How to use Data Science to produce evidence to inform public health policies: the example of the gestational weight gain monitoring system in Brazil

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Gestational weight gain (GWG) is the most important indicator of nutritional status during pregnancy. In Brazil, the Ministry of Health (MoH) used to adopt outdated or unsuitable methods created for other countries. This project aimed to update the GWG monitoring system in use in public health practice. Therefore, it used scientific evidence and unique methodologies to inform public health decisions by policymakers. Several project phases used data science elements, and FAIR (Findable, Accessible, Interoperable, and Reusable) principles were applied whenever possible. A key aspect was the engagement of all stakeholders (pregnant women, healthcare professionals, and policymakers) in all phases of the project. The first step comprised the identification, acquisition, and harmonization of GWG data from 30+ Brazilian longitudinal studies that originated the Brazilian Maternal and Child Nutrition Consortium. To allow the consortium establishment and management, we created a data-sharing agreement following the Brazilian data protection laws, a data repository in DATAVERSE (https://dataverse.nutricao.ufrj.br/), and virtual machines for online data analyses via Jupyter (Python/R). In the second step, a data cleaning algorithm for a big administrative dataset was created to prepare a national database to validate the new GWG charts. The third step used several data science resources to develop: i) a dashboard containing the GWG charts for healthcare professionals and pregnant women use; ii) a dashboard for policymakers to monitor the nutritional status of pregnant women in Brazil throughout time using data collected in primary healthcare units, cleaned with the algorithm developed by our team; iii) an app for women to monitor their GWG using the new charts, and iv) a GWG calculator (https://dataverse.nutricao.ufrj.br/dataverse/curvas_openaccess/). The most significant deliverable of the project was the new GWG charts adopted on the MoH pregnant booklet. This project was successful because it produced rigorous and solid evidence to overcome a relevant gap. In addition, the team managed to establish a reliable interaction with the MoH throughout all phases and implemented a considerable effort to understand the needs of the different stakeholders involved. This project is an excellent example of how data science elements can be used to produce evidence for policymakers.