

similar to an orthogeriatric unit, may be a suitable option.<sup>2</sup> Deciding on the most appropriate method may depend on the number of older people in the area and the human resources of each facility.

Co-management through the nurse-led team approach would be relatively easy to accept because it does not increase the burden on the physician. It would have been helpful to analyze the cost of this program as written in the protocol because it is a task-shifting from doctors and has the potential to reduce medical costs.<sup>3</sup>

#### CONFLICT OF INTEREST

None to report.

#### AUTHOR CONTRIBUTIONS

All authors contributed to the concept and preparation of the manuscript.

#### SPONSOR'S ROLE

None.



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## Reply to: Comment on: Geriatric co-management for cardiology patients in the hospital: A quasi-experimental study

*To the Editor:* We read with interest the comment of Kameda et al. on our article 'Geriatric co-management for cardiology patients in the hospital'.<sup>1,2</sup>

The authors point out that the difference between the functional status between hospital admission and discharge did not decline greatly in either group. However, the control group on average decreased in functional status, while the intervention group on average increased in functional status. Furthermore, the impact on outcomes is best understood at the patient level: 43% of patients in the control group experienced functional

decline, compared to 25% of patients in the intervention group, a difference that is both statistically (OR = 0.5, 95% CI [0.3–0.8],  $p = 0.006$ ) and clinically relevant. This was measured using the Katz Index per protocol. We also measured the Barthel index, and the analysis demonstrated similar results (mean difference =  $-4.3$  [ $-8.0$  to  $-0.5$ ] points,  $p = 0.027$ ).

As for our study design, performing a quasi-experimental single-center study was a deliberate choice as our aim was to establish a proof of concept. We wanted to get a more in-depth insight in how to co-manage and what implementation factors are important for later scaling up in case of positive findings. As

the study was conducted in one hospital, randomization at patient level would not have been possible without introducing a high risk for contamination or performance bias, as is inherent to most studies evaluating complex interventions targeting care teams.<sup>3</sup> We agree with the authors that a cluster RCT would be an appropriate design for a follow-up study to overcome potential bias inherent to our study design and further strengthen the evidence regarding cardio-geriatric co-management, and co-management in general.

The authors propose to only include 'high-risk' patients, based on our findings that the greatest benefit is observed in the high-risk group. We believe that this is not a black-and-white' decision. 'Medium-risk' patients constitute a much larger group than 'high-risk' patients, and also suffer negative outcomes. As a result, the total number of preventable complications can still be significant and constitute large costs. This group should therefore not be easily ignored, and resources should be balanced against individual patient needs and population needs.

We fully agree that a dedicated cardiogeriatric unit is a suitable option considering the large number of patients with cardiovascular disease and a geriatric profile. The authors rightly point out that the local context would be an important determinant for choosing between a co-management ward and a co-management liaison service. In our particular case, a liaison service was more appropriate because this was in line with the current legislation and financial structures for geriatric care for hospitalized older patients in Belgium.

Finally, the authors suggest that it would have been helpful to analyze the costs associated with the intervention. We refer to data published in the doctoral thesis reporting on the development, implementation, and evaluation of a cardio-geriatric co-management team.<sup>4</sup> A hospital cost model was developed by the University Hospitals Leuven based on recommendations and guidance of the Belgian Health Care Knowledge Centre.<sup>5</sup> Costs reflect on one hand the consumption of care (e.g., use of medication, surgical services), but also reflect hospital-wide costs (e.g., administration, cleaning services) that are weighted based on patient profiles. The cost data were delivered to our research team by the hospital. A quantile regression was performed to deal with the skewed cost data and outliers. The median hospital cost of the control and intervention group was similar (mean difference = 154 euro,  $p = 0.648$ ). No significant differences were observed across the different quantiles. It should be noted that these data do not reflect hospital costs from a societal perspective. The model also does not incorporate potential profits, for

example, more patients were referred to the geriatrics outpatient services (+18%) because of the program. These activities generate revenue for the hospital but are not included in the cost model (and should also be considered a societal cost).

In conclusion, we believe that our study was a first valid evaluation of a cardiogeriatric co-management model, and recognize that a randomized trial is needed to confirm our results. Our initial cost data suggest that a positive business case could be made for co-management, but more investigation is needed. We therefore initiated a follow-up project 'G-COMAN', to investigate the implementation of our intervention on multiple surgical units, and to investigate an economic model that could establish a business case for the Belgian healthcare setting.

### CONFLICT OF INTEREST

The authors declare no conflict of interest.

### AUTHOR CONTRIBUTIONS

All authors contributed to writing and revising the draft of the manuscript and approved the final version.



### SPONSOR'S ROLE

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