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Needs forecast and fund allocation of medical specialty positions in Emilia-Romagna (Italy) by system dynamics and integer programming

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ABSTRACT

Each year Emilia-Romagna health managers have to negotiate the number of medical specialization grants to be financed by the National government and define the number of additional grants to be funded by the regional budget.

The final goal of this study is to provide a Decision Support System for grant allocation to medical specializations within Emilia-Romagna over a 20-year planning horizon. We have developed a System Dynamics (SD) model that represents regional medical specialist human resources and forecasts population needs over the planning horizon.

The SD model provides a requirement indicator for each medical specialization.

On the basis of these indicators, an Integer Programming model computes optimal assignments of medical specialization grants.

We then define three demand scenarios and show how regional and national funded grants can be managed in order to reduce future gaps by comparing our results with current policies.