

# Team-Based Learning (TBL) 101

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# Pre-test

- Sit with some people you don't know.
- Please read the pre-reading if you haven't already done so.
- You may take the pre-test (RAT) individually but do not discuss until further instructed.
- The test is “open book”

# Team-Based Learning (TBL) 101

## Objectives

- Describe team-based learning (TBL) stages
- Experience TBL from the learner standpoint
- Describe the steps to design a new TBL experience
- List some of the challenges of TBL

# Agenda of Today's Session

- Introduction
- Demonstrate basics of TBL using a TBL format
- Example of TBL sessions
- Questions/comments
  - “Can I do this in my teaching?”
  - “How can I convert existing sessions to TBL format?”

# My uses of modified TBL

- M2 endocrinology case sessions instead of “small” groups of 25-30 (n≈80)
- Resident noon conferences (n≈20)
- M2 EBM (evidence-based medicine) case sessions (n≈170)
  
- Your experiences with TBL?

# Barriers/challenges in teaching adults?

- Perceived weaknesses of lectures

# Barriers/challenges in teaching adults



# Barriers/challenges in teaching adults

- Attendance
- Learner preparation – responsibility and accountability for “doing their part” to master new material
- Learner engagement in the learning process
- Retention and understanding with lectures



# What is TBL?

(a “flipped classroom” modality)

- Alternative strategy to lecture
- Learners accountable to prepare before class
- Team/group of learners
  - Accountable to each other for teaching and respect
  - APPLICATION of material occurs in class
  - RESULTS: ENGAGED AND ACTIVE LEARNERS TEACHING EACH OTHER

# Phases of TBL

- Preparation (Individual study)
- Readiness Assurance Testing
  - Individual (IRAT)
  - Group (GRAT)
- Application of Concepts
  - Small group teams during class
  
- Additional components:
  - Appeals process
  - Peer evaluation

# Applying phases of TBL

- Preparation (Individual study)
- Team formation – 5-7, distribute strength
- Readiness Assurance Testing
  - Individual (IRAT)
  - Group (GRAT)
- Application of Concepts
  - Small group teams during class

# Applying phases of TBL

- Preparation (Individual study)
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# Your new course

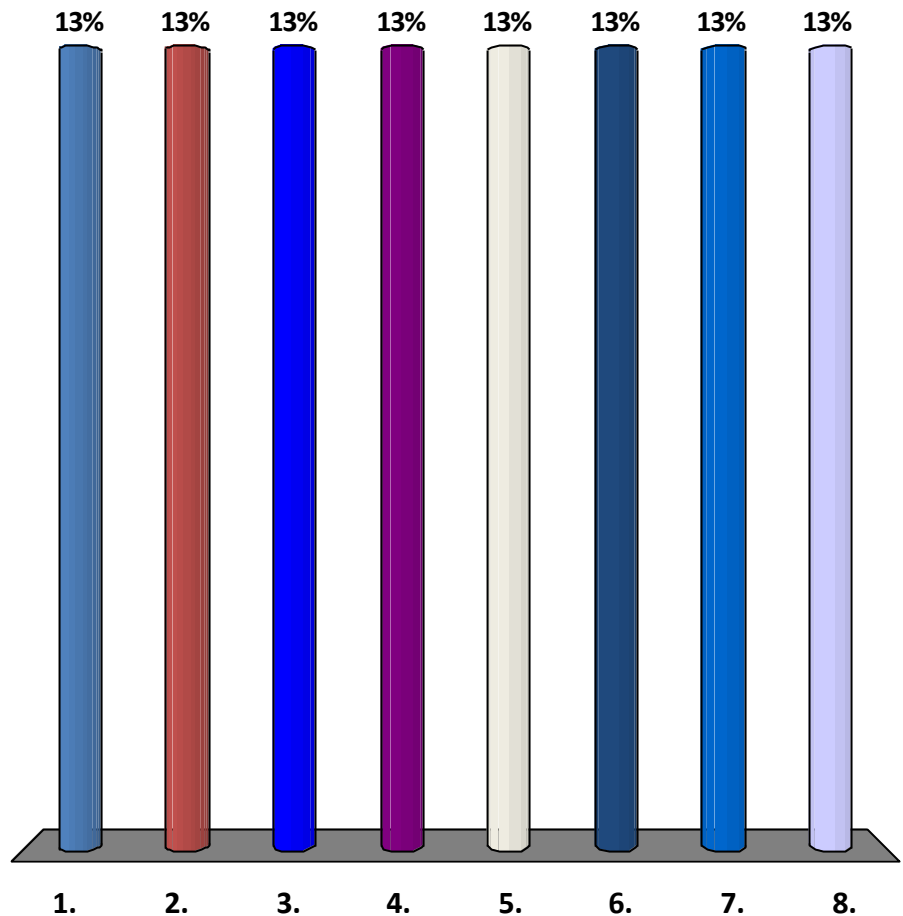
- Putting together a new course
- Who plans, who teaches?
- Pre-readings, RATs, exercises
- Faculty complaints
- Student complaints
- Grading

# Your TBL course

- You are asked to put together a new first-year medical school course, combining the objectives from prior courses in anatomy, physiology, biochemistry, microbiology, histology (microscopy), health and society, and clinical medicine, using TBL as the primary instructional method.
- We will focus on a session regarding the throat, using sore throat as a learning tool.

# Who should have input into TBL exercises?

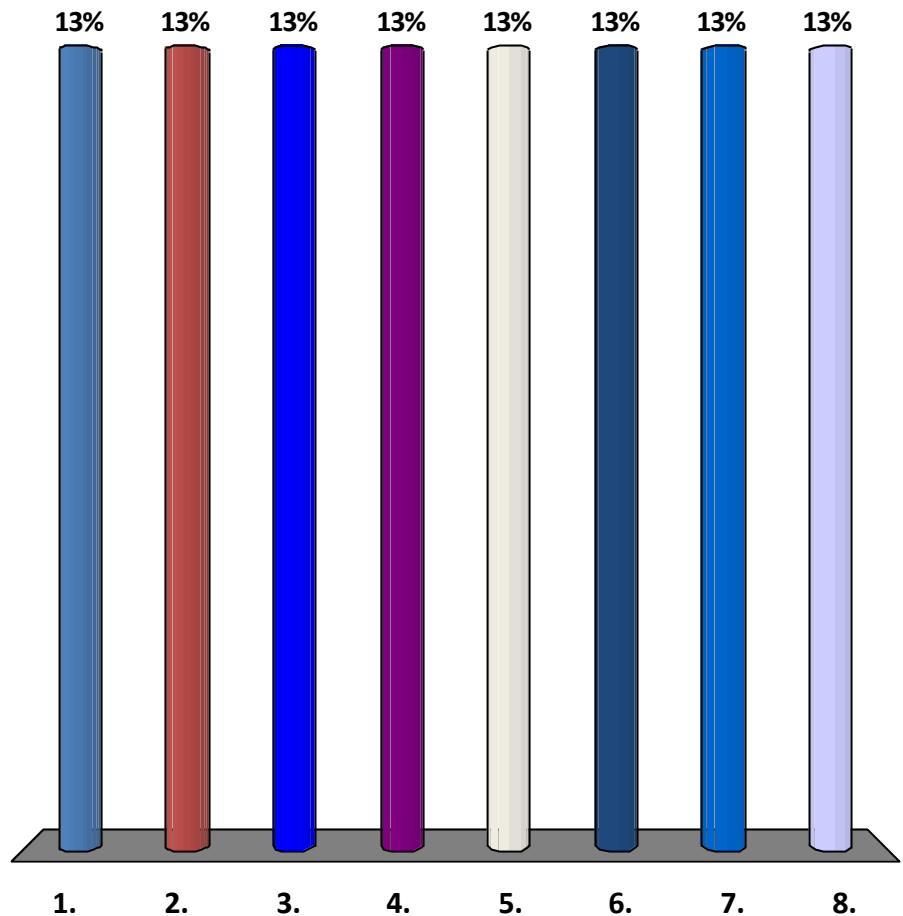
1. Anatomist
2. Physiologist
3. Biochemist
4. Histologist
5. Microbiologist
6. Clinician
7. Advanced student
8. All of the above





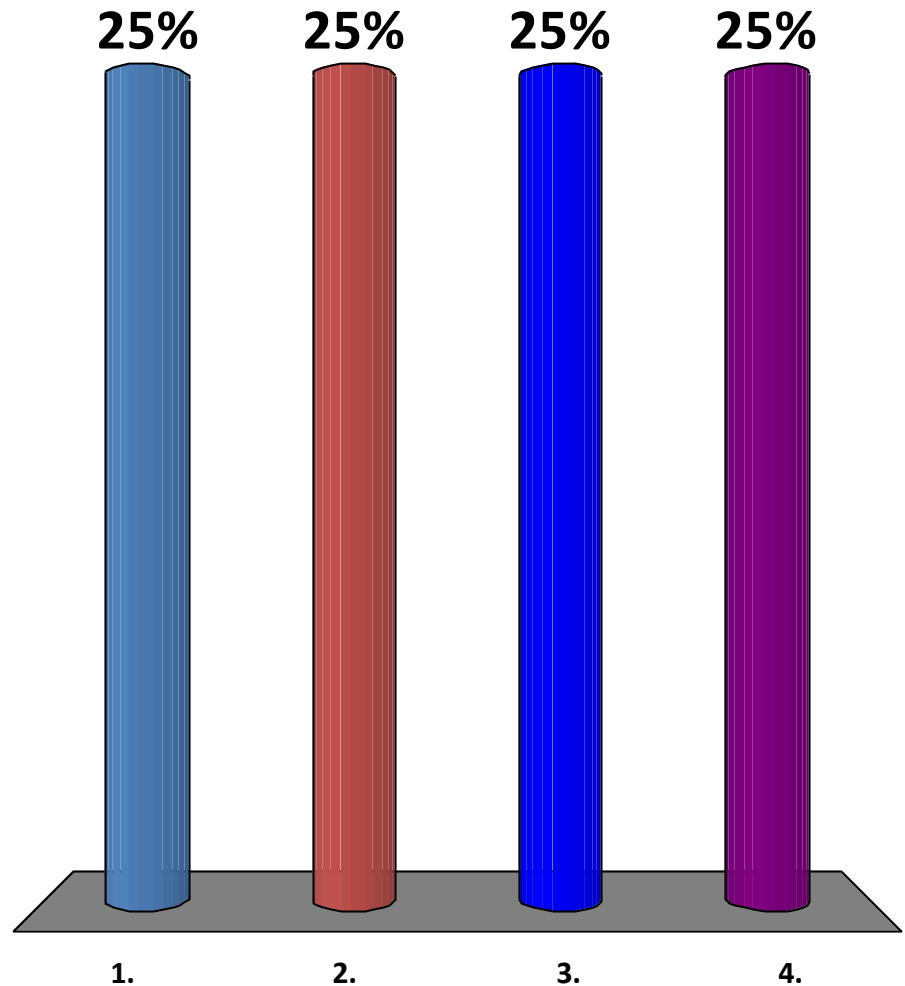
# What faculty should be present for TBL exercises?

1. Anatomist
2. Physiologist
3. Biochemist
4. Histologist
5. Microbiologist
6. Clinician
7. Advanced student
8. Any of the above



# What mechanism will you use to determine pre-readings?

1. Ask clinicians what information is most useful for students to know
2. Ask clinicians what students will be expected to do
3. Ask each course contributor what information is most useful for students
4. Include all assigned reading from previous independent courses



# Readiness assessment test (RAT) questions

## Open discussion

- What would be an appropriate anatomy-based question for the sore throat RAT?
- (We covered this concept in our RAT)

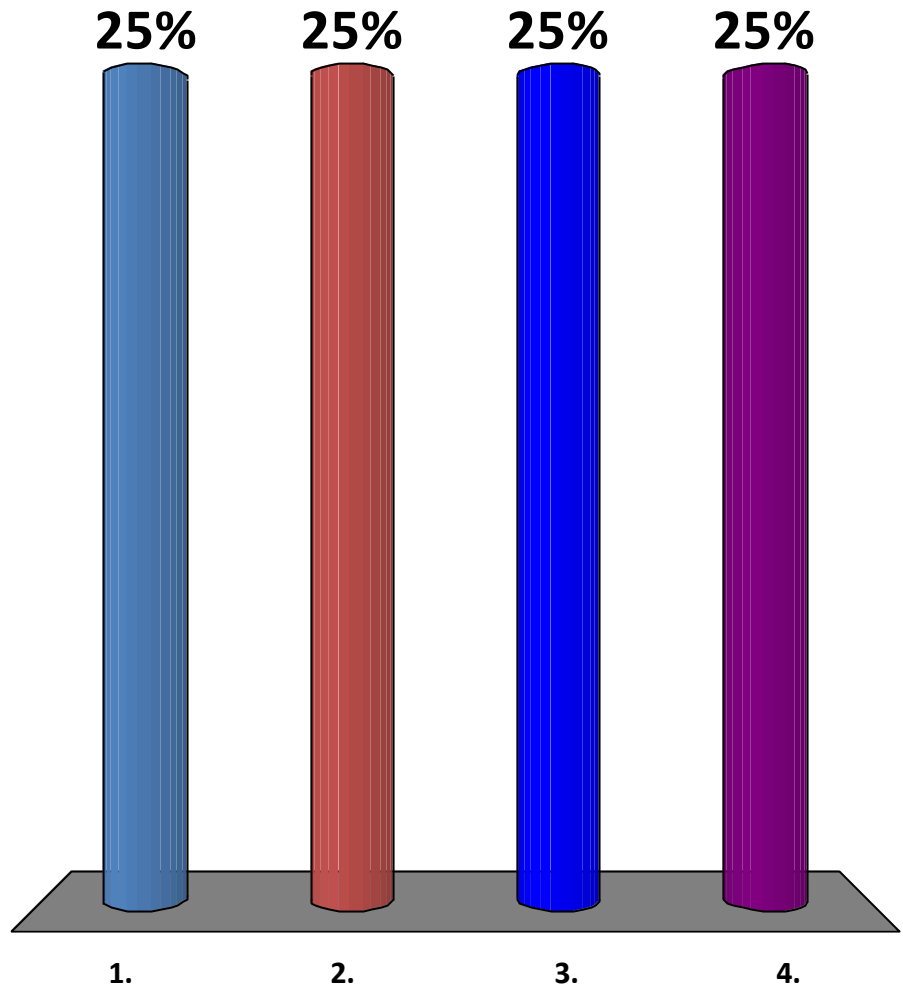
# RAT questions

## Open discussion

- What would be an appropriate anatomy-based question for the sore throat RAT?
- Can be MCQ, short-answer, drawing

# What would be appropriate application questions?

1. List the most common causes of sore throat
2. List mechanisms of toxicity for most common microbes
3. Evaluate questions to patients about possible sexual exposures causing sore throat
4. “Walk through” a case of sore throat, making decisions along the way



# Faculty complaint

## Discussion question

- The microbiology expert complains that your TBL case doesn't sufficiently emphasize the different mechanisms of illness associated with different microorganisms.
- She doesn't feel that this technique allows her to cover as many specific points as she did in her lectures. Is she right?

# Faculty complaint

## Discussion question

- She doesn't feel that this technique allows her to cover as many specific points as she did in her lectures. Is she right?
- What would you say?

# Student complaint

- Five students meet with you to complain that one of their team members is overbearing, and imposes his/her answer for the team RAT (GRAT) without allowing for much discussion. This has caused them to lose points towards their final grade.
- How would you address this problem?

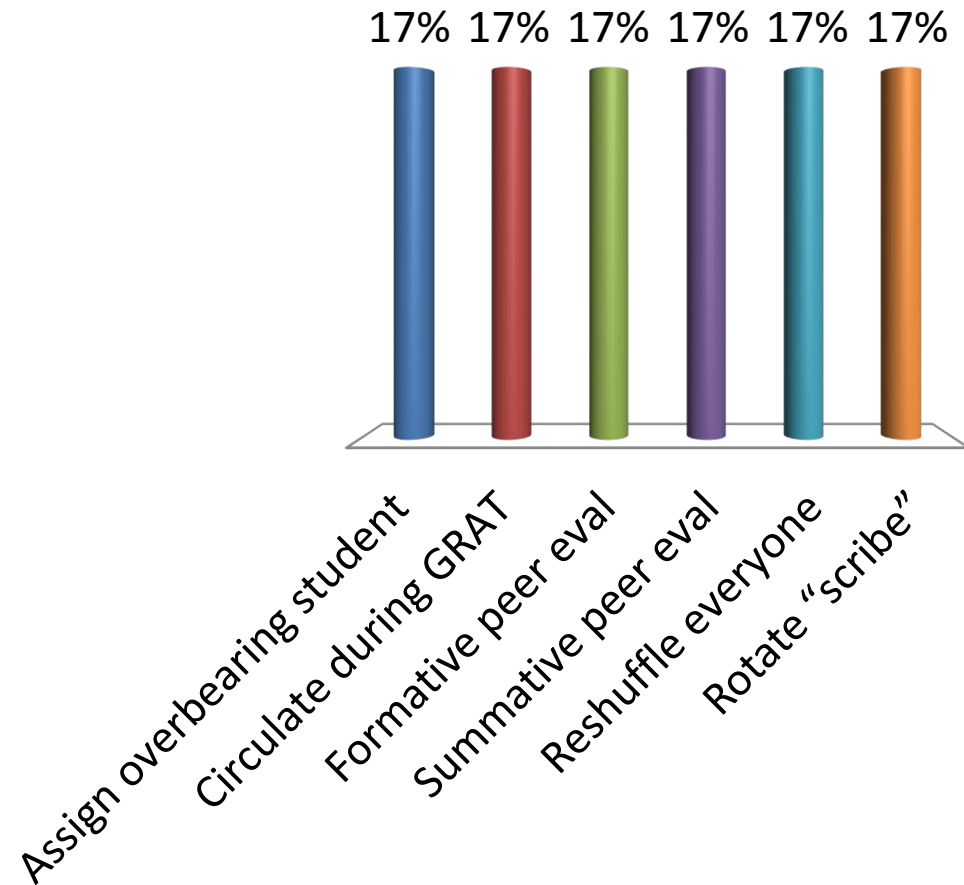


# The overbearing student

- A. Assign the overbearing student to another team
- B. Circulate during the GRAT and application exercises to encourage within-team discussion
- C. Institute formative peer evaluation halfway through course
- D. Institute summative (affects grade) peer evaluation at end of course
- E. Re-shuffle all teams halfway through course
- F. Rotate assignment of “scribe” to different team members

# The overbearing student

- A. Assign overbearing student
- B. Circulate during GRAT
- C. Formative peer eval
- D. Summative peer eval
- E. Reshuffle everyone
- F. Rotate "scribe"



Now for the students' most important  
question...

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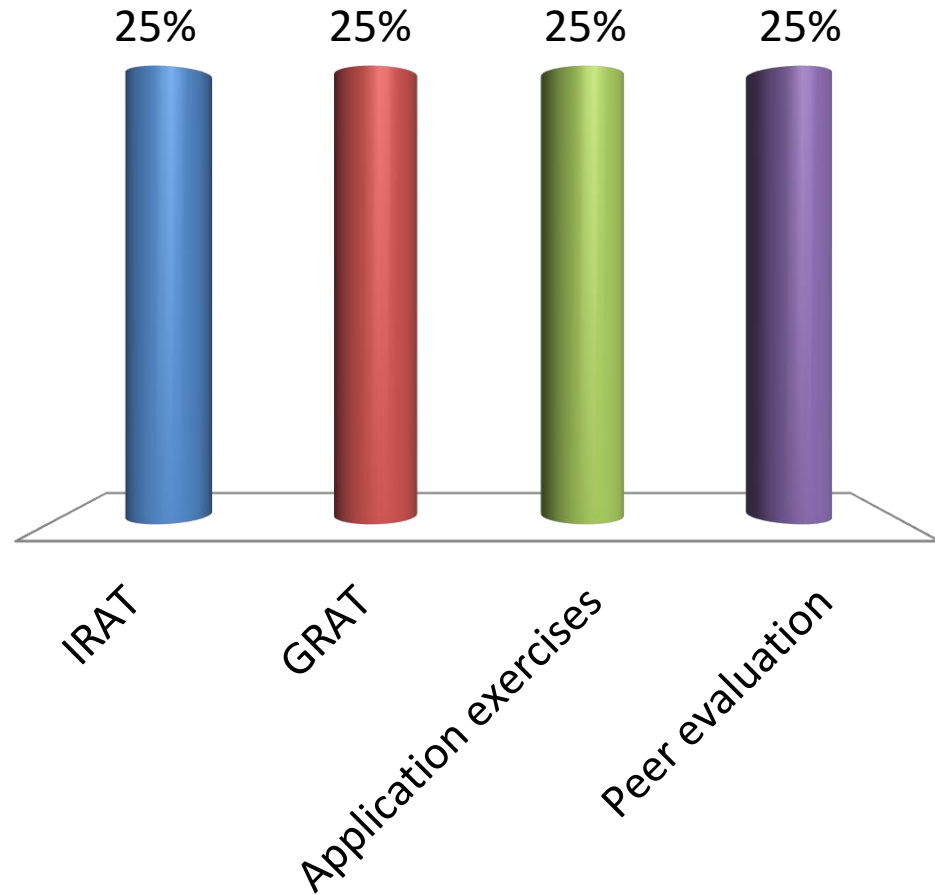
- What affects my grade?

Now for the students' most important question...

- What affects my grade?
- TBL components that can contribute:
  - IRAT
  - GRAT
  - Application exercises
  - Peer evaluation

# Which of the following is MOST problematic to contribute to final grade?

- A. IRAT
- B. GRAT
- C. Application exercises
- D. Peer evaluation



# Discussion points

- Team construction
- Pre-readings, assigned vs. objectives
- RATs
- Application exercises
- Grade implications

# Some actual examples



**M2 STUDENT SAMPLE  
CLINICAL APPLICATIONS EBM**

# Pre-test

- Ensure that you have at least one person who pre-read each article
- Do first by yourself for your own feedback
- Then do as team
  - Write all names legibly
  - Indicate answers clearly
  - Will collect for grading

# “Readiness Assessment Test”

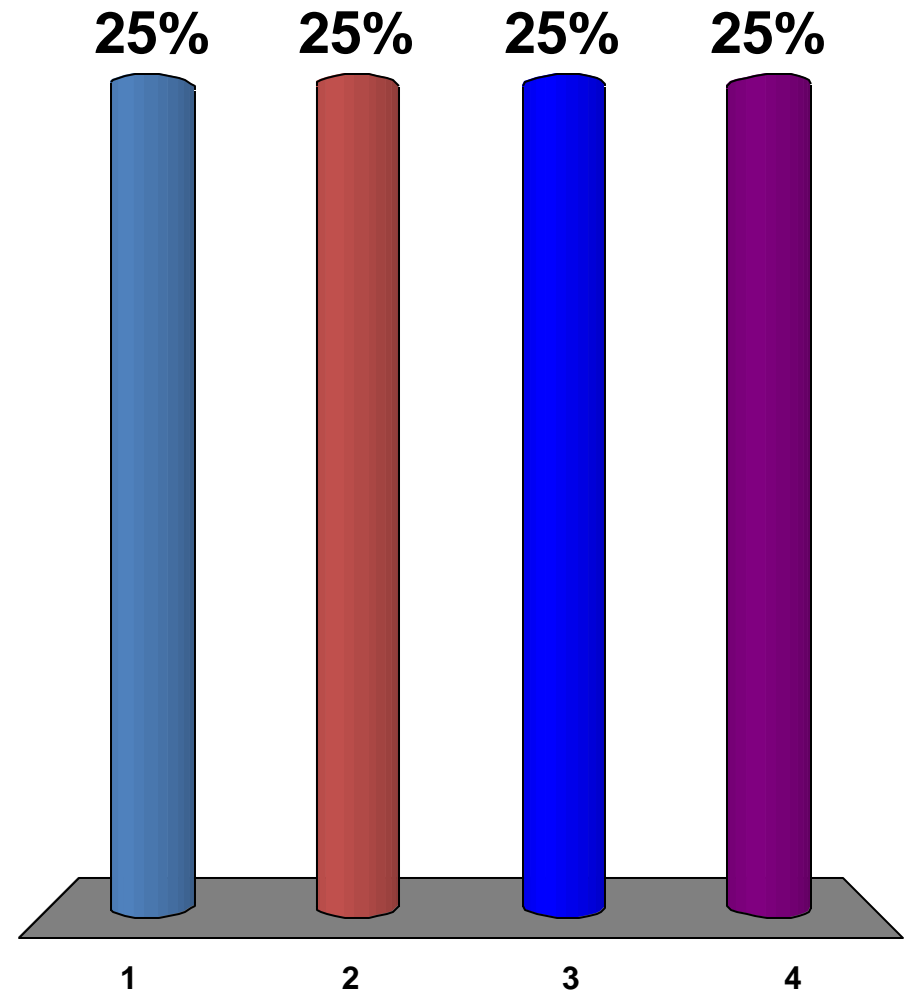
- What is the definition of sensitivity?
- Out of all the people who AAAA, this percentage BBBB.
  
- X

# X Sensitivity – Out of all the people who AAAA, this percentage BBBB

30

1. have disease – have pos test
2. don't have disease- have neg test
3. have pos test – have disease
4. have a neg test – don't have disease
5. get test done – have disease

0



# Case 1

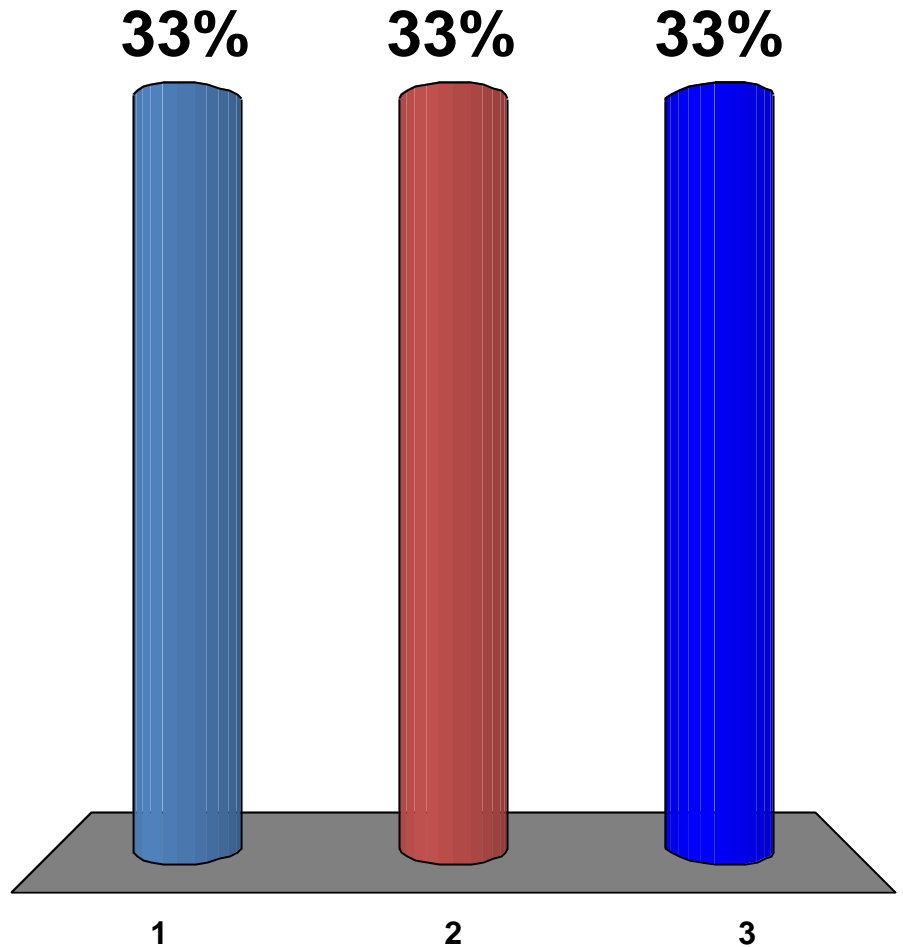
- A 25-year-old woman, uninsured, taking oral contraceptive pills comes to the ER for acute onset of shortness of breath 2 hours earlier.
- No other symptoms – just can't catch her breath. No other significant PMH or medications.

# Case 1 - continued

- Currently comfortable
- P 88, BP 110/62, R 14, T 98.2, oxygen 98%
- Exam normal
- Chest X-ray normal
  
- She is concerned that she may have a pulmonary embolism (PE), and you find out that her grandmother recently died of pulmonary embolism after hip surgery.

# What is her risk of PE?

1. Low (<10%)
2. Medium
3. High (>50%)



# PE Clinical Diagnosis – Wells low <2, high >6

- 1.5 Prior PE or DVT
- 1.5 Pulse >100
- 1.5 Surgery or immobilization
- 3 Signs of deep venous thrombosis
- 1 Hemoptysis (coughing up blood)
- 1 Cancer
- 3 Alternative diagnosis less likely



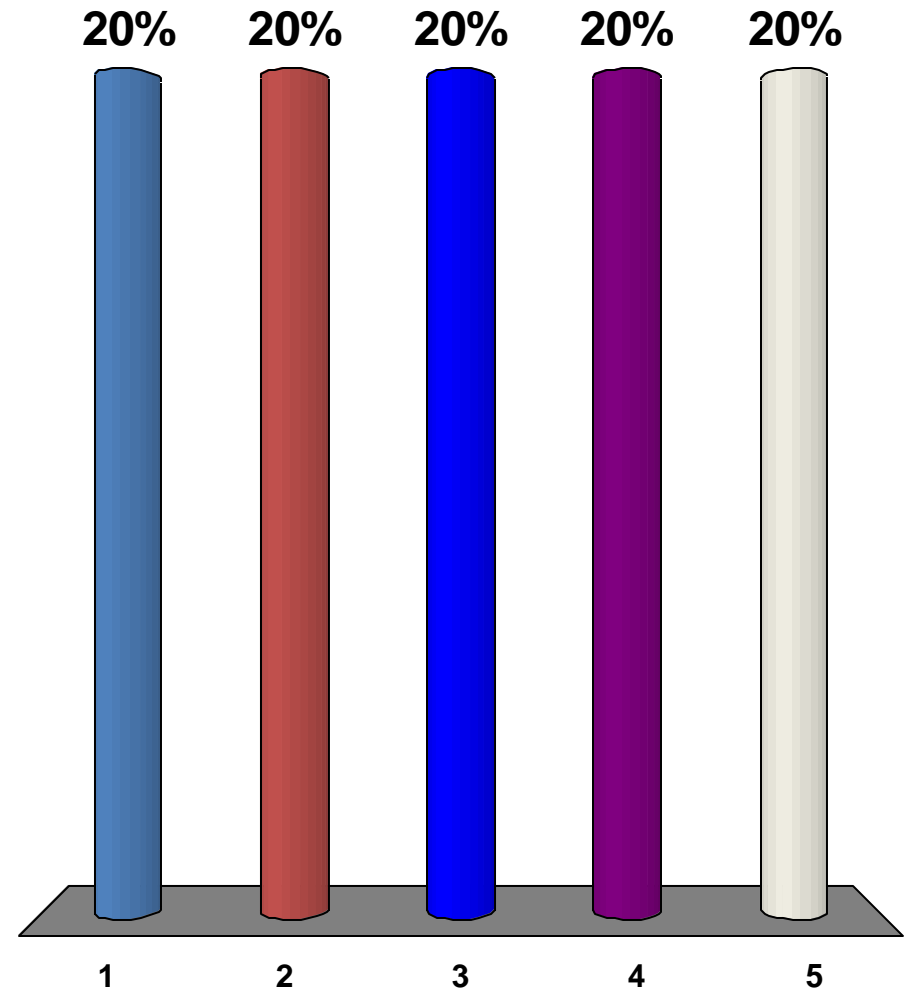
# Case 1 - continued

- A D-dimer blood test is sent and comes back negative
- Sensitivity is 96% (define?)
- Specificity is 50% (define?)
- Assume a pre-test probability of 5% (define?)
  
- With a negative D-dimer, her chance of having PE is closest to <1%, 2%, 4%, 10%, 70%?
- (Hint – start with 1,000 people)

# Case 1 – neg D-dimer

pre-test prob 5%, sens 96%, spec 50%

1. <1%
2. Approx 2%
3. Approx 4%
4. Approx 10%
5. Approx 70%



30

0

# RESIDENT SAMPLE - Venous Thromboembolism

# Diagnosis - Pre-test

- Which is sensitivity?
  - A. Of everyone with the disease, this proportion test positive
  - B. Of everyone without the disease, this proportion test negative
  - C. Of everyone with a positive test, this proportion have the disease
  - D. Of everyone with a negative test, this proportion do not have the disease

# Outline

- Epidemiology/risk factors
- Diagnosis - clinical and tests
- Outcomes with treatment
- Special situations
- IVC filters

# Case 1

- A 22-year-old generally healthy woman, an undocumented immigrant, comes to the ER 1 week after a Ceasarean delivery, complaining of pain and swelling of the left leg.
- The leg is grossly swollen and tender from the thigh down, with prominent tortuous veins.
- A D-dimer is ordered by the PA.

# Case 1 – Clinical probability?

- A. High
- B. Intermediate
- C. Low

# DVT – Clinical Diagnosis

## Wells Criteria

- 1 Active cancer
- 1 Paralysis or immobilization
- 1 Major surgery or bedridden >3d
- 1 Localized tenderness
- 1 Entire leg swollen
- 1 Calf >3cm larger than other side
- 1 Collateral superficial veins
- -2 Alternative diagnosis at least as likely



# DVT – Clinical Diagnosis

## Wells criteria

- Overall prevalence higher in inpatients
- Approximate prevalence in outpatients
  - Low (0 or less) 5%
  - Moderate (1 or 2) 17%
  - High (3 or more) 53%

# DVT – Testing

Do AFTER clinical eval

- D-dimer (?age-adjusted)
- Contrast venography
- Ultrasound compressibility
- CT or MR venogram
- Do these have (vote separately):
  - A. Sensitivity high
  - B. Specificity high
  - C. Both high
  - D. Insufficient information

# Case 1 – two questions

- What will you do if her D-dimer is positive?  
What if it is negative?
  - A. Admit for LMWH/warfarin
  - B. Send home for LMWH/warfarin
  - C. Obtain compression ultrasound
  - D. Obtain venogram
  - E. Send home without therapy

# Case 1 – D-dimer results

	DVT +	DVT -	
D-dimer +	57	20	77
D-dimer -	3	20	23
	60	40	100

# Case 1 – D-dimer results

	DVT +	DVT -	
D-dimer +	57	20	77 $57/77 = 74\%$
D-dimer -	3	20	23 $3/23 = 13\%$
	60	40	100

# Discussion points

- Team construction
  - For single session vs. multiple sessions
- Pre-readings, assigned vs. objectives
- RATs
- Application exercises
- Grade implications