The challenge of an increasingly expensive blood system

Kumanan Wilson, Paul C. Hébert

In 1997, Justice Krever released his final report on the Canadian blood system.[1] The report stated that "the safety of the blood supply system is paramount," transcending other principles governing the blood system. Since the release of this report, and true to its intentions, the safety of the blood supply has been the priority of Canadian blood authorities. Several new safety measures have been introduced, often in advance of other nations, which have helped to restore the public's confidence in the blood system.

The blood system, however, is now facing a new challenge: rising costs. The total expenditures of Canadian Blood Services, which replaced the Canadian Red Cross as the operator of the blood system in all provinces except Quebec, have risen 51% from an annualized total of $422 million in 1998/99 to $638.8 million in 2001/02 (Dr. Graham Sher, Canadian Blood Services, Ottawa, Ont.: personal communication, 2002). In contrast, over this same time period overall health care costs increased by 25%.[2] The increasing blood system costs are borne entirely by the provinces and are placing additional strain on already tight provincial health care budgets.

There are several reasons why blood system costs are rising. One of the important factors is the cost associated with new measures that have been introduced to improve the safety of the blood system. These measures include universal leukoreduction, that is, the removal of white blood cells from blood products, and nucleic acid amplification testing (NAT) for hepatitis C and HIV. Costs due to new donor recruitment have also been associated with the decision to introduce donor deferral policies to protect the blood system from variant Creutzfeldt–Jakob disease (CJD).[3] The blood system will also soon have to consider whether to adopt expensive new safety measures such as pathogen inactivation, which are techniques by which cellular products and plasma are treated to destroy known and potentially unknown infectious agents.[4] The blood system will also have to manage new infectious threats, such as that posed by West Nile virus.

Are these safety measures cost-effective?[5–7] In the United States, NAT testing is estimated to prevent the transfusion of 12 HIV-infected units of blood and 214 hepatitis C–infected units of blood per year at an estimated annual cost of $47.2 million.[8] The cost per quality-adjusted life-year of NAT testing is estimated at nearly $2 million, which is well above that of most health care interventions.[9–11] Similarly, some have argued that the benefits of universal leukoreduction do not appear to warrant the costs, an estimated one-third increase in the price of erythrocytes and platelets.[6–8] Variant CJD donor deferral policies have also come under criticism given that the benefit of these policies is only theoretical.[12] When evaluating these policies, it is important to remember that many of the benefits of safety measures may not be fully known at this time or may never be known. The blood system has chosen to introduce these measures in a precautionary manner, having learned the lessons of waiting for definitive evidence of benefit. The introduction of these measures, however, demonstrates to the public that the blood system is acting proactively, a benefit that cannot be captured by traditional cost-effectiveness analyses. It would not necessarily be a wise policy to rely solely on cost-effectiveness analyses to determine which measures should be introduced.

The other major cost drivers in the blood system are the increase in use of both fractionated and cellular products and the increase in purchasing cost of fractionated products. For example, spending on intravenous immune globulin (IVIG) in Canada (excluding Quebec) has increased steadily by 30% per year and is estimated to have exceeded $160 million in 2001/02.[13,14] Reasons for this rise in expenditure include a greater than 2-fold increase in the purchasing cost of the product since 1997 due to worldwide shortages, introduction of safety measures and reliance on foreign manufacturers for IVIG.[15] The rise in expenditures is also a result of annual increases in use of 15%–30%.[14] The general increase in use of both fractionated and cellular blood products, and the costs associated with this increase in use, has drawn attention to the possibility that health care providers may be using these products for indications supported by limited evidence. Attention once again is focused on IVIG, with estimates suggesting that 25% of current IVIG use is for off-label, nonclinically indicated purposes.[16] Identifying whether the use of blood products is appropriate, however, is generally limited by the lack of high-quality clinical studies intended to evaluate various management strategies in the administration of all forms of blood products.[17]

Further increases in blood system expenditures are expected over the next several years because of a predicted continued increase in the use of blood products combined with the impact on cost of existing safety measures. In addressing this problem, some individuals in the blood system have focused on the possibility that the present system of funding in the blood system does not encourage the optimal use of blood products.[13] Currently the provinces, except for Quebec, provide funds to Canadian Blood Ser-

vices, which then provides blood products free of charge to hospitals. As a result of this arrangement, hospitals do not experience any financial penalties if their physicians provide too many transfusions or provide transfusions for nonindicated reasons. However, hospitals would have to pay out of their own budgets to introduce measures, such as audit/feedback and education, to prevent inappropriate transfusions.[18] Similarly, hospitals would have to pay out of their own budgets to introduce the use of blood alternatives (e.g., erythropoietin) and blood conservation techniques (e.g., cell salvage).

One option that some individuals in the blood system are considering to remedy this situation is to change the system of payment, so that hospitals would have to purchase blood products in a manner similar to that in which they purchase pharmaceuticals. Instead of providing block payments to Canadian Blood Services in exchange for the provision of blood products free of charge to hospitals, the provincial governments would redirect this money to their hospitals, which would then purchase blood products directly from Canadian Blood Services. The belief is that this would create a financial incentive to introduce measures to control the use of blood products at the hospital level. However, more study is needed before deciding whether such a major structural change to the blood system should be instituted, because it would involve many challenges and has some potential drawbacks. These drawbacks include the potential for financial priorities to supersede patient care in the delivery of transfusion services at the hospital level.

The blood system should be commended for taking important steps to re-establish the public's confidence in the safety of the system. The provinces and the operators of the blood system must now consider the issue of rising costs. First, in order to address the problem of increasing use of products, further high-quality research is needed to identify appropriate transfusion thresholds, obtain quality data on current transfusion practices and determine the effectiveness of measures to improve appropriate use. These efforts need to be targeted particularly at specific high-use products such as IVIG. Second, the provinces and the blood system operators will need to identify effective methods by which to balance the cost of new safety measures versus their theoretical benefits. This is best achieved by continuing to introduce safety measures on a precautionary basis. However, once these measures are introduced, their cost-effectiveness should be regularly evaluated to determine whether they should be continued. Third, structural changes in the payment for blood products also need to be considered as an option to improve use, however, the effectiveness of these changes needs to be evaluated before they are introduced. Many of the initiatives described here are already underway at the level of the operators of the blood system and the provinces. Continued progress is needed in these areas to ensure that the Canadian blood system is able to maintain delivery of a high level of transfusion service and has the capacity to meet future challenges.

From the Department of Medicine, University of Toronto, Toronto (Wilson); the University of Ottawa Centre for Transfusion Research, Ottawa (both authors); and the Clinical Epidemiology Program, Ottawa Health Research Institute, University of Ottawa, Ottawa (Hébert), Ont.

Competing interests: None declared.

Contributors: Dr. Wilson was responsible for the initial conceptualization of the manuscript, obtained information and drafted the manuscript. Dr. Hébert was responsible for the initial conceptualization of the manuscript and critical revision of the manuscript.

Acknowledgements: Dr. Wilson is a Canadian Institutes of Health Research New Investigator. Dr. Hébert is a Career Scientist at the Ontario Ministry of Health.

This commentary is based on research supported by a Canadian Institutes of Health Research grant (no. 49455).

References

1. Krever H. *Commission of inquiry on the blood system in Canada*. Final report. Ottawa: Canadian Government Publishing; 1997.
2. Canadian Institute for Health Information. *Health Spending to top $112 billion in 2002, reports Canadian Institute for Health Information. Part 2.* Available: secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=media_18dec2002_2_e#charts (accessed 2003 Feb 18).
3. Health Canada. United Kingdom, France & Western Europe. Donor exclusion to address theoretical risk of transmission of variant Creutzfeldt-Jakob disease (vCJD) through the blood supply. Ottawa: Biologics and Genetic Therapies Directorate, Blood and Tissues Division, Health Canada; 2001 Aug. Available: www.hc-sc.gc.ca/english/media/releases/2001/2001_96ebk1.htm (accessed 2003 Mar 31).
4. Council of Europe Expert Committee in Blood Transfusion Study Group on Pathogen Inactivation of Labile Blood Components. Pathogen inactivation of labile blood products. *Transfus Med* 2001;11:149-75.
5. Aubuchon JP, Petz LD. Making decisions to improve transfusion safety. In: AuBuchon JP, Petz LD, Fink A, editors. *Policy alternatives in transfusion medicine*. Bethesda (MD): AABB Press; 2001. p. 193-226.
6. Goodnough LT. The case against universal WBC reduction (and for the practice of evidence-based medicine). *Transfusion* 2000;40:1522-7.
7. Van Hulst M, de Wolf JT, Staginnus U, Ruitenberg EJ, Postma MJ. Pharmaco-economics of blood transfusion safety: a review of the available evidence. *Vox Sang* 2002;83:146-55.
8. Medical Payment Advisory Commission (MedPAC). Appendix A: safety regulation, standards and technology. In: *Report to the Congress: blood safety in hospitals and Medicare inpatient payment*. Washington: MedPAC; 2001. p. 17-26. Available: www.medpac.gov/publications/congressional_reports/dec2001BloodSafety.pdf (accessed 2003 Feb 18).
9. Pereira A, Sanz C. A model of the health and economic impact of posttransfusion hepatitis C: application to cost-effectiveness analysis of further expansion of HCV screening protocols. *Transfusion* 2000;40:1182-91.
10. Stramer SL. US NAT yield: Where are we after 2 years? *Transfus Med* 2002;12:243-53.
11. Laupacis A, Feeny D, Detsky AS, Tugwell PX. How attractive does a new technology have to be to warrant adoption and utilization? Tentative guidelines for using clinical and economic evaluations. *CMAJ* 1992;146:473-81.
12. Wilson K, Hebert P, Laupacis A, Dornan C, Ricketts M, Ahmad N, et al. A policy analysis of major decisions related to Creutzfeldt-Jakob disease and the blood supply. *CMAJ* 2001;165(1):59-65.
13. Wadsworth L. Focus: IVIG. *Blood Matters* 2002;4(1):2. Available: www.bloodlink.bc.ca/newsletter/bm-jan02.html (last updated 2002 June 16) (accessed 2003 Feb 18).
14. Pi D, Petraszko T. IVIG supply and cost. In: *IVIG utilization management handbook*. 1st ed. Vancouver (BC): Provincial Blood Coordinating Office; 2002. p. 1-3.
15. Canadian Blood Services National Liaison Committee (NLC). Report on April 2002 meeting. 2002 Apr 15; Ottawa. Available: www.transfusion.ca/downloads/CBS-NLC-April-2002.doc (accessed 2002 Mar 31).
16. Sher G. Situation in Canada. Plasma self-sufficiency in Canada – is it a matter of safety? National Blood Safety Council Open Forum; 2001 Mar 29–30; Vancouver. Available: www.bloodsafety.gc.ca/docs/2001/min/03/min_2001032930-d1-3-e.html (accessed 2003 Mar 31).
17. Hebert PC, Fergusson DA. Red blood cell transfusions in critically ill patients. *JAMA* 2002;288:1525-6.
18. Wilson K, MacDougall L, Fergusson D, Graham I, Tinmouth A, Hebert P. The effectiveness of interventions to reduce physician's levels of inappropriate transfusion: what can be learned from a systematic review of the literature. *Transfusion* 2002;42:1224-8.

Correspondence to: *Dr. Kumanan Wilson, ENG-254, Toronto General Hospital, University Health Network, 200 Elizabeth St., Toronto ON M5G 2C4; fax 416 595-5826; Kumanan.Wilson@uhn.on.ca*