UTHealth
The University of Texas Health Science Center at Houston
School of Biomedical Informatics

SHARPC NCCD

Undermining Cognitive Constraints:

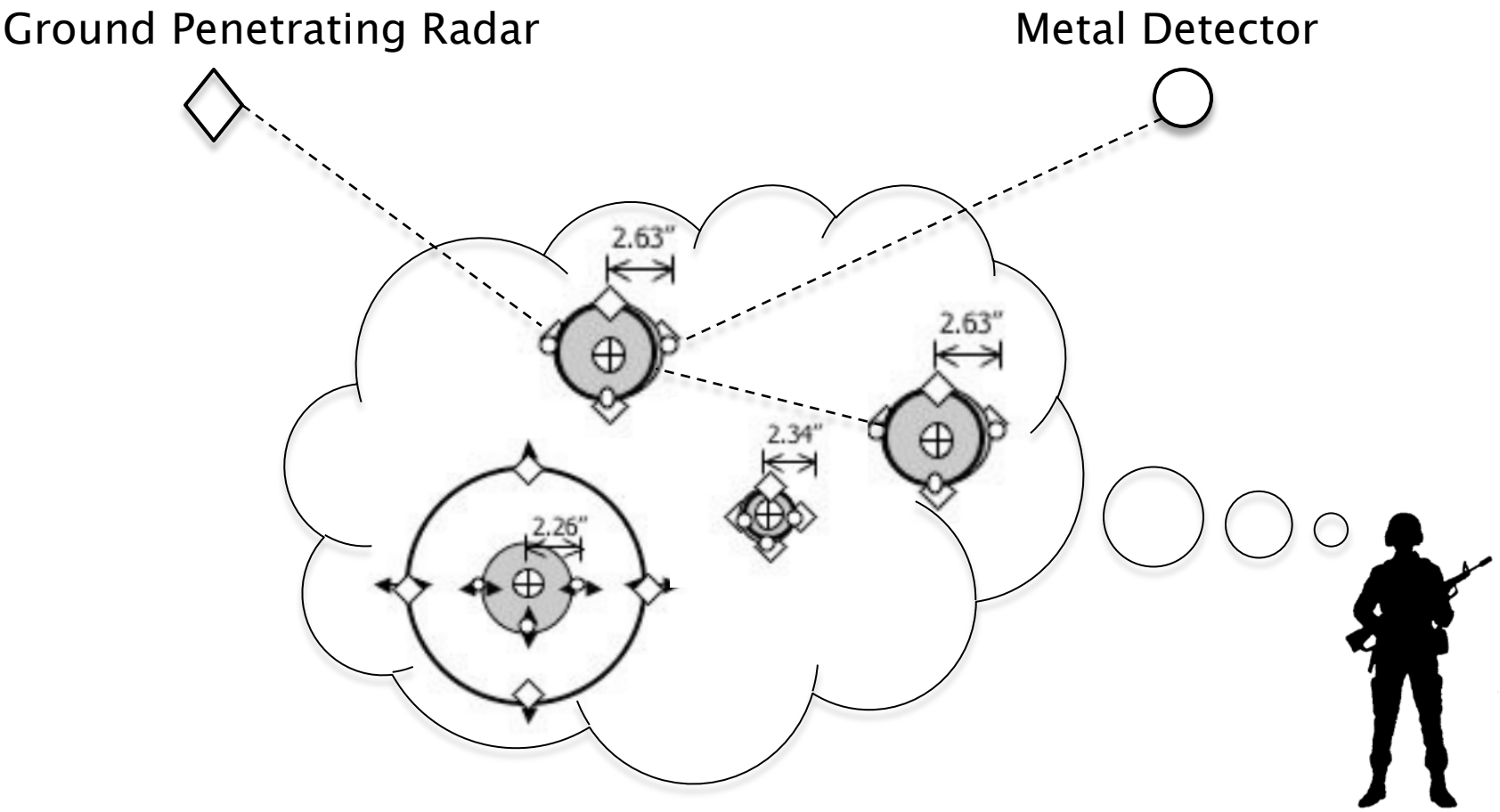
Revealing Threats Buried Beneath Mounds of Data

Trevor Cohen MBChB, PhD

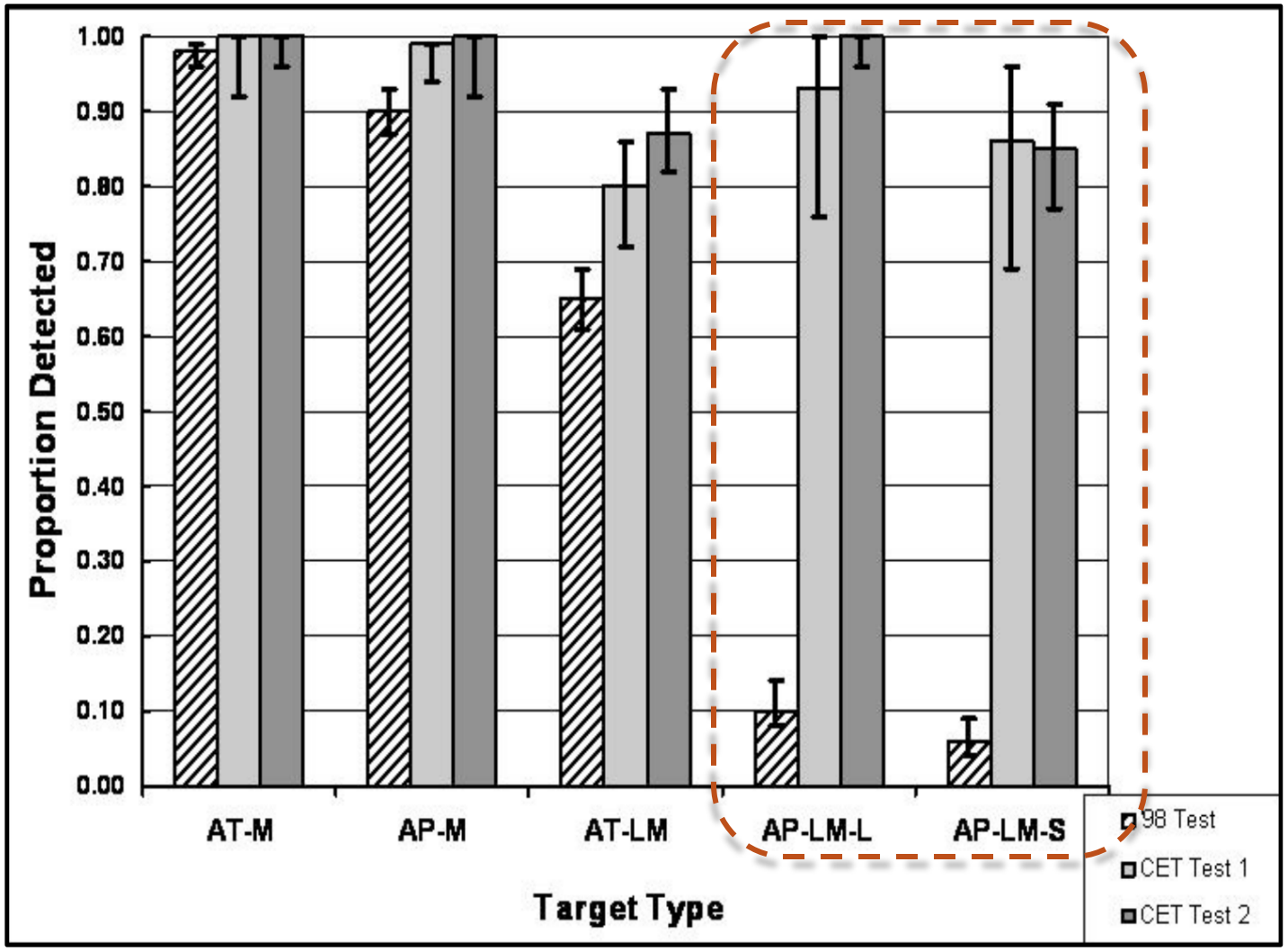
PMA-3 landmine (image courtesy wikipedia)

PSS 14 mine detector Image: www.cyterra.com

JAMES STASZEWSKI
Psychology – CMU



Staszewski, J. (2006). Spatial thinking and the design of landmine detection training. In G. A. Allen, (Ed.), Applied spatial cognition: From research to cognitive technology. (pp. 231-265). Mahwah, NJ: Erlbaum Associates



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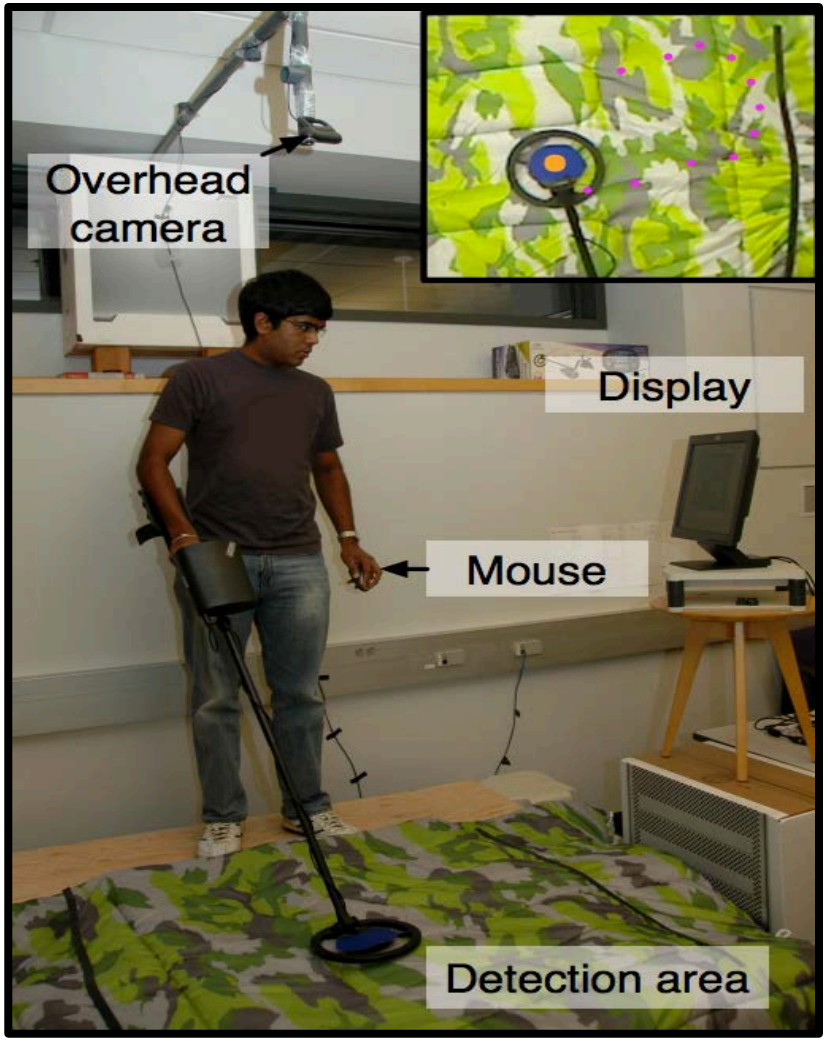
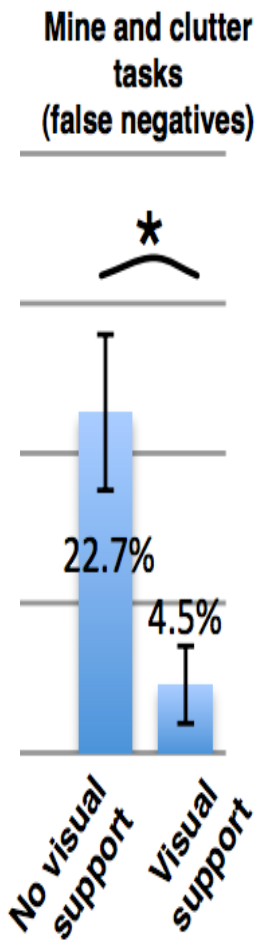
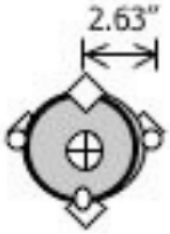




Lahiru G. Jayatilaka, Luca F. Bertuccelli, James Staszewski, and Krzysztof Z. Gajos. PETALS: Understanding the Implications of Visual Decision Support in Humanitarian Landmine Clearance. In CHI 2011: Proceeding of the annual SIGCHI conference on Human factors in computing systems , New York, NY, USA, 2011. ACM

DECISION

MENTAL REPRESENTATION



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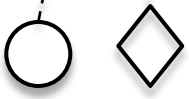

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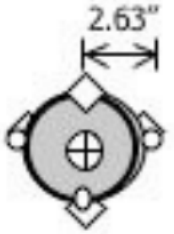

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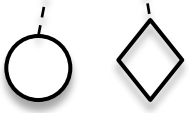
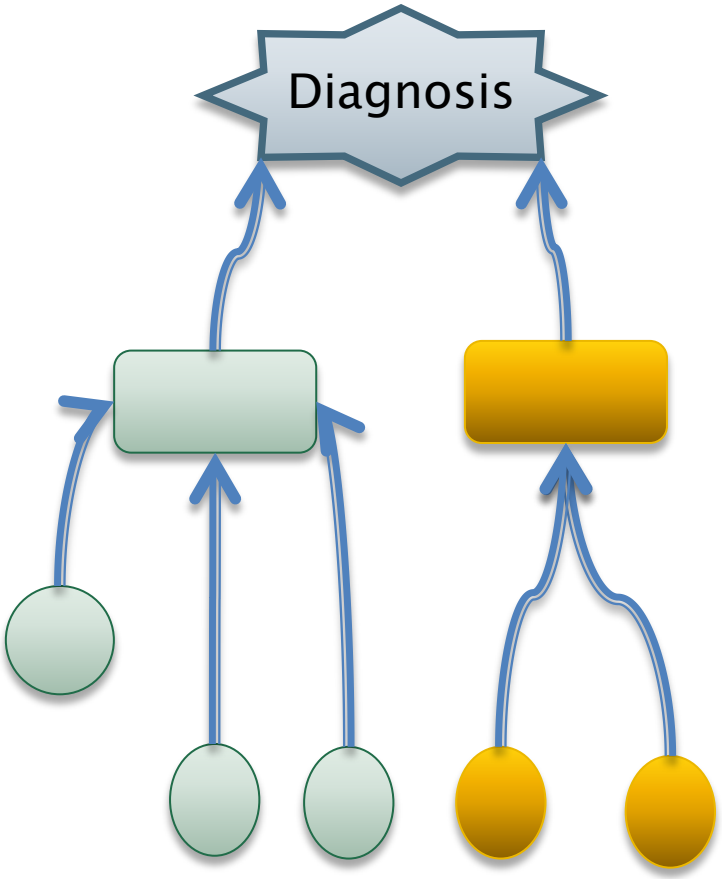
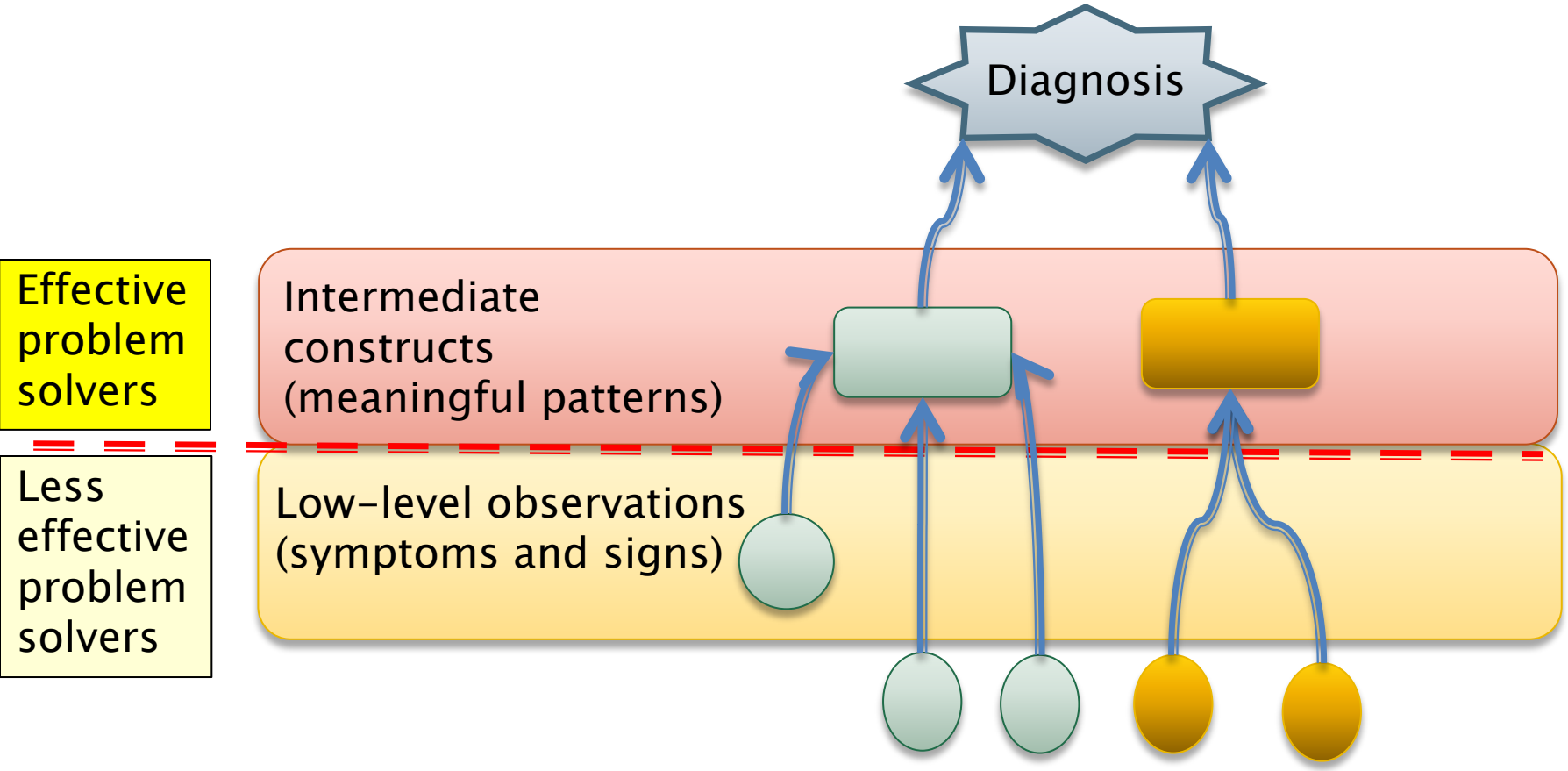


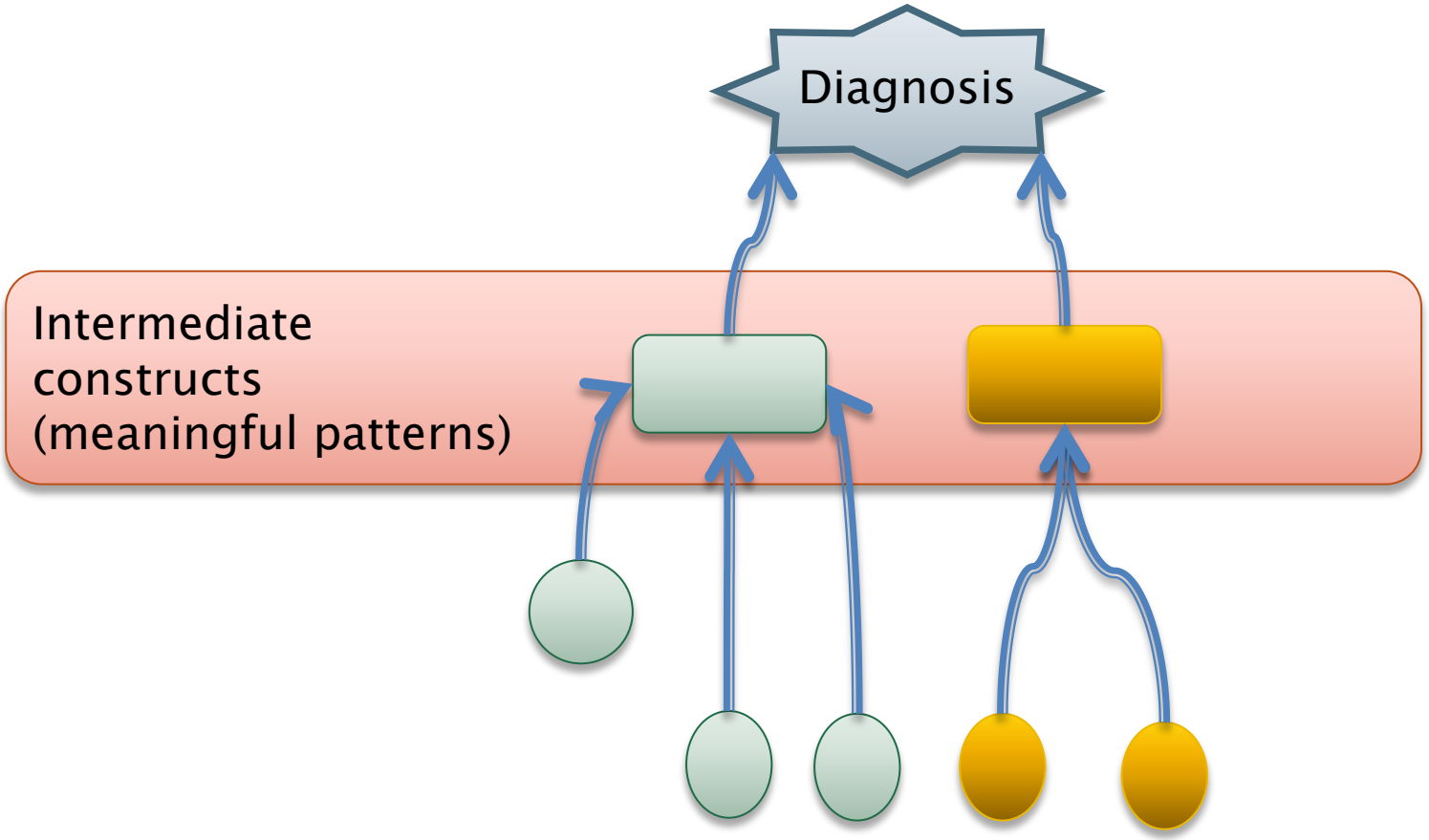


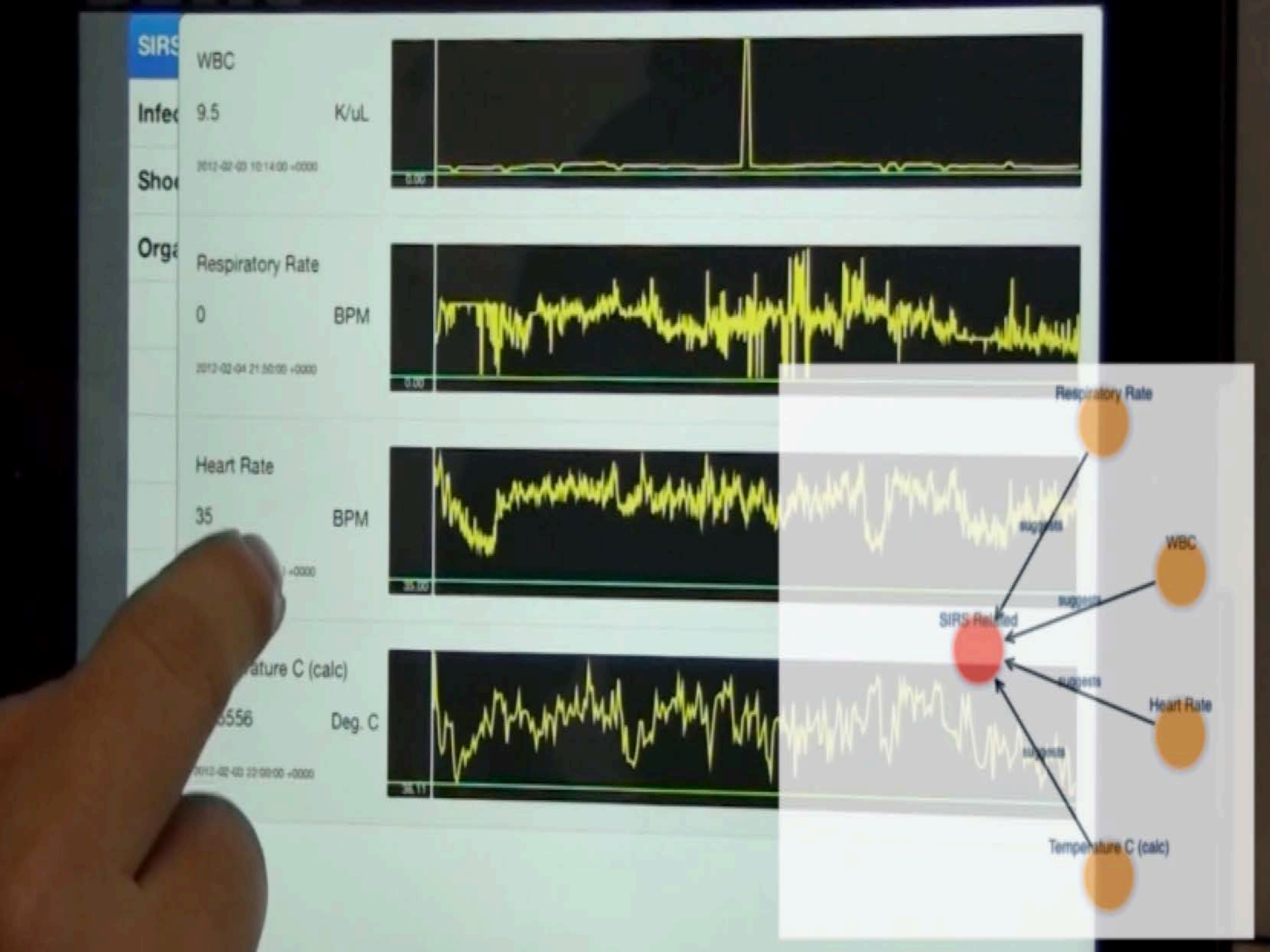
Patel, Arocha, Kaufman 1994



Patel, Arocha, Kaufman 1994

Cognitive Support System




WBC
9.5
K/uL
Respiratory Rate
0
BPM
Heart Rate
35
BPM
Deg. C
Respiratory Rate
WBC
Heart Rate

PSYCHOSIS	MOOD	SUBSTANCE	DANGER
• of the delusional idea that he was transparent ("	• and one anti-epileptic agent (carbamazepine) had been ineffective in moderating his feelings	• with alcohol abuse	• by numerous "drunken and disorderly" problems
• during episodes when his delusion was most manifest he drank heavily	• with increasing social isolation and	• He discovered that alcohol suppressed these symptoms	
• and were sometimes associated with generalised convulsions that were considered to be alcohol withdrawal fits		• during episodes when his delusion was most manifest he drank heavily	
• with a diagnosis of schizophrenia		• The drinking spells were often followed	
• Antipsychotic agents		• and were sometimes associated with generalised convulsions that were considered to be alcohol withdrawal fits	
• and there were no delusional ideas expressed at that time		• The episodic alcoholic binges continued	
• on treatment the delusion had completely gone		• by the end of 1993 he was drinking	
		• because of intoxication	
		• from alcohol according to British National Formulary guidelines over a seven day period	
		• into drinking again	
		• after drinking several pints the night	
		• to use more alcohol to suppress the feeling	

[A] Summary of Case Categories

We report the case of a 31 year old man who had an 11 year history **of the delusional idea that he was transparent (" like a piece of glass")** associated with alcohol ab

The intense fear he experienced when people seemed able to look right through him ca d him to hurry along the streets seeking shadows or darkness in order to hide his face as far as possib

He discovered that alcohol suppressed these symptoms and therefore **during episodes when his delusion was most manifest he drank heavily**

The drinking spells were often followed by numerous "drunken and disorderly" problems **and were sometimes associated with generalised convulsions that w**

After having a fit he often felt much less fearful and was able to work hard in his family's

He was never financially embarrassed took pride in his independence and had built his own house

Taken together with the fact that he was warm and pleasant in conversation these seemed unusual features in one labelled **with a diagnosis of schizophrenia**

He had been referred to neurologists on previous occasions for their opinion especially because there was a history of head injury at the age of 17

The full case-notes have not been available to us but no abnormal findings resulted

Antipsychotic agents and one anti-epileptic agent (carbamazepine) had been ineffective in moderating his feelings of transparency

These various medications had been prescribed at another hospital over the course of the previous 10 years and we have been unable to discover the dosages used although compliance was po

The episodic alcoholic binges continued and were associated with increasing social isolation and by the end of 1993 he was drinking to a consistently heavy degree

He was referred to a Community Mental Health Team and was admitted to an inpatient unit for assessment

At this point his mental state was difficult to assess because of intoxication

However the following day he was relaxed and well-spoken and apologetic for his previous state

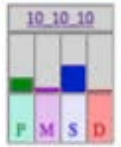
He had good cognitive function **and there were no delusional ideas expressed at that time**

He was de- toxified from alcohol according to British National Formulary guidelines over a seven day period

On high doses of chlormethiazole he had been able to speak normally but as the dose was reduced he began to stammer and develop a tic on the right side of his mouth

This tic was noted to be much worse when he was in stressful situations and the patient reported that he had had it before

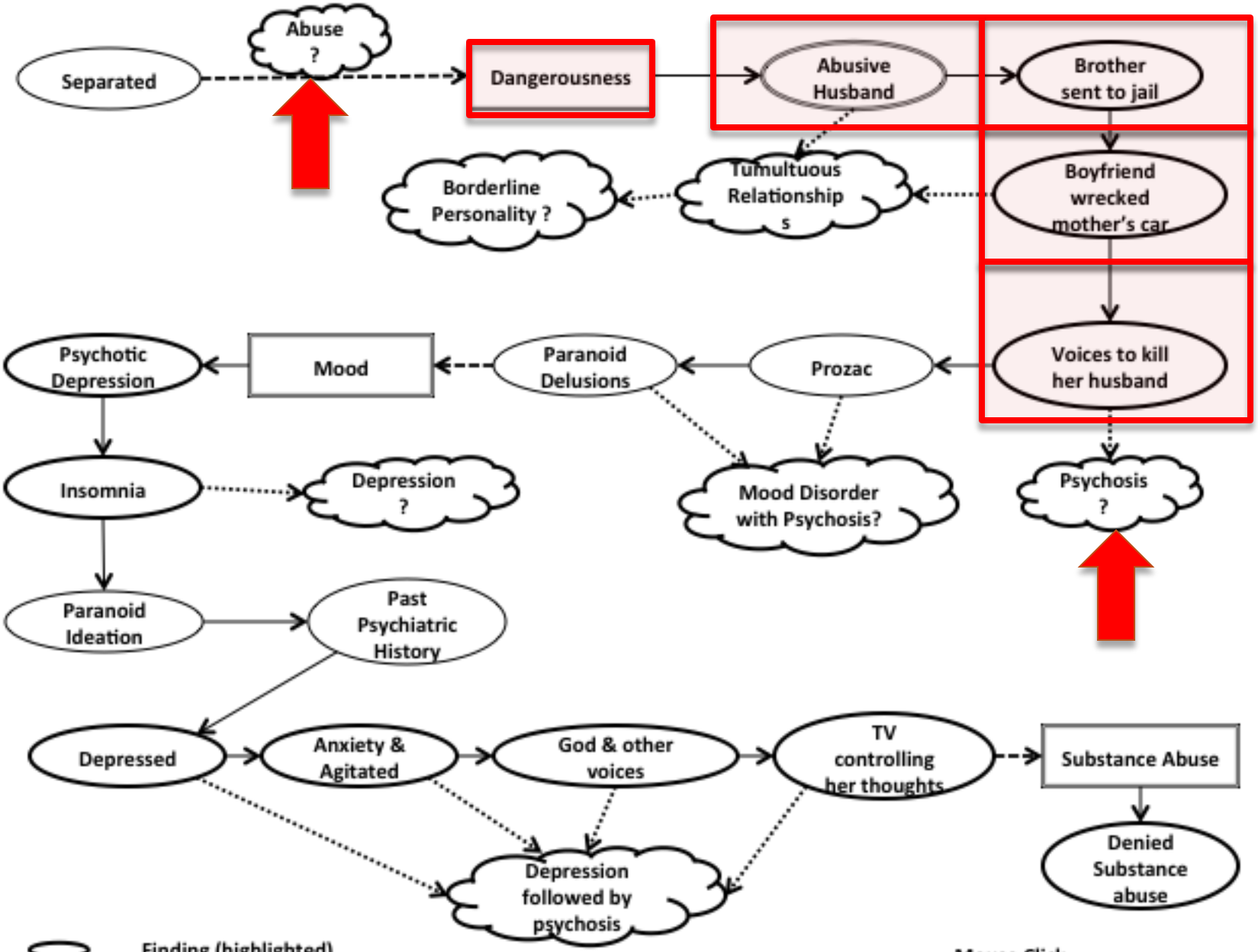
[B] Detailed Patient Note

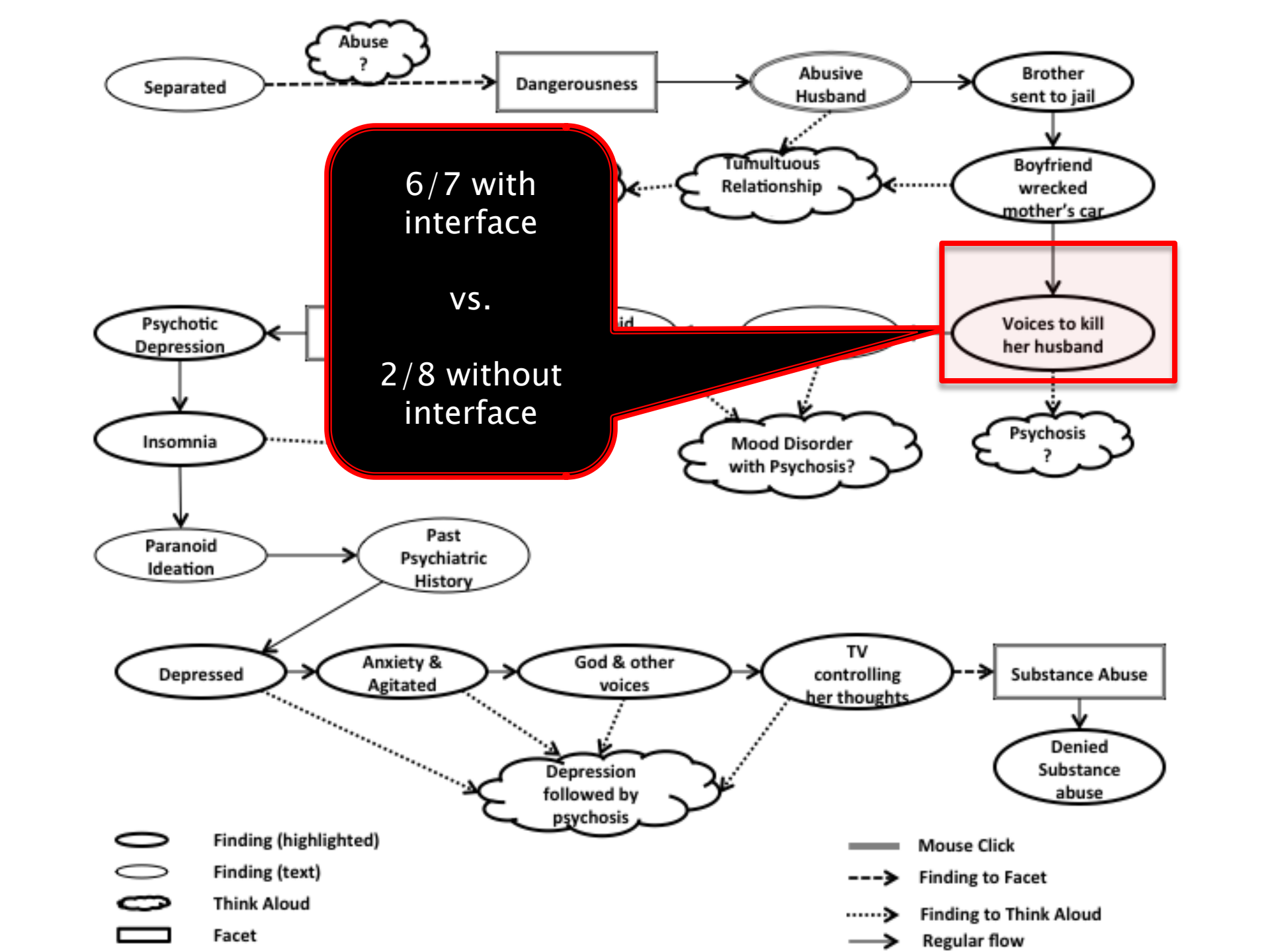


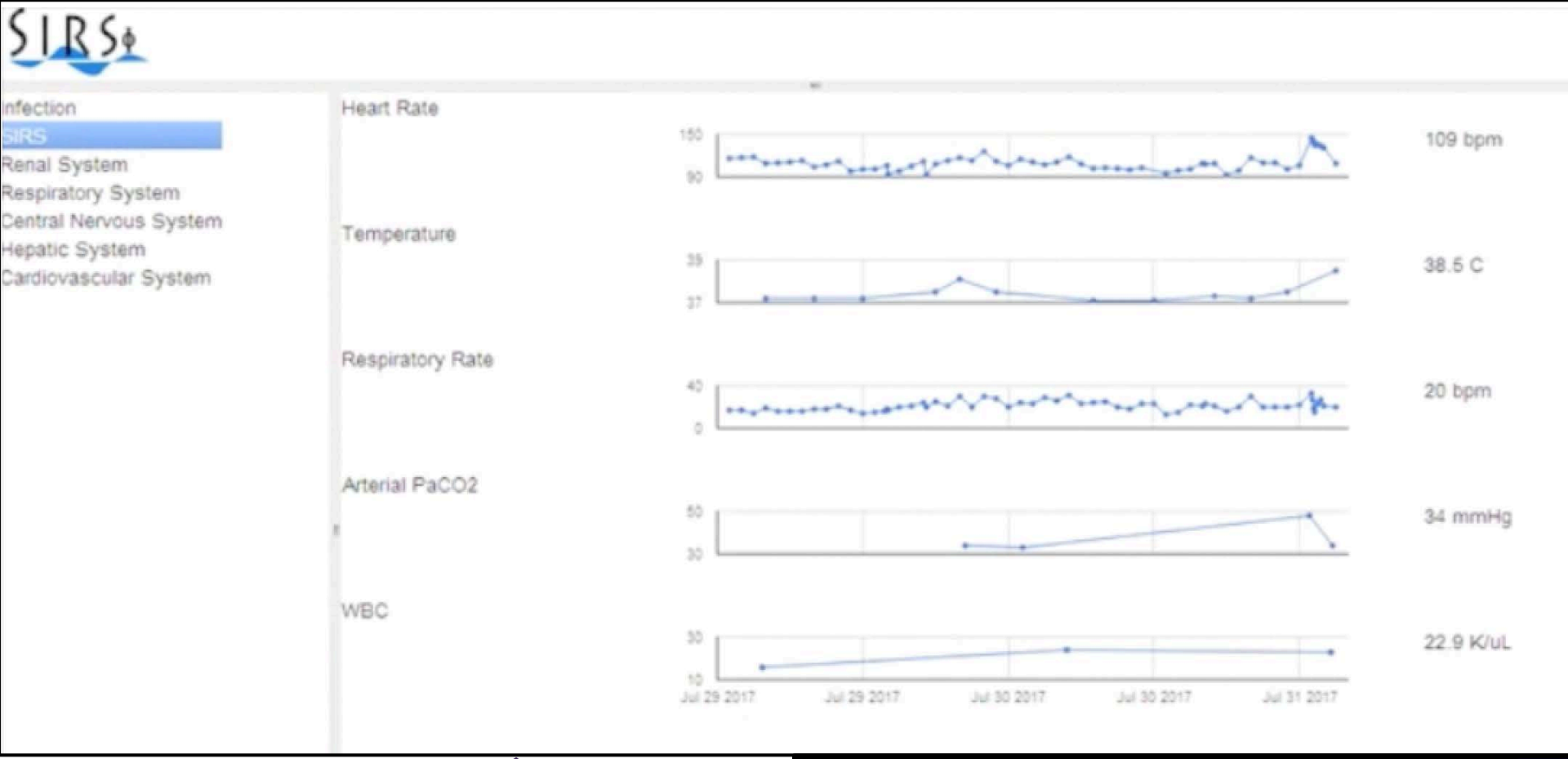
PSYCHOSIS

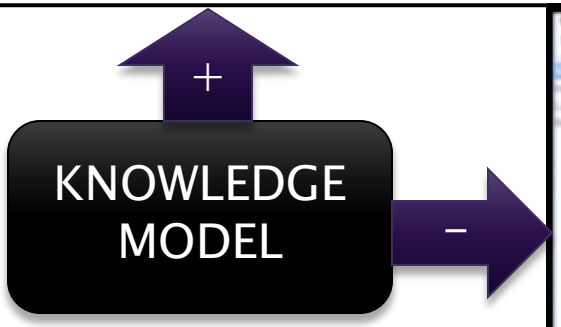
- of the delusional idea that he was transparent ("
- during episodes when his delusion was most manifest he drank heavily
- and were sometimes associated with generalised convulsions that were considered to be alcohol withdrawal fits
- with a diagnosis of schizophrenia
- Antipsychotic agents
- and there were no delusional ideas expressed at that time
- on treatment the delusion had completely gone

[C] Details related to Categories Selected in [A]


Separated
Abuse ?
Dangerousness
Abusive Husband
Brother sent to jail
Borderline Personality ?
Tumultuous Relationships
Boyfriend wrecked mother's car
Psychotic Depression
Mood
Paranoid Delusions
Prozac
Voices to kill her husband
Insomnia
Depression ?
Mood Disorder with Psychosis?
Psychosis ?
Paranoid Ideation
Past Psychiatric History
Depressed
Anxiety & Agitated
God & other voices
TV controlling her thoughts
Substance Abuse
Denied Substance abuse
Depression followed by psychosis
Finding (highlighted)
Finding (text)
Think Aloud
Facet
Mouse Click
Finding to Facet
Finding to Think Aloud
Regular flow


Separated
Abuse ?
Dangerousness
Abusive Husband
Brother sent to jail
Tumultuous Relationship
Boyfriend wrecked mother's car
6/7 with interface
vs.
2/8 without interface
Psychotic Depression
Voices to kill her husband
Insomnia
Mood Disorder with Psychosis?
Psychosis ?
Paranoid Ideation
Past Psychiatric History
Depressed
Anxiety & Agitated
God & other voices
TV controlling her thoughts
Substance Abuse
Denied Substance abuse
Depression followed by psychosis
Finding (highlighted)
Finding (text)
Think Aloud
Facet
Mouse Click
Finding to Facet
Finding to Think Aloud
Regular flow


SIRS
Infection
SIRS
Renal System
Respiratory System
Central Nervous System
Hepatic System
Cardiovascular System
Heart Rate
150
90
109 bpm
Temperature
39
37
38.5 C
Respiratory Rate
40
0
20 bpm
Arterial PaCO2
50
30
34 mmHg
WBC
30
10
22.9 K/uL
Jul 29 2017
Jul 29 2017
Jul 30 2017
Jul 30 2017
Jul 31 2017


+
KNOWLEDGE MODEL
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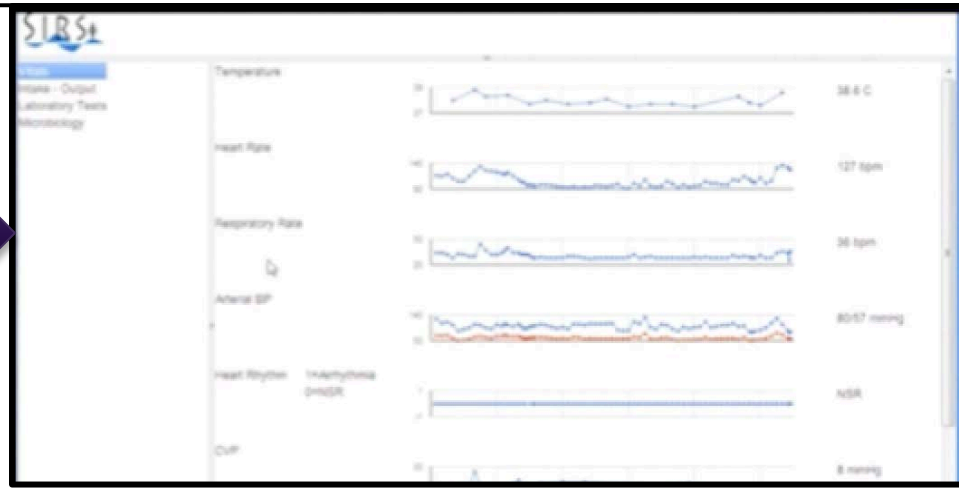
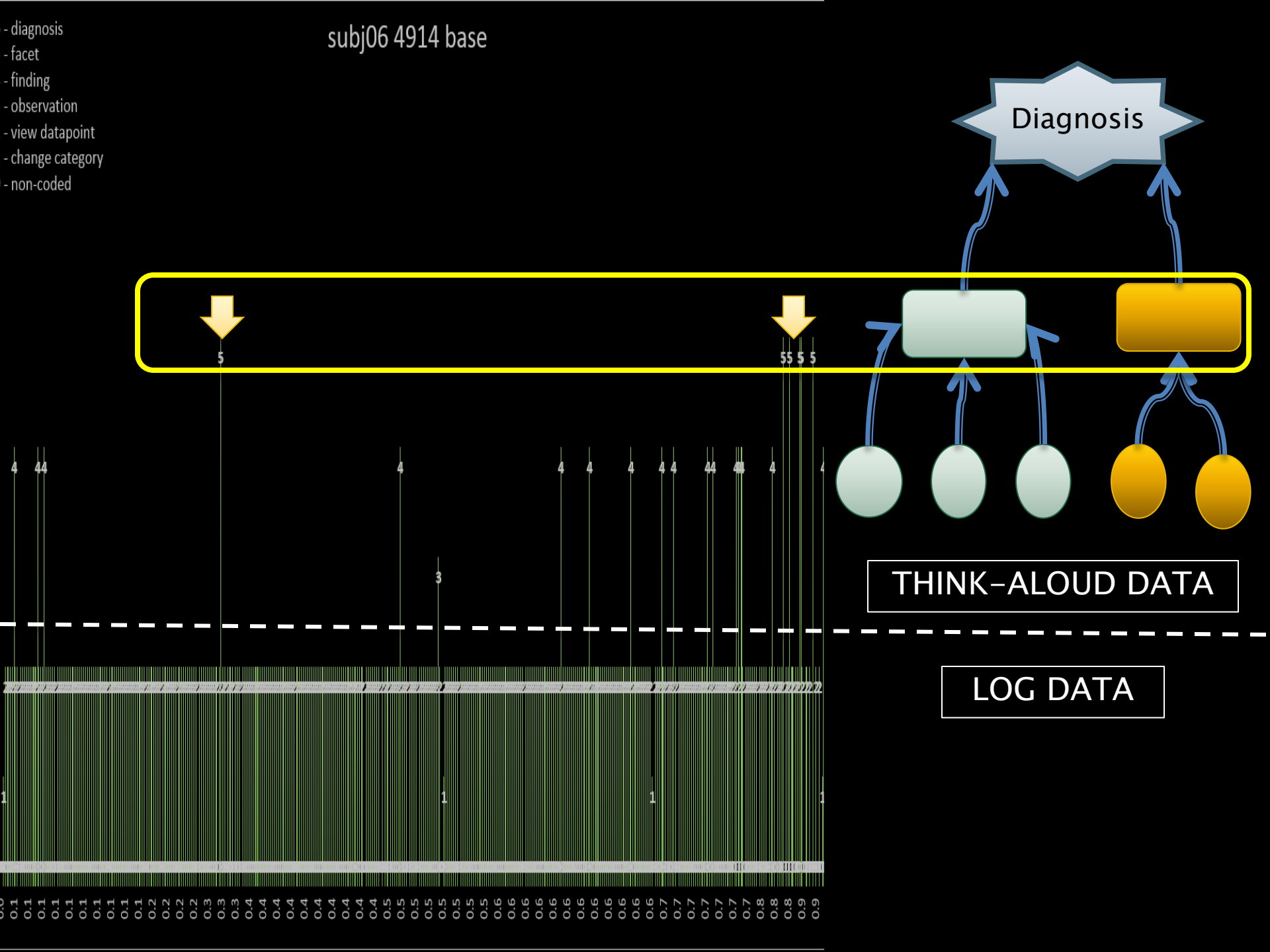
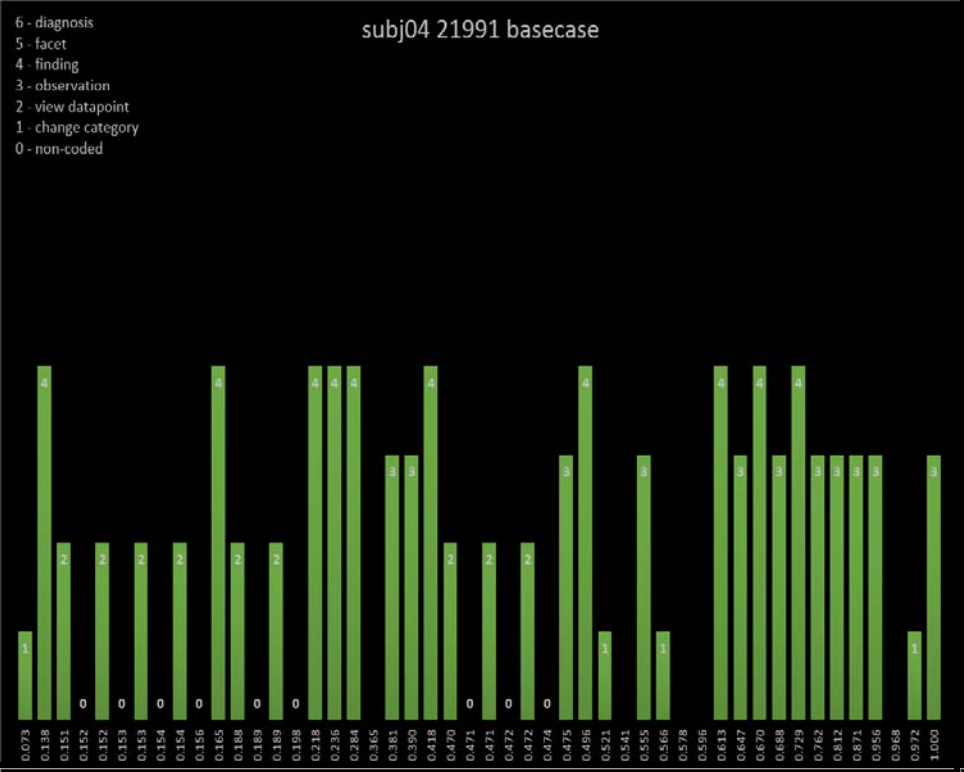
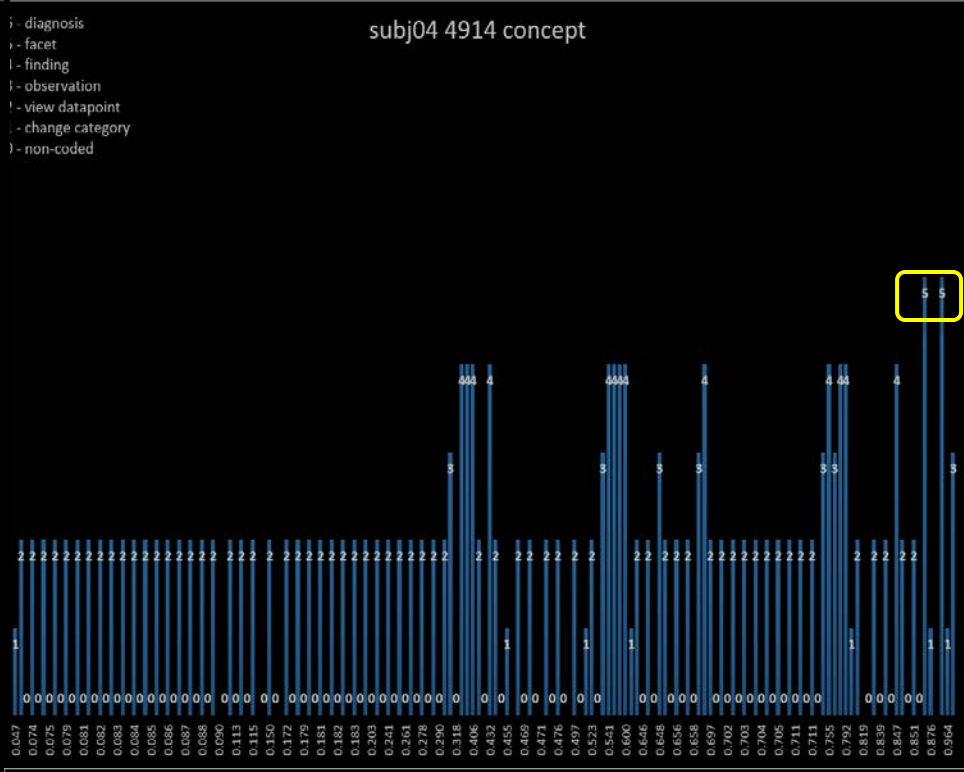
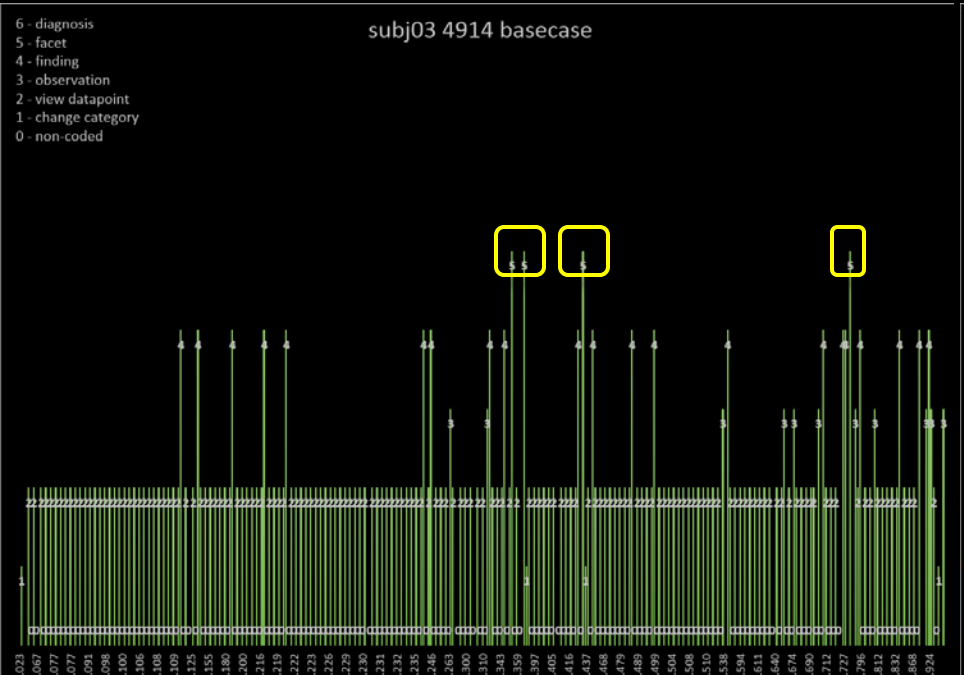
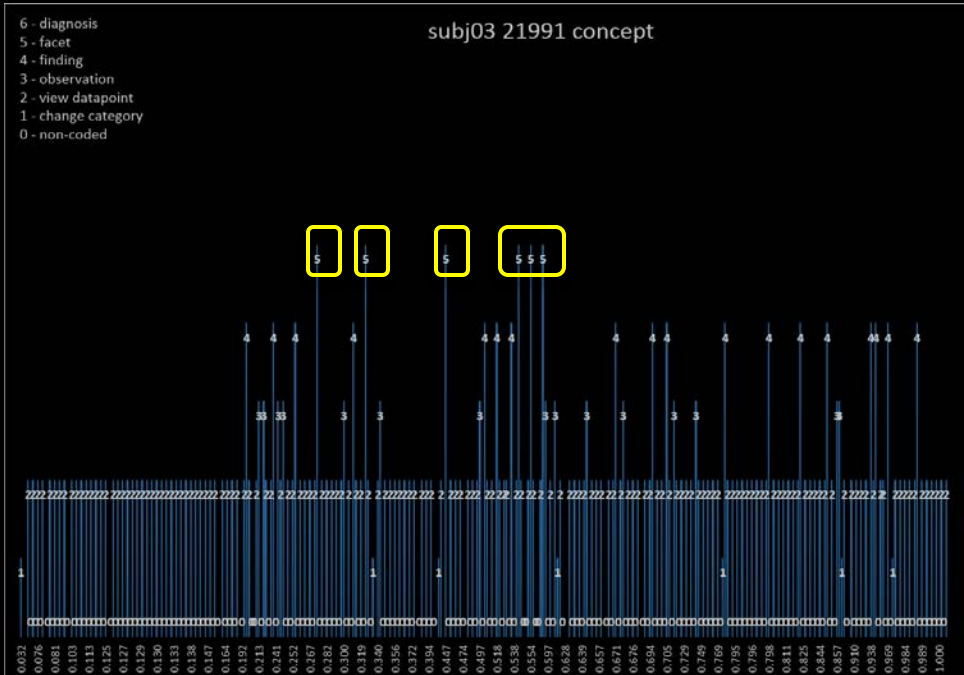

SIRS
Temperature
Heart Rate
Respiratory Rate
Arterial BP
Heart Rhythm
CVP


- diagnosis
- facet
- finding
- observation
- view datapoint
- change category
- non-coded
subj06 4914 base
Diagnosis
THINK-ALOUD DATA
LOG DATA


6 - diagnosis
5 - facet
4 - finding
3 - observation
2 - view datapoint
1 - change category
0 - non-coded
subj04 21991 basecase


- diagnosis
- facet
- finding
- observation
- view datapoint
- change category
- non-coded
subj04 4914 concept


6 - diagnosis
5 - facet
4 - finding
3 - observation
2 - view datapoint
1 - change category
0 - non-coded
subj03 4914 basecase


6 - diagnosis
5 - facet
4 - finding
3 - observation
2 - view datapoint
1 - change category
0 - non-coded
subj03 21991 concept

Decompensating patient

Has myocardial infarction shortly after period displayed to participants

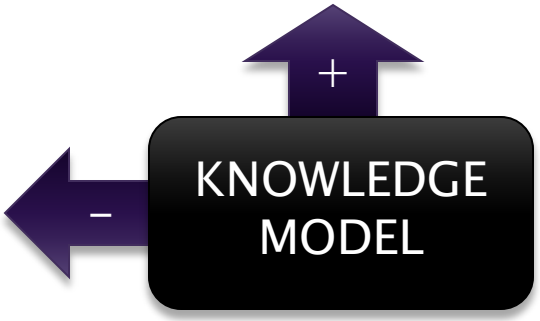
"I would be very concerned that this patient is acutely decompensating "

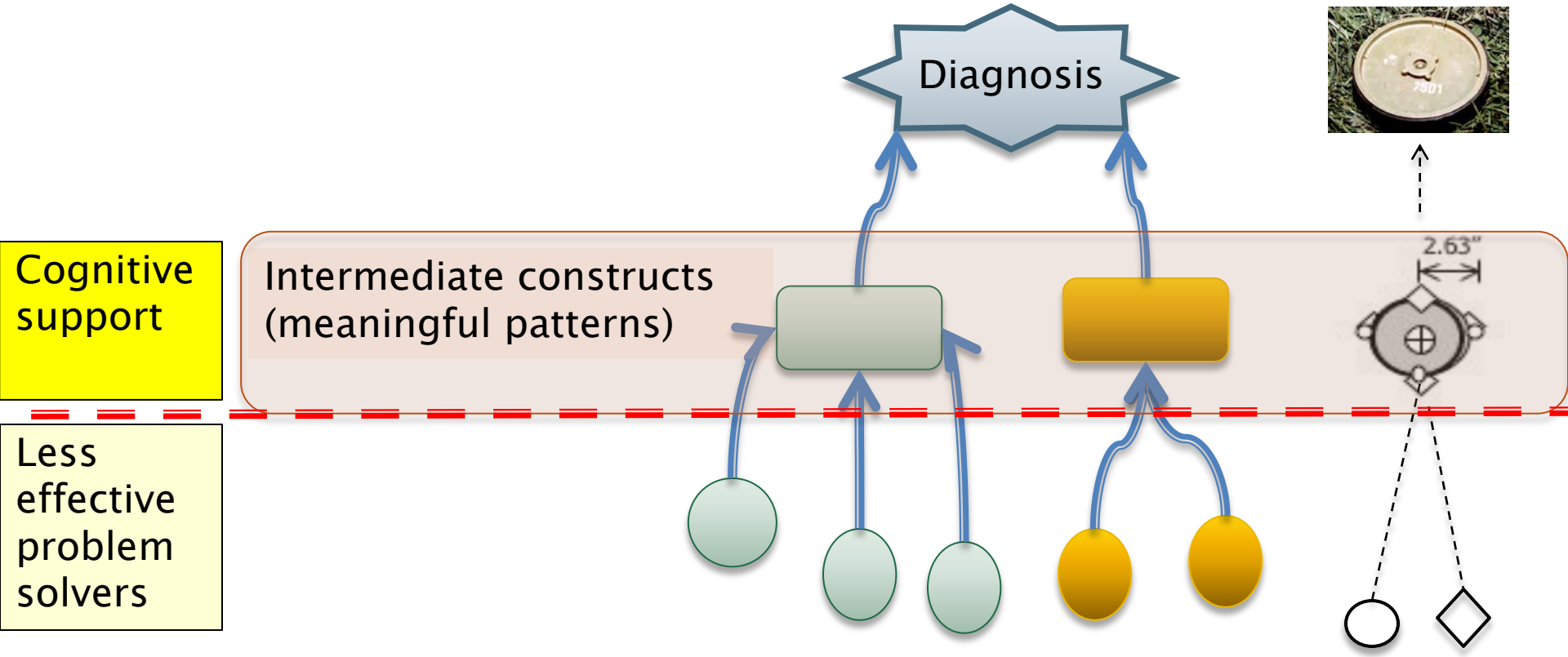
"I am concerned" "This is something I would need to investigate and intervene on"

"she seems OK… I would be concerned"

"I don't think I would do anything"

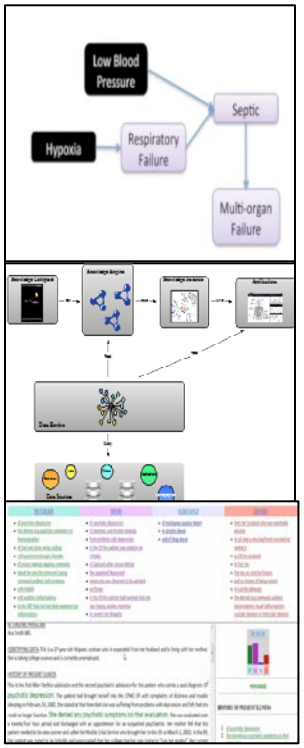
"I won't do any intervention just wait and watch"




Diagnosis
Cognitive support
Intermediate constructs (meaningful patterns)
Less effective problem solvers
2.63"

Acknowledgments

- ONC
- Collaborators and contributors



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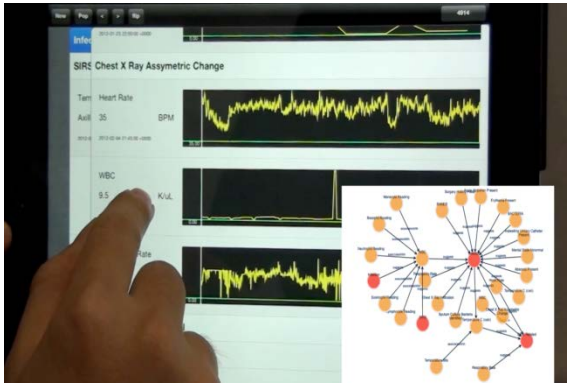

Thanks to:
Mimic 2 Google Web Toolkit