



# Project CDSS and KnowledgeBase

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# Clinical Decision Support Systems (CDSS) and Knowledge Bases

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- CDSS: Health information technology for supporting clinical decision-making

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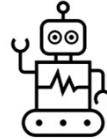
**Knowledge-based**

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- CDSS: Health information technology for supporting clinical decision-making



**Knowledge-based**



**Non-Knowledge-based**

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**Knowledge-based**



**Non-Knowledge-based**

- Knowledge base

# Clinical Decision Support Systems (CDSS) and Knowledge Bases

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**Knowledge-based**

- Knowledge base
- Inference Engine



**Non-Knowledge-based**

# Clinical Decision Support Systems (CDSS) and Knowledge Bases

- CDSS: Health information technology for supporting clinical decision-making



**Knowledge-based**

- Knowledge base
- Inference Engine
- Communication with the user



**Non-Knowledge-based**



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- CDSS: Health information technology for supporting clinical decision-making



Knowledge-based

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Non-Knowledge-based

```
IF  
"unexplained_weight_loss" AND  
"persistent_cough" AND  
"blood_in_sputum"
```

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Knowledge-based

- Knowledge base
- Inference Engine
- Communication with the user



Non-Knowledge-based

```
IF
"unexplained_weight_loss" AND
"persistent_cough" AND
"blood_in_sputum"

THEN
"suspected lung cancer" AND
"recommend immediate oncologist referral"
```

**BACK**   
**TO**  
**THE PAST**



**BACK**   
**TO THE PAST**



**MYCIN**

1970s Stanford University

**BACK  
TO THE PAST**



**MYCIN**

1970s Stanford University

CDSS / expert system for identifying bacterial infections

**BACK  
TO  
THE PAST**



1970s Stanford University

CDSS / expert system for identifying bacterial infections

- User puts in parameters/criteria

**BACK  
TO  
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CDSS / expert system for identifying bacterial infections

- User puts in parameters/criteria
- Simple Inference Engine

**BACK  
TO THE PAST**





1970s Stanford University

CDSS / expert system for identifying bacterial infections

- User puts in parameters/criteria
- Simple Inference Engine
- Knowledge base of about 600 rules

**BACK  
TO  
THE PAST**



1970s Stanford University

CDSS / expert system for identifying bacterial infections

- User puts in parameters/criteria
- Simple Inference Engine
- Knowledge base of about 600 rules
- Computer gives recommendation



# Antimicrobial Selection by a JAMA, 1979 Computer

## A Blinded Evaluation by Infectious Diseases Experts

Victor L. Yu, MD; Lawrence M. Fagan; Sharon M. Wraith; William J. Clancey; A. Carlisle Scott, MS;  
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- Recommendations of MYCIN acceptable in 65%
- Acceptability rate of five faculty specialists: 42.5 – 62.5%

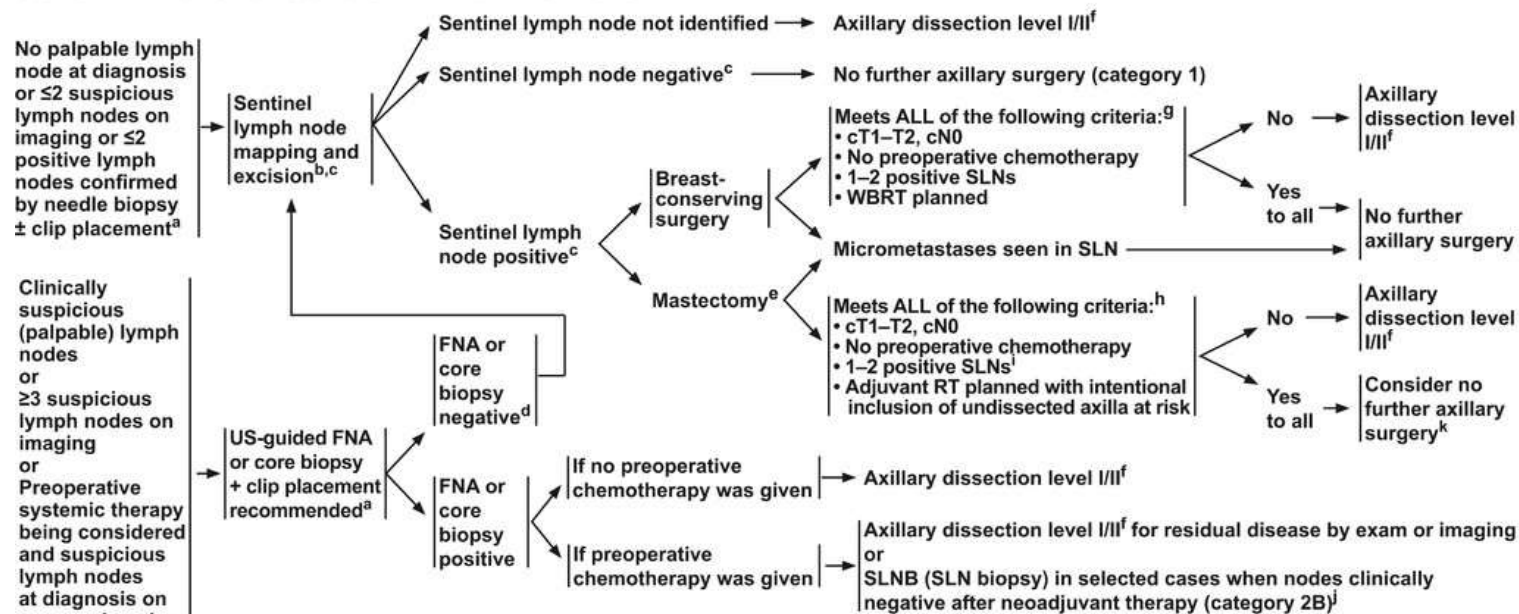


Ok, but why may this be interesting for radiation therapy?

**BACK** ←  
**TO** **PRESENT**  
**THE**

# Invasive Breast Cancer

## CONSIDERATIONS FOR SURGICAL AXILLARY STAGING



**BACK TO THE PRESENT**

<sup>a</sup> If a positive lymph node is clipped at biopsy, every effort should be made to remove the clipped node at the time of surgery.

<sup>b</sup> SLN mapping injections may be peritumoral, subareolar, or subdermal.

<sup>c</sup> Sentinel node involvement is defined by multilevel node sectioning with hematoxylin and eosin (H&E) staining. Cytokeratin immunohistochemistry (IHC) may be used for equivocal cases on H&E. Routine cytokeratin IHC to define node involvement is not recommended in clinical decision-making.

<sup>d</sup> If clinically negative axilla before chemotherapy and then have a positive sentinel node after chemotherapy, consider completion axillary lymph node dissection or multidisciplinary tumor board discussion on appropriateness of radiation of axilla without further surgery.

<sup>e</sup> Limited data exist for mastectomy patients.

<sup>f</sup> See Axillary Lymph Node Staging (BINV-E).

<sup>g</sup> ACOSOG Z0011: Giuliano AE, et al. JAMA. 2017 Sep 12;318(10):918-926.

<sup>h</sup> EORTC AMAROS: Donker M, et al. Lancet Oncol. 2014;15(12):1303-10; Rutgers E, et al. Cancer Research. 2019;79(4 Supplement):GS4-01-GS04-01.

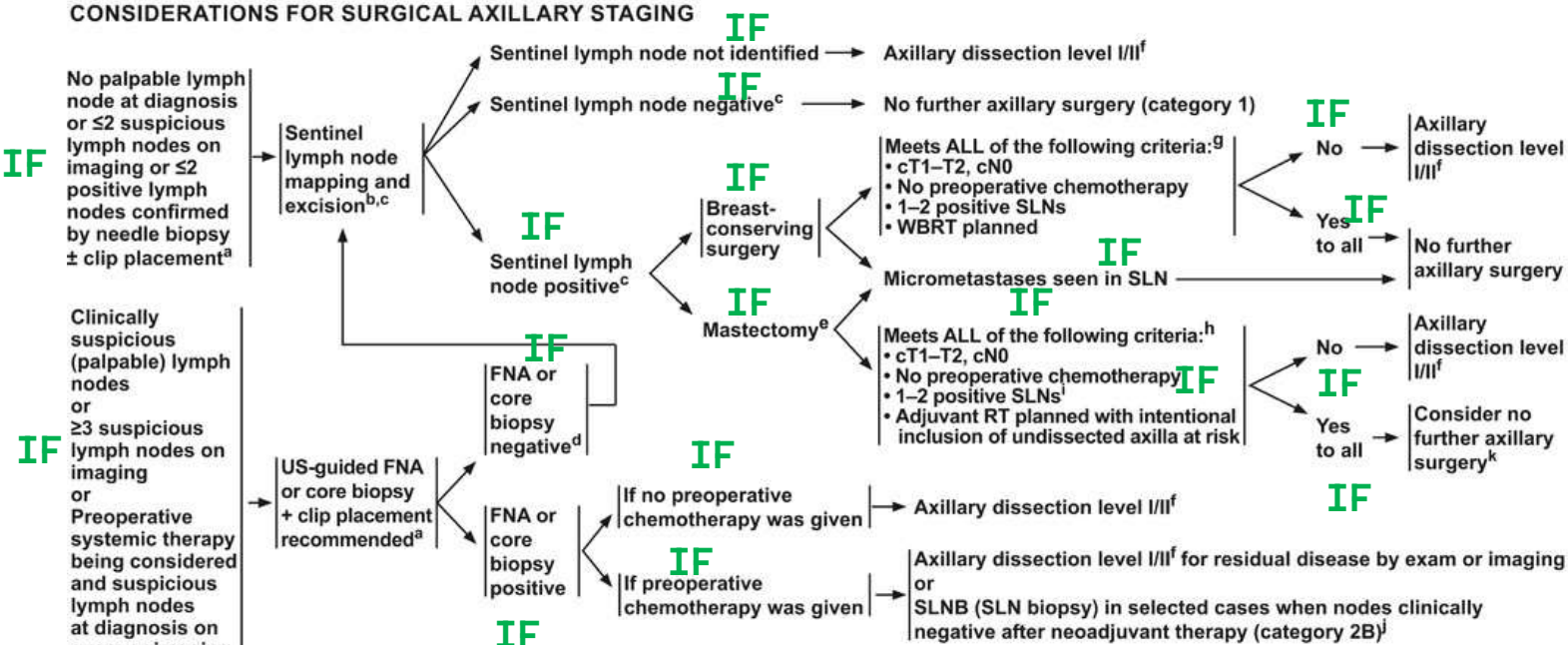
<sup>i</sup> Limited data exist for ≥3 positive SLNs.

<sup>j</sup> Among patients shown to be N+ prior to preoperative systemic therapy, SLNB has a >10% false-negative rate when performed after preoperative systemic therapy. This rate can be improved by marking biopsied lymph nodes to document their removal, using dual tracer, and by removing ≥3 sentinel nodes (targeted axillary lymph node dissection). (Caudle AS, et al. J Clin Oncol 2016;34:1072-1078.)

<sup>k</sup> In the mastectomy setting, in patients who were initially cN0, who have positive nodes on SLNB, and have no axillary dissection, RT to the chest wall should include undissected axilla at risk ± RNI.

# Invasive Breast Cancer

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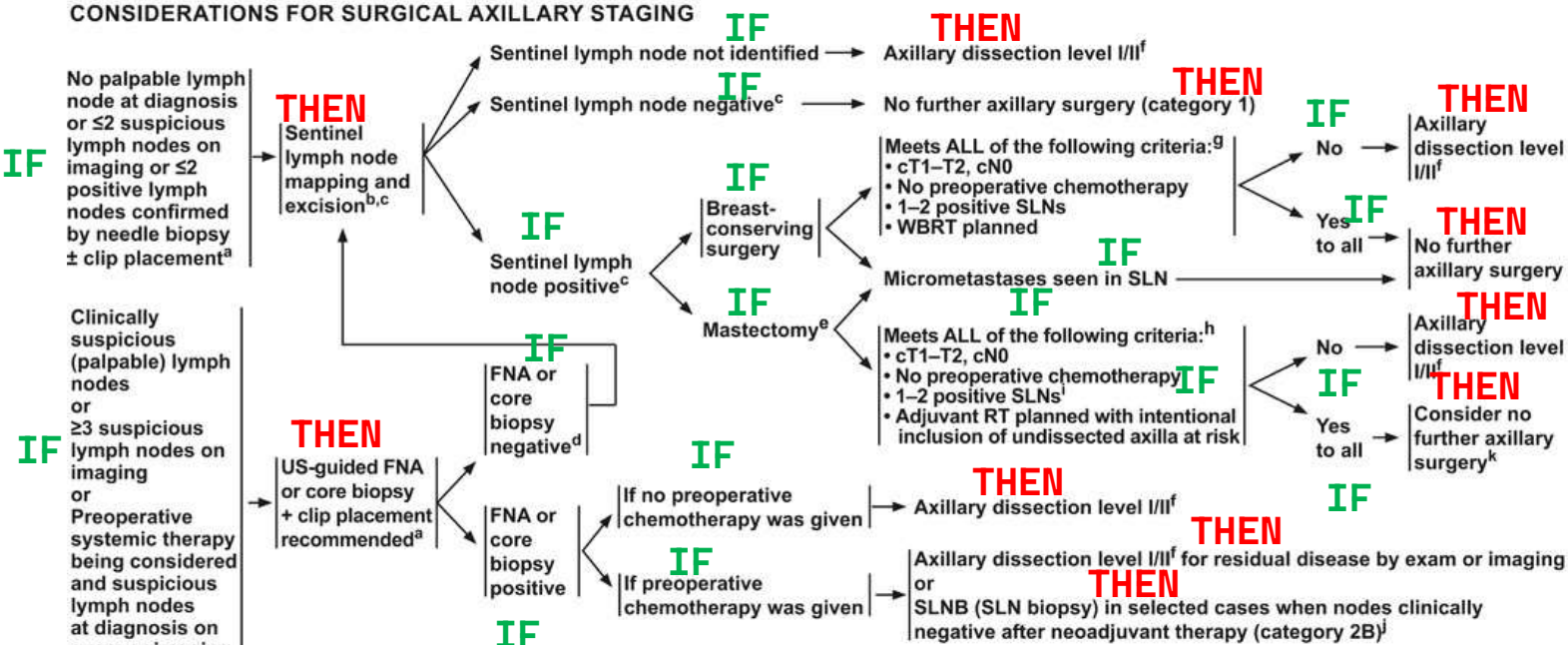
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  - ➔ 103 entries to 31 topics of 10 main topics (e.g., «indications», «radiation planning», etc.).



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  - 103 entries to 31 topics of 10 main topics (e.g., «indications», «radiation planning», etc.).
  - Information on 48 studies and 65 publications
- Can such a system help answering questions that appear in daily clinical life?
- What factors are relevant for succesful integration?

1.)

Which question/information is needed?

Question: \_\_\_\_\_

Open Knowledge base

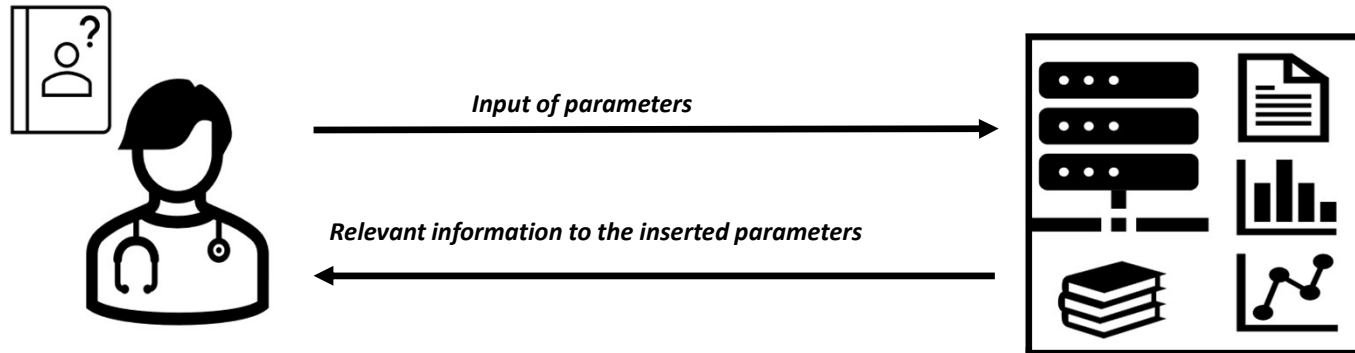
1.)

Which question/information is needed?

Question: \_\_\_\_\_

Open Knowledge base

2.)



1.)

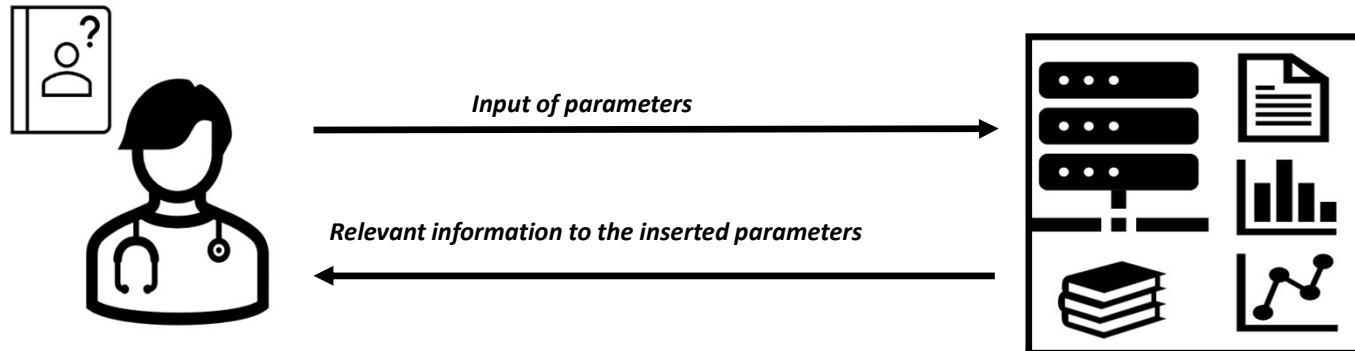
- □ X

**Which question/information is needed?**

Question: \_\_\_\_\_

Open Knowledge base

2.)



3.)

- □ X

**Was the needed information found?**

(Comment: \_\_\_\_\_)

Yes No

Thank you for your attention.