Problem Representation
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The *problem representation* is a one-sentence summary that highlights the defining features of a case. It helps clinicians summarize their thoughts and then generate a differential diagnosis. The "one-liner" statements used to summarize patient cases on rounds, in notes, or when calling consults are all versions of the *problem representation*. A *problem representation* should be updated iteratively as the clinician gathers data throughout a patient encounter. A well-formed *problem representation* facilitates clinical reasoning and serves as the backbone for how clinicians communicate with one another.

A thorough *problem representation* should answer three questions:

1. Who is the patient? *Pertinent demographics and risk factors*

2. What is the temporal pattern of illness? *Length (hyperacute, acute, subacute, chronic) and tempo (stable, progressive, resolving, intermittent, waxing and waning)*

3. What is the clinical syndrome? *Key signs and symptoms*

The *problem representation* activates *illness scripts*, mental representations of potential diagnoses, within the clinician's memory. Through a comparison process, the clinician develops a prioritized differential diagnosis based on the degree of match between the patient's *problem representation* and previous *illness scripts* (or disease prototypes).

To illustrate the properties of effective *problem representations*, consider the following case: *A 60-year-old woman with rheumatoid arthritis presents with one day of left ankle pain and swelling as well one week of malaise. She has been on prednisone 20mg daily for the past 6 months. On exam, she is febrile and tachycardic, with left ankle edema, erythema, and tenderness with active and passive range of motion. Blood work is significant for a WBC of 15.*

- *A concise problem representation:* A 60 year-old immunocompromised woman presents with acute monoarticular arthritis and the systemic inflammatory response syndrome (SIRS).

- *A less succinct problem representation:* A 60 year-old woman with rheumatoid arthritis presents with ankle pain and swelling in the setting of malaise, with exam significant for tachycardia, fever, left ankle arthritis, and leukocytosis.

The effective *problem representation* succinctly answers the three key questions listed above: *Who is the patient? What is the time course? What is the clinical syndrome?*

A 60 year old immunocompromised woman presents with acute monoarticular arthritis and SIRS.

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An effective *problem representation* includes discriminating features[1] and excludes nonspecific ones (e.g. malaise). It also translates the patient's data into medical terms. For example, *one day* becomes *acute*; *chronic daily use of 20mg of prednisone* becomes *immunocompromised*; *left ankle pain* and *swelling* become *monoarticular arthritis;* and *fever, tachycardia, and leukocytosis* become *SIRS*. By comparing and contrasting opposing diagnostic features, these abstract *semantic qualifiers* (e.g. acute vs. chronic, dull vs. sharp, distal vs. proximal) add differentiating power to a *problem representation*.[2–4]

By summarizing the most salient features and minimizing distractors, effective *problem representations* reduce *cognitive load* and facilitate problem solving. Translating lay language into medical terminology enables easier access to the knowledge stored in the clinician's *illness scripts*.

Attached Illustrative Teaching Case:
Complex cases like a ***43-Year-Old Woman with Abdominal Pain and Fever***[5] initially require a broad differential. Early in the case, two competing *problem representations* are proposed: "a 43-year-old woman of reproductive age with a subacute febrile illness and headaches associated with LUQ abdominal pain, nausea, and vomiting," and "a 43-year-old woman of reproductive age with acute onset of sharp, unremitting LUQ pain, nausea, and vomiting." Stating two distinct problem representations can help clinicians avoid *premature closure*. As the case develops, the *problem representation* is refined, becoming: a "43-year-old woman with acute, unremitting LUQ pain and a subacute history of night sweats, weight loss, and recent travel to Mexico." Later it becomes: a "43-year-old woman with recent travel to Mexico, fever, diffuse abdominal pain, jaundice and hepatomegaly." With each iteration of the *problem representation*, the discussant moves closer to the correct diagnosis. The case concludes with a demonstration of how to prioritize diagnoses based on the degree of match between the *problem representation* and candidate *illness scripts*.

The *slides* for this case, which include an embedded teaching guide, provide a didactic approach for teachers interested in developing their trainees' understanding of the clinical reasoning process.

For additional resources useful to both learn and teach about clinical reasoning visit: http://www.improvediagnosis.org/?ClinicalOverview.

References:

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