1. Two major products of Clinical Decision:
   1. Diagnoses: Not correct most of the time, Failure Rate – 10 -15%
      1. Rate higher among specialties (patients diagnosed undifferentiated) such as Emergency Medicine, Family Medicine and Internal Medicine
      2. Visual Specialty -- Radiology, Pathology, rate is lower around 2%
      3. Principal Cause – Cognitive Error (not a lack of knowledge but problems with clinical thinking)
         1. Instead of esoteric (obscure) disease common illness are usually misdiagnosed
         2. Disease signs and symptoms are notoriously variable and overlap for numerous other disease (pulmonary embolous – people know a lot about this)
         3. **Human Mind vulnerability – Cognitive biases, logical fallacies, false assumptions and reasoning failures**
         4. **Cognitive Failures** (context How brain manages and processes information), **Two principal modes:**
            1. Automatic – Intuitive, Type 1 process (psychologist call)

Very little reasoning happens here, largely reflexive and autonomous

*Augenblick Diagnoses,* Made in the blink of eye is very dangerous

Generally hard-wired, acquired through repeated experience

Subconscious and fast

Primary source of cognitive failures

Most biases, fallacies and thinking failure arise from this mode

**Clinical gamble of trusting one’s intuition carries good odds but inevitably, they will fail some patients**

* + - * 1. Controlled – Analytic, Type 2 process

Conscious, Deliberate, Slower and Generally reliable

Follow laws of science and logic, hence are rational

Failures in this case happens because,

Wrong rules are followed

Other factors came into play:

Cognitive Overload

Fatigue

Sleep Deprivation

Emotional Perturbations

**Biggest downside 🡪 Resource Itensive**

Though this can be done quickly and effectively, **impractical to deal with each clinical decision analytically**

* + - 1. Cognitive psychology historically has been considered within the remit of medicine
      2. Beneficial both to include basic psychology courses in the medical school curriculum and to expand medicine’s lexicon to incorporate terms for cognitive psychology.
    1. **Why cognitive biases cannot be identified and de-biased in clinical decision-making?**

Many decision makers are unaware of their biases

* + - * 1. Psychological defense mechanism prevent us from examining our own thinking, motivations and desires too closely
        2. Many clinicians are unaware or simply don’t appreciate the effect of such influences on their decision making
    1. De-biasing Strategies:
       1. Becoming alert to the influence of once bias requires maintaining keen vigilance and mindfulness of one’s thinking
       2. No one strategy will work for all biases, multiple interventions and lifelong maintenance
       3. Education Strategies embracing critical thinking
       4. Training that permits judicious interventions by analytic mind when needed (specifically its ability to override the intuitive mode)
       5. This critical step is referred to as:
          1. Decoupling
          2. Metacognition
          3. Mindfullness
          4. Self-Reflection
       6. Not born critical thinkers
       7. Critical thinking can be taught and cultivated
    2. Conclusion:
       1. Medical Educators should promote critical thinking throughout undergraduate, post graduate and continuing medical education
       2. Key element of training in critical thinking 🡪 **Review of major cognitive and affective biases and the ways they affect thinking**

1. **Case Study:**
   1. **Case 1**
      1. Stab wound on Head, Chest and Arms
      2. Hospital saw chest wounds only, thinking that’s only critical (intuitive decision as the patient was responding properly)
      3. They did not performed CT on head wound
      4. Cleaned up wounds and discharged
      5. CT scan later revealed track of knife penetrating skull
      6. **Conclusion:**
         1. As the patient was responding properly so doctors thought the skull wound is not an issue and looked over it, based on their intuitive thinking (Type 1 process involved)
         2. Check for all affected areas, whole body scan should be done
         3. Even if the wound is small and seems insignificant internal injuries could be fatal
         4. A complete documented report of all the emergency cases should be submitted and hospitals should have policies to scan for all possible injuries in emergency situations, instead of leaving that decision in the hand of person in charge
         5. Patient should not blindly follow the hospital and should get multiple opinions to ensure removal of any one person’s personal opinion
         6. Patients family should be vigilant on what tests are being performed what they mean and why are they not performing any other tests so they can make the decision themselves
   2. **Case 2**
      1. **Conclusion:**
         1. Similar to Case 1
         2. Doctor saw the symptom thought that this may be the cause performed analysis of the same problem he/she thought and then based on the result
         3. They thought anxiety, based on their intuition or experience
         4. They looked for first two common problems and they overlooked non common issues
         5. All possibilities should be considered and not just the most common ones
2. Bias: a general tendency that usually makes a decision outcome less positive than one without such a bias
3. Heuristic: a “mental shortcut” that reduces the mental effort (and/or time) of the diagnosis or decision, and usually produces a correct outcome
4. De-biasing, policies and procedures, displays, and automation, and task redesign can be used to support good decision-making