GOALS FOR TODAY:

- Make sure we’re asking the right question
- Understand screening basics
- Apply concepts to breast, prostate, colon
- Discuss benefits (and risks) of screening
- Examine origins of controversy and perceptions
- Review the guidelines
- What to tell our patients?
WHAT’S A SCREENING TEST?

- No symptoms allowed!
- Symptoms ➜ DIAGNOSTIC TESTING
- If you have symptoms **you should get tested**
A drug is shown to reduce risk of dying from heart disease from 2% to 1% over 10 yrs.

Which is true?

A. Drug reduces risk by 50%
B. Drug reduces risk by 1 percentage point
C. 1 out of 100 people taking drug will avoid death from heart disease (NNT 100)
D. 99% of people taking drug get no benefit
E. All are true
REQUIREMENTS OF A SUCCESSFUL SCREENING PROGRAM:

1. Screening advances time of diagnosis of cancers destined to cause death

1. Early treatment is superior to treatment started after patient has symptoms
What an effective screening program should do…

- Early-stage cancer
- Late-stage cancer

Initiation of screening

Overall

Incidence vs. Time

Figure by H. Gilbert Welch, MD, MPH
The heterogeneity of cancer progression

- Size at which cancer causes death
- Size at which cancer causes symptoms
- Abnormal cell
- Death from other causes

Time

Fast
Slow
Very Slow
Non-progressive
Regress

Figure by H. Gilbert Welch, MD, MPH
LEAD-TIME INCREASES SURVIVAL (EVEN IF TIME OF DEATH ISN’T DELAYED)

OVERDIAGNOSIS INCREASES SURVIVAL (EVEN IF NO CHANGE IN NUMBER OF DEATHS)

TRUTHS ABOUT SCREENING

- **Lead time** – time by which diagnosis advanced by screening compared to without screening

- **Overdiagnosis** – detection of a cancer by screening that was never going to cause symptoms in one’s lifetime

**CAUTION: DISREGARD SURVIVAL STATS IN SCREENING!**
PROSTATE CANCER SCREENING
HOW COMMON IS PROSTATE CANCER?

- Chance an average risk 50 year old man will be diagnosed with prostate cancer in his lifetime?

A. 1%
B. 10%
C. 20%
D. 50%
E. 75%

http://seer.cancer.gov/faststats/
WHAT’S THE RISK OF DYING FROM PROSTATE CANCER?

▪ Chance an average risk 50 year old man will die of prostate cancer in his lifetime?

A. 1%
B. 3%
C. 10%
D. 25%
E. 50%

http://seer.cancer.gov/faststats/
INCIDENCE AND DEATH FROM PROSTATE CANCER IN USA

- Lots of diagnosis
- When did it start?
- How does this compare to decrease in mortality?

HOW’S IT COMPARE TO THE UK?

HOW COMMON IS BREAST CANCER?

- Chance an average risk 50 year old woman will be diagnosed with invasive breast cancer in her lifetime?

A. 1%
B. 10%
C. 25%
D. 50%
E. 75%

http://seer.cancer.gov/faststats/
WHAT’S THE RISK OF Dying FROM BREAST CANCER?

- Chance an average risk 50 year old woman will die of breast cancer in her lifetime?

A. 1%
B. 3%
C. 10%
D. 25%
E. 50%

http://seer.cancer.gov/faststats/
TRENDS IN BREAST CANCER DIAGNOSIS (USA)

Source: SEER.cancer.gov
Sequential mammographic screening programs

Declines in breast cancer mortality USA and Europe, independent of mammography

Bleyer A BMJ 2011;343:bmj.d5630
COLORECTAL CANCER (CRC) SCREENING

Celebrity physician ➔
WHICH SCREENING TOOLS HAVE BEEN SHOWN IN AN RCT TO DECREASE RISK OF DYING FROM COLON CANCER?

A. Colonoscopy
B. Sigmoidoscopy
C. CT colonography (virtual colonoscopy)
D. Double contrast barium enema
E. gFOBT (guaiac)
F. iFOBT (FIT)
G. Stool DNA
H. Digital rectal exam
HOW COMMON IS COLORECTAL CANCER?

- Chance an average risk 50 year old will be diagnosed with CRC in their lifetime?

A. 1%
B. 5%
C. 15%
D. 25%
E. 50%
WHAT’S THE RISK OF DYING FROM COLORECTAL CANCER?

- Chance an average risk 50 year old will die of CRC in their lifetime?

A. 0.5%
B. 2%
C. 15%
D. 25%
E. 50%
CRC Trends in USA

- Incidence
- Mortality

Rate per 100,000 population

Year

1. Detecting cancer earlier proves that cancer screening saves lives

2. Early detection of cancer improves survival even if death isn’t postponed by screening

3. Getting a mammogram decreases your risk of being diagnosed with breast cancer

1. Since introduction of widespread screening in USA, incidence of CRC has decreased while incidence of breast and prostate cancer have increased

1. RCTs demonstrate the superiority of screening colonoscopy over FOBT for reducing CRC mortality
Regarding the potential upside of screening…
A 50 YEAR OLD MAN’S RISK OF DYING
OF PROSTATE CANCER IN NEXT 10 YRS
WITHOUT SCREENING?
(ASSUME AVERAGE RISK, NON-SMOKER)

A. 0.2%
B. 1%
C. 5%
D. 10%
E. 25%
A 50 YEAR OLD MAN’S RISK OF DYING OF PROSTATE CANCER IN NEXT 10 YRS WITH ANNUAL SCREENING?

- **Answer:** 0.1%

- **Starting risk:** 0.2% ➔ modified risk: 0.1%

- **Percent of 50 y/o men who benefit from screening:** 0.1% or 1/1000

- **Percent of 50 y/o men who do not benefit:** 99.9% or 999/1000

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A 50 YEAR OLD WOMAN’S RISK OF DYING OF BREAST CANCER IN NEXT 10 YRS WITHOUT SCREENING? (ASSUME AVERAGE RISK, NON-SMOKER)

A. 0.5%
B. 1%
C. 5%
D. 10%
E. 25%
A 50 YEAR OLD WOMAN’S RISK OF DYING OF BREAST CANCER IN NEXT 10 YRS WITH ANNUAL SCREENING? (ASSUME AVERAGE RISK, NON-SMOKER)

- **Answer**: 0.4%

- **Starting risk**: 0.5% ➔ **modified risk**: 0.4% (RRR?)

- **Percent of 50 yr old women who benefit from screening**: 0.1% or 1/1000

- **Percent of 50 yr old women who do not benefit**: 99.9% or 999/1000
A 50 YEAR OLD’S RISK OF DYING OF COLORECTAL CANCER IN NEXT 10 YRS WITHOUT ROUTINE SCREENING? (ASSUME AVERAGE RISK, NON-SMOKER)

A. 0.3%
B. 1%
C. 5%
D. 10%
E. 25%
A 50 YEAR OLD’S RISK OF DYING OF COLORECTAL CANCER IN NEXT 10 YRS WITH ROUTINE SCREENING?
(ASSUME AVERAGE RISK, NON-SMOKER)

- Answer: 0.2%
- Starting risk: 0.3% ➔ modified risk: 0.2% (RRR?)
- Percent of 50 yr olds who benefit from screening: 0.1% or 1/1000
- Percent of 50 yr olds who do not benefit: 99.9% or 999/1000
ARE THESE RESULTS WHAT YOU EXPECTED?
LIFETIME RISK DEATH/DIAGNOSIS: WHAT DO PATIENTS THINK?

#### PATIENTS OVERESTIMATE BENEFITS OF SCREENING

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<th>Percent responding</th>
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“**If screen 1000 women > 40 every other year for 10 yrs, how many fewer deaths from breast cancer?**”

“**If screen 1000 men > 50 every other year for 10 yrs, how many fewer deaths from prostate cancer?**”

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UNWARRANTED CERTAINTY

- Patients overestimate cancer risk & screening benefit
- 74% believed “finding cancer early saves lives most or all of the time”
- 40% felt that 80 y/o declining PSA or mammogram was “irresponsible”

Placed much greater emphasis on survival statistics compared to mortality reduction.

Half said finding more cases of cancer in screened as opposed to unscreened populations “proves that screening saves lives.”
25% recommended CRC screening for 80 yo with unresectable non-small cell lung cancer

71% recommended CRC screening for an 80 yo with symptomatic ischemic cardiomyopathy
1. Exaggerated perception of risk of getting and dying of cancer
2. Exaggerated perception of benefits of screening

What about the harms?
WHAT HAPPENS IF SCREEN 1000 MEN WITH PSA YEARLY FOR 10 YRS?

- false positive test: 100-120
- unnecessary diagnosis and treatment (*overdiagnosis*): 10-30
- erectile dysfunction/incontinence: 30
- death from cancer avoided: 1

WHAT HAPPENS IF SCREEN 1000 WOMEN WITH MAMMOGRAPHY EVERY 1-2 YRS FOR 10 YRS?

- false positive test requiring another mammogram or biopsy: 200-500
- biopsy: 50-200
- unnecessary surgery, radiation, or chemo (*overdiagnosis*): 2-10
- avoid death from cancer: 1

WHAT ARE THE HARMS FROM CRC SCREENING?

- Death
- Perforation
- Severe bleeding
- Diverticulitis
- Severe pain
- MI

- Colonoscopy – 3/1000
- Sigmoidoscopy – 0.3/1000
- FOBT – see above

What I Learned from My Cancer Scare

By Dr. Mehmet Oz | Thursday, June 02, 2011

At some level, I knew I was standing in the middle of New York City traffic, but my mind was in another dimension entirely. Reminders of your mortality will do that.

The day hadn't started off so strangely and scarily, but it hadn't started off to be much fun either. I was going to my doctor's office for a colonoscopy, my second in nine months. Colonoscopies aren't supposed to happen nine months apart, of course, unless the first one turns up something worrisome — and mine had. Back in August, my doctor discovered a suspicious polyp that needed to be removed. It turned out to be precancerous, and while a large majority of such growths do not usually become cancer, colon cancer usually starts...
PERCEPTION AND REALITY

1. Exaggerated perception of the risk of getting and dying of cancer
2. Exaggerated perception of the benefits of screening
3. Harms often ignored

Does public health messaging help?
ORIGINS OF CONTROVERSY

“Get screened now”

“Less talk. More action.”

“5 yr survival when caught early is 98%”
FROM THE AMERICAN CANCER SOCIETY…

“Give yourself the chance of a lifetime”
THE PINK LIFE SAVER

http://www.uch.edu/conditions/imaging-services/mammograms/pink-life-saver/
“Get checked. It could save your life… Every THREE minutes an American man finds out he has prostate cancer.”
The early warning signs of colon cancer:

You feel great.
You have a healthy appetite.
You’re only 50.

You look healthy. You feel fine. Nothing seems to be the matter. Unfortunately, those are the same symptoms thousands of Americans had last year before they were diagnosed with colon cancer. Colon cancer is the second leading cancer killer among men and women. Yet, as deadly as it can be when diagnosed late, when diagnosed early it’s one of the most curable cancers. 90% curable. That’s why we’re urging everyone over fifty to be tested. It’s simple. Fast. Effective. Of course, studies have shown you can also reduce your risk of colon cancer by following a low-fat diet high in fruits, vegetables and fiber, by limiting your intake of alcohol, and by exercising regularly. Remember, the best way to beat colon cancer is early detection. So please, even if you feel fine, call your doctor or the Memorial Sloan-Kettering Cancer Prevention and Wellness Program at 1-888-MSK-WELL — Take the test. Not the chance —

Memorial Sloan-Kettering Cancer Center
The Best Cancer Care. Anywhere.
1275 York Avenue • New York, NY 10021 • http://www.mskcc.org
CREDIBLE SOURCES OF INFORMATION

Organizations that carefully weigh benefits and harms
"The USPSTF recommends against PSA-based screening for prostate cancer"

"It bases its recommendations on the evidence of both the benefits and harms of the service, and an assessment of the balance."
“The USPSTF recommends against routine screening mammography in women aged 40 to 49 years.”

Screening < 50 yrs should “take patient context into account, including the patient's values regarding specific benefits and harms.”

“The USPSTF recommends biennial screening mammography for women aged 50 to 74 years.”
Adults 50-75 yrs:

Annual FOBT
Sigmoidoscopy q5 yrs
Colonoscopy q10 yrs
THINGS WE CAN TELL OUR PATIENTS

- If hearing a lot of certainty it’s time to start asking questions
- Healthy skepticism is a good thing
- Frame benefits/harms in absolute terms
- Tradeoff between benefit and harm is a close call
The gist of cancer screening

Figure by Tanner Caverly, MD