

Rise of the Cyborgs: Residents With Smartphones, iPads, and Androids

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In this issue Lobo et al¹ report the results of a pilot study surveying residents' use of iPads. This study of 12 residents found there was high self-reported use of the devices, with an average of 2.1 hours per day. Using their iPads, residents could access electronic health records along with a range of educational resources. Most residents perceived that iPads should be distributed to all residents and fellows, and that this would improve communication and efficiency.

To put this pilot study in context, there has been a rapid uptake in the use of smartphones and tablets in medical practice: a recent survey estimates that 85% of residents have smartphones² and most use smartphones for clinical work. The expected benefits of using smartphones and tablets in medical practice include improved access to knowledge and patient information, and improved communication and documentation. The future of mobile smartphones and tablets promises to be exciting, with advances in medical functionality such as mobile ultrasound.

However, it is important to pause and consider the unintended consequences of the adoption of this technology. Unintended consequences are now a well-recognized phenomenon in health care information technology implementation.³ For example, there have been multiple reports of medical errors caused by information technology, such as computerized provider order entry and clinical decision support systems.⁴

For the unintended consequences of tablet and smartphone adoption, we may consider both noneducational and educational effects. Noneducational impacts include infection control issues with colonization of devices, which would likely be similar to other medical devices such as stethoscopes. Because of the increased connectivity of these devices to work colleagues as well as to residents' personal life, interruptions may increase in both realms. This may result in "distracted doctoring" and increased medical errors.⁵ If smartphones and tablets are used to communi-

cate patient information through nonsecure messaging, there are additional privacy concerns.⁶

From an educational perspective, we have found that providing residents with smartphones makes them, in effect, more global and less local.⁶ This combined with increased interruptions can create professionalism issues. A resident may be providing good care for a patient on a distant ward when he responds quickly to a request from a nurse via smartphone or tablet. However, this act may be viewed as rudeness by the patient right in front of the resident.

These devices may also negatively impact resident learning. Because devices make reaching supervisors easier, residents may defer most decision making to supervisors, with resulting loss of autonomy and learning. Tablets and smartphones also increase connections to residents' personal lives. Recently at our institution, an attending on rounds observed his medical student accessing Facebook while the attending was discussing a recently diagnosed cancer with the patient. Finally, with enhanced connectivity and increased interruptions, trainee time for thoughtful reflection may be disappearing.

What is the evidence to support adoption of this technology? To date there is limited information that tablets or smartphones improve care or efficiency. However, a lack of evidence will not stop the ongoing rapid adoption of smartphones and tablets in the clinical setting. It is more important to recognize that increasingly we are "screen-staring, button-clicking" cyborgs: humans with electronic enhancements of smartphones, tablets, and apps.⁷ We need to understand the implications of widespread use of these devices with further research. The next steps for research should continue along the lines of this pilot study to confirm the residents' self-perceived benefits of iPads. Next, studies should look at the unintended consequences of iPads not only on residents but also other users, including nurses, physician supervisors, and patients. Studies need to examine actual observations, not just perceptions of users. In addition, methods to define and teach the rapidly evolving concept of digital professionalism will be important.

From an educational point of view, there are many challenges ahead. The ability of residents to have nearly instantaneous access to knowledge and universal connectivity will likely dramatically alter how we educate residents. These changes have already begun.

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