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**Title:** Vitamin D levels and risk of infection, assessment for disease severity, and predictor of mortality in the Chinese intensive care units: A prospective cohort study

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**Body:** Introduction Vitamin D level below normal prolongs hospital stay and increases incidence of adverse prognosis and pushing up mortality of a number of diseases. Objectives To evaluate the significance of vitamin D's relevance to sepsis, as well as its value in severity and prognosis assessment. Methods The high-performance liquid chromatography and tandem mass spectrometry was used to detect the concentrations of the total 25(OH)D in serum of Chinese critically ill patients. Results This study involved 50 healthy control, 51 as ICU control patients, and 105 diagnosed with sepsis. Critically-ill ICU patients (ICU sepsis and ICU control group) have lower vitamin D density than normal people, but sepsis patients show no significant reduction of vitamin D density when compared with critically-ill patients with no obvious signs of infection (normal vs. ICU Control vs. ICU Sepsis [Iq],  $1.14 \pm 0.28$  vs.  $0.97 \pm 0.22$  vs.  $0.91 \pm 0.24$ ,  $P < 0.05$ ). For assessment of disease severity, there were negative correlation trend between APACHE II, SAPS II, SOFA score and vitamin D level. Pearson correlation efficient turned out  $-0.124$  ( $P = 0.124$ ),  $-0.039$  ( $P = 0.629$ ), and  $-0.12$  ( $P = 0.221$ ), respectively. Additionally, subjects of different 25(OH)D levels show no difference whether in terms of 28-day survival ( $\chi^2 = 1.78$ ,  $P = 0.776$ ) or 90-day survival ( $\chi^2 = 4.12$ ,  $P = 0.389$ ). Multivariate logistic regression demonstrates that APECHE II and SAPS II score are independent risk factors to deaths caused by sepsis. Conclusion Clinically, measurement of vitamin D is not to be taken as an indicator for diagnosis and assessment in Chinese critically ill patients.