Developing A Paper-based Surviving Sepsis Campaign Guidelines Compliance Support and Outcome Predicted System

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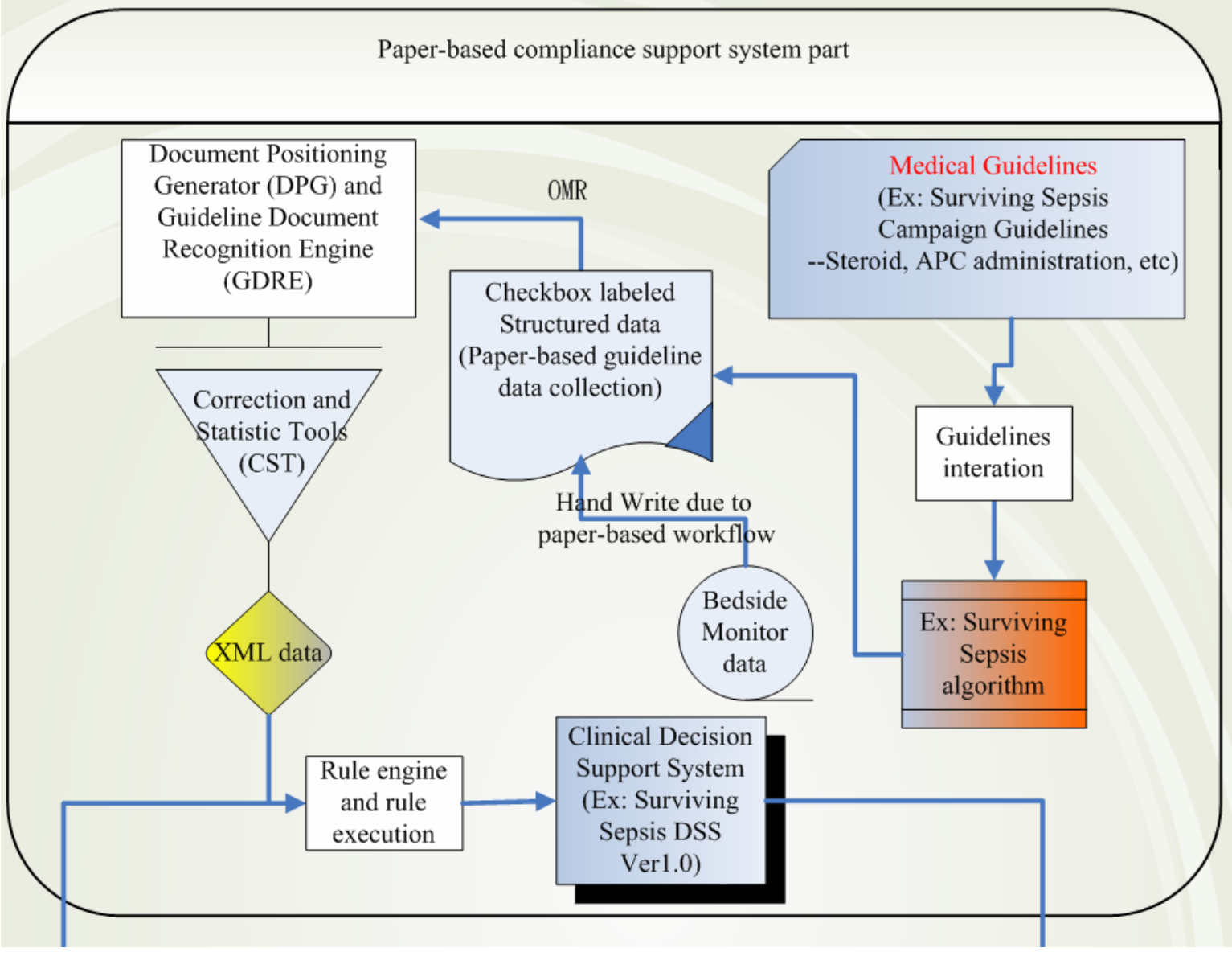
Background (1)

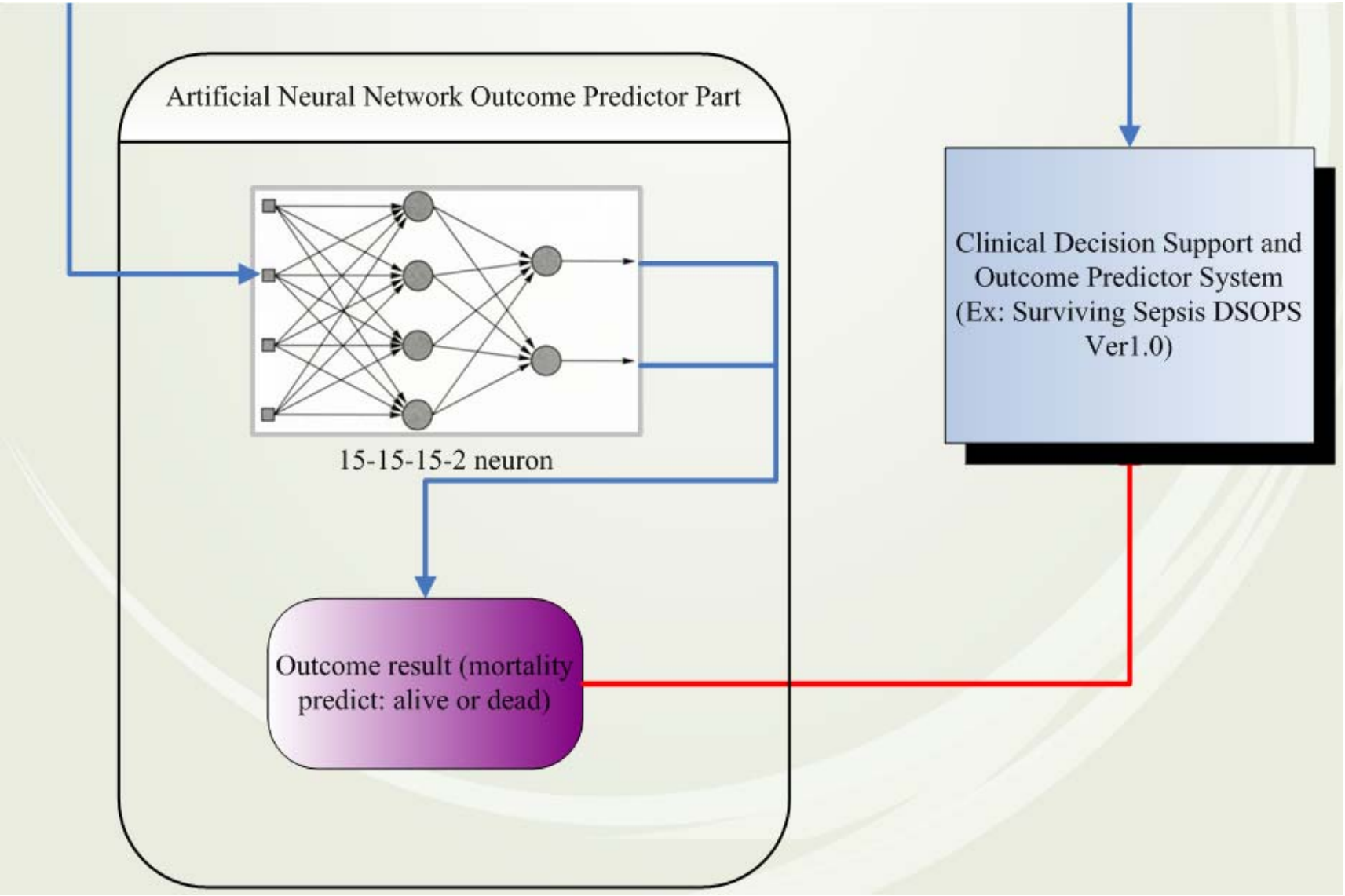
- Severe sepsis mortality rate still high[1]
- 2003 Surviving Sepsis Campaign (SSC) guidelines
- What Clinical Decision Support System (CDS) can do ?[2]

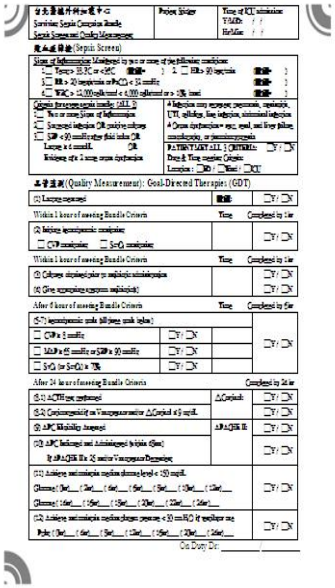
Background (2)

- Computer Industry (such as IBM CDI) try to provide a solution
- Should consider cost effectiveness
- Lack for outcome (mortality) prediction system
- Hard to implement to the organization that still paper-based working

System Architecture[3]




Artificial Neural Network Outcome Predictor Part
15-15-15-2 neuron
Outcome result (mortality predict: alive or dead)
Clinical Decision Support and Outcome Predictor System (Ex: Surviving Sepsis DSOPS Ver1.0)



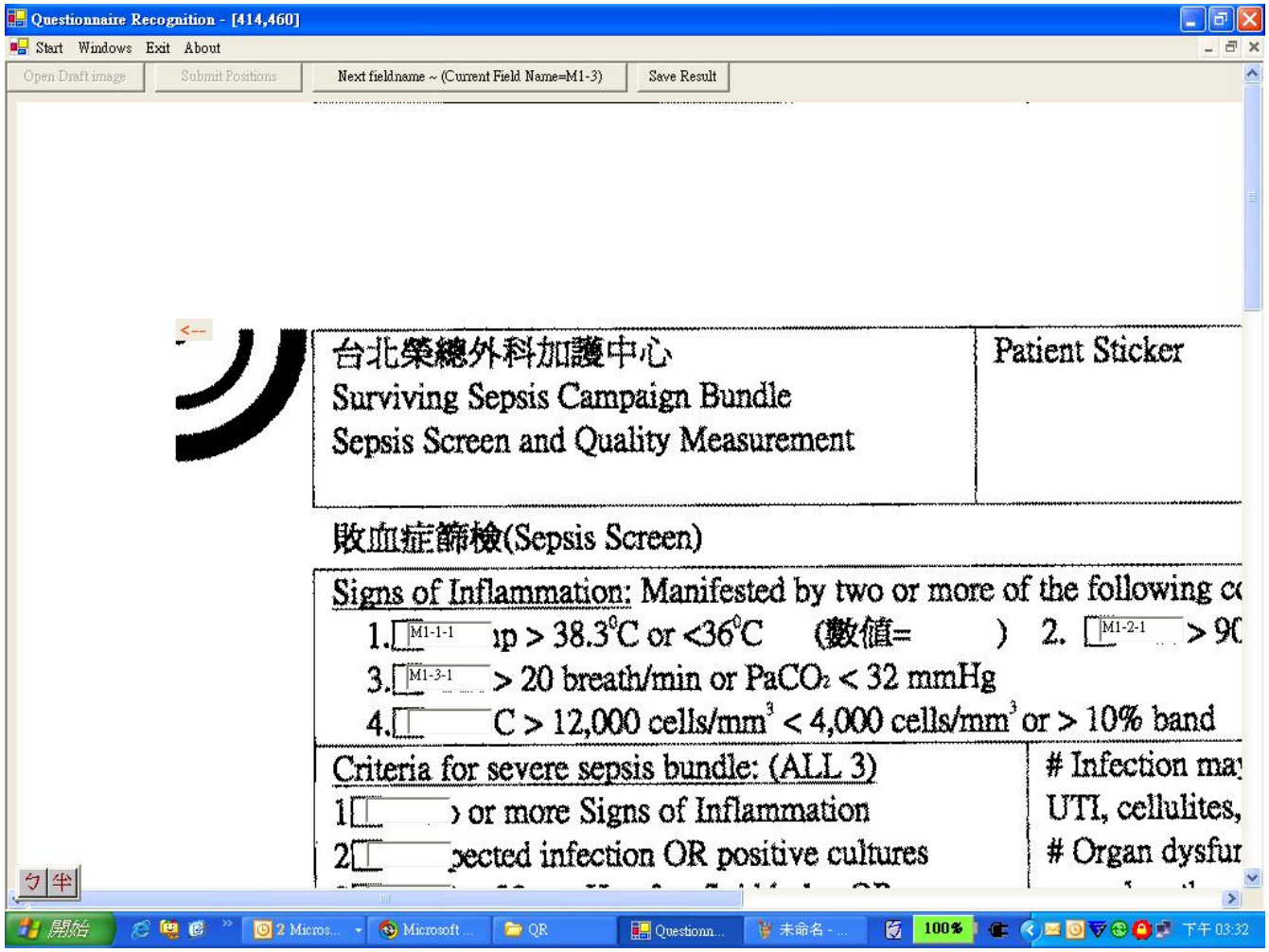
Paper-based guideline data collection

Scanner scan the paper

OMR system processing

Software designed for sepsis treatment decision support and ANN

Checkboxes Scanned



Scanned Results
(XML data for rule engine)

Questionnaire Recognition - [Result Statistics]

Start Windows Exit About

Result Statistics

NO	M1-1	M1-2	M1-3	M1-4	M2-1	M2-2	M2-3	S1	S2	S3	S4	S5	S6	S7	S8	M3-1	S9	M3-2	S10	M3-3	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22
001	1	9	1	1	1	1	1	8	8	1	2	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1
002	1	9	1	9	9	1	9	1	2	1	2	1	1	1	1	1	2	1	2	1	2	1	1	2	1	2	8	1	2	1	2	1
003	9	1	1	9	9	1	9	1	1	1	9	1	1	1	1	9	9	1	1	9	9	1	1	1	1	2	2	1	2	1	2	1
004	1	9	9	9	9	1	9	1	1	1	1	2	1	1	2	9	9	1	2	9	9	1	1	1	2	2	1	1	2	1	1	1
005	1	9	9	9	9	9	1	1	1	1	1	1	1	1	1	1	2	9	9	9	9	1	1	1	1	1	1	1	2	2	1	2
006	9	1	1	9	9	1	9	1	2	2	2	2	1	2	1	1	2	1	2	1	2	2	2	1	1	1	1	1	1	2	2	1
007	9	1	1	9	1	1	9	1	2	1	2	1	2	2	1	1	2	1	2	1	2	2	2	2	2	1	2	2	2	2	1	2
008	1	9	9	1	9	1	9	1	3	2	1	2	1	1	1	9	9	1	1	9	9	2	1	2	2	2	1	1	2	2	2	1
009	9	9	1	9	9	1	9	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1
010	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9

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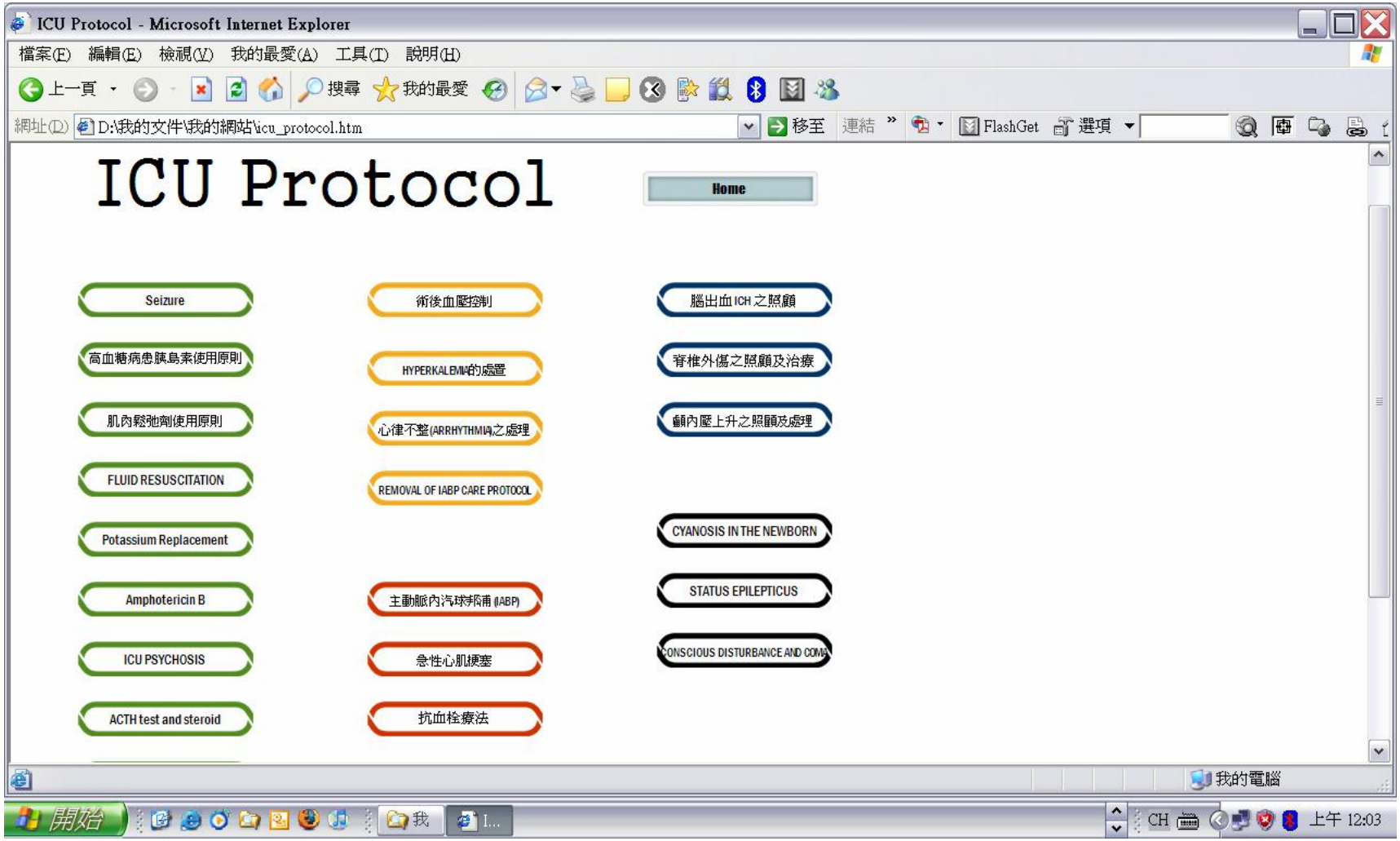
開始 2 Microsoft O... application 未命名 - 小畫家 Questionnaire R... 100% 下午 03:35

Embedded Rule Engine CDS



Results

- Error rate of document recognition: 0.19%
  - If scan document one by one, the error rate can be reduced to 0.057%
- Raise of the rate that adherence to guideline-based care: from 25% to 54%
- Mortality prediction: Need more data collection

Conclusion

- Cost saving : 6,000 us dollars versus 600,000 us dollars to setup CDS
- Organization that still paper-based working can take advantage of this CDS to improve guideline-based care

References

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2.. Amit X. Garg; Neill K. J. Adhikari; Heather McDonald; M. Patricia Rosas-Arellano; P. J. Devereaux; Joseph Beyene; Justina Sam; R. Brian Haynes. Effects of Computerized Clinical Decision Support Systems on Practitioner Performance and Patient Outcomes: A Systematic Review JAMA. 2005;293:1223-1238

3. Shiffman RN, Michel G, Essaihi A, Thornquist E. Bridging the guideline implementation gap: a systematic, document-centered approach to guideline implementation. J Am Med Inform Assoc.2004;11:418–26