S Carpentier, M Bhat, M Deschenes, P Wong, P Ghali, G Sebastiani. A care coordination program to optimize management of cirrhosis. Real-life applicability and feasibility in the context of the Canadian health care system. Can J Gastroenterol Hepatol 2014;28(4):221-222.

To the Editor:

Liver cirrhosis is a major cause of death worldwide. Due to an aging population with chronic liver diseases, modelling projections show that cirrhosis-related morbidity and mortality will increase in the next 10 years. Currently, liver cirrhosis affects approximately 5.5 million patients in United States, representing the eighth leading cause of death. Cirrhosis-related complications are responsible for approximately 25,000 deaths per year (1). These numbers translate to an annual cost of >$1.5 billion (2). There are no data regarding the prevalence of cirrhosis in Canada. However, data obtained by extrapolation of *International Classifcation of Diseases* codes indicative of likely death from cirrhosis, including chronic viral hepatitis, liver failure, hepatocellular carcinoma, fibrosis and cirrhosis, and alcoholic liver disease, show that liver-related mortality increased from 3964 in 2000 to 5049 in 2007, a stunning increase of 27.9% (3).

Natural history studies show that 50% to 60% of patients with compensated cirrhosis will develop ascites within a decade. These patients have a five-year survival rate of approxiamtely 50% without a liver transplant (4). Once cirrhosis progresses to decompensation, in addition to ascites, patients develop complications such as spontaneous bacterial peritonitis, hepatic encephalopathy and hepatorenal syndrome. Up to 69% of patients with one of these complications require at least one nonelective hospital readmission within a median time of approximately two months after the first admission (5). The need for improvement in the structure of the health care system to more optimal care for cirrhotic patients with ascites is demonstrated by new research published in the *Journal of Hepatology*. In a study from the University of Padua, Italy, Morando et al (6) introduce a new model for specialized care in ambulatory cirrhotic patients with ascites. The authors evaluated the efficacy and financial sustainability of a 'care management check-up' as a new model of specialized care-giving support based on a series of diagnostic facilities and integrated activities performed in real time compared with standard care in outpatients with cirrhosis and ascites. This prospective study included 100 cirrhotic patients admitted to a single hospital. After discharge, the patients were allocated, in a nonrandomized alternate fashion, to the 'care management check-up' group, or to a 'standard outpatient care' group. The 'care management check-up' group was followed by a team of hepatologists, physicians-in-training, dedicated nurses and primary care physicians. The patients were then followed as outpatients up to the time of death or for at least 12 months. Patients of the two groups could also access a day hospital when an invasive procedure was required. The 'care management check-up' group had same-day access to blood and urine testing, ultrasound, gastroscopy, electroencephalography and psychometric testing. Based on the results of the tests obtained within the same day, patients received specific dietary and pharmacological instructions, were rescheduled for a new clinic visit within one to 12 weeks, and the new results and recommendations were immediately forwarded to the primary care physician. With this system in place, the authors showed significant improvements in the care of cirrhotic patients. In comparison, the 'standard outpatient care' group was followed by the primary care physician after discharge and was managed according to current guidelines with 'as needed' support from the hepatologist. The 'standard outpatient care' group presented with a higher 12-month mortality rate compared with the 'care management check-up' group (45.7% versus 23.1%; P<0.025). The rate of 30-day readmission was also higher in the former group (42.4% versus 15.4%; P<0.01), while the global cost attributable to the management per patient-month of life was lower in the 'care management check-up' group than 'standard outpatient care' (1479.19±2184.43€ versus 2816.13±3893.03€; P<0.05). In light of these results, Morando et al (6) suggest that the 'care management check-up' model, which requires a dedicated specialized team for care of cirrhotic patients with ascites, can delay complications, improve quality of life and survival, and is cost effective.

To date, the body of hepatology literature has addressed expected complications of cirrhosis with great rigour, and continues to investigate and instruct on the specifics of medical management as these complications arise. As pointed out in the 'Focus' article by Shouval et al (7) in the *Journal of Hepatology*, this could be regarded as a fairly reactionary approach, in which specialist support is provided only on an "as needed" basis (7). The 'real time' monitoring infrastructure proposed by Morando et al (6) provides on-the-spot comprehensive clinical evaluation and intervention, expert dietary and lifestyle counselling, immediate medication adjustment and real-time communication to the family physician (6). With the remarkable improvements achieved by this model, hepatology clinics should be examining at their own practice in an attempt to implement a similar structure at their own facility.

In reading the article and attempting to compare the model described by Morando et al (6) with our own clinical practice, we came across two stumbling blocks. First, we noticed that the study group excluded cirrhotic patients >80 years of age. We actually have several such patients in our centre and are unsure of the rationale behind their exclusion. In fact, cirrhotic patients are living longer and, as a consequence, the incidence of cirrhosis in elderly patients is rising (Table 1). Furthermore, this is the group of patients who are unlikely to be offered liver transplantation and in whom the delivery of care is likely to have the greatest impact. D'Souza et al (8) showed that the prevalence of cirrhosis in hepatitis C patients >71 years of age may be as high as 45% among Caucasian patients and 85% among Asian patients, while it is 6% and 30%, respectively, among patients <70 years of age. Considering the ethnic diversity of the Canadian population, we believe that the rates of cirrhosis in our institution are similarly high in elderly

TABLE 1
Prevalence/incidence of cirrhosis in elderly patients

Author (reference)	Number of patients included	Elderly patients	Nonelderly patients
D'Souza et al (8)	382 (hepatitis C)	Prevalence in >70 years of age 85% (Asians); 45% (Caucasians)	Prevalence in <70 years of age 30% (Asians); 6% (Caucasians)
Hsu et al (11)	9711 (all etiologies)	Prevalence in >70 years of age 18.7%	Prevalence in <70 years of age 20.3%
Ratib et al (10)	5118 (all etiologies)	Incidence in >75 years of age 18.1%	Incidence in <75 years of age 20.5%
Fleming et al (12)	3360 (all etiologies)	Incidence in >75 years of age: 21.1% (75 to 85 years of age); 8.82% (>85 years of age)	Incidence in <75 years of age 25.4% (65 to 74 years of age); 23.5% (55 to 64 years of age); 10.2% (<54 years of age)

patients. Accordingly, a recent study suggested that patients with cirrhosis are living longer in North America, with a mean age of 75 years (9). In fact, age at diagnosis of cirrhosis is >75 years in >18% of cases (10). Finally, the incidence of cirrhosis continues to increase, especially in individuals ≥75 of age (11,12).

Second, in the 'care management check-up' group, the availability of an endoscopy suite, day hospital, electroencephalography technology and dedicated laboratory processing, should it be needed on demand for a given patient, would be an unattainable goal at most hospitals in our region. Current organization is such that resources in chronic disease management are first channelled to development of community-based integrated networks (13,14). The interventional model demonstrated in Padua would require not only adjustments beyond the capacity of a single hepatology division, but a paradigm shift toward the pooling of resources between divisions and across specialties at the tertiary level for this special population of chronic liver disease patients. This is not to say it cannot be done. Rather, the results of this study suggest that it should be done, and has been done in the context of the Italian Health Care system. As such, we would urge administrators and decision makers to consider how proven, integrated health care systems that have demonstrated clinical and cost-effective benefit may be funded.

Overall, we are enthusiastic about the new infrastructure of care proposed by Morando et al (6) and the effect on patient care is well documented. Additional information regarding choice of inclusion criteria and the organization of the model from an administrative perspective would be helpful in determining real-life applicability and feasibility within the Canadian public health care system.

ACKOWLEDGEMENTS: MB is supported by a fellowship from the Canadian Institutes of Health Research (CIHR). GS holds a *Chercheur-Boursier* career award from the *Fonds de la Recherche en Santé du Quebéc* (FRSQ).

DISCLOSURES: The authors have no financial disclosures or conflicts of interest to declare.

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REFERENCES

1. Schuppan D, Afdhal NH. Liver cirrhosis. Lancet 2008,371:838-51.
2. Kim WR, Brown RS Jr, Terrault NA, El-Serag H. Burden of liver disease in the United States: Summary of a workshop. Hepatology 2002,36:227-42.
3. Canada S. Deaths and mortality rate, by selected grouped causes and sex, Canada, provinces and territories, annual, CANSIM (database). <www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=1020552&paSer=&pattern=&stB 2013> (Accessed December 5, 2013).
4. Gines P, Cardenas A, Arroyo V, Rodes J. Management of cirrhosis and ascites. N Engl J Med 2004,350:1646-54.
5. Volk ML, Tocco RS, Bazick J, Rakoski MO, Lok AS. Hospital readmissions among patients with decompensated cirrhosis. Am J Gastroenterol 2012,107:247-52.
6. Morando F, Maresio G, Piano S, et al. How to improve care in outpatients with cirrhosis and ascites: A new model of care coordination by consultant hepatologists. J Hepatol 2013,59:257-64.
7. Shouval D. Focus. J Hepatol 2013,59:201-2.
8. D'Souza R, Glynn MJ, Ushiro-Lumb I, et al. Prevalence of hepatitis C-related cirrhosis in elderly Asian patients infected in childhood. Clin Gastroenterol Hepatol 2005,3:910-7.
9. Rakoski MO, McCammon RJ, Piette JD, et al. Burden of cirrhosis on older Americans and their families: Analysis of the health and retirement study. Hepatology 2012,55:184-91.
10. Ratib S, Fleming KM, Crooks CJ, Aithal GP, West J. 1 and 5 year survival estimates for people with cirrhosis of the liver in England, 1998-2009: A large population study. J Hepatol 2014;60:282-9.
11. Hsu YC, Lin JT, Chen TT, Wu MS, Wu CY. Long-term risk of recurrent peptic ulcer bleeding in patients with liver cirrhosis: A 10-year nationwide cohort study. Hepatology 2012,56:698-705.
12. Fleming KM, Aithal GP, Solaymani-Dodaran M, Card TR, West J. Incidence and prevalence of cirrhosis in the United Kingdom, 1992-2001: A general population-based study. J Hepatol 2008,49:732-8.
13. Québec. MoHaSSo. The Québec health and social services system – in brief. 2008. < http://publications.msss.gouv.qc.ca/acrobat/f/documentation/2007/07-731-01A.pdf> (Accessed December 5, 2013).
14. Sutherland J RN, Crump R. Funding Health and Social Care in Montréal, Québec: A Review of the Methods and the Potential Role of Incentives. Canadian Foundation for Healthcare Improvement, 2013. <www.cfhi-fcass.ca/Libraries/Reports/Funding-Care-Methods-Sutherland-E.sflb.ashx> (Accessed December 5, 2013).