

University of Groningen

## Rate control was more cost effective than rhythm control in persistent atrial fibrillation

Hagens, V. E.; Vermeulen, K. M.; Ten Vergert, E. M.; Van Gelder, I. C.; Newman, David

*Published in:*  
Evidence-Based Medicine

*DOI:*  
[10.1136/ebm.10.2.59](https://doi.org/10.1136/ebm.10.2.59)

**IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.**

*Document Version*  
Publisher's PDF, also known as Version of record

*Publication date:*  
2005

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*

Hagens, V. E., Vermeulen, K. M., Ten Vergert, E. M., Van Gelder, I. C., & Newman, D. (2005). Rate control was more cost effective than rhythm control in persistent atrial fibrillation. *Evidence-Based Medicine*, 10(2), 59. <https://doi.org/10.1136/ebm.10.2.59>

### Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

### Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

*Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.*

# Rate control was more cost effective than rhythm control in persistent atrial fibrillation










Hagens VE, Vermeulen KM, TenVergert EM, *et al.* Rate control is more cost-effective than rhythm control for patients with persistent atrial fibrillation—results from the RAte Control versus Electrical cardioversion (RACE) study. *Eur Heart J* 2004;**25**:1542–9.

Clinical impact ratings GP/FP/Primary care ★★★★★☆☆ IM/Ambulatory care ★★★★★☆☆ Internal medicine ★★★★★☆☆ Cardiology ★★★★★☆☆

## Q In patients with persistent atrial fibrillation, is rate control more cost effective than rhythm control for reducing cardiovascular morbidity and mortality?

### METHODS

Abstract and commentary also appear in ACP Journal Club

-  **Design:** cost effectiveness analysis (from a societal perspective) of a randomised controlled trial (RAte Control versus Electrical cardioversion [RACE]).
-  **Allocation:** concealed.\*
-  **Blinding:** blinded (outcome assessors and monitoring committee).\*
-  **Follow up period:** mean 2.3 years.
-  **Setting:** 31 centres in the Netherlands.
-  **Patients:** 522 patients who had recurrent persistent atrial fibrillation or flutter, 1–2 electrical cardioversions during the previous 2 years, and no contraindications to oral anticoagulation. Exclusion criteria: arrhythmia lasting >1 year, New York Heart Association class IV heart failure, current or previous treatment with amiodarone, or use of a pacemaker.
-  **Intervention:** rate control (n = 256) or rhythm control (n = 266). Rate control included use of digitalis, a non-dihydropyridine calcium channel blocker, and a β blocker, alone or in combination. Target resting heart rate was <100 beats/minute. Patients in the rhythm control group received serial electrical cardioversion and serial antiarrhythmic drugs using sotalolol, 160–320 mg/day, as the first choice, followed by class IC antiarrhythmic drugs, with amiodarone used as the last choice.
-  **Outcomes:** incremental cost savings per avoided composite endpoint (ie, death from cardiovascular causes, heart failure, thromboembolic complications, bleeding, need for pacemaker implantation, or severe effects of antiarrhythmic drugs). Costs of care (including cardioversions, medications, outpatient visits, hospital admissions, general practitioner visits, thrombosis laboratory, professional help, informal care, and travel costs) (discounted at a rate of 4%) were estimated in 2000 European euros.
-  **Patient follow up:** 82% of patients (mean age 69 y, 63% men) were included in the intention to treat cost effectiveness analysis.

\*See glossary.

Rate control v rhythm control in persistent atrial fibrillation at mean 2.3 years\*

Outcomes	Rate control	Rhythm control	Difference (95% CI)
Composite endpoint	17.5%	21.2%	-3.7% (-11.2 to 3.9)†
<b>Cost effectiveness ratio</b>			
Mean cost per patient	€7386	€8284	€24 944

\*Composite endpoint = death from cardiovascular causes, heart failure, thromboembolic complications, bleeding, need for pacemaker implantation, or severe effects of antiarrhythmic drugs. CI defined in glossary.  
†Difference not significant.

### MAIN RESULTS

The groups did not differ for the composite endpoint; however, rate control was more cost effective than rhythm control (table).

### CONCLUSION

In patients with persistent atrial fibrillation, rate control was more cost effective than rhythm control for reducing cardiovascular morbidity and mortality.

For correspondence: Dr I C Van Gelder, University Hospital Groningen, Groningen, The Netherlands. i.c.van.gelder@thorax.azg.nl

Sources of funding: Center for Health Care Insurance; Interuniversity Cardiology Institute; 3M Pharma.

### Commentary

The RACE trial by Hagens and *et al* did not identify a strategy-dependent difference in efficacy outcomes between patients randomised to receive efforts to maintain sinus rhythm or continue with rate control. This negative result was also seen in the 4000 patient Atrial Fibrillation Follow up Investigation of Rhythm Management (AFFIRM) Study.<sup>1</sup> In RACE, 36% of patients in the rhythm control group were in sinus rhythm by the time the study ended compared with 9% in the rate control group. Given the neutral intention to treat differences for mortality and health related quality of life (QOL),<sup>2</sup> the well done study by Hagens *et al* assessed costs in a “straight up” comparison without the need to adjust costs per QOL improvement. As seen in a similar AFFIRM analysis,<sup>3</sup> the rhythm control strategy was more expensive. Furthermore, the costs did not differ when data were analysed by efficacy (ie, who is, or is not, in sinus rhythm) as opposed to a strict intention to treat analysis. In an efficacy analysis, however, a weighted QOL approach may be needed because both the RACE<sup>2</sup> and AFFIRM<sup>1</sup> trials have shown a QOL benefit associated with achieving sinus rhythm in their respective efficacy analyses.

For the older RACE and AFFIRM types of patients, no clear QOL, mortality, and now cost based reason exists to support a strategy aimed at maintaining sinus rhythm.

David Newman, MD  
University of Toronto  
Toronto, Ontario, Canada

- Corley SD, Epstein AE, DiMarco JP, *et al.* Relationships between sinus rhythm, treatment, and survival in the Atrial Fibrillation Follow-Up Investigation of Rhythm Management (AFFIRM) Study. *Circulation* 2004;**109**:1509–13.
- Hagens VE, Rancho AV, Van Sonderen E, *et al.* Effect of rate or rhythm control on quality of life in persistent atrial fibrillation. Results from the Rate Control Versus Electrical Cardioversion (RACE) Study. *J Am Coll Cardiol* 2004;**43**:241–7.
- Marshall DA, Levy AR, Vidaillet H, *et al.* Cost-effectiveness of rhythm versus rate control in atrial fibrillation. *Ann Intern Med* 2004;**141**:653–61.