

Development of a time-driven activity-based costing model for assessing the societal acquisition cost of erythrocyte concentrate in Europe

Szucs T⁺, Bauwens J^{*}, Alfonso JE^{*}, Holthuis N[°], Von Knorring J^{*}, Demey J^{*}

⁺ University Zurich, Zurich, Switzerland; ^{*} Health Information Communication Technology (hict), Bruges, Belgium; [°] Landstinget Kronoberg - Department of Clinical Chemistry & Transfusion Medicine, Växjö, Sweden

Background

The cost of blood products is regularly underestimated since the acquisition cost does not represent the total cost for obtaining and producing blood components. Historical accounting attempts to assess the cost of erythrocyte concentrate have varied in scope, perspective and methodology, leading to incomparable and criticised conclusions.

Aims

To assess the true acquisition cost of erythrocyte concentrate in different European health care systems by using a standardised methodology.

Method

We derived a time-driven activity-based costing model taking into consideration blood centre costs and donor costs. Input from 3 (Swedish) blood centres was consolidated to develop a country specific model.

	Step	Source
Blood centres	1. Chronological description of the transfusion chain in main processes and activities.	Transfusion specialists.
	2. Identification and quantification of all necessary resources and outputs of the activities.	Transfusion specialists.
	3. Collection of cost information.	Blood centre's general ledger.
	4. Quantification of each resource's consumption.	Time estimates from transfusion professionals.
Donors	5. Collection of figures on transportation method, time and moment of donation.	Questionnaires administered to donors.
	6. Obtaining transport costs.	National databases.

Table 1: Input for the activity-based costing model for the acquisition cost of erythrocyte concentrate.

To quantify the cost of activities, a capacity cost rate is calculated for the resources actually performing the work, representing a monetary value for each minute of available practical capacity in the blood centre.

$$\text{Capacity cost rate} = \frac{\text{actual costs for supplying resources (in monetary terms)}}{\text{practical capacity of resources performing actual work (in minutes)}}$$

Donor time is quantified in monetary terms by using the national value of productivity.

Results

Part	Content
Process description	Between 5 and 24 activities per main process.
Outputs	Represented by statistics on: <ul style="list-style-type: none"> - donors; - blood collections; - units erythrocyte concentrate.
Practical capacity	In the direct «production» processes: <ul style="list-style-type: none"> - all direct labour functions; - all equipment performing automated work.
Costs	Expenditures for direct and indirect resources necessary to perform the activities.

Table 2: Summarised description of the activity-based costing model for the acquisition cost of erythrocyte concentrate.

We were able to determine a simplified cost formula:

Societal cost of erythrocyte concentrate

$$= \sum (\text{direct labour time} \times \text{labour capacity cost rate}) \\ + \sum (\text{direct equipment time} \times \text{equipment capacity cost rate}) \\ + \sum \text{donor time} \times \text{national value of production} \\ + \sum \text{cost donor transport}$$

Dividing the obtained cost by the number of units erythrocyte concentrate obtained in the same period of time, shows the total societal cost of 1 unit erythrocyte concentrate. The model presents the respective costs for each of the identified processes where costs are occurred.

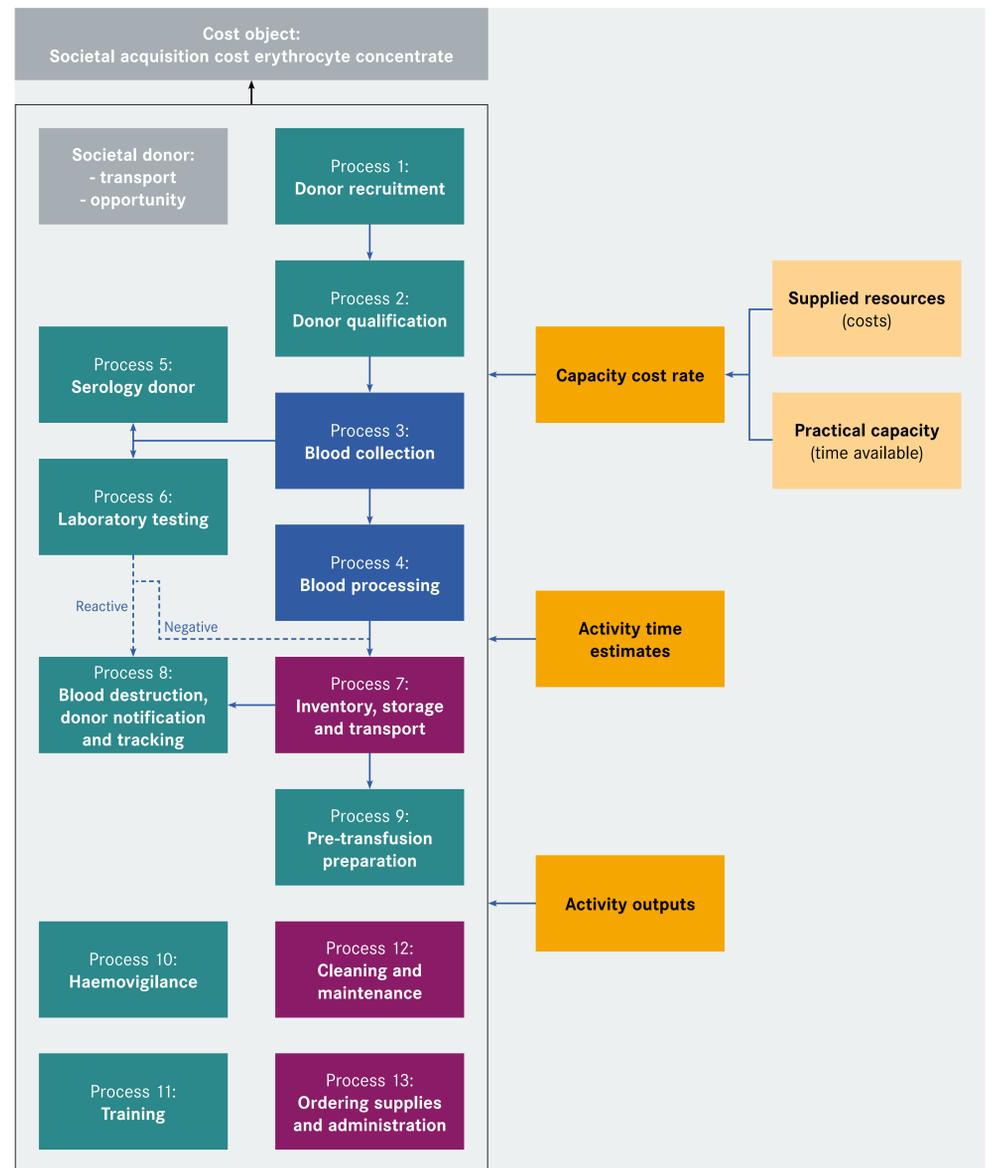


Figure 1: Time-driven activity based costing model to assess the societal acquisition cost of erythrocyte concentrate (key: blue: direct «production» processes; green: quality assurance processes; red: supporting processes).

Summary/Conclusions

The detailed process analysis reveals many activities and a significant amount of resources that have been excluded in previous accounting attempts to assess the acquisition cost of erythrocyte concentrate. The described model provides a complete and documented scope with a straightforward and transparent cost allocation methodology, respecting the societal perspective. First results using this methodology are coming by the end of year from Sweden. Other countries will also be evaluated thereafter.

Added value:

- insights in how the total cost is occurred;
- comparisons of results from different health care systems;
- use in cost-effectiveness analyses;
- support public health decision makers in evaluating alternative therapies;
- beneficial for institutions seeking adequate financing of erythrocyte concentrate.

Acknowledgements

This study has been supported by an unrestricted educational grant through Vifor Pharma Ltd.

References

1. Amin M, Fergusson D, Aziz A, Wilson K, Coyle D, Hébert P. The cost of allogeneic red blood cells – a systematic review (2003) *Transfusion Medicine* 13(5):275-85.
2. Kaplan RS, Anderson SR. Time-driven activity-based costing (2004) *Harvard Business Review*, November 2004, 1-8.
3. The cost of blood: Multidisciplinary consensus conference for a standard methodology (2005) *Transfusion medicine Reviews* 19(1):66-78.
4. Pereira A. The economics of blood transfusion in the 21st century (2007) *ISBT Science Series* 2(1): 184-188.
5. Shander A., Hofmann A, Gombotz H, Theusinger OM, Spahn DR. Estimating the cost of blood: past, present and future directions (2007) *Best Practice and Research Anaesthesiology* 21(2):271-289.

Address for correspondence

Thomas D. Szucs, MD, MPH, MBA, LL.M.
Professor of Medicine
Institute of Social- and Preventive Medicine
University of Zurich
Hirschengraben 84
8001 Zurich
Thomas.szucs@ifspm.uzh.ch



University of Zurich