Hyponatremia Scenario:

A 55-year-old male is being seen in the emergency room (ER) after clinic hours with elevated blood sugar. The patient's blood sugar at home was 555 gm/dl, and he was sent to the ER by the triage nurse for evaluation for diabetic ketoacidosis. The patient checked his blood sugar twice. The first time it was 555 gm/dl, and the second time it showed "hi" on the glucometer. That is when the patient called the triage nurse. The patient does not report any symptoms, except that he feels tired, and he had to cancel a coaching session with some high school kids. The patient's finger stick blood sugar is checked twice, and each time it is 125 gm/dl. The patient is sent home with instructions to follow up with his primary care provider, and to get a new glucometer. However, additional labs in terms of metabolic panel and urinalysis are done to make sure that there is no other abnormality. Lab results become available after the patient leaves and are displayed below.

Sodium: 128 gm/L
Potassium: 4.5 meq/L
Glucose: 128 gm/dl
Urine dipstick is negative for glucose

Using the Epi-logical approach, what should be the probable diagnoses?
Although the patient has diabetes, the clinician should not consider hyperglycemia as causing pseudo hyponatremia, because his serum blood sugar is 128 gm/dl, which should not lead to an osmolar shift in sodium. The patient's home glucometer may not be working properly. The clinician should consider all differentials in the clinical mind map, in addition to making sure that there is no lab error in the ER lab. There is no lab error, because the clinician has three blood glucose readings which are consistent with each other.
How should a clinician address urgent/emergent situations?
The patient's vital signs included BP 129/80, HR 88, T 98F, O2sat 99% and his BMI is 25. Since the patient was alert and oriented, and he did not seem to have any symptoms other than fatigue, the clinician can conclude that there was no urgent/emergent situation.
Weighing and Removing Anchor Bias:
In this particular case, these steps are in the order of reviewing additional labs, doing a physical exam, and asking history related questions and/or reviewing medical records, although all of these can be done in parallel to one another, depending upon the situation.

Data to collect	Findings	How does this information help with the weighing process?
Serum osmolality	265 mOsm/kg	The differentials causing hypotonic hyponatremia are more likely.
Hydration status	Urine specific gravity 1.015. His mucous membranes and skin turgor are normal. There is no peripheral edema,	The differentials causing isovolemic hypotonic hyponatremia are likely.

	crackles on lung exam, or ascites on abdominal exam.	
Urine osmolality	90 mOsm/kg	SIADH, hypothyroidism, and adrenal insufficiency are more likely.
Review medical records	No history of lung cancer/mass, recent pneumonia, or intracranial mass. No history of hypothyroidism or adrenal insufficiency.	The clinician needs to contact the patient and gather more information.

The patient is contacted and is advised to see his primary care clinician. The patient arrives at the clinic next morning, where the clinician continues steps 3 and 4 of the Epi-logical approach.

The Clinician's Questions	**The Patient's Responses**	**How does this information help with the weighing process?**
It seems like your blood sugar was normal, but your sodium level was very low. Reviewing your medical history, it does not look like you have ever had any problem with sodium. *(The patient's last metabolic panel 3 months ago shows normal sodium)*	I am not sure. What does it mean? Should I eat more sodium? I heard it's bad for blood pressure.	The patient's sodium level dropped in the last 3 months.
No. Eating extra sodium will not help. We need to find out what is causing this. So, let me ask you a few questions.	Sure. I feel fine though.	The hyponatremia doesn't seem to be very acute because of the lack of symptoms.
There are a few medical conditions which can cause the type of drop in sodium we are seeing in your labs. Based upon your medical history, it does not seem like you have been diagnosed with any of those, but it is possible that you recently developed one of those conditions. So, do you feel excessively tired, cold, constipated, or depressed?	I do feel tired off and on, but I think it is due to my blood sugar. I don't have any constipation, and I do not feel cold.	Hypothyroidism is unlikely, although some patients may not have classic symptoms, and hypothyroidism is more prevalent in diabetic patients than the general population.

Do you have any cough, phlegm, or shortness of breath?	I do cough a lot, and have been noticing it especially this year, but I think it is because of allergies, and I do not have much phlegm or breathing difficulty.	This raises the suspicion for a lung mass/cancer. Based upon the review of information so far, the patient did not have pneumonia.
The clinician can ask additional questions about risk factors for lung mass/cancer and other diagnoses to remove anchor bias.		
Based upon my notes from last time, you do not smoke. Is that still the case?	Oh, no. I actually have been smoking for a few years. I was too embarrassed to disclose it.	This further raises the suspicion for lung cancer.
We can definitely work on it. Let me ask you a couple more questions. In your family, is there a history of lung cancer?	Not really. Why? Do you think I have that? I will quit smoking.	Lung cancer is less likely but continues to be a suspect.
I don't know. I am gathering this information to make sure I don't miss it if you have it. I am glad you will quit smoking. While we are on this topic, tell me how much you drink?	I do not drink. I don't like alcohol.	Beer potomania is unlikely.
How about water? How much water do you drink every day?	Almost 8 glasses, or when I am thirsty.	Psychogenic polydispsia is very unlikely. A person needs to drink several liters to develop hyponatremia from this condition.
I see that the only medicines you are taking are insulin, a blood pressure medicine, and a cholesterol medicine. Any other medicine that I am not aware of?	No. this is all.	Drug induced hyponatremia is unlikely.
At this point, the clinician has sufficient evidence to suspect a lung mass. The clinician can perform a physical exam and order labs/imaging.		
Pulmonary exam	Normal air entry and breath sounds.	Neutral. A lung exam can be normal even in the presence of pathology.
Cardiovascular exam	Normal.	Neutral.
Skin and lymph nodes	Slight pallor, but no palpable lymph nodes.	Neutral.

Labs and imaging are ordered. The metabolic panel continues to show hypotonic hyponatremia. The complete blood count is consistent with mild normocytic anemia. Imaging is ordered, and

the patient’s chest X-Ray reveals an irregular mass in the right middle lobe. The CT shows a mass consistent with lung cancer, and the biopsy confirms the diagnosis of small cell lung cancer.