Reviewer’s report

Title: The challenges of colposcopy for cervical cancer screening in LMICs and solutions by artificial intelligence

Version: 0 Date: 14 Apr 2020

Reviewer: Kexin Chen

Reviewer's report:

The authors have given a good summary on the current challenges of colposcopy screening and diagnosis in low- and middle-income countries (LMICs). The solutions of these challenges are of great significance for improving the diagnostic performance of colposcopy in LMICs. We especially agree with the author's opinion that the diagnostic results of artificial intelligence (AI) model are only used as a reference, and the human colposcopists should continue to be responsible for the result. Based on the authors' great opinions, some minor modifications are suggested to improve the current manuscript.

Page 5, line 108-114. The author should provide relevant references to support the corresponding opinions, such as the specific difference on CIN diagnosis ability between expert colposcopists and junior colposcopists, and the reported intra-operator and inter-operator variabilities based on current published data. These published data would be better to illustrate the application value of AI.

Page 6, line 126-127, it will be difficult to build a high-quality AI diagnostic model due to lack of uniform diagnostic standard and strict quality control for colposcopy practice. This problem should be the first solved by professional organization or alliance of colposcopy screening or diagnosis. We cannot rely on AI to solve all problems.

Page 7, line 150-152, AI interpretation depends on the accuracy of the "gold standard", which is usually based on the CIN diagnosis of the expert colposcopists. If there is high inter- and intra-colposcopists variability in the diagnosis of CIN between expert colposcopists, it will be hard to build a stable and reliable AI guided digital colposcopy model.

Page 8, line 183-185, Sato's study only achieves an accuracy of 50% for CIN2+ detection. This is a very worrying result. The author should preliminarily summary the reasons for the different accuracy obtained by different AI analysis techniques, so as to clarify the possible risks of applying AI technology to population screening.

Page 9, line 216-218, at present, AI can analysis of dynamic imaging, so the challenge for AI analysis of dynamic imaging is how to embed the AI interpretation system in the existing image imaging equipment.
Page 10, line 242-244, due to the requirement of large amount of data to develop AI model, in addition to the risk of data privacy disclosure, data sharing could be an equally important solution to the lack of large amount of data.

Page 10, line 247-248, we strongly agree with the author's opinion that the target positioning of AI guided digital colposcopy is to assist colposcopists rather than replace them. Meanwhile, the author should emphasize that colposcopists should not rely on AI guided digital colposcopy, especially for junior colposcopists. Otherwise, junior colposcopists may still have the risk of being replaced. Meanwhile, it should be emphasized that colposcopists should continuously improve their ability from AI-assisted model, and can find the problems in AI interpretation, rather than simply apply the AI-assisted technology.

Page 11, line 269-271, the team of AI guided digital colposcopy should emphasize the communication between colposcopists and AI engineers. Only when colposcopists can find the problems existing in the current AI-assisted model, can they really promote the development of AI guided digital colposcopy.

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Please indicate the quality of language in the manuscript:

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