# Prediction of adverse health outcomes in older patients visiting the Emergency Department: the APOP study

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## English summary

### Introduction

The rate of adverse health outcomes 90 days after an emergency department (ED) visit is high for older patients. A comprehensive geriatric assessment (CGA) can effectively identify patients at highest risk and improve outcomes. Unfortunately, the fast-paced environment and the medical condition of the acutely ill older patient make it virtually impossible to perform a CGA in all patients in the ED. A two-step approach could be useful in order to improve adverse health outcomes. Older patients at highest risk need to be identified first, subsequently targeted interventions can be conducted. The aim of the present thesis was to develop and validate a screening instrument to predict adverse health outcomes in older patients visiting the ED.

### Summary of the chapters

**Chapter 2** describes the characteristics and outcomes of acutely admitted older patients. It shows that approximately 1 out of 5 older patients deceased 90 days after acute hospital admission. A prediction model containing information about illness severity and geriatric parameters was developed to predict 90-day mortality. Using this model, 53% of the patients in the highest risk decile were deceased within 90 days. In **chapter 3** a new prediction model for predicting 90-day functional decline or mortality was developed and validated for older patients visiting the ED: the APOP (Acutely Presenting Older Patient) screener. The prediction model included early available predictors, to ensure measures can be conducted in an early phase of presentation. We showed that the existing Identification of Seniors At Risk (ISAR) screening tool is more useful to 'rule out' patients at high risk and that the APOP screener was more useful to identify those at highest risk. **Chapter 4** aims to optimize the predictive value of the Identification of Seniors at Risk – Hospitalized Patients (ISAR-HP) by using different cut-off points in acutely hospitalized older patients. The ISAR-HP classifies a high percentage of patients incorrectly as high risk and performance improved marginally by raising the cut-off.

Many developed screening instruments to predict adverse health outcomes in older patients visiting the ED are frequently rejected in clinical practice. In **chapter 5** the APOP screener was refined according to international methodological standards in order to increase the chance for successful implementation. The predictors included in the APOP screener were chosen based on predefined criteria. Performance of the screener was satisfactory, cross-validation between four hospitals was successful and a pilot study among triage nurses showed that it was feasible to complete screening during triage. In **chapter 6** the predictors of ED revisits and the association of an ED revisit with 90-day functional decline or mortality were studied. This chapter shows that a few independent predictors were identified, but no useful clinical prediction model could be developed.

More importantly, an ED revisit was strongly associated with functional decline and mortality and can possible be used as new predictor in future prediction models.

**Chapter 7** includes the key findings of this thesis. In the development phase of the APOP screener choices have been made in order to make a useful screener for clinical practice. A representative study population was included by using minimal inclusion criteria and including patients 7 days a week. A wide range of disciplines were involved in the research project. In order to have a balance between accuracy and optimal use in practice the APOP screener was redeveloped based on pre-defined criteria in a multi-disciplinary meeting. The result of the APOP screening shows an absolute risk of the adverse health outcome and classifies a group of patients at high risk. In contrast to comparable existing screening instruments, the cut-off was set to ensure high specificity. This way relatively a low percentage of older patients will be incorrectly classified as high risk and (costly) follow-up interventions will be targeted in older patients with a higher chance to benefit from.

The APOP screener has been developed and recently an implementation study was conducted to test feasibility and impact of the screener. Future studies should focus on the effect of (single) interventions on outcomes, examine the patient perspective on the APOP screening program and investigate how to cooperate with other health care professionals in the acute setting, such as the general practitioners.