Screening

- Definition: strategy used in a population to identify an unrecognized disease in individuals without signs or symptoms
- Cancer causes 1 in 4 deaths in the US
- Screening is ONE approach to reducing morbidity and mortality
- Full implementation won't eliminate cancer deaths
- Be selective: information and interventions have risks, consequences

"Ideal" Screening Tests

- Prevalent disease
- Acceptable test (patient perspective)
- "Good" sensitivity/specificity for detecting the disease (low false +/false -)
- Early detection + action leads to a different/clinically better, outcome
- Disease in question has consistent characteristics, homogenous, predictable
- Low cost
- Impact on Quality Adjusted Life Years ($QALY)

Guidelines

- A statement by which to determine a course of action
- Aims to streamline processes according to set routine, sound practice
- By definition: never mandatory, binding, or enforced
- Guidelines may be issued by and used by any organization to make actions more predictable, higher quality
- Ideal to organize favorites: Useful phone app – AHRQ ePSS

- Patient reported FHx accurate, useful for 1st degree breast and colon cancer risk
- National family history day: Thanksgiving
- Offer tools to patients

Murff, H, et. Al. *JAMA*. 2004. 292 (12). 1480-1489.
https://familyhistory.hhs.gov/FHH/html/index.html accessed 6.14.2015

Case 1: Breast Cancer Screening

Case 1: Breast Cancer Screening

- 50 y/o F presents for annual physical exam
- No complaints
- No h/o breast issues or concerns
- G2P2, menarche 13, 1st birth 31
- Family history negative for cancer

"I skipped having mammograms in my 40s, but am concerned many friends of mine are getting breast cancer now. Are they useful?"

Evidence

- 2015: Dx 231,840; 40,290 deaths
- Most ages 55-64 yrs, median death 68
- Screening mammography reduces breast cancer mortality[1, 2]

Age (y)	Trials Included, n	RR for Breast Cancer Mortality (95% CI)	NNI to Screening
39-49	8	0.85 (0.75-96)	1904
50-59	6	0.86 (0.75-0.99)	1339
60-69	2	0.68 (0.54-0.87)	377
70-74	1	1.12 (0.73-1.72)	N/A

1) Nelson, HD, et al. Ann Intern Med. 2009; 151 (10): 727-737
2) Pace, L. Keating, N. JAMA. 2014; 311 (13): 1328
http://www.cancer.org/acs/groups/content/@editorial/documents/document/acspc-044552.pdf accessed 6.16.15

Mammography Screening Guidelines

- USPSTF (2016)[1]
  - Age 40-49: "Discuss risks and benefits" (C)
    - Biennial screening
    - Exception: BRCA mutation or h/o chest radiation therapy
  - Age 50-74: Biennial screening (B)
  - Age > 75: Insufficient data (I)
- ACS[2]
  - Annual screening (ages 45-55)
  - Biennial screening (>55)
  - *Option* of starting age 40, or continuing annually
- ACOG, ACS, ACR, AMA, NCCN, NCI*, AAFP*
  - Annual screening age 40

*Screening every 1-2 years
1) Siu A et al. Annals of Inernal Medicine. 2016;164(4):279-296
2) Oeffinger KC et al. JAMA. 2015;314(15):SWK

Screening Mammography

Risks
- Pain
- False positives
  - Anxiety, psychological distress, biopsies
- False negatives
- Over diagnosis
- Overtreatment
- Radiation exposure

Benefits
- 15-32% mortality reduction
- Reduced morbidity
  - Fewer mastectomies
  - Less chemotherapy

Warner et. al. NEJM. 365(11):1025-1032

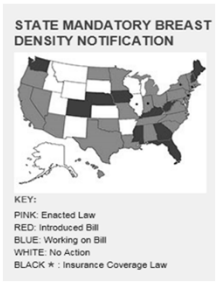
Breast Cancer Screening Case: Part 2

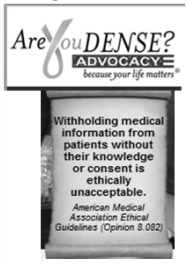
- She completes her mammogram – report returns to you noting "…extreme breast density. No malignancy identified. Birads-1"
- You receive an email a week later:

"I received a letter about my mammogram showing dense breasts. Do I need more testing?"

What about breast density?

- Dense tissue (heterogeneous or extreme density) decreases sensitivity of mammography
- Supplemental imaging may increase cancer detection rates w/increased false positives, biopsies
- No data on mortality benefit





areyoudenseadvocacy.org accessed 9/26/16

Decision Making Summary

Make definitive statements:
- Some benefit, false positives occur, with anxiety
- Some women will die despite screening
- Most women will live even without screening
- Density matters, but needs more research
- Explain over diagnosis risk
- Risk factors and family history matter
- Seek immediate care for symptoms or signs of breast cancer
- Document the "informed decision" in patient's record

Pace, LE, Keating, NL. JAMA. 2014; 311 (13): 1327-35

Case 2: Cervical Cancer Screening

Case 2: Cervical Cancer

- 53 y/o F presents for annual exam, has history of abnormal pap smear in her early 20s, no treatment needed
- No sig PMH, not immunosuppressed
- Negative HIV testing, married but currently separated
- Had negative HPV test with pap smear 5 yrs ago
- You advise based on evidence and current guidelines that pap smear with HPV testing is needed
- Normal pap smear result with high risk HPV 16 positive

Evidence

- 2015: Dx: 12,900; 4,100 deaths
- Majority of cervical cancers caused by HPV
- Cytology detects squamous cell carcinoma
- HPV testing improves detection of adenocarcinoma (20%)
- HPV - necessary but not sufficient
- 15 types associated with cancer = "high risk"
- Time from infection to high grade disease ~15 yrs
- 80% of adults will be infected with HPV by age 50

Sawaya, G. et. al. *Ann Intern Med.* 2015;162(12):851-859
Schiffman, M et. al. Lancet. 2007; 370 (9590): 890
Galic, V. et al. Gynecol Oncol. 2012; 125:287-91
MMWR Recomm Rep. 2006; 55 (RR-11):1
http://www.cancer.org/acs/groups/content/@editorial/documents/document/acspc-044552.pdf accessed 6.16.15

Cervical Cancer Screening Guidelines

USPSTF/ACS/ASCP/ASCCP (2012)[1,2]

ACOG (2015)[3]

- Initiate: age 21 (regardless of history)
- Discontinue: age 65 (if appropriate screening prior)
- Frequency:
  - Age 21-29: cytology q 3 yrs
  - Age > 30: cytology with HPV q5 yrs, or cytology q3*
- Post hysterectomy (no cervix, no h/o CIN2/3): n/a
- Exclusions: h/o cervical cancer, CIN 2/3 or in-situ, DES in utero, immunocompromised, HIV

*Conventional cytology q3 yrs is preferred method of USPSTF, co-testing q 5 y alternative
1) Saslow, D. et al. CA Cancer Jnl Clin. 2012
2) Moyer, VA. Annals Int Med. 2012; 156: 880
3) ACOG Practice Bulletin 157. Obstet Gynecol. 2016; 127:e1

New option: Cobas HPV test

- FDA approved 4/2014 for primary screening (no cytology)
- Cervical sampling detects DNA of 14 high risk HPV types
- Interim guide option: age 25, q3 yrs

ACOG Practice Bulletin 157. Obstet Gynecol. 2016; 127:e1

Management: HPV positive, cytology negative

- High risk HPV is cleared by 90% of infected women
- Detection of persistent infection is key to cancer prevention
- Women can be infected for years prior to cervical changes
- Cellular abnormalities and cancer can be high in the endocervix -> beyond the reach of standard cervical sampling
- Options: repeat cotesting in 1 yr or assess HPV type; then, if HPV 16/18 positive, send for colposcopy. If negative for 16/18 ->repeat co-test in 1 yr

Jnl Lower Gen Tract Disease 17(5)

Case 3: Colon Cancer Screening

Case 3: Colon Cancer

- 55 y/o F presents for new patient physical
- No history of colon cancer screening
- Normal bowel habits
- No family history of cancer
- You advise screening colonoscopy

"What about the fecal DNA stool test? I won't get a colonoscopy!"

Evidence

- 2015: Dx 47,200; 23,600 deaths
- 5-yr survival 92% (Stg I), >50% (Stg IIa-IIIc)
- Polyps progress to cancer ~10 yrs
- Many options for screening
- Stool tests detect cancer and high grade lesions
- Structural tests (procedures) detect polyps and cancer

American Cancer Society Colorectal Cancer Facts & Figures 2014-2016
http://www.cancer.org/acs/groups/content/@editorial/documents/document/acspc-044552.pdf accessed 6.16.15

Colon Cancer Screening Options

Test	Mortality Benefit	Interval	Cost	Guidelines
High Sensitivity gFOBT	15-33%	Annual	Low	USPSTF, ACP
Fecal Immunochemical Test (FIT)		Annual	Intermediate	USPSTF, ACP
Stool DNA Test		3 yrs	High - $500	Covered by CMS
Flexible Sigmoidoscopy	50%	5 yr	High	USPSTF, ACP
Colonoscopy	50-80%+	10 yr	High	USPSTF, ACP
Double-contrast Barium Enema		5 yr	Low	ACP
CT Colonography		5 yr	High	ACP

Qaseem, A. et. al.. *Ann Intern Med.* 2012;156(5):378-386
American Cancer Society Colorectal Cancer Facts & Figures 2014-2016
Ouyang DL et al. *American Journal of Gastroenterology* 2005; 100(6):1393-1403

Colon Cancer Screening Case

- You inquire about her concerns
- Review options for cancer screening that would lessen her concerns
- Something is better than nothing
- We have more options than colonoscopy
- Document discussion and her informed preference in the chart

Case 4: Lung Cancer Screening

Case 4: Lung Cancer Screening

- 60 y/o F presents for follow up of high cholesterol
- Quit smoking 10 years ago; 30 pack yr history
- You review the grade A and B guidelines on your ePSS phone app and see USPSTF gives grade B recommendation for annual low dose CT screening for lung cancer
- Should you advise lung cancer screening with low dose CT?

Evidence

- 2015: Dx 105, 590; 71,660 deaths
- Only 18% alive 5 yrs after diagnosis
- Low-dose CT has benefits and harms
- 20% reduction lung ca death 55-74 y, 30 pk-yr hx, current/quit < 15yrs
- # events/1,000 persons screened*
  - 375 false positive results
    - 41 invasive biopsies for benign nodule
    - 10 surgical procedures for benign nodule
    - 3 complications from procedure
  - Radiation-induced cancer: uncertain

*Estimates from National Lung Screening Trial
Gould, M. NEJM. 2014; 371: 1813-20
http://www.cancer.org/acs/groups/content/@editorial/documents/document/acspc-044552.pdf accessed 6/16/15

Lung Cancer Screening Case

- You let her know there are options for lung cancer screening
- Provide her with information to review
- Schedule an appointment to discuss further
- Shared decision making is critical when risk of false positive and additional testing is high risk

Areas of uncertainty – USPSTF "I"

- Skin cancer screening
- Bladder cancer screening
- Oral cancer screening

Currently recommends against screening – "D"

- Ovarian cancer
- Pancreatic cancer

Key Points

- Cancer screening is ONE method to reduce cancer morbidity and mortality
- Assessing individual risk and careful family history can guide application of guidelines and shared decision-making (SDM)
- Risk assessments, family history, and SDM should be revisited over time
- Screening tests have varying sensitivities and may be applied to cancers with unpredictable characteristics
- Use of Apps for risk calculations and organizing guidelines can ease burdens on busy clinicians