MOBILE HEALTHCARE IN THE HOME ENVIRONMENT

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Abstract: **Mobile healthcare provision in the home environment presents many challenges. Patients are becoming more informed about the management of chronic conditions and the use of technology to support the process is rising. Issues such as system interoperability, cost, security and training all have to be addressed to ensure effective use of mobile devices within the home healthcare arena. An aging population will impact upon traditional healthcare delivery methods.**

I. INTRODUCTION

Attitudes to traditional methods of healthcare provision are changing. As the post-war generation move into old age, innovative methods of interacting with healthcare services are becoming available as increasing costs related to health and long term care is causing concern for all involved in the care process. Inevitably, new ways of delivering healthcare are being explored including delivery of healthcare to patients in the home environment.

Patients are becoming more involved in the management of their own conditions, with the support of healthcare professionals. The use of technology within the healthcare arena presents the opportunity to shift the burden of healthcare, including monitoring of chronic conditions, from Primary/Secondary care to the patients own home environment.

Patients are becoming more informed about the care process and are taking a fuller part in the planning and on-going monitoring of their own care. Monitoring of patients with chronic conditions at home, is underpinned by the development of individual tailored care management plans. The opportunity to inform healthcare professionals of any changes in condition in real time will support faster modification of treatment/care plans for individual patients. The use of appropriate mobile devices to collect, store, and transmit clinical data to nominated health professionals is critical to the process of supporting home-based healthcare.

The use of mobile healthcare devices also allows the exploration of use within the promotion of healthy lifestyles, the prevention and treatment of major diseases, all within the setting of the home environment.

II. MOBILE SOLUTIONS

Mobile devices suitable for deployment in the healthcare environment are evolving at a rapid pace. These include PDA's, laptops, smart phones, tablet PC's as well as devices specifically developed for the collection of clinical data in the home.

The development of mobile devices should focus on the clinical application along with patient requirements, including taking into consideration the level at which patients are able to accept the impact of technology in the home healthcare setting. There is a need to strike a balance between the cost of deployment and use of the device and satisfying individual users requirements.

Implementation of mobile healthcare devices requires the support of healthcare providers at a national level to ensure that a robust infrastructure is in place, allowing full interoperability to be supported. To support this activity, it may be prudent to study the implementation of mobile solutions in a range of other sectors, such as logistics and the financial sector.

III. APPLICATIONS

Mobile Healthcare devices possess the potential to support elements of the care process. These include:

- Reminders – mobile devices allow two way communication between patients and nominated healthcare professionals using text messaging. Communication can involve confirmation of appointments and reminders about medication schedules.
- Support – patients at home who suffer from chronic conditions may use mobile technology to remotely interact with other patients, thus reducing the feeling of isolation. Communication with nominated healthcare professionals, at times outside scheduled appointments, can also be supported. Patient satisfaction with healthcare systems and processes may also improve due to having access to current information and being the focus of patient centred care, these factors go some way to developing 'the expert patient' (1)

- Measurement and monitoring – these devices allow the collection of vital parameters from home based patients and may offer the opportunity to transmit data in real time to clinicians to support the optimisation of healthcare provision to individual
- rease in patient confidence due to a growth in understanding of their chronic condition and support patients taking a larger role in management of their condition.
- Wellbeing – healthcare delivery is beginning to increasingly contain elements that relate to the general wellbeing of populations in general. In order to support healthy initiatives, mobile devices can be deployed to monitor vital parameters during exercise and also deliver tailored individual advice on how to achieve and maintain a healthy lifestyle.

IV. ISSUES

Healthcare professionals increasingly require clinical data delivered in real time to support the clinical decision making process. The development of mobile healthcare devices allows this process to take place outside the traditional confines of Primary and Secondary Care. As with the deployment of any new technology that challenges traditional methods of healthcare delivery and management, there are issues that have to be addressed. These include:

- Security – includes the networks over which data are transmitted as well as security of the data themselves. Patients as consumers may raise concerns about the vulnerability of networks and potential breaches of security due to data being transmitted over 'perceived' unsecured networks. This issue merits focus as 'buy in' from patients is essential to ensure the full deployment of mobile devices within home based healthcare. There is a need to address and develop solutions for data security, authentication and risk management. However, communication of these solutions must be at a level which can be understood by individual patients.

- Training – it cannot be taken for granted that developers of mobile healthcare devices will take responsibility for end user training. Procurers of devices at an institutional level must be aware that ultimate responsibility for providing adequate training on how to use the devices to ensure maximum benefit has to be addressed and may have to be developed in-house. Focus must be on the requirements of an individual and diverse range of end users, including patients, carers as well as healthcare professionals.

- Cost – Advances in technology and the development of 'intelligent' devices to support

patients. As patients are able to access results and look at trends they can take a fuller part in treatment management. A benefit of this process may be an inc

home healthcare will play an increasing role over the next 20 years. However it is difficult to assess how mobile device costs will impact on healthcare expenditure in the future, or how the cost/benefit will be measured. The Health Related Quality of Life Assessment uses two types of measurement. The first is specific to a particular condition or disease, however chronic diseases such as diabetes do not have well tested measures (2) A second measurement is to capture the patients experience of their health. Both these methods may be used to evaluate the cost/benefit of supporting home healthcare by the use of mobile devices.

V. FUTURE FORECASTS

By 2010, the total spending on all healthcare services in the UK is likely to reach £144 billion. (3) This means that every £1 in 10 in circulation will be spent on healthcare. Providers of healthcare services will have to balance the cost of healthcare delivery with the investment required to deliver healthcare in Primary, Secondary and Home healthcare environments. An increase in expenditure will be due to population issues such as by 2020, 25% of the European population will be aged 60 and over and 20 million people will be aged 80 and over (an increase 0f 300% since 1960). The effect of an aging population will have an effect on types of healthcare delivery including home based services. New models of care will be required in order to support the demand for healthcare due to the projected increase in older people aged 80 and over. The UK Department of Health is currently investing £80 million in the 'Preventative Technology Grant' scheme. The scheme runs for two years from April 2006 and aims to promote the use of new technologies as a way of reducing avoidable admissions to hospital and residential care (4). The grant only covers basic technology provision but demonstrates a commitment to the integration of technology to support patients and carers in the home healthcare environment.

VI. CONCLUSION

The take up of mobile healthcare devices within the home environment must be patient driven, and will depend upon acceptable user interfaces, reliable service provision and a visible improvement in patient care/condition. The adoption of technologies such as XML will support interoperability between mobile devices and as such will deliver mobile device data integration solutions. Data security, regulation and integrity may differ depending on the mobile application but should always be developed in the context of patient requirements.

An aging population will impact upon healthcare delivery, the use of mobile healthcare devices in the home environment offers an opportunity to deliver services at the point of care. Healthcare managers will measure success using a complex matrix of techniques but success and integration into daily healthcare provision will be ultimately decided by patients, who will look for an improvement in the management of a chronic condition in the home environment.

Applications will continue to grow to support home based patient care with defined pathways to wider healthcare systems in whatever format. Perhaps the greatest challenge in the near future will be integrating home based mobile devices into mainstream healthcare provision.

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