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## **Risk stratification in Dutch primary care: a promising approach to manage population health**

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# CHAPTER 7

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## **SUMMARY**

As healthcare resources are running scarce, efficient use of the available resources is of eminent importance. With lots of routinely collected data available in primary care, opportunities open up to analyze and use these data in order to make efficient use of healthcare resources. With data-driven approaches, inequities in healthcare needs and supply can be made visible within the population. Risk stratification, the systematic assessment of patients' profiles in order to assign individual risk scores, can be used to provide personalized and population care according to that risk. In different countries, risk stratification is used to identify the right subpopulations for specific care interventions and lower expensive care utilization such as emergency care and hospitalization.

In the Netherlands, risk stratification is not yet notably used in primary care. Despite the great possibilities due to the widespread catchment area of primary care in the Netherlands and the gatekeepers function of general practitioners, systematic risk stratification approaches in Dutch primary care are minimal. The aim of this dissertation was therefore to identify and assess a suitable risk stratification tool to be used in Dutch primary care. After the introduction of the concept of risk stratification and the research question to be answered with this dissertation, the performed studies aiming at answering this question, are described in the chapters 2 till 5, with each chapter answering a sub-question derived from the central research question.

In chapter 2 a systematic literature review was described answering the sub-question *'What risk stratification tool is most appropriate for use in primary care?'* Studies were screened and systematically reviewed to identify risk stratification tools most suitable for primary care. Risk stratification tools were assessed on statistical validity. 61 articles were systematically reviewed and assessed, resulting in the identification of three mainly used risk stratification tools in primary care: 1) the Adjusted Clinical Groups (ACG), 2) the Charlson Comorbidity Index (CCI) and 3) the Hierarchical Condition Categories (HCC). Of these three identified risk stratification tools, the ACG was most frequently used in primary care and had the best statistical validity.

Chapter 3 described a pilot study in which the ACG tool was first applied in a Dutch primary care setting. The results showed the potential of the ACG in identifying different levels of morbidity and care burden using routinely collected Dutch general practitioners' data. Prediction models with ACG's diagnosis and multimorbidity categories as predictors have proven to be accurate for the prediction of GP visits per year.

The main question of this thesis was answered with chapter 4, describing a study assessing the model performance of ACG's hospitalization and high costs models applied in the Dutch primary care setting. Both models showed good performance regarding discrimination and calibration properties. In addition, the models were adjusted to best fit the Dutch primary care situation. Coefficients of the underlying predictors of the models were adjusted, improving the good model performances for both the hospitalization and the high costs model.

In chapter 5 an illustration is given of how risk stratification can be used to identify a specific subpopulation. With the use of the ACG, a group of complex patients with problems on multiple health domains (somatic chronic, psychological or social domain) could successfully be identified. Being able to identify such subpopulations can result in better care management and coordination of the right patients.

In the discussion of this dissertation, recommendations were done to methodologically improve the risk stratification models assessed in the different studies of this thesis. Suggested methodological improvements next to the statistical validation that has been performed in this thesis, included clinical validation of the underlying predictors of the models, taking the Dutch contexts into consideration. Social determinants are a valuable addition to biomedical determinants when it comes to the health of the population and the potential of adding them to risk stratification approaches in Dutch primary care should surely be investigated.

In addition to the methodological improvements of the models, first practical steps to be taken were discussed, including creating awareness of the benefits of risk stratification and trust in the tools, amongst health care professionals in and outside primary care as well as other stakeholders such as insurance companies, policy makers and municipalities. Lastly, although I believe that primary care is the best place in the care continuum to start off with risk stratification approaches, it is discussed that collaboration with especially the social domain would be beneficial to the improvement of the healthcare of the population. Social determinants are a valuable addition to biomedical determinants when it comes to the health of the population and the potential of adding them to risk stratification approaches in Dutch primary care should surely be investigated.