A Smart Phone-based Task Analysis

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BACKGROUND: In hospitals and health care organizations, there is some uncertainty regarding staffing
levels:

* Is there enough staff to accommodate workload in the current way of planning?
* Which tasks are performed and what are the time requirements for each task?
* Are there too few or too many times to rest within shifts for the personnel?

Traditional methods, such as self-reported surveys or diaries, used to record work tasks performed by
medical staff may not be the most accurate for several reasons. Medical staff may work under high stress
levels, often completing several tasks at the same time, making it difficult to record all activities
accurately. Moreover, it is quite common that medical staff change their work station during their shifts
making it difficult to administer traditional survey methods without incurring substantial costs.

METHOD: XIMES has developed a smart phone-based task analysis tool for conducting work sampling
studies in hospitals and health care organizations. Our approach is easy to use and requires only minimal
interference with regular working duties of participants. The smart phone is programmed to prompt
participants randomly every 30 minutes with an audible beep to gather information about their current
duties from a pre-defined task list. Answers can easily be recorded within seconds with just one finger
click. For longer resting periods sampling can be interrupted. Errors can be corrected by participants after
the end of their shift by logging onto their records at a predetermined website.

We have pilot tested this mobile work sampling instrument at two tertiary referral hospitals. Nine
different physicians were recorded each day for two months. The lengthy observation period provided
representative samples of working time and resting activities.

RESULTS: The convenient handling was commonly appreciated and our approach had a high response rate
(> 95% over two months). We were able to record more than 10,000 data points, thereby obtaining a
reliable perspective of work activity across weekdays, weekends and during night shifts. Our data showed
that physicians usually rested for four hours or more during night shifts. However, the variability in idle

periods was high between days and individuals. A detailed breakdown of non-patient times (e.g., waiting,
walking) facilitated discussion of process design.

CONCLUSION: The smart phone-based task analysis facilitates accurate collection of detailed information
with minimal financial and administrative efforts. Results obtained in our pilot study helped to inform
development of work/rest scheduling among hospital physicians.