Preventive Medicine

August 30, 2023

CSAM Addiction Medicine Board Review Course

Presented by Amy de la Garza, MD, FASAM, IFMCP

Owner and Physician Heron Wellness

Adjunct Faculty University of Utah School of Medicine

Updated from past content by C.Y Angie Chen, MD. FACP, FASAM

Clinical Associate Professor of Medicine, Stanford University

CONFLICT OF INTEREST DISCLOSURE

I, *Amy de la Garza,* have nothing to disclose, and I will not be discussing “off label” use of drugs or devices in this presentation.

EDUCATIONAL OBJECTIVES

After attending this presentation, participants will be able to:

1. Recall the basic principles of epidemiology that one must know to be prepared to take the Addiction Medicine Board Exam

2. Discuss Primary, Secondary & Tertiary prevention strategies

3. Identify common health conditions related to substance use, their screening recommendations and interventions to decrease morbidity & mortality

PREVENTIVE MEDICINE

Question 1: The Institute of Medicine classifies prevention strategies based on the targeted population. All the following prevention strategies are correctly paired, **except**:

A. Selective Prevention – Substance use education in primary schools
B. Universal Prevention – Public smoking bans
C. Indicated Prevention – Drug treatment for youth involved with the juvenile justice system
D. Selective Prevention – HCV screening at a MOUD clinic for patients with Opioid Use Disorder

PREVENTIVE MEDICINE

1) Answer is A. Selective Prevention – Substance use education in primary schools

- Universal Prevention focuses on the entire population as the target of the intervention.
  - The target population can be an entire nation, local community, school or neighborhood. Public smoking bans target the entire community where the bans are in effect. Education campaigns target the entire school.
- Selective Preventive targets high-risk groups.
  - Screening for HCV among patients with OUD would be appropriate given the increased risk of HCV in this population.
- Indicated Prevention specifically addresses **symptomatic** high-risk individuals.
  - Indicated individualized strategies are appropriate for individuals with high-risk behaviors such as youth in the juvenile justice system.

Institute of Medicine (IOM) Classifications for Prevention.
https://dpbh.nv.gov/uploadedFiles/mhnvgov/content/Meetings/Bidders_Conference/Institute%20of%20Medicine%20Prevention%20Classifications-rev10.20.14.pdf.

PREVENTATIVE MEDICINE

Question 2: A 46-year-old man with severe alcohol use disorder presents for his annual physical as well as his monthly LAI-NTX. He does not have a tobacco or nicotine use history. He received a PPSV23 vaccine with his TDAP vaccine last year. All the following are true **except:**

A. Pneumococcal vaccines prevent pneumonia, meningitis and other invasive infections with *Streptococcus pneumoniae.*

B. He should receive a second PPSV23 at age 65.

C. If he receives a PCV20 immunization he will not require further pneumococcal immunizations.

D. Patients with liver disease should receive pneumococcal immunizations according to ACIP guidelines

PREVENTATIVE MEDICINE

Answer is B - He should receive a second PPSV23 at age 65.

- Our patients with SUD frequently meet risk criteria for pneumococcal immunization prior to the age of 65
- Adults 19 to 64 who have the following risk factors should be immunized
  - Alcohol use disorder
  - Chronic liver disease
  - Chronic lung disease including COPD
  - Cigarette smoking
  - Diabetes
  - HIV
  - Various other chronic disease conditions not necessarily related to use

PREVENTATIVE MEDICINE

- The new conjugated vaccines, PCV15 and PCV20 have changed the existing ACIP guidelines for adults 19-64 and adults 65 and older
- Adults 19 to 64 with high risk
  - No previously received vaccine – **PCV20 ONLY**, no need to dose PPSV23 **OR** PCV15 followed by PPSV23 at least one year later
  - **Adults who have had only PPSV23 – administer EITHER PCV15 OR PCV20 at least one year after most recent PPSV23 – No other PPSV23 needed**
  - Adults who have had PCV13 only
    - Give 1 dose of PCV20 at least one year after PCV13 – no further doses needed
    - Give 1 dose of PPSV23 – the timing after PCV13 depending on risks and review of immunization needs again at age 65

PREVENTATIVE MEDICINE

- Adults who have had PCV13 only
  - Give 1 dose of PCV20 at least one year after PCV13 – no further doses needed

  OR
  - Give 1 dose of PPSV23 – the minimum interval to administer PPSV23 after PCV13 depends on the patient's specific risk factors which can be found on the CDC website

PREVENTATIVE MEDICINE

- Adults who have had PCV13 and 1 dose of PPSV23
  - Give one dose of PCV20 at least 5 years after last pneumococcal vaccine
  - Or give second dose of PPSV23 at least 8 weeks after PCV13 and 5 years after PPSV23 if immunocompromised and review recommendations when patient turns 65
- **Summary – PCV20 will complete your pneumococcal vaccinations for lifetime unless recommendations change**
- *https://www.cdc.gov/vaccines/vpd/pneumo/hcp/who-when-to-vaccinate.html*

PREVENTATIVE MEDICINE

Question 3: A 30-year-old cisgender, heterosexual woman who injects heroin presents for initial visit, interested in medications for opioid use disorder (MOUD). She reports use of sterile needles and does not share other injection supplies. She is in a monogamous relationship with a man who also uses IV heroin. She has an IUD and does not use condoms. She was treated for gonorrhea 3 months ago acquired from her previous partner. She received one HPV vaccine before 12th grade. The following statement regarding recommended preventative care is **true:**

A. She should undergo repeat testing for gonorrhea and chlamydia

B. Since she uses safe injection practices she does not meet criteria for preexposure prophylaxis (PrEP)

C. She no longer meets criteria for HPV vaccination

D. She should have screening for cervical cancer with cytology and HPV testing every 3 years

PREVENTATIVE MEDICINE

Answer is A – She should undergo repeat testing for gonorrhea and chlamydia

https://uspreventiveservicestaskforce.org/uspstf/recommendation/chlamydia-and-gonorrhea-screening

Recommendation Summary

Population	Recommendation	Grade
Sexually active women, including pregnant persons	The USPSTF recommends screening for chlamydia in all sexually active women 24 years or younger and in women 25 years or older who are at increased risk for infection.	B
Sexually active women, including pregnant persons	The USPSTF recommends screening for gonorrhea in all sexually active women 24 years or younger and in women 25 years or older who are at increased risk for infection.	B
Sexually active men	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for chlamydia and gonorrhea in men.	I

PREVENTATIVE MEDICINE

Assessing increased risk of GC/CT in women over 25

Patient has new sexual partner and recently treated for STI

Screening for chlamydia and gonorrhea. US Preventative Services Task Force Recommendation Statement. JAMA. 2021;326(10):949-956. doi:10.1001/jama.2021.14081

How to implement this recommendation?	**1. Assess risk:** • Women aged 15 to 24 y have the highest infection rates. • Women 25 years or older are at increased risk if they have ◦ A previous or coexisting STI ◦ A new or more than 1 sex partner ◦ A sex partner having sex with other partners at the same time ◦ A sex partner with an STI ◦ Inconsistent condom use when not in a mutually monogamous relationship ◦ A history of exchanging sex for money or drugs ◦ A history of incarceration Clinicians should consider the communities they serve and may want to consult local public health authorities for information about local epidemiology and guidance on determining who is at increased risk. **2. Screen for chlamydia and gonorrhea in sexually active women:** • 24 years or younger • 25 years or older and at increased risk for infection Screen for chlamydia and gonorrhea using a NAAT. NAATs can test for infection at urogenital and extragenital sites,including urine, endocervical, vaginal, male urethral, rectal, and pharyngeal. Both chlamydia and gonorrhea can be tested for at the same time with the same specimen.

PrEP – Patient meets high risk criteria – although she uses safe injection practice, she has a partner who injects as well as having gonorrhea within a 6-month time period

PREVENTATIVE MEDICINE

Figure 2. Clinical Summary: Preexposure Prophylaxis for the Prevention of HIV Infection

Population	**Persons at high risk of HIV acquisition**
Recommendation	**Offer preexposure prophylaxis (PrEP).** **Grade: A**
Risk Assessment	Persons at risk of HIV infection include men who have sex with men, persons at risk via heterosexual contact, and persons who inject drugs. Within these groups, certain risk factors or behaviors (outlined below) can place persons at high risk of HIV infection. Men who have sex with men, are sexually active, and have 1 of the following characteristics: • A serodiscordant sex partner (ie, in a sexual relationship with a partner living with HIV) • Inconsistent use of condoms during receptive or insertive anal sex • An STI with syphilis, gonorrhea, or chlamydia within the past 6 months Heterosexually active women and men who have 1 of the following characteristics: • A serodiscordant sex partner (ie, in a sexual relationship with a partner living with HIV) • Inconsistent use of condoms during sex with a partner whose HIV status is unknown and who is at high risk (eg, a person who injects drugs or a man who has sex with men and women) • An STI with syphilis or gonorrhea within the past 6 months Persons who inject drugs and have 1 of the following characteristics: • Shared use of drug injection equipment • Risk of sexual acquisition of HIV (see above) Persons who engage in transactional sex, persons who are trafficked for sex work, men who have sex with men and women, and transgender women and men who are sexually active can be at high risk of HIV infection and should be considered for PrEP based on the criteria outlined above.
Preventive Medication	Once-daily oral treatment with combined tenofovir disoproxil fumarate and emtricitabine is the only formulation of PrEP currently approved by the US Food and Drug Administration for use in the United States in persons at risk of sexual acquisition of HIV infection.
Relevant USPSTF Recommendations	The USPSTF has issued recommendations on behavioral counseling to reduce risk of STIs and on screening for HIV infection.

For a summary of the evidence systematically reviewed in making this recommendation, the full recommendation statement, and supporting documents, please go to https://www.uspreventiveservicestaskforce.org.

U.S. Preventive Services TASK FORCE

JAMA

Preexposure Prophylaxis for the Prevention of HIV Infection US Preventive Services Task Force Recommendation Statement. JAMA. 2019;321(22):2203-2213. doi:10.1001/jama.2019.6390

PREVENTATIVE MEDICINE

- 9 Valent Gardasil is the most widely used vaccine currently in US
- Ideally vaccination occurs prior to sexual activity and exposure to HPV – Recommended routine vaccination at age 11 or 12 (children exposed at an early age secondary to sexual trauma should consider vaccine at age 9
- ACIP recommends new vaccination, or vaccine completion in adults up to age 26
- ACIP recommends shared decision making for individuals ages 27-45 in individuals who have not completed immunization, or who otherwise may benefit from immunization. Vaccination is less effective with higher levels of HPV exposure.
- Cervical cancer screening is required regardless of vaccine status

PREVENTATIVE MEDICINE

- DOSING SCHEDULE
- **Series initiated BEFORE 15th birthday**
  - Two doses of HPV vaccine
  - Second dose 6-12 months after the first dose
- **Series initiated AFTER 15th birthday AND for immunocompromised children/adults**
- Three doses of HPV vaccine
  - Three-dose schedule is 1-2 months after the first vaccine, 6 months after the second vaccine
- Three doses are recommended for immunocompromised persons (including those with HIV infection) aged 9 through 26 years.
- HPV vaccine should not be given during pregnancy

HPV vaccination recommendations. https://www.cdc.gov/vaccines/vpd/hpv/hcp/recommendations.html

PREVENTATIVE MEDICINE

Cervical Cancer Screening : 30-year-old woman should have cervical cytology alone every 3 years, high-risk HPV testing alone every 5 years, or high-risk HPV and cytology every 5 years.

Recommendation Summary

Population	Recommendation	Grade
Women aged 21 to 65 years	The USPSTF recommends screening for cervical cancer every 3 years with cervical cytology alone in women aged 21 to 29 years. For women aged 30 to 65 years, the USPSTF recommends screening every 3 years with cervical cytology alone, every 5 years with high-risk human papillomavirus (hrHPV) testing alone, or every 5 years with hrHPV testing in combination with cytology (cotesting). See the Clinical Considerations section for the relative benefits and harms of alternative screening strategies for women 21 years or older.	A
Women younger than 21 years	The USPSTF recommends against screening for cervical cancer in women younger than 21 years.	D
Women who have had a hysterectomy	The USPSTF recommends against screening for cervical cancer in women who have had a hysterectomy with removal of the cervix and do not have a history of a high-grade precancerous lesion (ie, cervical intraepithelial neoplasia [CIN] grade 2 or 3) or cervical cancer.	D
Women older than 65 years	The USPSTF recommends against screening for cervical cancer in women older than 65 years who have had adequate prior screening and are not otherwise at high risk for cervical cancer. See the Clinical Considerations section for discussion of adequate prior screening and risk factors that support screening after age 65 years.	D

Cervical cancer: screening. https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/cervical-cancer-screening

PREVENTIVE MEDICINE

Question 4: Mr. Rogers is a 65- year-old male with a past medical history of opioid use disorder sees you for a follow up for his buprenorphine-naloxone treatment. He is stable on 12 mg of buprenorphine daily. He asks you if he needs any cancer screening although he quit smoking 5 years ago. Upon further history, he shares that he started smoking at age 20 and smoked 1-5 cigarettes per day on average until he quit. According to the United States Preventive Services Task Force, you recommend:

A. Yearly low dose computed tomography.
B. 1-time abdominal ultrasound
C. Yearly PSA screening for prostate cancer
D. Nothing, he quit over 5 years ago.

PREVENTIVE MEDICINE

4) Answer is B. 1-time abdominal ultrasound

- It is important to know the U.S. Preventative Services Task Force recommendations, particularly related to smoking related screening recommendations.
- The USPSTF recommends a **1-time screening for abdominal aortic aneurysm (AAA) with ultrasonography in men aged 65 to 75 years who have ever smoked (Grade B)**.
- This question also reviews additional USPSTF guidelines.
  - Prostate Cancer Screening: Individualized decision making for men aged 55-69 years old with periodic PSA-based screening (Grade C). Recommends against PSA-based screening in men over 70 years and older (Grade D).
  - Lung Cancer Screening: annual screening for lung cancer with low-dose computed tomography (LDCT) in adults **aged 50 to 80 years who have a 20 pack-year smoking history and currently smoke or have quit within the past 15 years.** (Max pack year for this patient: 5 cigs = 0.25 ppd x 40 yr (age 20-60 quit 5 yrs. ago) = **10** pack-year)
  - Screening should be discontinued once a **person has not smoked for 15 years** or develops a health problem that substantially limits life expectancy or the ability or willingness to have curative lung surgery (Grade B).
- Lung cancer is the **2nd most common** cancer.
- Lung cancer leading cause of cancer death among both men and women: **25% of all cancer deaths**. Each year, more people die of lung cancer than of colon, breast, and prostate cancers combined.
- 80%-90% of lung cancer cases are the result of smoking; increasing age & cumulative exposure to tobacco smoke are the 2 most common risk factors.

"Abdominal Aortic Aneurysm: Screening." *Recommendation: Abdominal Aortic Aneurysm: Screening | United States Preventive Services Taskforce*, US Preventive Services Taskforce, 10 Dec. 2019, https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/abdominal-aortic-aneurysm-screening.

CSAM

PREVENTIVE MEDICINE

Question 5: The rate of tuberculosis (TB) infection in the U.S. is 2.9/100,000. The prevalence of tuberculosis in persons who inject drugs (PWID) has been estimated to be 15,000-39,000/100,000. Which of the following is FALSE regarding TB prevention?

A. Treating patients for latent TB is SECONDARY prevention, because it provides treatment before TB progresses from latent to active.

B. Treating patients with active TB is TERTIARY prevention, stopping disease progression & limiting the spread of infection to others.

C. Many countries with higher rates of endemic TB utilize vaccinations for TB prevention.

D. Screening for TB using the tuberculin skin test or QuantiFERON-TB Gold is an example of PRIMARY prevention, identifying people at risk of active TB before they are sick.

CSAM

PREVENTIVE MEDICINE

5) Answer is D. Screening for TB using the tuberculin skin test or QuantiFERON-TB Gold is an example of PRIMARY prevention, identifying people at risk of active TB before they are sick.

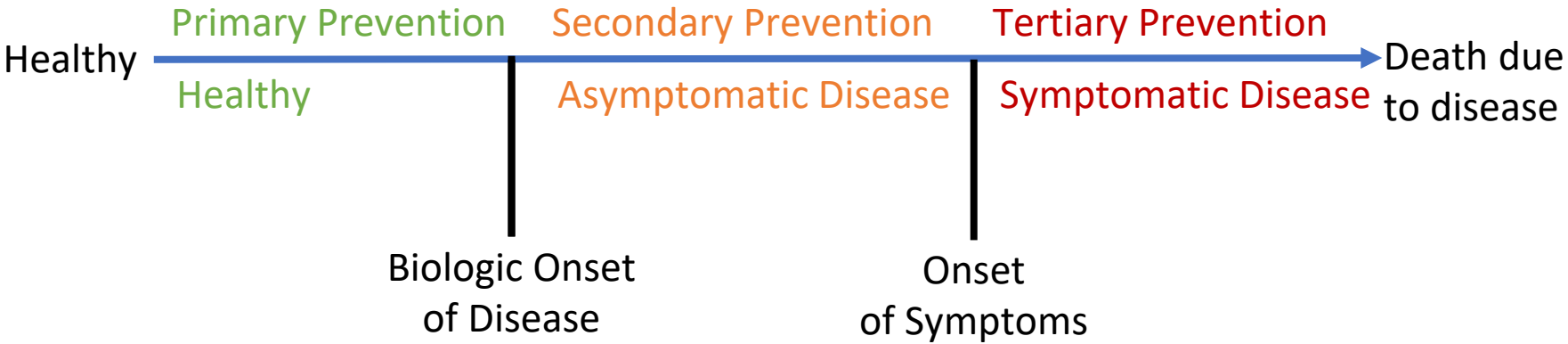
	PRIMARY Prevention	SECONDARY Prevention	TERTIARY Prevention
Definition	Action implemented before disease onset through behavior modification, policy, or medical intervention, such as vaccines.	Screening to detect diseases early before onset of signs and symptoms.	Disease management post diagnosis or to stop disease progression and screen for complications.
Goal	Risk Reduction	Screening	Diagnosis and Treatment
Example	**PRIMARY TB prevention:** environmental controls, such as use of adequate ventilation and decreasing overcrowding. Countries with high rates of infection vaccinate with BCG. 25% of the world's population is infected with TB.	Screening for latent TB infection & treatment of latent TB infection are both examples of **SECONDARY** prevention—the infection has already occurred—it has not been prevented.	**TERTIARY** PREVENTION is what we often think of as medical treatment, decreasing morbidity/mortality of diseases which are already symptomatic

"Picture of America." *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention, 6 Apr. 2017, https://www.cdc.gov/pictureofamerica/index.html.

CSAM

PREVENTIVE MEDICINE

5) Answer is D. Screening for TB using the tuberculin skin test or QuantiFERON-TB Gold is an example of PRIMARY prevention, identifying people at risk of active TB before they are sick.



"Picture of America." *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention, 6 Apr. 2017, https://www.cdc.gov/pictureofamerica/index.html.

PREVENTIVE MEDICINE

Question 6: Given the table below, what is the SENSITIVITY of the test?

	Disease +	**Disease -**	Total
Test +	25	10	35
Test -	5	60	65
Total	30	70	100

A. 25 divided by 35
B. 25 divided by 30
C. 5 divided by 30
D. 5 divided by 65

PREVENTIVE MEDICINE

6) Answer is B. 25 divided by 30 (.83)

	Disease +	**Disease -**	Total
Test +	25=TP	FP	TP + FP
Test -	5=FN	TN	TN + FN
Total	30=25TP + 5FN	FP + TN	

25 TP / 30 TP+FN

"Cochrane UK." *Sensitivity and Specificity Explained: A Cochrane UK Trainees Blog | Cochrane UK*, https://uk.cochrane.org/news/sensitivity-and-specificity-explained-cochrane-uk-trainees-blog.

CSAM

PREVENTIVE MEDICINE

6) Answer is A. 25 divided by 30 (.83)

- The sensitivity and specificity reflect the **TEST** and is **NOT dependent on the population**.
- The measure of sensitivity describes how well the proposed screening test performs against an agreed "Gold Standard" test, Gold Standard, meaning a diagnostic test that is regarded as definitive.
- In drug testing, sensitivity is the ability of the test to detect those who have consumed the substance. For instance, if I know that a patient used cocaine, how likely is that test going to come back positive for cocaine? If it were a perfectly sensitive test, it would 100% pick up every person tested who used cocaine.
- Sensitivity is the ability of a test to detect disease in all those who have the disease and is expressed as the proportion of those **with disease** correctly identified by a positive screening test result.
- Mathematically it is **True Positives/(True Positives + False Negatives)**
- Highly **S**e**N**sitive tests when Negative (-) rule OUT disease or use: "SN(-)OUT"

"Cochrane UK." *Sensitivity and Specificity Explained: A Cochrane UK Trainees Blog | Cochrane UK*, https://uk.cochrane.org/news/sensitivity-and-specificity-explained-cochrane-uk-trainees-blog.

CSAM

PREVENTIVE MEDICINE

Question 7: Given the table below, what is the SPECIFICTY of the test?

	Disease +	**Disease -**	Total
Test +	25	10	35
Test -	5	60	65
Total	30	70	100

A. 25 divided by 70
B. 5 divided by 65
C. 60 divided by 70
D. 60 divided by 65

CSAM

PREVENTIVE MEDICINE

7) Answer is C. 60 divided by 70 (.86)

	Disease +	**Disease -**	Total
Test +	TP	10= FP	TP + FP
Test -	FN	60=TN	TN + FN
Total	TP + FN	70=10FP + 60TN	

60 TN / 70 FP+TN

"Cochrane UK." *Sensitivity and Specificity Explained: A Cochrane UK Trainees Blog | Cochrane UK*, https://uk.cochrane.org/news/sensitivity-and-specificity-explained-cochrane-uk-trainees-blog.

PREVENTIVE MEDICINE

7) Answer is C. 60 divided by 70 (.86)

- Again, the sensitivity and specificity reflect the TEST and are NOT dependent on the population
- The measure of specificity describes how well the proposed screening test performs against an agreed "Gold Standard" test, meaning a diagnostic test that is regarded as definitive.
- In drug testing, **specificity is the reliability of the test to be negative in those who have not used the tested drug.**
- Specificity is the ability of the test to identify correctly those free of disease in the screened population and is expressed as the proportion of those without disease correctly identified by a negative screening test.
- Mathematically, it is **True Negatives/(True Negatives + False Positives)**
- Highly **SP**ecific tests when POSITIVE (+) rule **IN** disease or use: "SP(+)IN"

"Cochrane UK." *Sensitivity and Specificity Explained: A Cochrane UK Trainees Blog | Cochrane UK*, https://uk.cochrane.org/news/sensitivity-and-specificity-explained-cochrane-uk-trainees-blog.

PREVENTIVE MEDICINE

Question 8: Does the prevalence of the disease affect the sensitivity and specificity of the screening test?

A. Yes. As the prevalence of the disease increases, the sensitivity of the test increases, & the specificity decreases.

B. No. Sensitivity & specificity are independent of prevalence of disease.

C. Yes. As the prevalence of the disease increases, the sensitivity of the test decreases, & the specificity increases.

D. Yes. As the prevalence of the disease increases, sensitivity & specificity increase, & as the prevalence of the disease decreases, sensitivity & specificity of the disease decrease.

PREVENTIVE MEDICINE

8) Answer: B. No, sensitivity & specificity are independent of prevalence of disease.

- Again, the sensitivity and specificity are NOT dependent on the population, they are TEST dependent

- Sensitivity & specificity describe how well the test performs against the gold standard. This performance does not change with a change in disease prevalence, as it is an inherent property of the test itself.

- Prevalence refers to the total number of individuals in a population who have a disease or health condition at a specific interval of time, usually expressed as a percentage of the population

"Cochrane UK." *Sensitivity and Specificity Explained: A Cochrane UK Trainees Blog | Cochrane UK*, https://uk.cochrane.org/news/sensitivity-and-specificity-explained-cochrane-uk-trainees-blog.

CSAM

PREVENTIVE MEDICINE

Question 9: Given the table below, what is the POSITIVE PREDICTIVE VALUE of the test?

	Disease +	**Disease -**	Total
Test +	25	10	35
Test -	5	60	65
Total	30	70	100

A. 25 divided by 30
B. 25 divided by 35
C. 35 divided by 65
D. 25 divided by 70

PREVENTIVE MEDICINE

9) Answer: B. 25/35 (.71) PPV

	Disease +	**Disease -**	Total	
Test +	**25** TRUE POS	10 FALSE POS	**35** Total Test POS	**25/35 (.71) PPV**
Test -	5	60	65	
Total	30	70	100	

"Cochrane UK." *Sensitivity and Specificity Explained: A Cochrane UK Trainees Blog | Cochrane UK*, https://uk.cochrane.org/news/sensitivity-and-specificity-explained-cochrane-uk-trainees-blog.

PREVENTIVE MEDICINE

Question 9: Answer: B. 25/35 (.71) continued

- The positive predictive value (PPV) describes the probability or odds of having the disease given a positive screening test result in the screened population.
- This is expressed as the proportion of those with disease among all screening test positives.
- Mathematically, it is True Positives/(True Positives + False Positives)

"Cochrane UK." *Sensitivity and Specificity Explained: A Cochrane UK Trainees Blog | Cochrane UK*, https://uk.cochrane.org/news/sensitivity-and-specificity-explained-cochrane-uk-trainees-blog.

PREVENTIVE MEDICINE

Question 10: Given the table below, what is the NEGATIVE PREDICTIVE VALUE of the test?

	Disease +	**Disease -**	Total
Test +	25	10	35
Test -	5	60	65
Total	30	70	100

A. 60 divided by 65

B. 60 divided by 70

C. 65 divided by 70

D. 70 divided by 100

CSAM

PREVENTIVE MEDICINE

10) Answer: A. 60/65 (.92) NPV

	Disease +	**Disease -**	Total	
Test +	25	10	35	
Test -	5 FALSE NEG	**60** TRUE NEG	**65** Total Test NEG	60/65 (.92) **NPV**
Total	30	70	100	

"Cochrane UK." *Sensitivity and Specificity Explained: A Cochrane UK Trainees Blog | Cochrane UK*, https://uk.cochrane.org/news/sensitivity-and-specificity-explained-cochrane-uk-trainees-blog.

PREVENTIVE MEDICINE

Question 10: Answer: A. 60/65 (.92) continued

- The negative predictive value (NPV) describes the probability or odds of not having the disease given a negative screening test result in the screened population.
- This is expressed as the proportion of those without disease among all screening test negatives.
- Mathematically, it is True Negatives/(True Negatives + False Negatives)

"Cochrane UK." *Sensitivity and Specificity Explained: A Cochrane UK Trainees Blog | Cochrane UK*, https://uk.cochrane.org/news/sensitivity-and-specificity-explained-cochrane-uk-trainees-blog.

PREVENTIVE MEDICINE

Question 11: Does the prevalence of the disease in the population being screened affect the positive predictive value (PPV) & negative predictive value (NPV) of the screening test?

A. No. PPV & NPV are independent of the prevalence of disease.

B. Yes. As the prevalence of the disease increases, the PPV decreases, & the NPV increases.

C. Yes. As the prevalence of the disease increases, the PPV increases, & the NPV decreases.

D. As the prevalence of the disease increases, PPV & NPV increase, & as the prevalence of the disease decreases, PPV & NPV decrease.

PREVENTIVE MEDICINE

11) Answer: C. Yes. As the prevalence of the disease increases, the PPV increases & the NPV decreases.

- Positive predictive value (PPV) & negative predictive value (NPV) are disease prevalence dependent, meaning they are population specific. The denominator is the entire population of those with and without disease.

- PPV & NPV give information on how well a screening test will perform in each population with a known prevalence.

"Cochrane UK." *Sensitivity and Specificity Explained: A Cochrane UK Trainees Blog | Cochrane UK*, https://uk.cochrane.org/news/sensitivity-and-specificity-explained-cochrane-uk-trainees-blog.

PREVENTIVE MEDICINE

Prevalence = Disease+ / (Disease+ plus Disease-) = 50/1000 = 5%

	Disease +	**Disease -**	Total
Test +	40	95	135
Test -	10	855	865
Total	50	950	1000

PPV = 40/135 = 29.6%

NPV = 855/865= 98.8%

Sensitivity = 40/50 = 80%

Specificity = 855/950 = 90%

"Cochrane UK." *Sensitivity and Specificity Explained: A Cochrane UK Trainees Blog | Cochrane UK*, https://uk.cochrane.org/news/sensitivity-and-specificity-explained-cochrane-uk-trainees-blog.

PREVENTIVE MEDICINE

Prevalence = Disease+ / (Disease+ plus Disease-) = 200/1000 = 20% goes up

	Disease +	**Disease -**	Total
Test +	160	80	240
Test -	40	720	760
Total	200	800	1000

PPV = 160/240 = **66.6%**
Goes up as well

NPV = 720/760= 94.7%
Goes down slightly

Sensitivity = 160/200 = 80%

Specificity = 720/800 = 90%

"Cochrane UK." *Sensitivity and Specificity Explained: A Cochrane UK Trainees Blog | Cochrane UK*, https://uk.cochrane.org/news/sensitivity-and-specificity-explained-cochrane-uk-trainees-blog.

PREVENTIVE MEDICINE

Question 12: What does the number needed to treat (NNT) refer to?

A. NNT is the number of physicians needed in a specialty area and given geographical area to ensure adequate care for the number of patients with specific diagnoses

B. NNT is the number of patients that would need to be treated for one person to improve because of the active treatment.

C. NNT is the number of participants needed in a study to have adequate power to detect a real effect of the treatment

D. NNT is the number of patients that would need to be treated for a treatment to be considered cost effective.

PREVENTIVE MEDICINE

Question 12: Answer: B. NNT is the number of patients that would need to be treated for one person to improve because of the active treatment.

- **More effective treatments have lower NNTs. The ideal NNT is 1, meaning that everyone benefits from the treatment.**

- **NNT from clinical trials is usually calculated for active treatment relative to a control (often placebo) condition:**

PREVENTIVE MEDICINE

CALCULATING Number Needed to Treat (NNT)

Active treatment arm **50%** response
Placebo arm **30%** response

First calculate the absolute risk reduction (ARR)

ARR = **50%** - **30%** = **20%** ⍰ **difference in response to real treatment**

ARR = 0.5 – 0.3 = **0.2**

Then calculate the number needed to treat (NNT)

NNT = 1/ARR – 1/**0.2**

= **5**

5 people needed to treat to get one person to benefit from that treatment

CSAM

PREVENTIVE MEDICINE: NEED TO KNOW

- ❑ Basic principles of epidemiology
  - ❑ Incidence vs. prevalence
  - ❑ Period prevalence vs. point prevalence
  - ❑ Sensitivity & specificity
  - ❑ Positive & negative predictive value
  - ❑ Absolute risk reduction & number needed to treat
  - ❑ **Relative risk, odds ratio, & confidence interval**

PREVENTIVE MEDICINE: NEED TO KNOW

- Preventive health issues
  - Common health conditions related to substance use, modality of use (smoking, injecting, etc.), social situation, & lifestyle choices. Examples include:
    - ID: Hepatitis, TB, HIV, STDs, soft tissue infection
    - Smoking: lung cancer, abdominal aortic aneurysm
    - Medical: Poor dentition, reactive airway, unplanned pregnancy, Cardiomyopathy, QTc prolongation, COPD, cervical cancer, laryngeal cancer
  - Screening recommendations
  - Interventions to decrease morbidity & mortality
  - Primary, secondary & tertiary prevention strategies, **IOM definitions of universal, selective and indicated prevention**

PREVENTIVE MEDICINE: References

Question 1: *Institute of Medicine (IOM) Classifications for Prevention*. https://dpbh.nv.gov/uploadedFiles/mhnvgov/content/Meetings/Bidders_Conference/Institute%20of%20Medicine%20Prevention%20Classifications-rev10.20.14.pdf.

Question 2: https://www.cdc.gov/vaccines/pregnancy/hcp-toolkit/tdap-vaccine-pregnancy.html#nav-group-why-maternal-vaccines-are-important. Updated recommendations for use of tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine (TDAP) in pregnant women. Advisory Committee on Immunization Practices (ACIP), 2012. Centers for Disease Control and Prevention (CDC). MMWR Morb Mortal Wkly Rep 2013;62:131–5

Question 3: CDC 2017 January 30 Syphilis – CDC Fact Sheet https://www.cdc.gov/std/syphilis/stdfact-syphilis-detailed.htm
CDC 2017 January 30 Congenital Syphilis – CDC Fact Sheet. https://www.cdc.gov/std/syphilis/stdfact-congenital-syphilis.htm
Motoyuki Tsuboi, et al. Prevalence of syphilis among men who have sex with men: a global systematic review and meta analysis from 2000–20; The Lancet Global Health Volume 9, issue 8, e1110-e1118, August 01, 2021
A Devastating Surge in Congenital Syphilis: How Can We Stop It? - Medscape - Jan 14, 2019 https://www.medscape.com/viewarticle/907183?src=par_cdc_stm_mscpedt&faf=1#vp_2

Question 4: https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/lung-cancer-screening#bootstrap-panel—8
https://www.cancer.org/cancer/lung-cancer/about/key-statistics.html

Question 5: Armenta RF, Collins KM, Strathdee SA, et al. Mycobacterium tuberculosis infection among persons who inject drugs in San Diego, California. Int J Tuberc Lung Dis. 2017;21(4):425-431. doi:10.5588/ijtld.16.0434.
New Jersey Medical School Global Tuberculosis Institute./Incorporating Tuberculosis into Public Health Cor Curriculum./2009: Epidemiology Fact Sheet 1: Primary, Secondary, and Tertiary Prevention Fact Sheet – TB Examples INSTRUCTOR"S GUIDE Version 1.0.
RG Deiss, TC Rodwell, RS Garfein. Tuberculosis and Drug Use: Review and Update. Clin Infect Dis. 2009 January 1;48(1): .doi10.1086/594126.

Questions 6-11: K Mackenzie. Statistical aspects of screening tests, including knowledge of and ability to calculate, sensitivity, specificity, positive and negative predictive values, and the use of ROC curves. Health Knowledge Education, CPD and Revalidation from PHAST. 2017 https://www.healthknowledge.org.uk/public-health-textbook/disease-causation-diagnostic/2c-diagnosis-screening/statistical-aspects screening

Question 12:Stephanie Glen. "Number Needed to Treat (NNT)" From StatisticsHow To.com: Elementary Statistics for the rest of us! https://www.statisticshowto.com/number-needed-to-treat-nnt/
https://www.thennt.com/thennt-explained/
https://www.researchgate.net/figure/Examples-of-universal-selective-and-indicated-preventive-interventions-in-school_tbl1_232059467

Thank you and Best Wishes!