

The good, the bad and the ugly of mobile phone use in clinical practice

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After a great elective experience in London in 2009 Chris has been inspired to pursue a career in Neurosurgery. He is also an avid sportsman and particularly enjoys playing soccer and squash.

Act 1

Scene: at the bedside

Enter stage: registrar, intern, medical student, Mrs. Thompson

Registrar: "Hi Mrs. Thompson, how are you travelling?"

Mrs. Thompson: "Not too well dear, I've had a pounding headache since last night."

Registrar: "Really? Well you are recovering from a stroke, but I wonder if we have overlooked something. Maybe we should scan your head again?"

Medical student (to the rescue!): "We changed Mrs. Thompson's aspirin to Asasantin yesterday and it says here on my mobile phone application that Asasantin can cause headache. Should we try stopping it to see if her headache resolves before we zap her brain again?"

Act 2

Scene: outpatient clinics

Enter stage: consultant, medical student, Mr. McLeod

Consultant: "We seem to have your COPD under control with your current medications. It has been a while now since you've been hospitalised with an exacerbation."

Mr. McLeod: "Yeah I feel..."

Ring, ring (interruption by consultant's mobile phone)

Consultant: "Yes, it's me speaking. Go ahead..."

Conversation between consultant and his registrar regarding Mrs. Vince, a current inpatient; during conversation it is revealed to all present in the room that Mrs. Vince's bowel habits have been erratic and now she has PR bleeding; consultant recommends a gastro consult

Consultant: "Now, what were we saying?"

Act 3

Scene: at the bedside

Enter stage: consultant, registrar, intern, medical student

Mr. Walker's biopsy report has confirmed squamous cell carcinoma of the lung; it is now time to break the news to him

Consultant: "Hi Mr. Walker, how did you sleep?"

Mr. Walker: "Didn't get much sleep last night. I'm very anxious about the result."

Consultant: "Well, the result has come back and I'm afraid the news is not as good as we would have hoped for. Is your wife here with you today?"

Mr. Walker: "No she's just stepped out to run some errands. That's ok though, just give it to me straight. I want to know exactly what's going on."

Consultant: "Ok Mr. Walker. Well the biopsy reveals that you do have cancer. It is a type of lung cancer called squamous..."

Ring, ring (interruption by consultant's mobile phone)



Consultant: "Hold on Mr. Walker, I need to take this call. I will be back in a moment."

Registrar, intern and medical student standing around the patient's bed looking at each other and feeling rather awkward about the situation; meanwhile Mr. Walker has broken down and is now sobbing away after receiving the worst news of his life

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The three scenarios described above have all been actual events that I have encountered during my clinical years of medical school. Although mobile phones have many benefits, such as allowing fast communication and access to important information at the point-of-care, there is also the potential for problems such as interference with vital medical equipment, breach of patient privacy and confidentiality, and frequent interruptions during consults, even whilst breaking bad news. In this article the pros and cons of mobile phone use in clinical practice will be discussed and we will hopefully gain some insight into how best to approach this dilemma as future clinicians.

Mobile phones are having an increasingly important role in day-to-day clinical practice and are now almost a necessity. However, not all that long ago there was an unwritten policy of no phones on ward rounds, in theatre or in lectures, as their use was considered rude. Yet these days we are almost blasé about their use. Personally, I must admit to using my own mobile phone on the wards and in the clinic setting. Although I tend to ignore phone calls and messages, replying when I feel it more appropriate, I do often reach for my pocket to use the multitude of applications on my iPhone® (created by Apple Inc., Cupertino, CA, USA). If despite all these "apps" I cannot find the answer to my clinical question, it is just as easy to gain access to the internet and Google™ it!

Then there is the flipside of patients using their mobile phones in hospital. If it is ok for clinicians to use their phones, why shouldn't it be the same for patients? An interesting article by Pearce explores this very issue. [1] In terms of patients using their phones in hospital, the author believes that there are three main sources of potential danger or inconvenience. Firstly, charging of mobile phones. There is a risk that patients may unplug medical devices in order to charge their phones, necessitating additional vigilance by nursing staff to ensure this does not happen. Secondly, ring tones and phone conversations. Noisy ring tones and loud talking can be irritating to both patients and staff. The final issue discussed is that of patient privacy and the

particular problem of taking photographs and videos using a mobile. On the other hand there are obvious benefits of allowing patients to use their phones. Mobile phones allow direct communication between the patient and their families or friends, not only reducing isolation, but also limiting calls to the ward enquiring about patients' well-being.

The use of mobile phones in hospital is very common, even in areas where it is "prohibited" such as in the intensive care unit (ICU). In one study, 66% of surgeons admitted to using their phones on a regular basis, including in operating theatres. [2] The capabilities of modern mobile phones are immense and the technology is relentlessly advancing. There is obvious potential for benefit. However, this needs to be weighed up against the problems associated with mobile phone use in the hospital. The good, the bad and the ugly of mobile phone use in clinical practice will now be explored.

The good

Improved communication

Trying to contact a doctor through the paging system employed by the majority of hospitals can sometimes be quite frustrating and inefficient. Using mobile phones allows direct contact, which is especially critical in cases of emergencies. In a study conducted at Queen Elizabeth Hospital in Barbados, telephone operators were asked to monitor time elapsed as they attempted to contact medical staff by various methods. [3] Overall, medical staff could be contacted within two minutes most easily by mobile phones and it was considered a more efficient means of communication. It will be interesting to see if the paging system will be superseded by mobile phone technology in the near future.

Photo-messaging is another tool which has led to improvements in communication. Registrars can take photos of, for example, a traumatic injury or a peculiar rash, and forward it to their consultant for an opinion. Lam *et al.* utilised mobile phone photo-messaging in 27 cases of hand trauma for communication between the registrar and consultant, and based on their findings recommended the technology in clinical practice. [4]

Another potentially useful application of mobile phones is in medical image transmission. Because the medical imaging systems are built and used in hospitals, doctors out of the hospital have problems accessing them immediately on emergent cases. Lee *et al.* [5] developed a system that could transmit the images acquired by medical imaging systems in hospital to the remote doctors' handheld device using a cellular phone network.

Communication can also be improved between the hospital and patients. A study at the Royal Children's Hospital in Melbourne revealed that using SMS text messaging improves outpatient attendance. [6] Furthermore the cost of sending the SMS reminders was small compared with the increase in patient revenue and associated benefits generated as a result of improved attendance. Phone applications which send alert messages have also been developed to help increase patient compliance with taking medication.

Improved clinical practice

One of the greatest benefits of mobile phones in clinical practice is having immediate access to medical information at the point-of-care. This has the potential to reduce costs, improve accuracy in diagnosis and treatment, reduce errors and optimise workflow. [7] Personally, I refer to a handful of applications on a daily basis when I am unsure of a particular diagnosis or just need a quick refresher. One of the most useful applications that I have is Epocrates® (created by Epocrates Inc., San Mateo, CA, USA), which provides access to several resources including a drug guide. Within seconds I am able to search a particular medication, find the appropriate dose for the patient and be warned of any specific safety and monitoring issues. As an intern, this will be an invaluable tool.

Leon *et al.* [8] implemented and evaluated point-of-care, wireless internet access using smart phones for information retrieval during

daily clinical rounds and academic activities of internal medicine residents in a community hospital. Overall, the doctors found these devices easy to use and the information retrieved was perceived to be useful for patient care and academic activities. Mobile phones are also useful for personal scheduling and checking emails on the go.

Miscellaneous

Some very interesting uses for mobile phones have been explored. One example is the application of mobile phone technology for managing chemotherapy-associated side-effects. [9] The symptoms of a patient are communicated to healthcare professionals via a server and they are then provided advice on management of toxicity. Overall the patients felt secure in the knowledge that their symptoms were being closely monitored and that they were participating effectively in their own care.

Another novel use of mobiles is for the assessment of burns as described by Shokrollahi *et al.* [10] Camera phones appear to be reliable for the assessment of total body surface area and burn depth in minor burns and potentially also in major burns.

Engineers at Washington University have recently created a device that incorporates ultrasound technology into a mobile phone. [11] Such technology can be particularly useful in diagnosing patients who have access difficulties and it can further improve medicine in developing countries.

The bad

Interference with medical equipment

When the use of mobile phones first became widespread, there was major concern regarding interference with vital equipment within the hospital. To this day, there are signs sporadically scattered throughout hospitals warning against the use of mobile phones particularly in areas such as the ICU and in theatre. The question arises however, are these concerns warranted? What impact does signage in the hospital have anyway? I can recall an instance where my registrar was holding open the door to the ICU whilst talking on her phone, and directly behind her was a "No Mobile Phones" sign. There have been some anecdotal reports of phones causing interference; however in general this is usually harmless to the patient such as alarms being triggered and electrocardiograms showing reversible aberrations. Overall, the evidence suggests that there is no significant risk from using mobile phones in hospitals as long as they are more than one metre away from sensitive equipment. [12] Furthermore, with advances in technology, newer medical equipment is becoming less sensitive to interference, as manufacturers are adopting increasingly stringent standards for screening. [13]

Interruptions

Witnessing constant interruptions by mobile phones during patient consultations on the wards and in the outpatient clinics is what really prompted me to reflect on this issue. Oftentimes patients are stopped mid-sentence and the doctor draws his or her focus elsewhere momentarily. This results in a distracted doctor who may then go on to forget vital pieces of information and subsequently fail to manage their patient optimally. Unfortunately, the rude interruptions are not always followed by an apology. It reaches breaking point when the clinician performs a truly insensitive and inappropriate act by answering their phone shortly after informing a patient of a serious diagnosis. Another important point to make is that it is difficult for a clinician to offer good advice regarding another patient over the phone, particularly when they already have a patient in front of them. This is because of both confidentiality issues and the fact that the clinician may be distracted by thoughts regarding their current patient.

These days, as medical students, we have come to expect at least one interruption per lecture by the clinician taking a phone call. Although it is understandable that they are busy people and are awaiting important calls, it can be quite frustrating once the lecturer has ended the call and

tries to re-engage a distracted group, often having forgotten their train of thought. On the other hand, clinicians have expressed their disdain regarding medical students sneakily sending an SMS under the desk or preferring to play a game on their iPhone rather than pay attention to the lecture content.

Thankfully, interruptions by mobile phones have become a recognised issue and groups have tried to implement strategies to reduce them. Solvoll and Scholl [14] proposed a system which would intercept the signals from the existing communication system before they are sent out to the mobile devices. The signals would then be routed through a context-aware system, paired with context information and available rules defined by the doctor, which will then decide what to do.

Privacy and confidentiality issues

Mobile phones nowadays have the capabilities to take high resolution still photos and even high definition videos. This has raised concern regarding breach of patient privacy and confidentiality. Unless explicit patient consent is given, it is not appropriate to take a photo of a patient's ailment and share it with others. At a bare minimum, there must be an effort to de-personalise a photo, by not including their face and covering any names that may appear in the image. In the United Kingdom, the confusion surrounding use of mobile phones in hospitals has led to the Medicines and Healthcare Products Regulatory Agency advising more selective restrictions on their use. [15] They have reasonably suggested that a total ban on mobile phones is not needed and is impossible to enforce effectively, but they do acknowledge that the use of camera phones may compromise patient confidentiality.

Another concern is with regards to the discussion of a patient over a mobile phone conversation. You only need to walk the corridors of a hospital or take a ride in the lift to hear a doctor or other healthcare professional discussing their patient with little concern about confidentiality. An effort should be made to delay such conversations until in a private setting.

The ugly

There has been evidence to suggest that nosocomial pathogens can be transferred throughout a hospital on objects such as ties and lanyards, to the point where some hospitals have now developed recommendations regarding "dangling bits." However, do we realise that our mobile phones are just as good an incubator for pathogens? In a study conducted by Ulger *et al.* [16], the contamination rate of healthcare workers' mobile phones and hands in the operating room and ICU was determined. In total, 94.5% of mobile phones demonstrated evidence of bacterial contamination with various bacteria (gram negative strains in 31.3% and *Staphylococcus Aureus* in 52%, including methicillin-resistant strains). Overall, distributions

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of the isolated microorganisms from mobile phones were similar to strains isolated from hands, and some phones were contaminated with nosocomially-important pathogens. The authors go on to suggest that we may need to develop active preventative strategies such as routine decontamination of mobile phones with alcohol-containing disinfectant to reduce the risk of cross-infection.

Conclusion

Having now reflected on the issue of mobile phone use in clinical practice, it is pertinent to adopt certain practises that will allow us as future clinicians to attain the benefits of mobile phones, without compromising patient care and respect.

Firstly, and most importantly, one should not answer their phone or respond to a message during consultation with a patient. If, for some unforeseen reason, there is no alternative but to answer the phone, a sincere apology should be promptly provided. Whether or not, as discussed above, certain strategies to reduce interruptions will be implemented remains to be seen. For now, it is easy enough to simply put one's phone on silent mode and respond when more appropriate. Furthermore, when discussing another patient over the phone, one should ensure that it is done in a suitable setting in order to uphold all patients' right to privacy and confidentiality. If it is useful to take a photo of a patient's ailment and share it with a colleague for educational purposes or for advice, firstly the patient's permission should be obtained. Then we should do our utmost to ensure their face does not appear in the image, and that all names are disguised.

Regarding the risk of interference with medical equipment by mobile phones, the evidence suggests that it is safe to use a mobile phone so long as there is at least a one metre distance from sensitive equipment.

Finally, now having the knowledge that mobile phones are potential sources of spread of infection, it would be sensible to sanitise our hands after their use and periodically give our phones a thorough clean with an alcoholic-based antiseptic solution.

By implementing the above strategies, we can exploit the benefits, whilst minimising the potential bad or ugly aspects, of mobile phone use in clinical practice.

Conflicts of Interest

None declared.

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