Peer Review Report

Review Report on Monitoring and optimization of POCT devices in a multi-specialty hospital in Poland: usage trends, quality assurance, and Clinical Impact (2017-2024)

Original Research, Acta Biochim. Pol.

Reviewer: Marta Popławska
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EVALUATION

Q 1 **Please summarize the main findings of the study.**

This study explores the implementation and management of Point-of-Care Testing (POCT) devices, specifically glucometers, in a multi-specialty hospital in Poland between 2017 and 2024. It provides valuable insights into the evolving use of these diagnostic tools, emphasizing the challenges encountered, particularly during the COVID-19 pandemic. The authors analyze changes in practices and equipment over time and examine the impact of national healthcare regulations on the usage of POCT devices. A key strength of this research lies in its commitment to ensuring quality and accuracy in POCT. By assessing various glucometer models under different conditions, the study underscores the critical importance of reliable test results in clinical settings. The findings highlight the advantages of POCT, such as faster test results, which may enhance patient care and clinical decision-making. Moreover, the discussion on Polish regulations provides valuable context regarding how governmental policies shape the application and quality control of these diagnostic tools.

Q 2 **Please highlight the limitations and strengths.**

The manuscript presents a well-documented and timely analysis of POCT in a hospital setting. The focus on quality assurance and the influence of healthcare regulations adds practical relevance to the findings. Additionally, the examination of POCT during the COVID-19 pandemic provides an important perspective on the adaptability and resilience of healthcare services. However, the study could benefit from additional statistical analysis to provide a clearer comparison of different glucometer models. For example, this could include applying paired statistical tests, such as paired t-tests or Wilcoxon signed-rank tests, to determine the significance of observed differences in glucose readings. Is it possible to conduct Bland-Altman analysis? It would help assess the level of agreement between glucometer models and a reference laboratory method, ensuring that observed deviations are clinically acceptable. As the content of the article shows, the available data for analysis is limited, but a regression-based approach could also be used to analyze performance trends over time, while outlier detection and error analysis could provide additional insights into device consistency and reliability. These statistical enhancements would contribute to a more robust and nuanced comparison of glucometer models. Further exploration of POCT's impact on patient outcomes and clinical decision-making would add depth to the discussion. This could include an analysis of how POCT influences the speed and accuracy of diagnoses, the timeliness of medical interventions, and the overall efficiency of patient management in both emergency and routine hospital settings. Examining case studies or real-world examples where POCT has led to improved treatment decisions, reduced hospital stays, or prevented complications would strengthen the study's relevance. Additionally, patient-centered outcomes, such as satisfaction levels, adherence to treatment plans, and long-term health improvements, could provide a more holistic view of POCT's role in clinical practice, although I know it will be difficult to get this data from patients or immposible. Nevertheless, it should at least be discussed. A comparison with traditional laboratory testing methods in terms of clinical effectiveness, error rates, and physician confidence in POCT results would further clarify its benefits and potential limitations. Additionally, an economic assessment comparing POCT to traditional laboratory testing could offer valuable insights for hospital administrators considering the adoption of these technologies. Lastly, a more explicit acknowledgment of study limitations. This could include recognizing potential biases in device selection, sample size constraints, and the generalizability of findings to other healthcare settings. Are any certain confounding factors or the potential for measurement errors

affecting the accuracy of glucometer comparisons? Additionally, discussing any technical limitations of the POCT devices themselves, such as variations in performance across different patient populations or environmental conditions, would provide a more comprehensive perspective. Highlighting these aspects would enhance the transparency of the research and offer valuable insights for future studies looking to refine POCT implementation and quality assessment.

Q 3 **Please comment on the methods, results and data interpretation. If there are any objective errors, or if the conclusions are not supported, you should detail your concerns.**

The methodology is well-structured and provides a thorough overview of the study's design. However, incorporating more detailed statistical comparisons, incorporating advanced statistical techniques to provide a comprehensive evaluation of glucometer performance. This could include Bland-Altman plots to visualize agreement between POCT devices and reference laboratory methods, ensuring that bias and variability are within acceptable clinical limits. Additionally, linear regression analysis may be employed to assess systematic deviations, and correlation coefficients could quantify the strength of relationships between glucometer readings and reference values. Is it possible to perform an ANOVA or Kruskal-Wallis test? These would help compare multiple glucometer models statistically, ensuring that observed differences are not due to random variation. These statistical refinements would provide a more robust foundation for evaluating glucometer performance and their clinical utility. The results section presents vary valuable data, but a more structured comparison of performance metrics across various POCT devices would enhance the clarity of findings. It would also be beneficial to explore how the use of POCT influenced patient management decisions and treatment outcomes. A discussion of cost-effectiveness and resource allocation in relation to POCT would further enrich the study's practical implications. This could for example include a comparative cost-benefit analysis between POCT and centralized laboratory testing, examining factors such as equipment costs, operational expenses, staffing requirements, and maintenance. Is it possible to evaluate the financial impact of faster diagnosis and treatment initiation through POCT? Such analysis could provide insights into potential cost savings related to reduced hospital stays, fewer complications, and optimized resource utilization. The study could also explore reimbursement policies, insurance considerations, and hospital budgeting constraints that influence POCT adoption. Providing economic modeling or real-world case studies demonstrating financial advantages or limitations would offer hospital administrators and policymakers a clearer understanding of POCT's economic feasibility and long-term sustainability. The interpretation of results aligns with the study objectives, but additional discussion on potential confounding factors or external influences on POCT performance would provide a more balanced perspective. Addressing these aspects would increase the credibility and applicability of the findings.

Check List

Q 4 **Please provide your detailed review report to the editor and authors (including any comments on the Q4 Check List)**

The manuscript provides an insightful exploration of POCT implementation and management in a hospital setting over seven years, with a particular emphasis on the COVID-19 period and the influence of Polish healthcare regulations. Its focus on quality control and accuracy in diagnostic testing makes it a relevant contribution to the field.
To further enhance the study, I recommend the following improvements:
Statistical Analysis: A more in-depth statistical evaluation comparing different glucometer models would strengthen the conclusions.
Data Transparency: Including specific details on the number of tests conducted would improve the reliability and generalizability of the findings.
Clinical Impact: Expanding the discussion on how POCT affects patient outcomes and decision-making in clinical practice would provide a more comprehensive understanding of its benefits.
Economic Considerations: Analyzing the cost-effectiveness of POCT in comparison to traditional laboratory tests would be highly beneficial for hospital administrators and policymakers.
Acknowledgment of Limitations: Addressing potential study limitations and external factors influencing results would improve the transparency and credibility of the research.

Overall, this study is well-structured and presents relevant findings for those involved in POCT implementation and management. With minor revisions to strengthen statistical analysis, data interpretation, and contextual discussions, this manuscript would offer even greater value to the field. I suggest a minor revision to address these points before publication.

Q 5 **Is the English language of sufficient quality?**

Yes.

Q 6 **Is the quality of the figures and tables satisfactory?**

Yes.

Q 7 **Does the reference list cover the relevant literature adequately and in an unbiased manner?**

Yes.

Q 8 **Are the statistical methods valid and correctly applied? (e.g. sample size, choice of test)**

Not Applicable.

Q 9 **Are the methods sufficiently documented to allow replication studies?**

Yes.

Q 10 **Are the data underlying the study available in either the article, supplement, or deposited in a repository? (Sequence/expression data, protein/molecule characterizations, annotations, and taxonomy data are required to be deposited in public repositories prior to publication)**

Yes.

Q 11 **Does the study adhere to ethical standards including ethics committee approval and consent procedure?**

Not Applicable.

Q 12 **Have standard biosecurity and institutional safety procedures been adhered to?**

Not Applicable.

QUALITY ASSESSMENT

Q 13	Originality	
Q 14	Rigor	
Q 15	Significance to the field	
Q 16	Interest to general audience	
Q 17	Quality of the writing	
Q 18	Overall quality of the study