## Letters to the Editor

### RECALCAR methodology. Some clarifications

### *Precisiones sobre la metodología de RECALCAR*

**To the Editor,**

We have read with interest the editorial published in *Revista Española de Cardiología* by Marrugat et al.,[1] who took the time to focus on the methodology of the RECALCAR project. Although the editorial addresses other methodological aspects, we limit our letter exclusively to issues that could lead to incorrect interpretations related to the methodology of the project.

The territorial and population scope of RECALCAR does not exclude "122 facilities at 283 public hospitals with a cardiology department" but only includes all general hospitals for acute patients in the Spanish national health system. The reference taken by Marrugat et al. from the Ministry of Health includes medium- and long-stay public hospitals and psychiatric hospitals, and considers that a hospital offers cardiology care even if it has only 1 cardiologist. RECALCAR only assesses hospitals with structured cardiology units or departments.

The method used to calculate the risk-adjusted mortality ratio (RAMR) is not based on the minimum data set of patient discharges from the hospitals completing the RECALCAR survey, but rather on all general hospitals for acute patients in the Spanish national health system. All units or departments participating in RECALCAR were informed of the complexity group in which they were included, along with their average, median, standard deviation, interquartile range, and percentile for each indicator calculated, including the RAMR. Because RECALCAR collects a large volume of data (very narrow confidence intervals), we understand that this information is much more useful to department heads.

Last, we should mention some of the differences between the RAMR and the risk-adjusted in-hospital mortality rates in acute myocardial infarction (AMI) of the EURHOBOP project.[2] While EURHOBOP was constructed with data from 11 631 patients with AMI at 68 hospitals in 7 European countries over a 4-year period (2008-2012) using univariate logistic regression models, the RECALCAR survey for only 2020 (last year available) analyzed 44 936 episodes of AMI (differentiating between ST-segment elevation AMI [STEMI] and non–ST-segment elevation AMI [NSTEMI])[3] from all general hospitals for acute patients in the Spanish national health system (n = 256). The methodological consistency used to calculate the RAMR is supported by RECALCAR's use of multilevel logistic regression models (considering intrahospital variability in addition to each patient's characteristics),[4] by the excellent calibration and discrimination obtained with these models (area under the curve [AUC] ROC = 0.87; 95% confidence interval [95%CI], 0.86-0.87 for STEMI; AUC ROC = 0.86; 95%CI, 0.86-0.85 for NSTEMI), and by the validation of the minimum data set as a data source for studying acute coronary syndrome in the Spanish health system.[5]

We agree with Marrugat et al. that region-based hospital groups are subject to many hard-to-control factors. However, RECALCAR was designed from the start as a project meant to undergo ongoing analysis and continuous improvements to provide indicators that could reflect the quality of cardiology care with ever-increasing accuracy. This challenge includes a comparison between health services in the various autonomous communities and has already helped bring about further standardization of care networks for STEMI.[6] Constructive observations, such as those of the authors of the editorial, are appreciated because they will drive improvements to the quality of the RECALCAR project.

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## AUTHORS' CONTRIBUTIONS

All authors have made equal contributions to the preparation of the letter.

## CONFLICTS OF INTEREST

The authors declare no conflicts of interests related to this letter.

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## RECALCAR methodology. Some clarifications. Response

### *Precisiones sobre la metodología de RECALCAR. Respuesta*

**To the Editor,**

We appreciate the comments by Cequier et al. on our article,[1] which are both timely and illuminating. Our reference to the RECALCAR project was peripheral to the main focus of our editorial. We are nevertheless fully aware of the effort this registry represents and the valuable information it has provided over the past decade through its reports and publications. All of us in the Spanish cardiology community can feel justly proud of this initiative.

Our intention was simply to demonstrate that outcome evaluation is possible and reliable at the level of the hospital or hospital unit. In contrast, the factors that operate at other levels of hospital organization cannot be precisely known or sufficiently controlled, inevitably leaving persistent doubts about the accuracy of the information obtained. In this regard, RECALCAR does a magnificent job in providing dedicated hospital cardiology units with objective quality indicators; however, as Cequier et al. acknowledge, these indicators do not cover other, smaller-scale cardiology services. The point we wanted to make about the risk-standardized mortality ratio (RSMR) was that this value should always be quoted with its corresponding 95% confidence interval.

We also take this opportunity to highlight the multilevel analysis included in the EURHOBOP project. To take account of data grouping, this analysis modeled in-hospital mortality using the country of origin of each patient and the hospital as random effects variables, with other patient and hospital variables included as fixed effects.[2] The EURHOBOP study also calculated the projected in-hospital mortality rate in each hospital by adjusting the models with all the patients except those admitted to the hospital being analyzed. Finally, EURHOBOP provided a software application to enable each hospital to compare its in-hospital mortality rate for patients with acute coronary syndrome with that of other hospitals with similar characteristics.

We thus fully share the RECALCAR investigators' goal to provide tools that are useful, objective, and robust indicators of the quality of cardiology care, especially at the level of the hospital or cardiology service, and that result in improved outcomes of the treatment of cardiac conditions.

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