Can Patient Centred Chronic Disease (CD) Care Be Improved By e-Health Technologies?

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Aims & Objectives

- This research project aims to generate improvements in the management and monitoring of CD care programs and pathways by using e-Heath technologies.
- Project Aims**:**
  - Enhancing health outcomes for patients, enabled by increased patient engagement that supports early intervention and prevention
  - Reducing the cost and increasing the effectiveness of care by using technology
  - Develop a framework that can be extended to all CD patients and replicated community wide

Using e-Health Technologies For

- Project Objectives:
  - Process modelling and automation of care plans to enhance information flow & sharing between patients & a team of care providers
  - Enhanced communication modes (email, SMS, Web and sensor based clinical devices) enabling clinical data collection at the patient's home and automated alert generation for early intervention
  - Smart Decision Support through activation of clinician-specified trigger points based on timely data collection
  - Improved workforce utilisation, redirecting resources to early intervention

Background

- The Australian Institute of Health and Welfare estimates, ~80% of disease in Australia is CD
- CD is often associated with ageing
- As social and economic conditions in developed countries now support longer life expectancy, current healthcare models are unsustainable
- Much of CD burden is attributable to ‘life-style’ factors, behaviour largely under the control of individual patients

Background - CD Care Plans

- Evidence-based care plans in US & Canada are known to support patient self-management and prevention
- In Australia only 14% of CD patients are provided with plans and less than 1% are monitored for adherence
- Care Plans are specific to a disease group (heart, diabetes) & involve clinical data recording by the patient and 3 monthly check-up
- The care plan in current usage is usually paper-based and voluntary

Background – Requirements for Care Plan Success

- Regular patient engagement recording relevant clinical data for monitoring
- Supporting alert generation for early intervention and risk prevention
- Facilitating timely communications and coordination between patient and clinicians

These can only partially be achieved, at substantial cost and variability, within the current systems using hardcopy, Fax and personal use of the telephone

Method - Case Study (Leadership)

- A case study design and participatory research approach in collaboration with the Helensvale Community Health Centre showing leadership in the articulation and implementation of Care Plan Management by:
    - Sharing some initial referral processes across several chronic disease programs
    - Appointing Case Managers to help co-ordinate patient treatments across a multi disciplined healthcare team
    - Keeping the GP part of the on-going treatment and informed of patient progress
    - Encouraging on-going patient engagement by recording clinical data in journals

Method - Case Study (Limitations)

- Procedures and processes were still paper based and often local to a single centre
- Information flow between the patient and several health professionals treating the one patient were slow and often not effective for timely intervention
- Monitoring relied on paper based summaries collated for 3 monthly review meetings

Method - Process Model Prototype

- CD management processes for Heart Failure, COPD and Diabetes 2, were mapped into a model prototype with the main features of any of the 3 actual plans reviewed and validated
- Lower level processes were modelled ensuring that information is only collected once and shared among care providers (with patient consent)
- Paper based journals with clinical data measured at home were to be enhanced using a web interface, SMS or sensor devices (for later)

Method - Process Model Prototype Cont…

- Patient clinical data collected is continuously analysed by a Decision Support Module to allow ‘real-time’ alerts & early intervention
- The prototype includes access points (activities) for application (clinical information systems) and human interaction – such as web-based forms for the patient and clinical roles to interact in an ersatz Care Plan scenario
- The process models support automation and provide a full picture of a patient care plan status to clinical staff

Results

- The Business Process Modelling Notation (BPMN) simplified the design of integrated processes of all 3 CD programs studied
- The picture/diagram representation of care plan and management processes provided a common language of communication for clinical staff, technical staff and researchers
- As translation from modelling to computer language is automatic, changes to the processes were instant during role-play and process optimisation

Results Continued

- The integrated record of care plan observables eliminates duplication in data collection at each location of treatment
- The techniques used are scalable and replicable to other CD areas with minimum effort
- The analysis by the Decision Support Systems redirects professional resources to patients who require early intervention
- The next step of the study aims to quantify improvement in care effectiveness and efficiencies afforded by the new processes and supporting technologies including a number of wireless sensor devices

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