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## LIVES 2017: Which delirium prediction model should we use?



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ICU delirium affects around one-third of ICU patients, leading to short- and long-term impaired outcome as well as increased costs. Better prediction of who is at risk of delirium will lead to increased efficiency, as preventive interventions will focus on those patients at high risk of delirium, suggests Anneliese Wassenaar, Radboud University Medical Center, Department of Intensive Care Medicine, Nijmegen, the Netherlands.

Wassenaar presented a study on delirium prediction at LIVES 2017, the 30th congress of the European Society of Intensive Care Medicine, which met in Vienna last week. Wassenaar outlined why it is important to predict delirium:

- For the patient - prevent unwanted side effects and inform them about the risk
- For the family - information and engagement in available therapies
- For healthcare professionals - reduce time and costs
- For researchers - patient selection based on delirium risk

Their study compared the predictive performance and user convenience of the two available delirium prediction models: [E-PRE-DELIRIC](#) which is for use immediately after ICU admission, using 9 predictors, and [PRE-DELIRIC](#) which can be used to predict delirium within 24h after admission, using 10 predictors. The models have 4 predictors in common.

The secondary aim of the study was to determine the value of the use of both models in a two-stage calculation of patients' risk for ICU delirium, immediately after admission and 24 hours after admission.

It was a multinational prospective cohort study in 11 ICUs in 7 countries (Canada, United States, Portugal,

Germany, Belgium, Denmark and Australia.

All adult patients were included within a 3-month period, until a maximum of 300 per hospital were included. Excluded were patients who were delirious at ICU admission, with an expected ICU stay < 6 hours and unable to be reliably assessed for delirium.

The outcome measure was positive assessment using a recommended delirium assessment tool (Confusion Assessment Method for the ICU [CAM-ICU] or the [Intensive Care Delirium Screening Checklist](#) [ICDSC]) and/or anti-psychotics for delirium treatment to prevent false negative delirium assessments.

The predictive performance of both prediction models was assessed using the area under the receiver operating characteristic curve (AUROC) and compared using the Hanley & McNeil method. Physicians completed a questionnaire about the convenience of both models.

## Results

A total of 2,178 patients were included in the analysis. Mean age was 62.1, 61 % were male. Around half were surgical admissions; 62% were urgent admissions. Around half had  $\geq 1$  day use of sedatives during ICU stay, 40.1 percent had  $\geq 1$  day comatose during ICU stay, median SOFA score was 4.5 and mean APACHE-II score was 17.4. 21.4% (n=467) experienced delirium. The median length of stay (LOS-ICU) was 3 days.

## Primary outcome

E-PRE-DELIRIC had AUROC 0.68 and PRE-DELIRIC had AUROC 0.74. The cut-off high risk for delirium was  $\geq 0.30$ . The PRE-DELIRIC model had significantly higher discriminatory performance.

### Cut-off Sensitivity Specificity

#### E-PRE-DELIRIC

0.30	44	77
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#### PRE-DELIRIC

0.30	48	81
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#### Two-stage calculation

0.30	58	71
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E-PRE-DELIRIC model compared to the PRE-DELIRIC model:

- Less burden to collect model data
- Variables were more available
- More likely to use it in daily practice

The E-PRE-DELIRIC scored significantly better on user convenience and was preferred by ICU physicians, although the predictive accuracy is lower. Both predictive models show a moderate-to-good statistical performance. A two-stage calculation using both models increases the sensitivity, to prevent patients being incorrectly identified as low-risk and missing out on delirium preventive measures.

### **Suggestions for practice**

Wassenaar suggested that ICUs use the E-PRE-DELIRIC model at admission and in patients at low predicted risk of delirium update the risk by using the PRE-DELIRIC model within 24 hours of admission. She emphasised that it is important to focus delirium prevention efforts on those patients at high risk for delirium and to ensure that delirium risk is well characterised and stratified in controlled studies.

At Radboud they are using the E-PRE-DELIRIC in new multicentre trial on nursing interventions for delirium.

### **Reference**

The full abstract is available at <http://www.professionalabstracts.com/esicm2017/iplanner/#/presentation/1317>

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