would be interesting if you could find a source that has previously illustrated that clinical research has consistently**

failed to follow the recommendations for conducting a TDABC study to include in the statement you are making.

We thank the reviewer for this suggestion. The sentences are based on a systematic review conducted by Leusder and colleagues (2022), which analysed the cost measurement methodologies used across 215 VBHC studies between 2003 and 2021. This study highlighted that TDABC or activity-based costing (ABC) remain the primary cost measurement methods as there are no well-documented alternatives. Furthermore, the study states that a significant portion of the included VBHC studies deviated from the full application and methodology guidelines, resulting in omitting crucial elements and inconsistencies in results. Hence, TDABC can facilitate VBHC, but the authors emphasise the need to follow TDABC guidelines carefully and to explicitly document the methods used. The paragraph is adjusted as follows: "A recent systematic review by Leusder and colleagues (2022) showed that despite the clear recommendations on how to conduct TDABC, the application described in clinical research indicates a significant deviation from the preferred methodology (9). This deviation resulted in the omission of crucial elements and inconsistencies in results (9).".

10. **Line 46-47: I would appreciate citations for the statements made regarding "complexity, time-intensive nature and its sustainability mainly for predictable short-term care".**

    To accurately reflect that this sentence is derived from the findings of previous studies and expert opinions rather than our own perspective, the sentence has been revised to the following: "Most importantly, according to previous studies and expert opinions, the practical application of TDABC is restricted due to its complexity, time-intensive and highly laborious nature and its suitability mainly for predictable short-term care and less scalable in healthcare settings with complex patient pathways (with references).

11. **Line 47-48: I Disagree with the statement "Also, TDABC seems most useful for (financial) managers and contains less relevant information for patients and physicians". TDABC can reveal opportunities for improve workflow efficiencies by understanding a granular level of how costs accrue, due to its nature of analyzing costs from the perspective of resource consumption and not based on arbitrary claims data or hospital charge data. The net result from this is that TDABC does contain relevant information for patients and physicians because it can instruct providers on how to adjust clinical workflows to decrease costs without altering the outcomes of care, thereby improving value to patients.**

    We agree with the reviewer that this sentence might cause confusion. The revised text aims to clarify the sentence: "Furthermore, TDAB is most frequently used by managers to highlight operational enhancement and to make comparisons against reimbursement rates."

12. **Line 37-52: Incorporating a brief point pertaining to other costing methodologies such as Relative Value Unit (RVU) and Ratio of Cost-to-Charges (RCC),**

specifically regarding the advantages that TDABC has over them, could prove beneficial. When talking about making systematic changes to the way that healthcare is conducted, you need to have the appropriate level of granularity of costs so that you can evaluate and subsequently optimize systems to produce greater value for whichever stakeholder you are optimizing the system for. TDABC is the only costing methodology that can accurately identify costs in this regard because it evaluates cost at the level of resource consumption, which is opposite of how other methodologies determine cost, which utilize claims data and arbitrarily determine cost based on that.

The reviewer is correct in highlighting the existence of several other cost accounting methods for precise and accurate cost measurement. Nevertheless, within the VBHC context, TDABC remains the gold standard as advised by Porter & Kaplan.. As mentioned earlier, prior studies have also emphasized its widespread application and the absence of suitable alternatives. To ensure clarity and a clear scope and also due to the word limit being reached, we have provided examples of the various cost accounting methods, without individually explaining each method in lines 42-44: "Although multiple cost accounting methods exist, such as relative value unit, diagnosis-related group, and ratio-of-cost-to charges, the preferred method for monitoring costs as part of the VBHC paradigm is the time-driven activity-based costing (TDABC) model, pioneered by Kaplan & Anderson (8,9).".

13. **Line 55: Is there something that can be cited that illustrates to what degree scarcity exists for PV models?**

    While we have referenced two systematic reviews that highlight the absence of well-documented alternatives for cost measurement in healthcare, we have cited several models and systematic approaches for measuring clinical outcomes. However, the integration of both clinical outcomes and costs in one model remains scarce, and we did not come across any patient value models addressing this aspect in the existing literature.

14. **Line 57: I would consider rephrasing "PV monitoring".**

    We incorporated the reviewer's feedback: "…models that can be used to monitor PV".

15. **Line: 65: Please correct the grammar in the phrase "Physicians be able to".**

    We thank the reviewer for this correction and adjusted the sentence accordingly: "Physicians should have the capacity to influence the indicators measured and results should be presented in a comprehensible manner."

16. **Line 71: Possibly reword "full cycle of care" unless it is verbatim wording from the sources.**

    We integrated the suggestion from the reviewer and revised the phrase to 'entire care chain'.

17. **Line 73: Consider changing "an important aspect is whether" to "an important**

aspect of VBHC is whether" or specify what aspect you are highlighting.
We incorporated the reviewer's suggestion.

18. **Line 78-79: Please provide further explanation of "process indicators" and "outcome indicators".**
We clarified the terms 'process' and 'outcome' indicators in the manuscript: "Furthermore, while process indicators, which signify activities during patient care, are relevant, they are primarily supportive to outcome indicators, which signify the results of patient care."

19. **Line 80: TDABC is primary a way of measuring the direct variable component of cost, meaning the variable cost of labor. I would recommend specifying this at the end of the sentence.**
In response to this and a previous comment by the reviewer, we have extended and clarified the description of TDABC methodology in the manuscript in lines 42-44 and 47-51, providing more information on the included costs. This approach unites all information regarding the cost accounting method in a single location.

20. **Line 87-92: More effort should be placed on how specifically these calculations for the PVTS were performed. In an effort to make this information as broadly applicable as possible, the clearer your explanation, as well as Orlandi's explanation, the more relevant it becomes to the reader when they can understand step-by-step what took place to determine a given measure. This decreases the hurdle for implementing such a model into other clinical practices.**
We agree with the reviewer's assessment that the description of the Orlandi et al. model is brief and limited. This is primarily due to the lack of detailed information on the methodology provided in the original published paper. Moreover, the article does not explicitly outline how the PVTS is calculated. We have acknowledged this as a limitation in lines 225-227.

21. **Line 90: Consider rephrasing "foundation" with "framework" or "template" or "skeleton" because this article attempts to provide the structure for evaluating value. I would also include what specifically it is a theoretical frame for.**
We incorporated the reviewer's suggestion and changed the word 'foundation' with 'framework'.

22. **Line 93-94: Consider directly stating to what degree the implementation of this tool positively impacted performance and improved clinical efficacy.**
Unfortunately, the published paper by Orlandi et al. does not provide these details. The paper reports an overall improvement was achieved in clinical efficacy and average outcomes without attributing this success to the utilisation of the tool.

23. **Line 99-111: I have the same recommendation for this paragraph as I did with my recommendation in Line 87-92. One should be able to explicitly understand how**

they performed these calculations to arrive at their outcome; this should not just be broad sweeping statements about their process because it loses relevance to the reader when the step-by-step calculations aren't clearly communicated.
We incorporated the reviewer's advice and clarified and extended the paragraph on the methodology of Van Steenbergen and colleagues: "Cost parameters are selected using readily available financial in-hospital data, such as outpatient clinic visits and intensive care stays. This selection process consists of a systematic, stepwise and multidisciplinary approach involving researchers, data analysts, physicians and patient representatives, aiming to ensure patient-centred and physician-driven principles. The first step was to create a comprehensive list of all healthcare activities associated with a specific medical intervention. Activities of minimal cost or negligible occurrence were excluded. Second, the cumulative effect of each activity was calculated by adding the quantity and the price. Third, healthcare activities were ranked by physicians according to their ability to influence activity volume or associated costs. Finally, the relevance of care activities was assessed by patient representatives. Through this collaborative process, fifteen patient-relevant cost drivers were identified, collectively capturing over eighty per cent of the incurred real-world in-hospital costs"

24. **Line 99: You state that this article (Van Steenbergen) was published in 2022 but I believe it was published in 2023, per citation #17 in your citation list.**
We appreciate the reviewer's keen observation, and we rectified the year of publication in the text accordingly.

25. **Line 105-107: The sentence starting with "utilizing readily available…" is an incomplete sentence. It's understandable that readily available cost data is convenient, however the caveat is that this data isn't informative in terms of where costs are truly originating from and doesn't provide useful information regarding how to optimize workflows to decrease costs while providing a similar quality of care. Please refer to my comment about Line 37-52 for additional information.**
We corrected the sentence to the following: "Cost parameters are selected using readily available financial in-hospital data, such as outpatient clinic visits and intensive care stays". Moreover, the Van Steenbergen et al. model is specifically designed to enhance its applicability in daily practice, hence why only in-hospital data was used. In response to the reviewer's feedback # After the reviewer's previous comment, we have included a more detailed explanation of the employed method. According to the published article by Van Steenbergen et al. all care activities and costs registered under the selected diagnoses were included, providing clarity on the origins of costs and insights to optimize workflows.

26. **Table 1: Spelling error in the Criteria for row "d" for the word "centred". I think it may also be worthwhile to include direct quotes from each paper for each criterion, however this may be logistically challenging. Additionally, I think moving rows "n" and "m" should be moved higher in the table to be associated**

with rows "b" and "a" respectively. I think the readability would be improved by grouping costs in one area of the table, along with grouping outcomes and other logically similar rows. If this change is implemented, it should be reflected in the body of the paper as well.

We thank the reviewer for reviewing the included table. Concerning the spelling of 'centred' or 'centered', it is worth noting that throughout the manuscript, we have consistently adhered to British English, where 'centred' is accepted spelling. This aligns with the authors' guidelines of the journal. Unfortunately, incorporating direct quotes for each criterion into the table is challenging as the papers themselves do not explicitly mention each VBHC criterion. Our evaluation of the articles on each criterion has been conducted objectively.

Following the reviewer's suggestion, we reorganized the table into three categories: general principles, indicators, and methodological aspects. Correspondingly, the text in the manuscript has been adjusted to align with this revised structure, as indicated in lines 74-109.

27. **Line 128: Consider stating how many of the 37 outcome indicators are validated or not.**

    While all indicators in the model are retrieved and validated via literature studies, the authors regrettably do not provide explicit details on how these indicators are retrieved or validated.

28. **Line 130: Please reword or define "non-financial costs". This phrase is not readily understandable.**

    Orlandi et al. categorises non-financial costs into two indicators: patient opportunity costs and training costs. In essence, non-financial costs are used to describe costs that are not solely monetary in nature but contribute to the overall outcomes. To provide clarity, we added an example of non-financial costs: "patient opportunity costs".

29. **Line 132: "Patient-relevant" is unclear and should be defined or reworded so that the reader can more easily understand what precisely this means.**

    The term 'patient-relevant' is used to describe indicators or issues that are significant or relevant to patients. This concept is a widely recognised term within the domain of VBHC. An description is added in lines 30-31: "When implementing VBHC, improving patient value (PV) should be the overarching goal for all stakeholders which is increasing and optimizing costs and patient-relevant outcomes, which are outcomes that are significant or relevant to patients for a specific medical condition".

30. **Line 149: What is meant by "trajectory" and what does it entirely encompass? I think this might be a different approach to illustrate what you are trying to say. Additionally, should "first-line healthcare" be defined? Also consider including a citation for this matter-of-fact statement about what the ideal is. Consider changing "Last" to "Lastly".**

    We acknowledge the reviewer's confusion regarding the terms 'trajectory' and 'first-

line healthcare'. Consequently, we have replaced these terms with 'care chain' and 'primary healthcare' respectively, and provided the right citation. In addition, we changed 'last' to 'lastly' to enhance clarity.

31. **Line 163: What is meant by "as indicators may be included without corresponding real-world data"? Are you intending to state that the integration of indicators described in literature into real-world workflows is challenging?**
As seen in the Orlandi et al, model, almost two-thirds of the initial indicators are not analysed because they are not present in the hospital's database. In other words, the indicators selected from the literature, cannot be used using real-world data because these data are not (yet) collected. The authors themselves conclude that it is difficult to use theoretical indicators. We adjusted the sentence to improve clarity: "As the authors note in the discussion section, the feasibility of certain indicators from the literature in daily practice proves challenging at a retrospective stage, as theoretical indicators may be included without corresponding real-world data."

32. **Line 171: What is the purported impact on VBHC of not including patients in "the process of selecting indicators"? Is there a source that has discussed this issue in the literature? One could argue that patient's don't need to be involved in the selection of the indicators because the indicators themselves have likely demonstrated some benefit for their intended purpose and targeted patient demographic, thereby meaning that patient's don't need to "select" them; it then becomes the responsibility of the physician to implement these indicators since they have been shown to benefit patients (if they were validated).**
This is an insightful point raised by the reviewer, which can be distilled into the question: why involve patients when their concerns are likely to be represented by physicians? VBHC adopts a patient-centred approach and as Porter (2010) suggests, it is crucial to incorporate outcomes that hold the most significance for patients. In addition, patients possess experiential knowledge on healthcare which is deemed valuable for enhancing the quality of care (Vahdat et al., 2014 doi: 10.5812%2Fircmj.12454; Wiering et al., 2016 doi: 0.1111/hex.12442).
By engaging patients or patient representatives in the selection of the indicators, the objective is to ensure the inclusion of indicators that are directly relevant to patients and reflect their interests. Hence, most standardised clinical outcome sets, such as ICHOM or NHR, are developed with the involvement of patients (often via a Delphi method). This explains our inclusion of this practice, not as an explicit criterion, but as supplementary information.

33. **Line 173-177: This is a great assessment, but I wonder if the statement about the limitations of the model could be expanded to highlight the flaws that exist with using "in-hospital data" such as its accuracy, precision, and overestimation relative to alternative costing methodologies such as TDABC.**
We would like to thank the reviewer for this suggestion. As it is a deviation of both methods to not have used TDABC cost measurement, we added this as a limitation in

lines 186-187: "Lastly, both models developed methods for cost calculations, deviating from the use of TDABC as the gold standard for cost measurement, potentially constraining the accuracy and precision.".

34. **Line 174-176: "thus only using cost indicators based on readily available in-hospital data and outcome indicators based on data that is already collected for a CQR" is an incomplete sentence.**
We incorporated the reviewer's feedback in lines 204-207: "The model presented by Van Steenbergen et al. is pragmatically designed to enhance its applicability in daily practice, focusing solely on cost indicators derived from readily available in-hospital data and outcome indicators based on data that is already collected for a CQR.".

35. **Line 179: Please address the grammar of the phrase "and are not standard included in the…". I believe you are trying to say something along the lines of "and are not traditionally included in the…". If possible, a source to support this statement would also be appreciated.**
We addressed the grammar and phrasing of the sentence accordingly: "There is a possibility that certain indicators, although theoretically important, such as sustainability of recovery or patient satisfaction, may be omitted from the model because they are not clinical outcomes used by a CQR and are often not included in the registered in-hospital healthcare activities by default.".

36. **Line 205: Consider rephrasing "the developed PV model of Orlandi et al." to "the PV model developed by Orlandi et al.". Consider rephrasing "has a theoretical foundation" to "creates a theoretical framework" or something similar.**
We incorporated the reviewer's suggestion in line 235-237: "To summarise, the PV model developed by Orlandi et al. employs a theoretical foundation, selecting cost and outcome indicators using literature from the last decade providing a representative overview of indicators.".

37. **Line 218: Please specify what model you are referring to. Also please recheck the spelling of "utilise".**
We adjusted the sentence to clarify we are referring to a general PV model that healthcare providers can use (as mentioned in line 244-246). "In terms of clinical outcomes, a PV model can readily utilise indicators that are included in international reporting guidelines and CQRs."
Regarding the spelling of 'utilise', it is worth noting that throughout the manuscript, we have consistently adhered to British English, where 'utilise' is accepted spelling. This aligns with the author guidelines of the journal.

38. **Line 224: Specifically what other cost methods are viable alternatives to TDABC? And just because they are viable, if they lack accuracy, precision, and the ability to make decisions based on the determination of the costs, then how valuable are they in the incorporation with VBHC? From that perspective, they may be "viable"**

from the business perspective to make sure that costs are accounted for, but they are not "valuable" as it pertains to VBHC, where they don't provide any meaningful insight on how to optimize workflows based on the level of resource consumption. Please refer to my comments above for Lines 37-52 and Lines 105-107.

As previously highlighted in the manuscript, several prior studies have underscored the absence of well-documented alternatives for the TDABC methodology to measure costs within the VBHC framework TDABC has significant shortcomings in complex patient pathways. The two recently developed models by Orlandi et al. and Van Steenbergen et al. have both created frameworks to pragmatically measure costs without adding to the registration burden. We would like to emphasize that although the two studies do not employ TDABC, they can still provide insight into costs and guidance for workflow optimisation. For example, Van Steenbergen et al. model covers over 80% of the costs, while Orlandi et al. includes various process indicators that demonstrate potential optimization. Therefore, we propose both models as feasible alternatives to the TDABC approach. We substituted the word 'viable' with 'feasible'.

39. **Line 228: What is meant by "attainable costs"?**
    We omitted the word 'attainable' to improve clarity.

40. **Line 231: Consider rewording "used" with "chosen" for grammatical reasons.**
    We thank the reviewer for this suggestion and incorporated it in the manuscript.

41. **Line 239-241: Please reword this sentence so that it is not such a forceful call-to-action statement from the perspective of the reader. You could. Consider phrasing this statement as a goal that all physicians should strive to achieve, as one alternative way of writing this sentence.**
    We adjusted the paragraph to make it a less forceful statement. Lines 265-270: "Given that much development is needed before this can be achieved, we encourage healthcare providers and researchers to take a pragmatic approach. Consider initiating the process, learning and refining the measurement of both outcomes and costs using suitable models such as those developed by Orlandi et al. or Van Steenbergen et al., and progressively work towards the use of more advanced models that better adapt to real-world healthcare costs."

Reviewer B

This article discusses two recently proposed models on Patient Value, and related these with the Porter-Teisberg perspective on Value-based Healthcare. I congratulate the authors on developing this thought-provoking article, and the critical approach used. I have a few minor comments and suggestions which are noted below, and are for the authors' consideration.

We would like to thank the reviewer for the provided feedback on our manuscript. Below, we will provide a response to the comments.

1. **Porter-Teisberg may have coined in VBHC, which focused on cost-effectiveness, but this represented one version or perspective of this concept. Other VBHC perspectives have also emerged, which define 'value' somewhat differently, albeit with some overlap (also noted in your reference Mjåset et al. 2020). For example, the US CMS Value-based Purchasing program of 2010 did not directly tackle cost-effectiveness, but rather, it measured clinical care processes and the patient experiences; although the over-arching theme of CMS initiatives was to contain healthcare costs. It may be useful to acknowledge that the Porter-Teisberg perspective is one among others, so readers may be aware that not all VBHC directly equates with cost-effectiveness. However, it is credited with catalyzing subsequent VBHC initiatives.**

   We would like to thank the reviewer for this insightful suggestion. In the section 'The key VBHC principles of a model to measure PV' we included a sentence in lines 70-72 to acknowledge the potential existence of more theories and perspectives while emphasizing our focus on the main VBHC theory as developed by Porter and Teisberg: "While acknowledging the potential development of new sub-theories that either extend or deviate from the original VBHC framework, this manuscript adopts the VBHC theories as originally developed by Porter and Teisberg.".

2. **The authors accurately assess the Orlandi et al. and Van Steenbergen et al. models, vis-à-vis Porter-Teisberg, including the criteria on Outcome Measure Hierarchy. However, it may be noted that non-prioritization across tiers (Van Steenbergen et al.), and combined process-outcome measures (Orlandi et al.) may not be disadvantageous. Particularly the process-outcome mix may have a promising future in VBHC, as improvement may be complex to capture across some outcomes, and may be better substituted by process measures.**

   An essential part of Porter's VBHC theory is the Outcomes Measures Hierarchy. The Outcomes Measures Hierarchy is designed to ensure that the most relevant outcomes are considered for each medical condition. According to Porter's Quality Measurement Landscape, "[...] process measurement and improvement are important tactics, but they are not a substitute for measuring outcomes and costs". (Porter, 2010, p.2477). According to this view, measuring outcomes is deemed the primary step, with process indicators playing a supportive role (as described in lines 86-88 in the manuscript). We agree with the reviewer that process indicators are also important to achieve

improvements in outcome indicators. Therefore we included this as criterion in the manuscript and Table 1.

3. **Line 170: Consider rephrasing the sentence for clarity "Despite the crucial role of the patient perspective within VBHC, the paper lacks details on patient involvement in the process of selecting indicators."; does it lack details, or does it not explicitly mention patient involvement in this process?**
   The paper by Orlandi and colleagues does not provide any information on the selection of indicators, including indicators related to the patient perspective. We adjusted the sentence to "Despite the crucial role of the patient perspective within VBHC, the paper does not explicitly mention patient involvement in the process of selecting indicators.".

4. **Line 173: Comment regarding this paragraph. Patient satisfaction is an unclear concept, and cannot be internationally benchmarked (as noted by the authors). However, though not considered a clinical outcome by CQR, it is considered an outcome in and of itself (e.g. Donabedian 1966 on health and satisfaction as "[…] the ultimate validator of the quality of care"). Measures of the patient experience tend to be less subjective than satisfaction, and more firmly, measures of self-rated health are associated with health outcomes and life-expectancy (from a wide population perspective). As such, although form a practical sense the patient perspective may be omitted, it may result in decreasing patient-centeredness.**
   We acknowledge the reviewer's valid observation regarding the subjective nature of patient satisfaction, making it less suitable for direct benchmarking compared to more objective indicators like healthcare costs. We would like to clarify that the intention of this paragraph was to emphasize the practical applicability of the model developed by Van Steenbergen et al., which primarily uses existing data. Consequently, theoretically important indicators may not have been included. While we used patient satisfaction as an example to illustrate this point, we recognize that it is not the only theoretically relevant indicator that could have been considered. For instance, we could have included indicators related to the sustainability of recovery or treatment-related discomfort. To address this, we have included these additional examples.

5. **Line 241: "…and work towards the use of more complex models". I would like to suggest that complexity is not desirable, in and of itself. But it is a feature of our living environment. Perhaps phrasing this as working towards "better adapted" or "more suitable" models may be more useful.**
   We agree with the reviewer that the primary objective is not the adoption of more complex models but that the current sentence indeed suggests this. In addition with a comment from the first reviewer, we therefore adjusted the sentence as follows: "Consider initiating the process, learning and refining the measurement of both outcomes and costs using suitable models such as those developed by Orlandi et al. or Van Steenbergen et al., and progressively work towards the use of more advanced models that better adapt to real-world healthcare costs.".

Reviewer C

Well written editorial comparing two different methodologies and putting things in perspective.

We would like to thank the reviewer for this compliment and the interest in our manuscript.