

SEPSI INDEX FRAMEWORK

Early Sepsis Detection Through AI Innovation

Transforming routine blood counts into life-saving clinical insights
with the SEPSI INDEX FRAMEWORK

⚡ Fast Analysis

€ Cost-Effective

🧠 AI-Driven



1. THE EMERGENCY IN NUMBERS

The Problem



2. THE CLINICAL CHALLENGE

Diagnostic and therapeutic complexities in sepsis management



Delayed Diagnosis

The initial symptoms of sepsis are nonspecific and easily confused with other conditions, leading to critical delays in identification.

- 1 Lack of specific biomarkers in the early stages
- 1 Clinical variability between patients
- 1 Information overload for clinicians



Non-Optimized Therapy

The "one-size-fits-all" approach does not account for the heterogeneity of septic patients, compromising treatment effectiveness.

- 1 Delay in starting targeted antibiotic therapy
- 1 Inappropriate dosing based on standard protocols
- 1 Lack of personalized monitoring



Fragmented Data

Clinical information is often distributed across non-integrated systems, making it difficult to get a holistic view of the patient.

- 1 Non-interoperable electronic health records
- 1 Lack of real-time predictive alerts
- 1 Difficulty in retrospective analysis



Misaligned Teams

Sepsis management requires multidisciplinary coordination, often hindered by non-standardized protocols.

- 1 Ineffective communication between departments
- 1 Lack of shared clinical pathways
- 1 Inconsistent staff training

3. THE SOLUTION: SEPSIS INDEX FRAMEWORK

An integrated platform combining artificial intelligence, advanced biomarkers, and validated clinical protocols



Predictive AI

Machine learning algorithms that analyze over 150 clinical parameters in real time to identify sepsis risk early with >92% accuracy.



Multiple Biomarkers

Combined panel of PCT, IL-6, Presepsin, and clinical scores for precise risk stratification and personalized therapeutic approach.



Real-Time Alerts

Early warning system integrated with hospital EHR that automatically notifies the clinical team in case of patient deterioration.

Proven Results

-42%

Hospital mortality

-3.2h

Diagnosis time

+67%

Appropriate antibiotic use

-€8.5K

Cost per patient

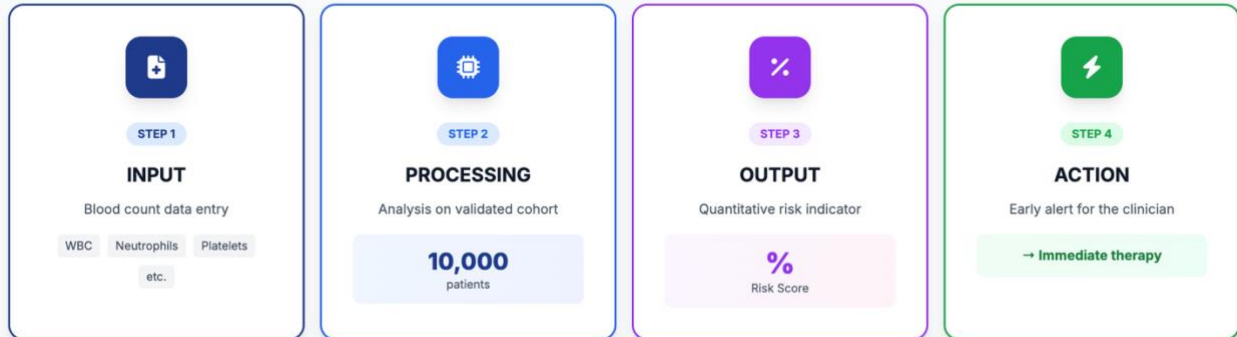
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4. THE WORKFLOW

The Result



1. Product Description

SEPSI Index is an advanced predictive index, developed to support Emergency Department staff in the early identification of sepsis risk using only standard blood count parameters.

The framework is based on a predictive statistical model derived from the retrospective analysis of a large cohort of patients and allows to obtain an immediate, low-cost indicator that can be integrated into existing diagnostic flows.

2. Clinical Purpose

1. **Early identification** of patients at risk of sepsis as early as the first access to the Emergency Department.
2. **Rapid decision** support in the early stages of assessment, when clinical signs may be non-specific.
3. **Optimization of diagnostic and therapeutic pathways** and **reduction of the risk of non-diagnosis**.

Clinical Rationale: Sepsis requires timely recognition to reduce mortality and complications. However, in the early stages the clinical signs are often nuanced and the traditional diagnostic criteria are not always met.

The SEPSI Index leverages information already available in the blood count, transforming it into a reliable and immediately usable predictive indicator.

Use in a clinical environment: the system provides a graphical interface for entering the needed values but supports integration for acquisition from legacy systems.

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3. Clinical validation and model performance

The system is articulated according to the doctor's needs by providing three different models:

Model IA_1: This model is the most balanced: it greatly improves the ability to find patients without sacrificing too much specificity.

Performance metrics:

- **Sensitivity:** 92.23% → catches many more sufferers.
- **Specificity:** 98.96% → the highest of the three models.
- **VPP:** 98.36% → is the probability that a positive test is really sick: positives are almost always really sick.
- **VPN:** 94.97% → Probability that a negative test is truly healthy.
- **Accuracy:** 96.25% → the highest.

Model IA_2: This model is very sensitive but less specific: it takes almost all the sick, but it gets the most mistakes on the healthy (more false positives). It is an ideal choice if the goal is not to lose sick people, accepting a few more mistakes on healthy people.

Performance metrics:

- **Sensitivity:** 94.68% → identifies almost all sufferers.
- **Specificity:** 97.18% → decreases compared to other models, so false positives increase.
- **VPP:** 95.77% → lower, a sign that some of the positives identified are not really sick.
- **VPN:** 96.44% → the best, negatives are almost always true healthy.
- **Accuracy:** 96.17% → similar to the IA_1 model, slightly lower.

Model IA_3: This model is very conservative: it ranks healthy people well and reduces false positives, but it loses several sick people.

Performance metrics:

- **Sensitivity:** 82.87% → fair, but leaves about 17% of sufferers behind.
- **Specificity:** 98.85% → very high, the model is very good at recognizing healthy people.
- **VPP (Accuracy):** 97.98% → almost all classified positives are actually sick.
- **VPN:** 89.53% → less robust, which means that among the negatives some sufferers escape.
- **Accuracy:** 92.41% → good, but not the best.

4. Advantages and benefits

Below we show the advantages and benefits of the proposed approach.

Operational advantages

- Immediate: Use data already available in the blood count.
- Economical: no additional costs for dedicated exams.
- Integrable: Can be implemented into existing LIS/HIS systems.
- Scalable: applicable to any Emergency Room.
- Decision support: Helps the clinician stratify risk in seconds.

Benefits for the Hospital

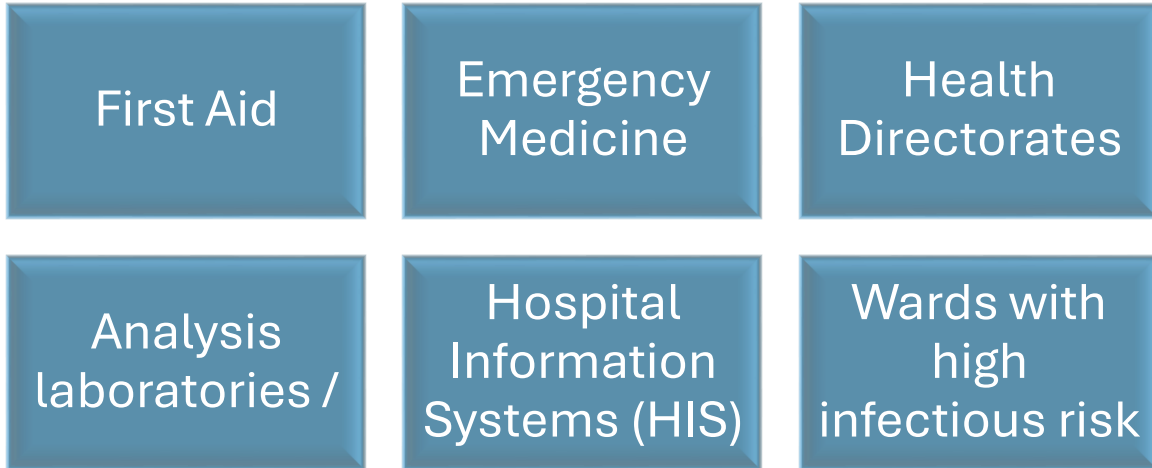
- Improvement of clinical outcomes.
- Reduced decision-making time.
- Optimization of diagnostic and therapeutic pathways.
- Potential reduction in costs related to complications and prolonged hospitalizations.
- Increased patient safety and quality of care.
- Reduction of complication costs
- Reduction of days of hospitalization

Benefits for the Clinician

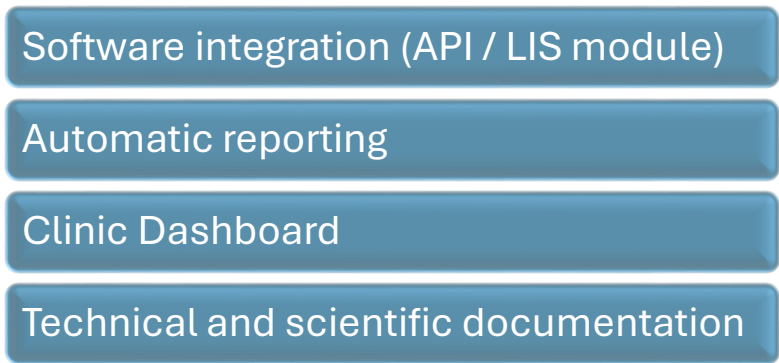
- Objective and immediate tool for risk stratification.
- Support in the early stages, when diagnosis is more difficult.
- Reduced risk of septic patients not being identified.
- Better management of flows in the Emergency Department.

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5. Target audience



6. Product Deliverables



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