Title: Exploring factors associated with the uneven utilization of telemedicine in Norway: a mixed methods study

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Reviewer: Maurice Mars

Reviewer's report:

Thank you for the opportunity to review this interesting paper exploring factors associated with the uneven use of telemedicine in Norway. The paper updates the data presented in 'Adoption of routine telemedicine in Norwegian hospitals: progress over 5 years' by Zanaboni P and Wootton R, BMC Health Services Research 2016:16:496, with additional data for 2014 and 2015, and new information from interviews with key stakeholders. The methods are appropriate, although as the authors acknowledge, their interview sample was small.

While having given a broad definition of telemedicine in the introduction the authors have for the purpose of the paper then used a stipulative definition in the methods, which includes only telemedicine by videoconference. Other forms of telemedicine are not remunerated and thus not recorded in the national registry used as the data source and thus not reported in this paper. There are several papers reporting telemedicine activities in Norway that are not videoconference based even if they are research based or pilot projects and this is identified as a limitation of the study. Mention of other non-videoconference based telemedicine services would help to put the findings of the paper in perspective.

Norway was a global leader in telemedicine in terms of early adoption and enabling regulation, such as remuneration for both store and forward and videoconferenced telemedicine. Store and forward remuneration was apparently withdrawn in 2008, although not mentioned in this paper. Unfortunately, time appears to have stood still and use of telemedicine (videoconferencing) is regressing according to this report - although this may not be completely correct as there may be informal and other store and forward and mobile health based services. No mention is made of any discussions or plans to re-introduce remuneration and thus record keeping for store and forward telemedicine and other mobile phone based store and forward services in Norway. What impact will the Norwegian eHealth strategy have on telemedicine and store and forward telemedicine in particular and what of the effects or potential effect of the various EU eHealth directives and strategies? Surely they include store and forward telemedicine and different forms of mHealth.

The paper presents an interesting case study of how the visionary approach to telemedicine in Norway in the 1990's has stagnated because of failure to embrace changes in the field and revisit and revise policies that were initially enabling but which have become stifling and obstructive.
The most restrictive policy appears to be remuneration: the GP is required to do all the work in arranging a videoconference consultation and is then not paid for this extra work or the teleconsultation. I don't think that this message of the need to review and revise policy has been adequately made strongly enough in the paper. Successful telemedicine implementation, including sustainability and its scaling-up, are still evolving fields of telemedicine research. While many call for a facilitating and enabling environment to make telemedicine successful, including remuneration policies, solutions found and used need to be periodically reviewed as technology advances, people's use and approaches to technology change and the ways of conducted telemedicine change. Surely the days of pilot projects and champions should be a thing of the past in Norway and the developing world?

Paradoxically radiology is reported as being fully integrated in the health system in Norway, and no doubt remunerated, even though it is not videoconference based. How has this anomaly occurred and has it been used to leverage other forms of telemedicine?

Analysis of telemedicine use and uptake is difficult. This paper reports use by region, site and discipline. Is it possible from the available data to identify the number of telemedicine users per site? A small rural hospital with many active users would be considered an adopter as would a larger hospital with only one or two users. Reporting telemedicine use as a percentage of outpatient visits may be appropriate based on the national data available for this paper but misses important and seldom reported data: papers often report that X% of patients managed through a telemedicine service were saved an unnecessary referral and transfer, but we are not told, as in this paper what percentage of all the patients seen as outpatients were referred for specialist treatment. This would allow better understanding of actual telemedicine use, as use is a function of need.

Overall I found this to be a sad report - a fallen hero. But we must extract all that we can to learn from it, especially for those in the developing world with limited resources who must not make the same mistakes.

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