

with more emerging aimed at “mental performance” and sports, for example—the arguments given by de Jong and colleagues for postlaunch monitoring are sound.<sup>3</sup> Such monitoring could take a second look at need and synergistic effects, a research direction raised by the impact of food colourings, for example, which are used extensively in food and soft drinks.<sup>11</sup>

If evidence is robust that these products improve health, then what was wrong with people’s diets in the first place?<sup>12</sup> Attention to global nutrition has historically been on underconsumption, but more recently the reliance on preprocessed foods in industrialised society means that obesity has also become a problem.<sup>13</sup> So where do functional foods fit? Are they the first phase of fine tuning the consequences of the industrialised diet and lifestyle?<sup>14</sup> Or are they part of the wider struggle to improve diet in populations, which the WHO and Food and Agriculture Organization championed in 2004?<sup>15</sup>

Proponents argue that functional foods and drinks allow people to eat and drink more healthily without radically changing their diet.<sup>2</sup> Certainly, big changes in diet are needed.<sup>13</sup> Functional foods and drinks may be legal, make money, and reshape the way we think about food and drink. However, at best they are likely to be technical fixes, and at worst, another confounding factor that nutritional epidemiologists will have to unravel for years to come.

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## Multimorbidity’s many challenges

Time to focus on the needs of this vulnerable and growing population

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Patients with multiple conditions are the rule rather than the exception in primary care.<sup>1</sup> In a recent study of 21 family practices in the Saguenay region, Quebec, the prevalence of multimorbidity was 69% in 18-44 year olds, 93% in 45-64 year olds, and 98% in those aged over 65, and the number of chronic conditions varied from 2.8 in the youngest to 6.4 in the oldest.<sup>1</sup> Other countries report a similar burden.<sup>2,3</sup> The number of Americans with multimorbidity is estimated to rise from 60 million in 2000 to 81 million by 2020.<sup>4</sup>

Having multiple chronic medical conditions is associated with poor outcomes: patients have decreased quality of life,<sup>5</sup> psychological distress,<sup>6</sup> longer hospital stays, more postoperative complications, a higher cost of care, and higher mortality. Multimorbidity also affects processes of care and may result in complex self care needs<sup>7</sup>; challenging organisational problems (accessibility, coordination, consultation time); polypharmacy; increased use of emergency facilities; difficulty in applying guidelines; and fragmented, costly, and ineffective care.

Yet most research and clinical practice is still based on a single disease paradigm which may not be appropriate for patients with complex and overlapping health problems. Classic clinical trials tend to emphasise efficacy at the expense of effectiveness. In doing so, they exclude patients with multiple conditions, thereby compromis-

ing the external validity and the relevance of the trials for this population.<sup>8</sup>

Research on multimorbidity is in its infancy.<sup>9</sup> So far, most research has investigated the epidemiology of multimorbidity, its effect on physical functioning, and its measurement. Much less studied is the effect of multimorbidity on processes of care and what constitutes “best care” for these patients.

Areas for potential investigation of multimorbidity fall primarily into three categories—defining and categorising the population; developing the tools needed to explore multimorbidity and its consequences; and using these tools to investigate promising processes of care.

Who are the patients with several conditions? What is their risk profile? How do we distinguish multimorbidity from related concepts such as complexity, frailty, and polypharmacy? How do we classify multimorbidity and comorbidity in terms of conditions that need disparate versus congruent treatment strategies? For example, how does the patient with coronary disease, hypertension, and diabetes differ from the one with pulmonary disease, arthritis, and depression? In which situations is a subjective or an objective measure of multimorbidity more appropriate? Investigators have begun to look at several of these complex questions, but standards have not yet been developed.<sup>10</sup>

The results of prevalence studies reveal a complex picture of coexisting diseases. We now require a clear conceptual framework that includes consistent measures of multimorbidity and permits comparisons between studies. This will facilitate the next step—investigating improved processes of care. What are the best processes for making decisions in the context of multiple, often ill defined, problems and fragmentary evidence?<sup>11</sup> How should we assess the shifting priorities of patients and providers, design adaptive responses to unpredictable aspects of the illnesses, and organise multiple resources to achieve specific health goals?<sup>11</sup> What affects processes of care, and what constitutes best care? Which outcomes matter to these patients in which situations? How do we implement whatever best care turns out to be?

Answers to these questions will require continual experimentation, with substantial innovation and reform in healthcare delivery and organisation. Models of collaborative, patient centered, and goal oriented care are more likely to meet the complex needs of patients with multimorbidity. Involving patients in the research process and making good use of mixed methods research designs that incorporate both patient and provider perspectives may also help answer complex clinical questions.

The study of multimorbidity is particularly appropriate for the international research community for several reasons. Research is in its infancy, and appropriate collaboration may minimise redundancy and promote efficient and timely research. Different international communities have varied access to administrative data that can be used to paint broad pictures of caring for people with several conditions. The World Health Organization has given priority during the next decade to worldwide prevention and care of chronic illness.<sup>12</sup> International collaboration specifically among primary care researchers may result in patient centered and low

tech care practices that can be translated into practice in varied settings and across different healthcare systems.

As a step towards facilitating this collaboration, we have started a virtual research community to discuss research questions specifically directed towards international communication on multimorbidity ([www.med.usherbrooke.ca/cirmo/](http://www.med.usherbrooke.ca/cirmo/)). The increasing number of primary care research networks in many countries also offers an ideal setting for collaboration to occur. The time has come not only to include people of all ages with multimorbidity in research efforts, but to focus on improving the care of this vulnerable and growing population.

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## Thromboprophylaxis for adults in hospital

An intervention that would save many lives is still not being implemented

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The evidence that pharmacological thromboprophylaxis can reduce the rate of venous thromboembolism by 60-65% is compelling.<sup>1-3</sup> Last month the United Kingdom's National Institute for Health and Clinical Excellence (NICE) published guidelines on venous thromboembolism in patients having surgical procedures,<sup>4</sup> which are summarised in this week's *BMJ*.<sup>5</sup> The risks to surgical patients, particularly those undergoing orthopaedic procedures, are well known, but most people who develop venous thromboembolism in hospital are medical patients.

The prevention of venous thromboembolism in adult patients in hospital was the main challenge to patient safety in 2001, according to a technical assessment by the Agency for Healthcare Research and Quality in the United States.<sup>6</sup> In 2005, the UK government's Health Select Committee reported that venous thromboembo-

lism caused more than 25 000 potentially preventable deaths a year, and probably half of these deaths resulted from admission to hospital.<sup>7</sup>

Despite all this evidence, mortality due to venous thromboembolism after hospital admission is still at least 10 times greater than the more widely publicised mortality due to methicillin resistant *Staphylococcus aureus* (MRSA). Overall, the number of deaths from venous thromboembolism in the UK each year is five times greater than the combined total number of deaths from breast cancer, AIDS, and road traffic incidents. Indeed a revised estimate, based on an epidemiological model using extrapolation from European data, suggests that about 60 000 deaths from venous thromboembolism occur annually in the UK.<sup>8</sup> Autopsy data indicate that about 10% of deaths in hospital are due to pulmonary embolism.<sup>9</sup>