

The Hospital Pager: Out with the Old or Here to Stay?

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Miscommunication between health care teams is a major source of medical error, and it has been identified as the most common cause of preventable death or disability during hospital admissions.^{1,2} The increased specialization of health care and institution of the 80-hour work rule for trainees have resulted in a more frequent need for communication between clinicians both within and across care teams. Resultant problems include increased interruptions, identifying whom to contact for specific types of communication, and choosing the most efficient route of delivering that communication.^{3,4}

As the number of health care teams caring for a patient increases, communication becomes more complex and breakdowns are thus more likely to occur. These clinician-clinician miscommunications are a major source of medical error and morbidity.⁵⁻⁷ The goal of hospital communication systems is to allow for accurate and efficient communications, and advances in technology have been used to achieve this goal.

The 1950s saw the advent of the alphanumeric paging system for use in health care. Earlier systems transmitted

one-way numeric messages sent via telephone keypad, but this quickly evolved to one-way text-based messaging and, in some systems, two-way pagers equipped with small keyboards.⁵ Although alphanumeric pager use has allowed for increased information transmission, many physicians view pagers as disruptive.⁸ Studies have shown that during a typical call shift, as the proportion of urgent pager messages increased, the resident workload increased and the majority of these messages were later determined to be nonurgent.^{5,6,9} In addition, as the volume increased, many ceased to respond or when they did, response time exceeded 10 minutes.^{6,10} A clear workload threshold where communication breakdown occurred was not identified, but it was evident that increasing workload had adverse effects on patient care.

More recently, introduction of cellular phones and smartphones have created other options for rapid communication within hospitals. The bidirectional functionality of cellular phones has decreased the time needed to relay important information, eliminating the need to wait for a response as with pagers.^{5,11} Health care team

Abbreviations: ●●●, ●●●.

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members value the efficiency of cell phones and the ability to alternate between text messaging and phone call functions, and use of smartphones for communication within health care teams has increased dramatically over the past decade.^{5,8,12,13} However, recent studies have shown nurses associate smartphones use with decreased face-to-face interactions and limited opportunities for more meaningful interaction, despite a perceived decrease in time required to contact a physician.^{8,13,14} Another major barrier to the implementation of cellular phones as the primary method of communication over pagers is network reliability, unpredictable receptivity or “dead zones” within the hospital.³ In addition, the security of information sent via cellular phone is uncertain, risking loss of confidentiality.^{5,12,15} These issues all must be addressed before cellular phones can fully replace pagers as a primary means of communication within hospitals.

Alphanumeric paging remains the primary mode of communication, as cellular phone numbers are not made readily available to the entire hospital in the same way pager numbers are accessed.⁸ Interdisciplinary communication is the area that may most benefit from exploration of new technology, for example, hands-free communication devices, such as Vocera, or other video-based systems.^{5,8,16,17} Efficiency and faster speed of communication are perceived positively however, increased volume of communication and loss of control are commonly perceived as negative effects.^{15,18} Video-based communication systems may be the next step and this has already been explored in some centers. The cost is high, but it may be able to combine the ease of communication with the desire for face-to-face interaction. It is clear, though, that to reduce errors and miscommunication, one system should be chosen for reliability, and limitations should be examined and addressed.

Quality patient care requires an interdisciplinary approach and efficient interaction within and between hospital teams. Modern health care teams include physicians, physician assistants, nurse practitioners, RNs, dieticians, and pharmacists; teams in academic centers include residents, interns, and medical students. Advances in technology have the potential to improve patient care by increasing the efficiency and efficacy of communication within and among increasingly large health care teams. However, breakdowns in clinician-clinician communication are complex and cannot be solved through the implementation of devices or techno-

logically advanced systems alone. The introduction of more devices with expanding capabilities results in multiple methods of communication. It is essential to understand the correlation between emerging technologies, a demanding workload, and clinician-clinician interaction. The perfect method of communication would be easily accessible, allow for rapid message transmission, require minimal network usage, and be immune to network failure. Future research should investigate the use of emerging technologies as well as the frequency and quality of personal device use for hospital communications.

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