Sepsis Early Detection Systems (SEDS)
User Manual

The Sepsis Early Detection System (SEDS) employs advanced AI predictive models for the diagnosis of sepsis patients, aiming to assist clinicians in diagnosing patients. After successfully registering an account and logging into the system, clinicians can view various basic information of patients, and diagnose patients based on AI model prediction results and medical experience.

Upon logging into SEDS, each clinician will be randomly assigned to a numbered patient. For example, consider patient number 10078. The initial interface clinicians encounter, as shown in Figure 1, provides the related information for the assigned patient. Clinicians are required to complete the rapid bedside diagnosis and treatment plan within 4 hours. Once this is done, the system will display the patient's subsequent examination data, as depicted in Figure 2. This process helps ensure timely and informed decision-making in the treatment of sepsis patients.

Note : The patient's examination information listed below is for reference, intended to illustrate the operation process and system functions. The actual data is subject to the officially deployed system data.

1.Logout
2.Sepsis
3.AI model -> sepsis
4.Predicting the probability of sepsis 0h : 1.0,3h : 1.0
5.Basic Information
6.Temperature : 36.61℃
7.Heart rate : 88.0bpm
8.Blood pressure : 120/64mmHg
9.24-hour fluid (input/output 0/0 ml)
10.Consciousness: normal consciousness
11.Respiratory rate : 19insp/min
12.Systolic blood pressure : 115mmHg
13.Historical data
14.Chief complaints
15.Confusion,difficulty breathing.
    Reason for MICU transfer : Hypotension
16.Demographic information and medical history
17.Gender:male
18.Age : 54
19.Weight : 85.4kg
20.Marriage: widowed
21.Race: white
22.Past and present medical history
23.Current time : 2149/12/11 16:46~2149/12/11 17:46
24.Historical inspection data
25.Rapid bedside diagnosis
26.Please choose
27.Rapid bedside treatment plan within 4 hours
28.Drugs
29.Please select drugs
30.Dose
31.Box
32.Diluted solutions of drugs
33.None
34.Determine
35.Back to Patients Catalog
36.Next patient

Figure 1. Rapid Bedside Diagnosis Interference

1.下一步检查 ∧	1.Next inspection
2.降钙素原	2.Procalcitonin
3.血常规	3.Routine blood test
4.动脉血气分析	4.Arterial blood gas analysis
5.止凝血	5.Anticoagulant
6.影像检查	6.Imaging examination
7.病原检查	7.Pathogenic examination
8.培养/涂片	8.Culture/Smear
SOFA ∧	
9.呼吸系统 Pao2/FiO2:	9.Respiratory system Pao2/FiO2
10.机械通气:	10.Mechanical ventilation
11.凝血系统	11.Coagulation system
12.血小板:	12.Platelet
13.参考范围: 125~350|10^9/L	13.Reference scope : 125~350|10^9/L
14.肝脏	14.Liver
15.胆红素: 51.3umol/L	15.Bilirubin : 51.3umol/L
16.参考范围: 1.71~21|μmol/L	16.Reference scope : 1.71~21|μmol/L
17.心血管系统 MAP: 87.0mmHg	17.Cardiovascular system MAP : 87.0mmHg
18.参考范围: 70~105|mmHg	18.Reference scope : 70~105|mmHg
19.中枢神经系统 gcs: 15.0	19.Central nervous system gcs : 15.0
20.参考范围: 3~15	20.Reference scope : 3~15
21.肾脏	21.Kidney
22.肌酐: 97.24umol/L	22.Creatinine : 97.24umol/L
23.参考范围: 57~97|umol/L	23.Reference scope : 57~97|umol/L
24.尿量(24小时内):	24.Urine volume
25.*最终诊断: 26.请选择	25.Early diagnosis
	26.Please choose
27.*最终4小时内治疗方案:	27.Early treatment plan within 4 hours
28.药品: 29.请选择药品	28.Drugs
	29.Please select drugs
30.用量: 20 31. 盒	30.Dose
	31.Box
32.药物稀释溶液:	32.Diluted solutions of drugs
33. 无 500 ml +	33.None
34.真实临床上处理相似患者需要花费的时间:	34.The time required to manage similar patients in real clinical practice
35.15分钟 36.5小时	35.Minutes (15 Minutes)
	36.Hours (5 Hours)
37.确定	37.Determine
38.返回患者目录	38.Back to Patients Catalog
39.下一个患者	39.Next patient

Figure 2. Early Diagnosis Interference

The detailed introduction of the Sepsis Early Detection System (SEDS) is as follows.

Diagnostic Patient Interface

Patient ID

After logging into the system account, the clinician randomly assigns a patient with the number 10078. (The patient's examination information listed below is for reference, intended to illustrate the operation process and system functions. The actual data is subject to the officially deployed system data.)

Figure 3. Patient ID

Model Diagnosis

Diagnosis result of patient model numbered 10078: The patient was diagnosed with sepsis using an AI model. The model predicts a probability of 1 for sepsis to occur currently, and a probability of 1 for sepsis to occur within the next 3 hours.
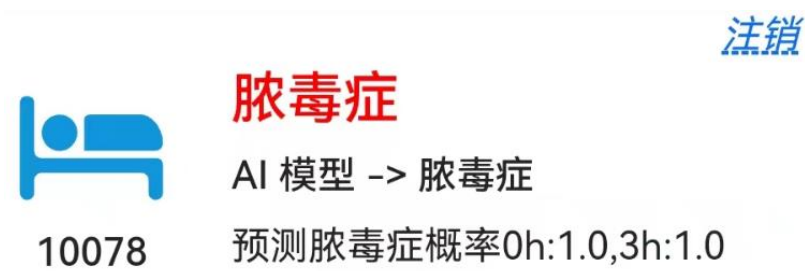

Figure 4. Model Diagnosis

Basic Information

The basic information of the patient mainly includes: temperature, blood pressure, heart rate, 24-fluids (input/output), QSOFA score, QSOFA examination items (respiratory rate, consciousness, systolic blood pressure), and historical data of the above examinations. In the historical data, the historical examination results of each examination item are sorted in descending order according to the examination time.

基础信息

体温： 36.61℃　　　心率： 88.0bpm

血压：　　　　　　　120/64mmHg

24小时内体液(入量/出 0/0ml
量)：

QSOFA： 0　　　　　意识： 意识正常

呼吸频 19insp/min　　收缩压： 115mmHg
率：

历史数据

Figure 5. Basic Information

←　　　历史基础数据

体温 ⌄
| 2111-10-13 22:36:00 | 36.94℃ |
| 2111-10-13 20:00:00 | 36.89℃ |

血压 ⌄
| 2111-10-13 22:36:00 | 128/96mmHg |
| 2111-10-13 22:01:00 | 157/95mmHg |

心率 ⌄
| 2111-10-13 22:36:00 | 71bpm |
| 2111-10-13 22:00:00 | 75bpm |

输入 ⌄
| 2111-10-13 21:15:00 | 氯化钠0.45%|NaCl 0.45%/1000.0ml |
| 2111-10-13 20:30:00 | 葡萄糖50%|Dextrose 50%/25.0ml |

输出 ⌄
| 2111-10-13 21:00:00 | 保险套导尿管|Condom Cath/350.0ml |
| 2111-10-13 18:22:00 | 保险套导尿管|Condom Cath/85.0ml |

QSOFA ⌄
| 2111-10-13 22:36:00 | 1 |

意识 ⌄
| 2111-10-13 22:36:00 | 意识改变 |
| 2111-10-13 20:00:00 | 意识正常 |

呼吸频率 ⌄
| 2111-10-13 22:36:00 | 15insp/min |
| 2111-10-13 22:00:00 | 18insp/min |

收缩压 ⌄
| 2111-10-13 22:36:00 | 128mmHg |
| 2111-10-13 22:01:00 | 157mmHg |

Figure 6. Historical Data

Demographic Information and Medical History

The demographic information of the patient mainly includes gender, age, weight, marriage, and race. Additionally, click on 'Past Medical History and Present Medical History' to view the patient's medical history.

人口学信息及病史

性别：	男	年龄：	54
体重：	85.4kg	婚姻：	丧偶
种族：		白人	

既往病史和现病史

Figure 7. Demographic Information

过去病史:
无

现病史:
现病史（中文）：__由血管服务广为人知，s/p右髂动脉-股动脉旁路手术，使用达克隆移植物，SFA-到-AKP旁路手术，使用PTFE移植物，AKP到AT旁路手术，使用右臂静脉对接_，R TMA __.病人一直处于正常健康状态，直到今天下午出现右脚急性出血，召唤了急救车，患者抵达时处于脉搏电活动消失状态，红细胞压积15%，经心肺复苏后恢复为窦性心动过速，输注了10单位的新鲜全血，___，行气管插管，对右下肢进行扎带止血，转送到__继续治疗。抵达时，病人血压低，使用多巴胺/去甲肾上腺素升压药物，继续出血，可能是远端旁路吻合口出血。患者将立即进行手术探查旁路。

现病史（原英文）：__ yo M well known by the vascular service, s/p Right iliac-to-SFA bypass with Dacron graft, SFA -to-AKP bypass with PTFE graft,AKP to-AT bypass with right arm vein on __, R TMA __. Patient was in his usual state of health until this afternoon when he had acute bleeding from his R foot, EMS was called, on arrival the patient was on PEA, HCT 15, s/p CPR ->Sinus tach, transfused 10U RBD, ___, intubated, tourniquet was placed on RLE, transferred to __ for further care. On arrival patient was hypotensive, on pressors Dopa/Norepi, continue to have arterial bleeding from R foot, possible distal bypass anastomosis. Patient will be immediately taken to the OR for bypass exploration.

Figure 8. Past Medical History and Present Medical History

Current Time

The current time indicates that the above basic information of the patient is valid during this time. The current time for the patient's basic information is from 16:46 on December 11, 2149 to 17:46 on December 11, 2149.

当前时间：
2149/12/11 16:46~2149/12/11 17:46

Figure 9. Current Time

Historical Inspection Data

The historical examination data includes examination items before the current time, mainly including routine blood routine, arterial blood gas analysis, anticoagulation, imaging examination, pathogenic examination, culture/smear, and historical medication. The inspection items in the historical inspection data are based on descending time series, displaying the corresponding inspection item data at historical time points.

历史检查数据 ∧

血常规

动脉血气分析

止凝血

影像检查

病原检查

培养

涂片

历史用药

Figure 10. Historical Inspection Data

Rapid Bedside Diagnosis

The clinician makes a rapid bedside diagnosis based on demographic information, medical history, basic data of the current time, and historical data before the current time. The rapid bedside diagnosis mainly confirms whether the patient has sepsis or the suspected degree of sepsis. There are two ways for clinicians to complete rapid bedside diagnosis:

① Diagnosis in the selection list: The current system's diagnosis list includes severe sepsis, general sepsis, highly suspected sepsis, low-grade suspected sepsis, and no sepsis. If the clinician's current diagnostic needs are met, the diagnosis name in the list can be directly selected.

② Autonomous diagnosis addition: If the diagnosis in the list does not meet the current diagnosis requirements, the clinician can enter the diagnosis name in the blank box below the "Rapid bedside diagnosis" button, click the " Determine " button in the figure, and save the input current diagnosis. Note: After completing the treatment plan, you can click the " Determine " button below the "Rapid Bedside Treatment Plan within 4 Hours" to save both the diagnosis and treatment plan.

Figure 11. Rapid Bedside Diagnosis - List Selection

Figure 12. Rapid Bedside Diagnosis – Self Add

Rapid Bedside Diagnosis Treatment Plan

Based on the rapid bedside diagnosis results, a rapid bedside diagnosis treatment plan is formulated, which requires filling in the medication, dosage, and drug dilution solution. There are two ways for clinicians to complete the rapid bedside diagnosis treatment plan:

① Select List Drug Name: Select the drug name to be used in the drug list, match it by entering a single word in the space box at the top of the list, which helps to efficiently filter the matching drug names in the list. Then select the drug dosage and unit, confirm whether to dilute the solution and dosage, and click the "plus sign" on the right to complete the addition of the drug name to the list.

If the input drug name cannot be matched in the list, use the following method to add the drug name independently.

② Add drug name independently: Enter a custom drug name in the space box at the top of the list without matching it with a drug, then select the drug dosage and unit, confirm whether to dilute the solution and dosage, and finally click the "plus sign" on the right to complete the custom drug name addition.

Figure 13. Drug List

Figure 14. Autonomous Input Therapy Plan

After the rapid bedside diagnosis and rapid bedside treatment plan within 4 hours, there are two situations in the system operation, which are respectively explained:

① If there is a lack of rapid bedside diagnosis or rapid bedside treatment plan within 4 hours, simply click the "Determine" button, and the system will prompt that the current patient's rapid bedside diagnosis or treatment is not completed, and the next steps of the patient's examination cannot be displayed.

② After ensuring that the rapid bedside diagnosis and rapid bedside treatment plan within 4 hours are filled in correctly, click the " Determine " button, and the system will record the rapid bedside diagnosis time in the background. At the same time, the system will automatically display the patient's next examination data, and the clinician can continue to diagnose the patient based on

the displayed next examination data.

Special note: Only after completing the rapid bedside diagnosis and the rapid bedside treatment plan within 4 hours and clicking " Determine ", will the system display the patient's next examination data. If the rapid bedside diagnosis or the rapid bedside treatment plan within 4 hours has not been completed, the system will hide the patient's next examination data.

Figure 15. Rapid Bedside Diagnosis Not Filled In

Figure 16. Rapid Bedside Treatment Plan Not Filled In

Next Step Inspection

After completing the bedside diagnosis and treatment plan within 4 hours, the system will display the patient's next examination data. In the next step of the examination, it mainly includes: procalcitonin, blood routine, arterial blood gas analysis, anticoagulation, imaging examination, pathogen examination, and culture/smear. The clinician further diagnoses the patient's condition by selecting the necessary examination items. It should be noted that the time required for the next examination may affect the timeliness of the patient's treatment.

Figure 17. Next Step Inspection

SOFA

Clinicians can view the SOFA examination items of the patient during the current time, which mainly include six major parts: respiratory system, coagulation system, liver, cardiovascular system, central nervous system, and kidneys. The respiratory system data needs to be displayed after arterial blood gas analysis, and the coagulation system data needs to be displayed after blood routine examination.

Figure 18. SOFA

Early diagnosis

The clinician makes a early diagnosis of the patient based on basic information and all data from the next examination. There are two ways for the clinician to complete the early diagnosis:

① Diagnosis in the selection list: The current system's diagnosis list includes severe sepsis, general sepsis, highly suspected sepsis, low-grade suspected sepsis, and no sepsis. If the clinician's current diagnostic needs are met, the diagnosis name in the list can be directly selected.

② Self add diagnosis: If the diagnosis in the list does not meet the current diagnostic needs, the clinician can enter the diagnosis name in the blank box below the "Diagnosis" button.

Note: After completing the early 4-hour treatment plan, you can click the " Determine " button to save both the diagnosis and treatment plan.

Figure 19. Early Diagnosis - List Selection

Figure 20. Early Diagnosis - – Self Add

Early Treatment Plan

After determining the early diagnosis, it is necessary to develop a early treatment plan within 4 hours. There are two ways for clinicians to complete the early treatment plan:

① Select List Drug Name: Select the drug name to be used in the drug list, match it by entering a single word in the space box at the top of the list, which helps to efficiently filter the matching drug names in the list. Then select the drug dosage and unit, confirm whether to dilute the solution and dosage, and click the "plus sign" on the right to complete the addition of the drug name to the list. If the input drug name cannot be matched in the list, use the following method to add the drug

name independently.

② Add drug name independently: Enter a custom drug name in the space box at the top of the list without matching it with a drug, then select the drug dosage and unit, confirm whether to dilute the solution and dosage, click the "plus sign" on the right to complete the custom drug name addition.

Figure 21. Early Treatment Plan Within 4 hours

Time Assessment and Determination

After completing the early diagnosis and treatment plan, clinicians must choose the time required to treat similar patients in real clinical practice. By pulling the progress bar to select the length of time, after completing all the above steps, click "confirm" to complete the diagnosis of the patient! Special note: When clicking "confirm", there may be two situations:

① If there is a lack of early diagnosis or treatment plan within 4 hours, simply click the "Determine" button, and the system will prompt that the current patient's early diagnosis or treatment is incomplete, and the patient's early diagnosis and treatment plan data cannot be saved.

② Ensure that the bedside diagnosis and early treatment plan are filled in correctly within 4 hours, and complete the time evaluation. Click the " Determine " button, and the system will record the early diagnosis time in the background, successfully saving the patient's early diagnosis, treatment plan, and time evaluation data.

Figure 22. Time Assessment and Determination

Figure 23. Early Diagnosis Not Filled In

Figure 24. Early Treatment Plan Not Filled In

Next Patient

There are two possible outcomes of clicking on the 'Next Patient' operation, which explain:

① Successfully transitioned to the next patient. This situation indicates that there are still undiagnosed patients allocated by the system in the current clinician's account, and the system selects undiagnosed patients for display.

② Cannot jump to the next patient. This situation indicates that all patients allocated by the system in the current clinician's account have been diagnosed.