Prediction of in-hospital death from community-acquired pneumonia by varying CRB-age groups

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ABSTRACT

C(U)RB-65 is now a generally accepted severity score for patients with community-acquired pneumonia (CAP) in Europe.

In an observational study based on the large database from the German nationwide performance measurement program in healthcare quality including data from all hospitalized patients with CAP during 2008-2010, different CRB-age groups across the total CAP population and three entities of CAP (younger population aged < 65 years, patients aged ≥ 65 years not residing in nursing homes and those with nursing-home acquired pneumonia [NHAP]) were validated for their potential to predict in-hospital death.

660,594 patients were investigated. Mortality was n=93958 (14.0 %). In the total population, CRB-80 had the optimal AUC (0.690, 95% CI 0.688-0.691). However, in the younger, CRB-50 performed best (0.730, 95% CI 0.724-0.736), with good identification of low risk patients (CRB-50 risk class-1: 1.28% deaths, negative predictive value 98.7%). In the elderly, CRB-80 as optimal age group performed worse (0.663, 95% CI 0.660-0.655 in patients not residing in nursing homes, 0.608 95% CI 0.605-0.611 in those with NHAP). In the latter group, all CRB-age groups failed to identify low risk patients (CRB-80 risk class-1: 22.75% deaths, negative predictive value 81.8%).

Patients with hospitalized CAP aged < 65 years may be assessed by the CRB-50 score. In those aged ≥65 years (not NHAP) assessed by the CRB-65 score, also low risk patients already are at increased risk of death. In NHAP patients, even use of CRB-80 does not identify low risk patients and should be accompanied by the evaluation of functional status and comorbidity.
INTRODUCTION

The assessment of pneumonia severity is now recognized as one of the most important steps in the management of patients with community-acquired pneumonia (CAP). In Europe, CURB-65 and its variation (CRB-65) have been gained general acceptance as a tool for severity assessment because of its favourable predictions comparable to the more complex pneumonia severity index (PSI) and its fabulous simplicity (1,2).

The simplicity of this tool is a major advantage which cannot even be outweighed by potential small improvements of predictive power introducing additional variables. However, the optimal cut-off of the variable “age” has not been determined, and concerns have been raised about the appropriate cut-off of age in the elderly population (3,4). As it stands, the cut-off of 65 years appears arbitrary. On the other hand, whereas crude age has a major impact on mortality and different cut-offs of age may considerably impact the predictive power of the tool, it has not been settled whether age is an independent risk factor for death (4-6). Moreover, setting the cut-off for age is particularly important in view of the fact that the high weight of advanced age may negatively impact the sensitivity for high risk of death in younger patient ages (2).

We recently could show that CAP should be regarded as a condition including three entities with highly different prognostic implications: the younger (aged < 65 years), the elderly not residing in nursing homes (≥ 65 years), and the elderly with nursing home acquired pneumonia (NHAP) (7,8). In the present analysis, we provide a validation of different CRB-age groups across the total CAP population and the three entities of CAP based on the large database from the German nationwide performance measurement program in healthcare quality including data from all hospitalized patients with CAP during a three year period.
METHODS

Database
This observational study is based on the database from a nationwide mandatory performance measurement program in Germany established in 2005. All hospitals are required to provide a set of data defined by the speciality group on CAP together with the Aqua Institut of Healthcare (formerly until 2009 with the Bundesgeschäftsstelle für Qualitätssicherung, BQS).

CAP is identified by encoding pneumonia without severe immunosuppression (HIV-infection, solid organ or bone marrow/stem cell transplants, severe neutropenia) as the principal diagnosis of hospital admission. The underlying ICD-Codes (ICD-10–German modification (GM)) is used for in- and exclusion of cases. These codes clearly exclude acute bronchitis and exacerbations of COPD but also nosocomial pneumonia.

The database included all hospitalized patients with acute CAP regardless where they primarily presented. Since patients presenting with CAP in the hospital in Germany are usually admitted, the group of patients safely discharged from the emergency room is considered to be minimal. The use of CRB-65 score is recommended by German CAP guidelines, however, there are no data about compliance with this recommendation.

The database comprise information on the referral mode (from home, nursing home, another hospital, or rehabilitation facilities), age and sex, comorbidities according to the international classification of diseases (ICD-10-GM) (optional); functional condition, respiratory rate, systolic and diastolic blood pressure, presence of acute pneumonia-related mental confusion at admission, the use of ventilatory support (noninvasive or invasive), the presence of stability criteria at discharge (including respiratory rate, systolic and diastolic blood pressure, and mental state), and outcome (survival or death). These data are assessed electronically. Data on pathogen patterns and choices of antimicrobial treatment are not available. Further details were published elsewhere (9).

For the purpose of this analysis, a dataset including three most recent years was chosen.
(2008-2010). The database had no missing data except comorbidity since the entry of the variables was mandatory.

**CRB-age groups**

CRB was calculated assigning one point in the presence of 1) pneumonia-associated mental confusion, 2) respiratory rate ≥ 30 / min and 3) systolic blood pressure < 90 mmHg or diastolic blood pressure ≤ 60 mmHg.

The analysis of the predictive potential of CRB-age groups for in-hospital mortality was performed by assigning different cut-offs for age (≥ 30, 40, 50, 60, 65, 70, 80, 90, 100 years) to the categorization according to CRB criteria.

CRB-age group classifications resulting in groups (0-4) were recalculated into risk classes in a modified way according to Lim et al. Risk classes were calculated as follows: Risk-class (RC) 1 (CRB-65 = 0 points); Risk-class (RC) 2 (CRB-65 = 1 or 2 points); Risk class (RC) 3 (CRB-65 = 3 or 4 points or mechanical ventilation at admission, since no reliable assessment of respiratory rate is realistic in these latter patients).

CRB-age groups were tested for predictions of in hospital mortality in the general population and the three entities of CAP: the younger (aged < 65 years), the elderly not residing in nursing homes (≥ 65 years), and in the elderly with nursing home acquired pneumonia (NHAP).

**Statistics**

Multivariable analysis for independent predictors of in-hospital death of patients admitted with CAP was performed by stepwise forward logistic regression. In order to investigate the relative weight of age decades, CRB, nursing home residence and bedridden functional status only these four variables were included. The predictive performance for in hospital death in patients with CAP was presented listing the predictions of CRB-age groups according to CRB-age group risk classes, and calculating sensitivity (true positives (CRB-age group risk class 2 and 3)/all deaths), specificity (true negatives (CRB-age group risk class 1/all
alive), as well as positive (true positives/all positives) and negative predictive values (true negatives/all negatives). In addition, these were formally assessed by building ROC-curves and calculating the area under the curves (AUC). The level of significance was set at $p < 0.05$. 
RESULTS

Patient population
Overall 660,594 patients (2008: 211,708, 2009: 229,796 and 2010: 228,090) hospitalized with CAP in Germany from 2008-2010 were included. Mean age was 72.81 ± 71.40-74.22, the relation of males and females was 55.8 to 44.2%.

The characteristics of these patients and the distribution of CRB-65 risk classes are provided in table 1.

Mortality
Total in-hospital mortality was n=93,958, 14.0 % (2008: 30,373, 14.3 %, 2009: 32,414, 14.1 %, 2010: 31,171, 13.7%). Mortality increased according to increasing age, nursing-home residency and bedridden functional status. Distribution of mortality rates stratified into patients aged < 65, ≥ 65 not residing in nursing homes and ≥ 65 with NHAP is given in figure 1, that stratified according to age, nursing home residency and bedridden functional status in figure 2. Nursing home residency was associated with excess mortality also in those without bedridden functional status, however, the difference in mortality decreased in the higher age decades. The mortality rates according to CRB-65 risk classes across the three different CAP entities is given in table 2.

Factors associated with in hospital mortality of patients admitted with CAP
Age grouped in decades, CRB, nursing home residency and bedridden functional status were included in a multivariable analysis. All were independently associated with death (table 3).

Predictions of in hospital mortality according to varying CRB age-groups in the general population
According to ROC analysis, the AUC improved with each age group until the age group 80 (AUC 0.690; 95% CI 0.688-0.691). However, the differences to CRB-65 were minimal (AUC 0.684, 95% CI 0.682-0.685) (table 4).
Looking at CRB age risk group classifications, equally CRB-30, -40 and -50 seemed to confer the optimal balance between identification of low risk patients (0.65, 0.71 and 1.28% deaths in CRB-30, -40 and 50 RC-1; negative predictive value 99.3%, 99.3% and 98.7%, respectively) and moderate and high risk patients (12.17-12.9% and 36.19–36.81% deaths in CRB-30, -40 and 50 RC-2 and 3, respectively) (Online supplement table 1).

Predictions of in hospital mortality according to varying CRB age-groups in three CAP entities
In the age group < 65 years, ROC analysis showed that AUC was best for age group 50 (0.730, 95% CI 0.724-0.736) (table 4). Such age threshold resulted in a mortality prediction of 1.28 for risk class 1, 5.68% for risk class 2, and 23.29% for risk class 3 (Online supplement table 2). The negative predictive value of CRB-50 was 98.7%.

In the age group ≥ 65 not residing in nursing homes, AUC was best for age group 80 (0.663 95% CI 0.660-0.655) which was similar to the general population (table 3). However, although the predictions of mortality of CRB-80 still followed a three class pattern, the risk of death was already considerably high in risk class 1 (6.62%). Death in risk class 2 was 14.38%, and in risk class 3 was 38.5% (Online supplement table 3).

In age group ≥ 65 years with NHAP, the best AUC was also 80 years but lower than in the general population (0.608, 95% CI 0.605-0.611) (table 4). Moreover, the CRB-80 did no longer identify low risk patients (risk class 1 18.23%, risk class 2 32.08%, and risk class 3 48.91%) (Online supplement table 4).

Overall, predictions of CRB were identical to that of CRB-65. Variations of agegroups to CRB improved AUC in the younger age group < 65 years (if set as CRB-50) but impacted AUC only marginally in the elderly (if set as CRB-80) (table 4).
DISCUSSION

The most important results of our investigation are the following: 1) age was an independent predictor of death together with nursing home residency, functional status and CRB; 2) age group 65 (resulting in CRB-65) was a reasonable threshold for the assessment of the risk of death from CAP in the total population, although age group 80 (CRB-80) had the highest AUC; 3) in patients aged < 65 years, the optimal AUC was 50 (CRB-50), with excellent prediction of low risk patients; 4) in patients aged ≥ 65 years but not residing in nursing homes, age group 80 (CRB-80) provided the best predictions, however, low risk patients were already at a 6.6% risk of death; 5) in patients aged ≥ 65 and NHAP, the optimal age group continued to be 80 (CRB-80), however, AUC was significantly worse than in those without NHAP. The CRB-80 score did no longer predict low risk patients.

In this large population comprising virtually all hospitalized patients with CAP during three years in Germany, age was an independent prognostic factor of in-hospital death in patients admitted with CAP. This is in contrast to several previous much smaller reports based on 30-day mortality (4-6). Since comorbidity was not systematically recorded, we cannot determine the exact impact of age in relation to comorbidity. However, age remained an independent predictor together with nursing home residency and functional status as well as severity criteria (CRB). This finding underlines the importance of identifying the optimal threshold for severity rules including age as a predictive factor.

Our data confirm the generally favourable operative characteristics of the CRB-65 score in the prediction of in hospital death from CAP in the general population. The AUC is somewhat lower than reported previously, probably because we relied on in-hospital and not 30-day mortality and we kept included NHAP and bedridden patients in the general population with CAP. Although CRB-80 had an even better AUC, the difference is most probably irrelevant in clinical terms.

A different view is provided on the CRB-score if applied in three subpopulations which according to our data should be regarded separately. The younger group aged < 65 years had the optimal AUC in the age group 50 (resulting in CRB-50). The AUC was even superior to
that of CRB-65 in the general population. The sharp increase in risk of death starting in the fifth decade is already obvious. In fact, the score provides an excellent tool for the identification of low risk patients, with a minimal mortality in risk class 1. Of note, despite a very low overall mortality rate, patients with risk classes 2 and 3 had already a considerable risk of death.

In patients aged ≥ 65, independent from residing status, age group 80 had the optimal AUC. Whereas prediction of CRB-80 in the population not residing in nursing homes was similar to that of the general population, it was clearly inferior in patients with NHAP. Moreover, prediction of low risk patients was clearly inferior, and although CRB-80 still resulted in a three risk class pattern, it frankly failed to identify low risk NHAP patients, with mortality in “low” risk class 1 being already very high.

These results are in line with other reports hinting at an inferior to unacceptable operative performance of C(U)RB criteria (5,10) and C(U)RB-65 in elderly patients (4,11). E.g., Parsonage et al. found CURB-65 to be unreliable for the prediction of low risk in elderly patients, the mortality reaching 27% in the low risk category in patients aged ≥ 80 years (11). In another study by Chen et al. including in- and outpatients, both severity scores (CURB-65 and PSI) performed significantly inferior with growing age: AUCs for CURB-65 were 0.80 (95% CI 0.67 to 0.93), 0.73 (95% CI 0.65 to 0.82) and 0.60 (95% CI 0.47 to 0.73) in the younger adult, elderly and very old patients, respectively (4). The AUC for the very old mirrored that in our investigation for NHAP patients. Prediction of low risk patients was clearly worse in the very old. The authors claimed that raising the cut-off for age in the CURB-age score would improve predictions of mortality in the elderly. Our data confirm this, and go beyond in that they also show that lowering the age cut-off in the younger population equally generates better predictions. Teramto et al. suggested to increase the cut-off to 80 years in the elderly population (3).

Thus, the good performance of the CRB-65 severity score in the general population with hospitalized CAP is mainly due to the inclusion of the younger population with much lower risk of mortality. We, therefore, would advocate to abandon the CRB-65 score in the younger population in the hospital setting. Instead, the CRB-50 score in younger patients
may be implemented. The CRB-50 in the younger performs significantly better than the CRB-65 score in the general population, and it perfectly identifies low risk patients. On the other hand, although the CRB-80 score in those aged ≥ 65 years performs somewhat better compared to the CRB-65 in the general population, this difference is probably irrelevant in clinical practice. Of importance, the CRB-65 in those aged ≥ 65 years does not identify a low risk group any more. This, of course, does not mean that any patient aged ≥ 65 years must be hospitalized but it may increase attention to individual risk factors that might support such treatment setting. These risk factors primarily include comorbidities. Alternative risk scores in the elderly (such as SOAR, A-DROP) have not convincingly been shown to be superior to CURB-65 (6,12).

Conversely, any CRB-age group does not seem to be of much value in patients aged ≥ 65 and NHAP. The predictions are moderate at best, and the score fails to identify low risk patients. Therefore, more extensive modifications or even an alternative risk score are needed for the evaluation of such patients. Functional disability has repeatedly been shown to be the main predictor of death in this patient population (13,14). The PSI risk score was shown to perform better when performance status was included (15). A multidimensional prognostic index, calculated from information collected in a comprehensive geriatric assessment, accurately stratified hospitalized elderly patients into groups at varying risk of mortality, and the predictive accuracy was even higher than the predictive value of the PSI (16).

Recent data from primary care confirm that CRB-65 performed satisfactorily to identify low risk patients also in the elderly (17). Evidently, the different settings must be interpreted differently. However, whether CRB-65 still is the optimal tool for patients with CAP managed in primary care remains to be determined.

An alternative way to revise the CRB-age group score and possibly improve its predictions would be a transformation of age into a continuous variable as suggested by others (18). However, such a transformation has the drawback of loss of simplicity and would finally require electronical support, without relevant improvement in predictions.
Risk of mortality is not the only principle assessment that has to be made initially. In many patients of this group, risk assessment must be combined with an early (and perhaps continuous) assessment of treatment aims and possible limitations due to ethical reasons. Moreover, increased risk of mortality is not generally linked to an inclination to hospitalize but may imply just the reverse. E.g., it has been shown that hospitalization may even worsen functional status, and that many patients would prefer home care (19). Much work is still needed to define the optimal risk assessment in these patients.

Our data are particularly strong due to the enormous number of patients and the fact that all hospitalized patients of a large Western country during a three year period are included. Although data validity was not formally assessed, age is obviously a robust parameter. Potential faults in CRB criteria remain equally distributed and cannot have affected the influence of age groups in the CRB score in our analysis. In view of mortality rates well comparable to many previous studies (1,2), external validity of our data is obviously very high, at least for Western countries. A limitation is that we ignore the validity of ICU codes for the identification of CAP. Prior studies from outside Germany evaluating far less complex ICU search procedures than that applied in our program suggest that the accuracy is modest (20,21). At present, we cannot imagine an alternative approach that may be practical when performing such a nationwide program. In view of the excessively large number of patients included, the impact of misclassification on our results is judged to be probably limited. Unfortunately, our database does not allow for a comparison of CRB-age groups with CURB-age groups and PSI, so we ignore whether other severity assessment tools would achieve better predictions. However, it is expected that the impact of age thresholds on the CURB-65 would be similar to that resulting in our analysis of CRB-65.

In conclusion, based on these data, we recommend a revision in risk assessment of patients with hospitalized CAP. Patients aged < 65 years may ideally be assessed by the CRB-50 score, and low risk patients evidently have a very low risk of death. Those aged ≥65 years not residing in nursing homes can be assessed by the CRB-65 score, however, also low risk patients already are at increased risk of death. NHAP patients need a different approach, and even if CRB-80 is used, initial risk assessment should be accompanied by the evaluation of functional status and comorbidity together with a consideration of treatment aims.
REFERENCES


(3) Teramoto S, Yamamoto H, Yamaguchi Y, Hanaoka Y, Ishii M, Hibi S, Kume H, Ouchi Y. Lower respiratory tract infection outcomes are predicted better by an age >80 years than by CURB-65. Eur Respir J. 2008; 31: 477-478


(5) Lim WS, Macfarlane JT. Defining prognostic factors in the elderly with community acquired pneumonia: a case controlled study of patients aged ≥ 75 years. Eur Respir J 2001;17: 200-205


### Table 1.

Characteristics of patients included in the analysis at admission

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>211,708</td>
<td>229,796</td>
<td>228,090</td>
<td>669,594</td>
</tr>
<tr>
<td>Males / females n/%</td>
<td>118,158 (55.8%)</td>
<td>127,341 (55.4%)</td>
<td>127,810 (56.0%)</td>
<td>373,309 (55.8%)</td>
</tr>
<tr>
<td></td>
<td>93,550 (44.2%)</td>
<td>102,455 (44.6%)</td>
<td>100,280 (44.0%)</td>
<td>296,285 (44.2%)</td>
</tr>
<tr>
<td>Age, years, mean, 95% CI</td>
<td>72.97 (70.50-75.45)</td>
<td>72.78 (70.36-75.19)</td>
<td>72.69 (70.28-75.10)</td>
<td>72.81 (71.40-74.22)</td>
</tr>
<tr>
<td>Age &lt; 65 years, n</td>
<td>47,533</td>
<td>52,765</td>
<td>53,603</td>
<td>153,901</td>
</tr>
<tr>
<td>Age ≥ 65 years, not NHAP, n</td>
<td>121.856</td>
<td>130.836</td>
<td>128.860</td>
<td>381,552</td>
</tr>
<tr>
<td>Age ≥ 65 years, NHAP, n</td>
<td>42,319</td>
<td>46,195</td>
<td>45,627</td>
<td>134,141</td>
</tr>
<tr>
<td>Functional condition (bedridden, n/%)</td>
<td>53,965 (25.5%)</td>
<td>56,849 (24.7%)</td>
<td>54,561 (23.9%)</td>
<td>165,375 (24.7%)</td>
</tr>
<tr>
<td>Respiratory rate /min, mean, 95% CI</td>
<td>22.27 (21.96-22.58)</td>
<td>22.23 (21.94-22.53)</td>
<td>22.13 (21.84-22.42)</td>
<td>22.13 (22.04-22.38)</td>
</tr>
<tr>
<td>Systolic blood pressure mmHg, mean, 95% CI</td>
<td>129.38 (129.27-129.48)</td>
<td>129.48 (129.38-13)</td>
<td>129.80 (129.69-129.90)</td>
<td>129.55 (129.50-129.61)</td>
</tr>
<tr>
<td>Diastolic blood pressure, mean, 95% CI</td>
<td>74.31 (74.25-74.37)</td>
<td>74.17 (74.11-74.22)</td>
<td>74.27 (74.21-74.33)</td>
<td>74.25 (74.22-74.28)</td>
</tr>
<tr>
<td>Mental confusion, n/%</td>
<td>17,787 (8.4%)</td>
<td>18,296 (8.0%)</td>
<td>17,454 (7.7%)</td>
<td>53,537 (8.0%)</td>
</tr>
<tr>
<td>CRB-65 RC-1</td>
<td>33,040</td>
<td>37,086</td>
<td>38,409</td>
<td>108,535</td>
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<tr>
<td>CRB-65 RC-2</td>
<td>161,772</td>
<td>175,012</td>
<td>172,577</td>
<td>509,361</td>
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<tr>
<td>CRB-65 RC-3</td>
<td>16,896</td>
<td>17,698</td>
<td>17,104</td>
<td>51,698</td>
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</table>
Table 2.

Total in-hospital mortality according to CRB-65 in different entities
n.a. = not applicable

<table>
<thead>
<tr>
<th></th>
<th>Mortality, n (%)</th>
<th>CRB-65 RC-1</th>
<th>CRB-65 RC-2</th>
<th>CRB-65 RC-3</th>
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<tr>
<td><strong>Age &lt; 65 years</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age ≥ 65 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age ≥ 65 years not NHAP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age ≥ 65 years and NHAP</td>
<td></td>
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Table 3.
Multivariable analysis of factors associated with in-hospital death in patients admitted with community-acquired pneumonia

<table>
<thead>
<tr>
<th>Variable</th>
<th>OR</th>
<th>95% CI</th>
<th>p</th>
</tr>
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<tbody>
<tr>
<td>Age decades</td>
<td>1.38</td>
<td>1.37 – 1.39</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Nursing home residency</td>
<td>1.27</td>
<td>1.25 – 1.29</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Bedridden functional status</td>
<td>2.93</td>
<td>2.89 – 2.98</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>CRB</td>
<td>1.73</td>
<td>1.72 – 1.75</td>
<td>&lt; 0.0001</td>
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</table>
Table 4.

Areas under the curve (AUC) by age groups in the total population, patients aged < 65, ≥ 65 not residing in nursing homes and ≥ 65 with NHAP

n.a. = not applicable

<table>
<thead>
<tr>
<th>CRB-age class</th>
<th>AUC (95% CI)</th>
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</thead>
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<tr>
<td></td>
<td>total population</td>
</tr>
<tr>
<td>CRB</td>
<td>0.684 (0.682-0.685)</td>
</tr>
<tr>
<td>CRB-30</td>
<td>0.652 (0.650-0.654)</td>
</tr>
<tr>
<td>CRB-40</td>
<td>0.659 (0.657-0.661)</td>
</tr>
<tr>
<td>CRB-50</td>
<td>0.669 (0.667-0.671)</td>
</tr>
<tr>
<td>CRB-60</td>
<td>0.679 (0.677-0.681)</td>
</tr>
<tr>
<td>CRB-65</td>
<td>0.684 (0.682-0.685)</td>
</tr>
<tr>
<td>CRB-70</td>
<td>0.688 (0.687-0.690)</td>
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<td>CRB-80</td>
<td><strong>0.690 (0.688-0.691)</strong></td>
</tr>
<tr>
<td>CRB-90</td>
<td>0.662 (0.660-0.664)</td>
</tr>
<tr>
<td>CRB-100</td>
<td>0.647 (0.645-0.649)</td>
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</table>
Figure 1.
Mortality in % according to age groups in patients aged < 65 (group 1, black), ≥ 65 not residing in nursing homes (group 2, grey) and ≥ 65 with NHAP (group 3, deep grey)
Figure 2.

Mortality in % according to age groups and functional bedridden status in patients aged < 65 (group 1, black), ≥ 65 (both not residing in nursing homes and not bedridden (group 2, grey), NHAP and not bedridden (group 3, deep grey), and bedridden status regardless of age and residency (group 4, white).