

Computerized Decision Support Systems for Multimorbidity Care: An Urgent Call for Research and Development

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INTRODUCTION

Multimorbidity is defined as the coexistence of two or more chronic illnesses in an individual (Smith & O'Dowd, 2007). General Practitioners (GPs) and healthcare systems, worldwide, are overwhelmed by the growing number of patients with multimorbidity (Kenning, Fisher, Bee, Bower, & Coventry, 2013; Smith, O'Kelly, & O'Dowd, 2010). Yet, healthcare itself and its associated software systems are primarily configured to support healthcare providers in managing individual diseases rather than multimorbidity (Barnett et al., 2012). Moreover, there have been calls for new interventions to promote the provision of high quality care that meets the needs of people with multimorbidity (cf. Hobbs, Baker, & Davies, 2015; Marengoni et al., 2011; Mason et al., 2014; Mercer, Smith, Wyke, O'Dowd, & Watt, 2009; Muth et al., 2013).

This chapter highlights the potential benefits of one such intervention – that is the deployment of computerized decision support systems (CDSS) which are specifically designed to support multimorbidity care. The chapter begins by reviewing the impact of growing numbers of patients with multiple chronic conditions, particularly in a primary care setting. It then draws on extant literature to consider the benefits of CDSS, particularly those benefits that could be applicable to the multimorbidity context. Subsequently, the chapter emphasizes the urgent need for further research and development in this area if we are to exploit the potential offered by CDSS for multimorbidity care. It proposes the required features of a CDSS for multimorbidity support (in light of the potential benefits identified) and concludes by underlining some of the key challenges that must be overcome in order to increase the likelihood of success in such an endeavor.

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BACKGROUND

Advances in preventative and curative medicine as well as increasing life expectancy in the developed world have contributed to increasing multimorbidity (Smith et al., 2010). For example, an extensive cross-sectional study which extracted data on 40 morbidities from a database of 1,751,841 people registered with 314 medical practices in Scotland found that 42.2% of all patients had one or more morbidities and 23.2% were multimorbid (Barnett et al., 2012). Indeed, healthcare globally is faced with the need to cope with rising costs, aging populations and chronic disease (Kenning et al., 2013; Wills, Sarnikar, El-Gayar, & Deokar, 2010). In a study of 99,997 patients across 182 general practices in England, the majority of consultations were found to involve patients with multimorbidity (Salisbury, Johnson, Purdy, Valderas, & Montgomery, 2011).

Patients with multimorbidity often have frequent healthcare visits and frequent hospital admissions with enormous costs for the individuals and for the healthcare provider involved (C. M. Boyd et al., 2005). The healthcare costs for individuals with at least 3 chronic diseases accounted for 89% of Medicare's annual budget in the US (Anderson & Horvath, 2004). The treatment of chronic illness patients in Europe was estimated to account for 70-80% of health care expenses in countries such as Denmark and comprise 8 of the top 11 causes of hospital admission in the UK (WHO, 2006).

Furthermore, it is widely accepted that the care of these patients is complex (Muth et al., 2013; Smith, Soubhi, Fortin, Hudon, & O'Dowd, 2012) and that this care should incorporate an integrated view of the patients' multiple conditions (Stange, 2005). The majority of clinical practice guidelines and healthcare software systems address single diseases and their evidence is regularly based on studies which excluded patients with other diseases – but these guidelines may have undesirable effects when applied to patients with multimorbidity (C. M. Boyd et al., 2005; Fortin, Bravo, Hudon, Vanasse, & Lapointe, 2005; Murphy, Fahey, & Smith, 2014).

In relation to primary care in particular, GPs regularly encounter patients with multimorbidity, yet many practitioners feel overwhelmed when trying to manage these patients (Smith et al., 2010). In a qualitative study that explores the views and attitudes of Irish GPs and pharmacists who manage patients with multimorbidity in primary care, “GPs described a strategy of treating simpler and more manageable (acute) conditions in preference to opening the Pandora's box of multimorbidity” (Smith et al., 2010).

Furthermore, the model of care for multimorbidity is changing from a disease approach to patient-centered holistic care, with primary care as the key integrator/coordinator of various professions and organizations (Fraccaro, Arguello Casteleiro, Ainsworth, & Buchan, 2015). It is not surprising, therefore, that extant research has found that GPs would welcome decision support when dealing with multimorbid patients (cf. Grace et al., 2013; Schuling, Gebben, Veehof, & Haaijer-Ruskamp, 2012).

CDSS AND THEIR RELEVANCE TO MULTIMORBIDITY

In the clinical context, CDSS have been defined as ‘any electronic system designed to aid directly in clinical decision making, in which characteristics of individual patients are used to generate patient specific assessments or recommendations that are then presented to clinicians for consideration (Kawamoto, Houlihan, Balas, & Lobach, 2005).

While CDSS have shown great promise for reducing medical errors and improving patient care (Kawamoto et al., 2005), evidence that clearly demonstrates the positive effects of CDSS on clinical and

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