Drug Telemonitoring in Oncology Research

Barbara Rapchak at Leap of Faith Technologies, Inc describes how technology can improve compliance and quality of life for cancer patients

With the rise in availability and use of oral cancer drugs, concern about compliance is an increasingly important issue in oncology. A review of compliance published in the *Journal of the National Cancer Institute* found that up to 80 per cent of cancer patients failed to follow their prescriptions (1). Many cancer centres do not have a system to track patient compliance, and the risk to patients is substantial. Patients who receive too much chemotherapy risk a toxic reaction or long-term damage, whereas those who receive too little lose the therapeutic benefits of the drug.

Emerging mobile phone-based telemonitoring technology has the potential to enhance medication compliance in oncology and clinical trials, while providing data in support of performance and pharmacodiligence. Solutions have recently been introduced that integrate mobile phones, radio frequency identification (RFID), and health and behavioural informatics to optimise medication compliance, track medication use, and extend patient care to the ambulatory setting.

Such technology can be thought of as a ‘smart service’ that uses the inherent abilities of wireless technologies such as mobile phones and RFID. It allows clinicians to take action based upon hard data: field intelligence. In this case, medication data read from a smart label (a label with an RFID inlay) on the medication package is collected wirelessly by the phone in real-time, and helps to verify that patients are taking the right drug at the right time, while monitoring adverse events. A web service makes the data readily available to clinicians. Alerts to various stakeholders can be triggered, enabling intervention in the case of missed medications or adverse events before they become a significant health risk. A mobile phone use case scenario is shown in Figure 1.

The best of these technologies are designed to facilitate compliance data collection and help manage adverse events. They go far beyond reminding patients to take their medications. Such systems also help...

Figure 1: Mobile phone use case scenario: outpatient care

1. Jim is 68 years old and takes two prescription medications for a chronic condition. He uses his mobile phone to manage his medications and monitor side effects and health status.
2. When it is time to take his medication, Jim receives a reminder call and uses his phone to scan each medicine. The phone reads encoded RFID data from the ‘smart label’ on the vial and confirms that he is holding the medication scheduled to be taken at this time. It tells him why he is taking this medication, and gives him instructions on the number of pills to take and the best way to take them.
3. Data from Jim’s phone is sent back to a server, where it is available to the pharmacy, provider, payer and/or other stakeholders in the healthcare chain.
patients monitor their symptoms, side effects, and overall wellbeing, using commercially available smartphones that integrate seamlessly into their lifestyle. Alerts can be triggered, allowing clinicians to intervene in the case of missed medications or adverse events before they become a significant health risk.

**HIGH-TECH, HIGH-TOUCH APPROACH**

Research suggests that a high-tech, high-touch approach is required in modifying patient behaviours surrounding adherence. The health decision model suggests that non-adherent behaviour is multifactorial (2). By modifying general and specific health beliefs, enhancing social interaction factors and optimising administration, adherence can be improved (3-5). Thus, adherence requires a sound technological approach coupled with a deep understanding of patient behaviours, health beliefs, and behaviour change.

A study undertaken by Express Scripts in the US examined principles related to the design of more effective therapy management programmes (6). They found that financial incentives alone had limited effect in changing consumer behaviour. The addition of psychosocial elements, such as message framing, to therapy management programmes had a significant effect in increasing the switch rate to generic simvastatin. Other research, funded by the US National Institutes of Health, suggests that patients want technology-based adherence interventions that fit seamlessly into the way they already live, and that use familiar technology to enhance self-efficacy (7). As a result, an intervention has been developed that delivers sustainable mobility to the patient on a familiar platform, while enhancing data quality and supporting automation efforts in drug delivery.

**TECHNOLOGY SUPPORTS CLINICAL TRIALS**

According to the *New England Journal of Medicine*, clinical trials report average adherence rates of only 43 to 78 per cent. It costs an average of $6,533 to recruit a patient for a trial, and three times that amount to recruit a new patient.

Remote telemonitoring technology can cost-effectively and accurately track drug
distribution, dosing times and missed doses, eliminating costly uncertainty about efficacy and the need for manual data entry. This can reduce the cost and time of bringing a drug to market.

With increased regulatory scrutiny of new drugs by the FDA, the technology is especially relevant to Phase IV studies, where it can automate data collection across large, widely distributed populations for extended periods of time.

NEED SUPPORTED BY COMPETITIVE PRESSURES AND REIMBURSEMENT ISSUES

Drug sales for cancer treatments are replacing cholesterol-reducers as the number one pharmaceutical sector, according to the IMS. Sales of oncology products worldwide will be $48 billion this year, representing nearly 17 per cent of the overall world pharmaceutical market, and will rise to between $80 and 85 billion by 2012 (9).

PhRMA recently came out with a report that there are 750 new drugs (or new indications for existing pharmaceuticals) currently under development (10). The single largest category is represented by drugs for solid tumours (204), followed by leukaemia (122), lung cancer (110) and breast cancer (90). Oral oncologytics that have come onto the market recently include Nexavar (sorafenib), Sutent (sunitinib malate), Revlimid (lenalidomide), Tykerb (lapatinib), Gleevec (imatinib mesylate) and Sprycel (dasatinib).

In their most recent drug trend reports, PBMs Express Scripts, Inc and Medco Health Solutions, Inc in the US both cited plans for increased use of oral oncology therapies. A study of pharmacy claims from a PBM for 500,000 members of small, self-insured plans found oral oncology drugs had a 300 per cent growth rate in spending from 1st January 2002 to 31st May 2006 (9). However, these drugs are not inexpensive – monthly therapy costs can range from $10,000 to more than $40,000. Health plans cannot afford to have noncompliant patients, or patients whose conditions do not warrant these very expensive therapies.

Pharmaceutical companies, governments and other payers are using more sophisticated economic analyses to understand the impact of pharmacotherapies on healthcare budgets worldwide. A ‘pay for performance’ reimbursement strategy is currently under evaluation between some manufacturers and national payers in the UK and Italy. In the US, The Centers for Medicare & Medicaid Services (CMS) is expected to more aggressively seek demonstrable proof that it is receiving ‘value for money’ from Medicare Part D and other government-funded programmes.

Competitive pressures and reimbursement issues will increase the demand for better evidential information on compliance and efficacy (11).

TECHNOLOGY SUPPORTS OTHER PATIENT POPULATIONS

Such technology was originally developed for cancer patients in clinical trials, and is now available to help anyone who is taking a lot of medication, or who is a caregiver for someone who is. This type of medication telemonitoring service puts everything patients need to know about their medication on their mobile phone, so that they can monitor and manage it while they’re on the go. Some systems keep a log of each medicine, similar to a call log, making it easy for patients to give their doctor or pharmacist an accurate list. It also gives the scheduled medications for each day, making it easy to plan ahead. Such technology represents the natural convergence of adherence, outcomes and intervention in a breakthrough technology.

References

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