

“Isabel to the Rescue”

Authors: J. Luis Zabala-Genovez, M.D.¹; Edwarda Golden, M.D.²; Farah Ciftci, M.D.³

1. PGY-2 Loyola Medicine MacNeal Hospital Internal Medicine Residency Program, 2. TY-1 Loyola Medicine MacNeal Hospital Transitional Year Residency Program, 3. Program Director, Transitional Year Residency Program.

BACKGROUND

The ability to accurately estimate probability to make a diagnosis is one of the most important qualities of a good physician. Differential diagnosis generators may be helpful in creating more accurate differential diagnosis in complex cases based on true probability.

We are presenting a case where a differential diagnosis generator guided the team to recognize the illness script.

CASE PRESENTATION

A female of 70-years with a history of osteoarthritis presented with four weeks of fever, weight loss, night sweats, and fatigue. She was hypotensive, febrile, tachycardic and tachypneic. She was initially managed per sepsis protocol. Laboratory data revealed WBC 2.7 K/UL, Hgb 9.8 g/dL, PLT 77 K/DL, AST 71 IU/L ALT 49 IU/L, CRP 12 mg/dL, ESR 41 mm/hr. Ferritin 7138 ng/mL, LDH 570 IU/L. She continued to be febrile, pancytopenic and generally ill for the first 48 hours despite IV antibiotics. A contrast-enhanced CT of the abdomen revealed splenic hypodensities; laboratory workup for Q-fever, RMSF, salmonella, and Lyme’s disease was sent to evaluate for secondary hemophagocytic lymphohistiocytosis (HLH).

Lack of clinical and laboratory improvement prompted us to utilize Isabel Healthcare Differential Diagnosis (DDX) Tool, a resource available in our institution. Our keywords generated ten differential diagnosis including Brucellosis. Our patient later admitted consuming homemade cheese on her last visit to Mexico. Brucella serology, blood cultures, and a liver biopsy were obtained. Fever resolved 48 hours after doxycycline was initiated. Blood cultures grew *Brucella* spp. Currently, our patient remains symptom-free and all laboratory abnormalities have normalized.

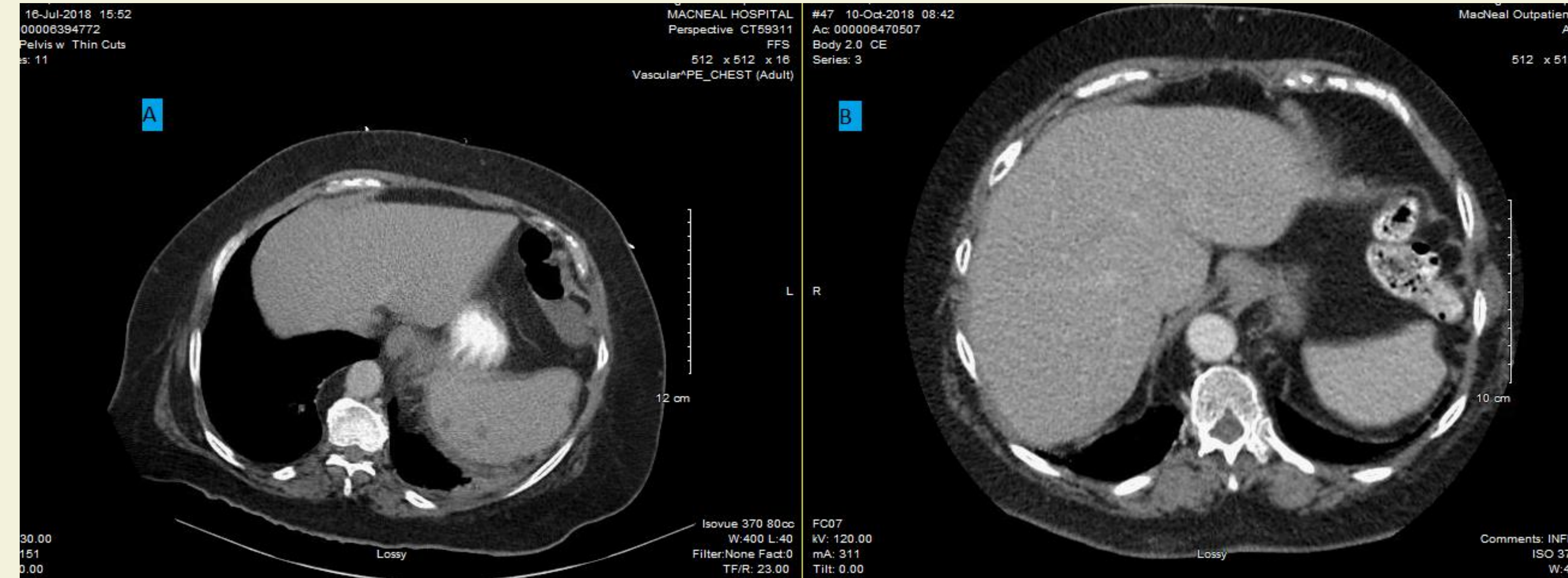


Fig 1: (A.) Contrast-enhanced CT scan Abdomen-Pelvis showing subcentimeter hypodensities within the spleen too small to characterize. (B.) Contrast-enhanced CT scan Abdomen-Pelvis, 6 weeks after completion of full course of doxycycline and rifampin. Small hypodensities are no longer noted.

	DAY 1	DAY 3	DAY 90
SODIUM	136	140	141
POTASSIUM	4.5	4.8	4.2
CHLORIDE	104	105	105
CO2	25	30	28
BLOOD UREA NITROGEN	5 L	4 L	21
CREATININE	0.60 L	0.60 L	0.66 L
CALCIUM	8.0 L	8.5	9.6
GLUCOSE	140 H	104 H	94
ALBUMIN	2.1 L	2.2 L	3.4
TOTAL PROTEIN	5.9 L	6.2	7.6
ALK PHOSPHATASE	148	154 H	94
ALT (SGPT)	266 H	230 H	16
AST (SGOT)	375 H	254 H	17
BILIRUBIN, TOTAL	0.6	0.7	0.9

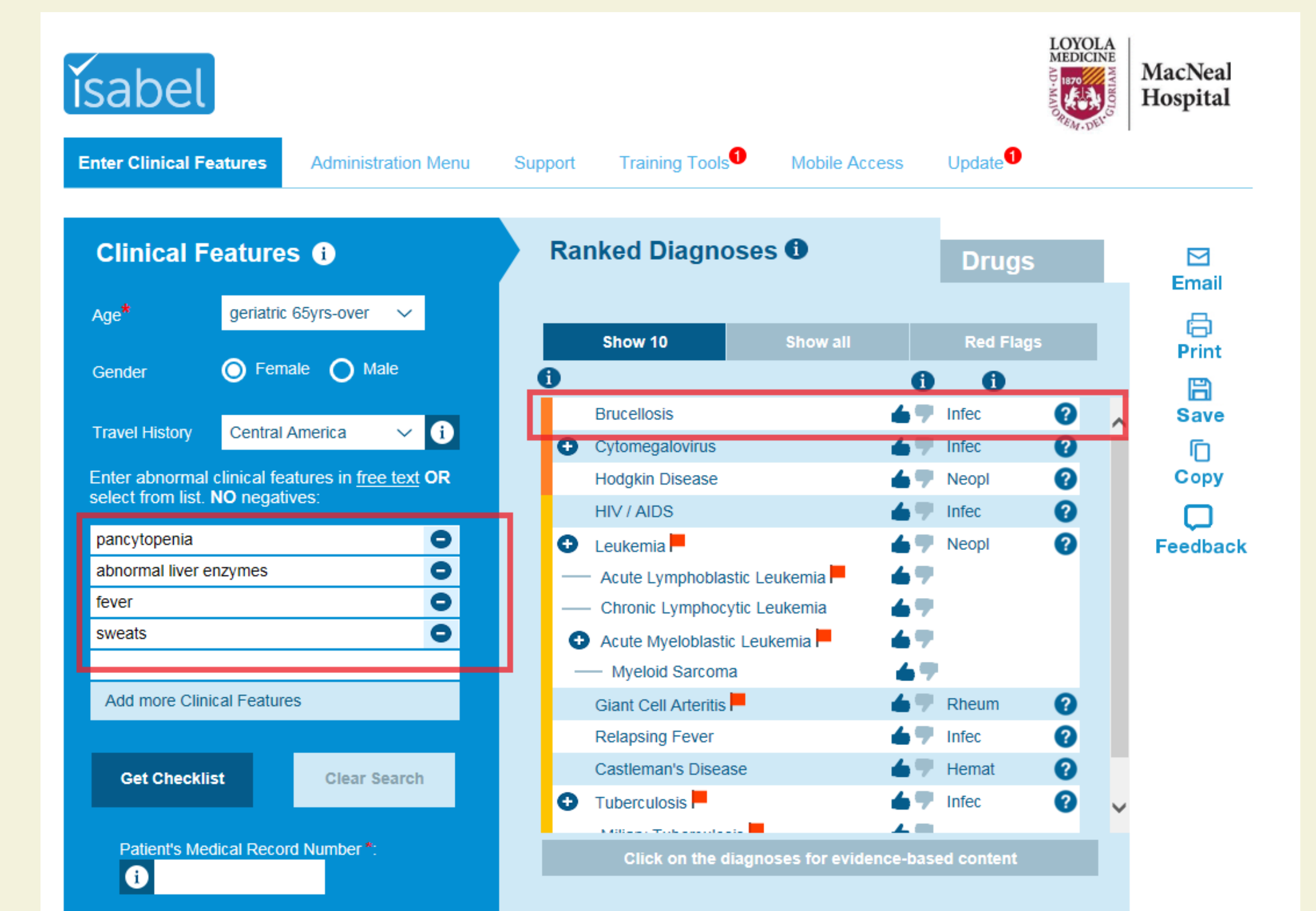
Fig 2: Comparison of comprehensive metabolic panel before and after treatment. Normalization of liver enzymes on Day 90. (6 weeks after completion of Doxycycline and Rifampin)

Components	DAY 1	DAY 3	DAY 90
WBC COUNT	3.9 L	2.7 L	4.2 L
RBC COUNT	3.46 L	3.39 L	3.94 L
HEMOGLOBIN	10.0 L	9.8 L	12.1
HEMATOCRIT	30.5 L	30.6 L	38.3
MCV	88	90	97
MCH	28.9	28.9	30.7
MCHC	32.8	32.0	31.6
RDW	13.7	14.0	15.4 H
PLATELET COUNT	74 L	77 L	228

Fig 3: Comparison of Complete Blood Cell Count. before and after treatment. Normalization of RBC and Platelet count on Day 90. (6 weeks after completion of Doxycycline and Rifampin)

DISCUSSION

Medical decision making relies on pattern recognition of illness scripts accumulated over time. Illness scripts can be contaminated by our own heuristics and biases. Complex and rare conditions like HLH secondary to Brucellosis may require more analytical decision making with the establishment of true probability. Historically, we referred to textbooks for the DDX for each symptom. Nowadays, we have more sophisticated DDX generators that include epidemiological data, clinical and laboratory findings to generate a DDX list. In a study, the pooled accurate diagnosis retrieval rate for DDX tools was as high as 0.84.¹⁻² To be able to utilize a DDX generator properly, it is crucial to identify significant and clinically relevant data. The expert physician goes through a series of hypothesis refinement during the process of solving a complex case and the search might be more refined to find the most probable etiologies. More studies are needed to test these systems’ ability to provide a final diagnosis. At this time, DDX generators may be useful resources for clinicians and it may also increase the medical knowledge.



References

- Bierbrier R, Lo V, Wu RC. Evaluation of the accuracy of smartphone medical calculation apps. *J Med Internet Res* 2014;16: e32
- Evaluation of symptom checkers for self-diagnosis and triage: audit study Hannah L Semigran,1 Jeffrey A Linder,2 Courtney Gidengil,3, 4 Ateev Mehrotra,1, 5