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## Does the use of machine learning algorithms help reduce mortality rates in patients with sepsis

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## **Abstract**

**Background:** Sepsis is the result of the body's dysregulated response to an infection. The response can cause an inflammatory chain reaction which can lead to multiple organ dysfunction, septic shock, and death. Early recognition and treatment of risk of sepsis is essential to control the disease. Each hour of delay treatment is associated with 3%-9% increase in mortality rate (Kuo et al., 2021). The current methods for prediction of sepsis such as SOFA have prediction rates low as 61% (van Doorn et al., 2021). Research using Machine Learning Algorithm has demonstrated prediction rates of 95% within an hour (Singh et al., 2022). The purpose of the project is to add MLA model as adjunct to prediction of sepsis.

**Brief Literature Review:** Protocol dictates sepsis is identified and detected using manual scoring methods such as SOFA. The scoring use laboratory reports, vital signs, and biomarkers to confirm sepsis. Zhao et al. (2021) proposed that MLA models could be an effective automated method to predict sepsis. There has been reluctance to use MLA because of lack of understanding, high cost of infrastructure. However, new organizations using data flow as a service can overcome the challenges required for implementation.

**Methods:** The implementation of the project will involve data flow as a service from Essen Medical Computing Platform (EMCP). EMCP will provide the hospital with a deep learning model, pre-trained using the de-identified personal health information of patients with sepsis. Linux/Unix will be used as the computing platform, de-identified data will be stored in an enclave separate from the hospital system and the internet. A virtual Local Area Network with multi-level authentication and dedicated firewall will be used.

**Evaluation:** Once EMCP is implemented for one year, if mortality rates from sepsis is reduced by 10% then the project will be deemed successful.