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Patient Classification Models, powerful tools in a healthcare emergency. A Data Driven Prioritisation Model for the Distribution of PPE.

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Introduction

How might a health ministry, or health system use existing health information to inform a data-driven prioritisation model in response to a future health care emergency or pandemic (e.g. COVID-26) and how might they bridge the gap between supply and demand for PPE.?

Let's imagine you were in charge of health policy for the nearly five million people in the Valencia Region of Spain and you have only 3.6 million masks available for distribution to the public.

Methods

At the time, published (but commonly not peer reviewed) studies told us that those most at risk of poor prognosis should they contract the disease are older people and those with diabetes, chronic heart, lung, kidney disease and a few other conditions.

Because you have administrative healthcare data you might have chosen to use diagnosis codes to flag everyone with diabetes (for instance), but you're aware that some people with diabetes are relatively healthy and others are desperately ill. In addition to the wide variation in severity of diabetes, you know that a person's total burden of illness (and risk of poor prognosis) is predicted by co-morbidity: the number of chronic conditions, the severity of those conditions, the number of organ systems involved and more.

Another concern would have been that the list of conditions predicting poor prognosis for people who contract COVID-19 was relatively short. If chronic obstructive lung disease puts a person at high risk, what about cystic fibrosis or systemic lupus erythematosus with lung manifestations?

A potentially more elegant framework would include age, a broader list of diagnoses and an indication of hierarchically ranked co-morbidity status. Solventum CRGs are an example of a patient grouping classification/methodology capable of providing this level of information.

Results

The Ministry of Universal Health and Public Health of the Valencian Community resolved on April 15, 2020 to use the 3M CRG methodology to prioritize mask distribution. Using CRGs, the Region of Valencia identified the most vulnerable members of the population, who, if infected, would have been at the highest risk of hospitalization, admission to ICU or in need for mechanical respirator.

That is, all people over 65 years old and those citizens who were under 65 but with one of the following conditions: significant chronic disease in multiple organ systems (CRG Health status 6), dominant chronic disease in three or more organ systems (CRG Health status 7), malignancies underactive treatment (Health status 8) or catastrophic conditions (CRG Health status 9).

Conclusions

This is a good example of using patient grouping to achieve a more scientific prioritization framework in a pandemic. This framework can be applied to PPE distribution, identifying individuals who may choose to extend their social distancing because of their high risk of poor prognosis. It may also be useful for identifying those who should maybe not try to "ride it out" at home if they contract the disease.

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