Canadian Task Force on Preventive Health Care

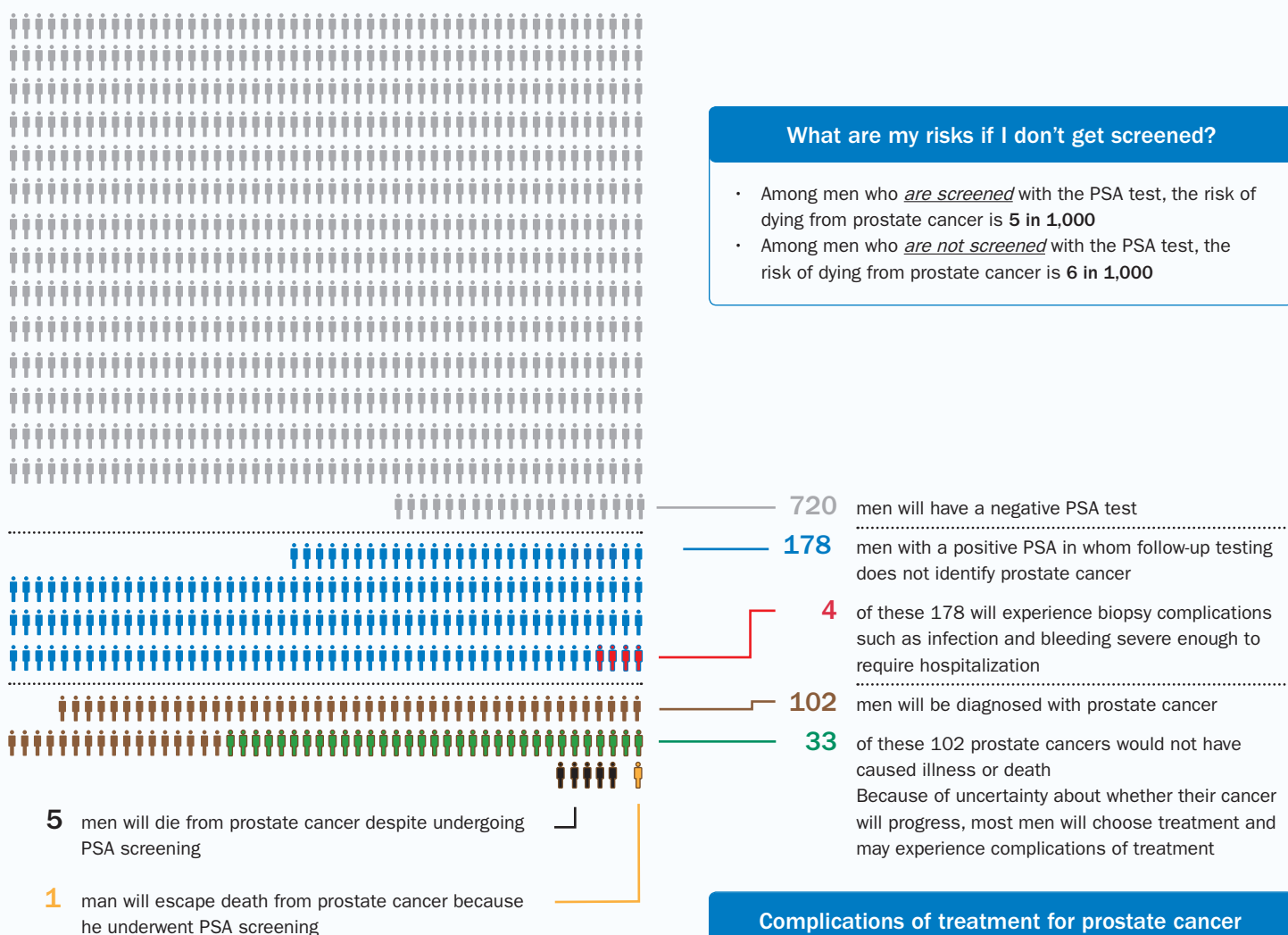# Benefits and Harms of PSA Screening

The Canadian Task Force on Preventive Health Care recommends against screening for prostate cancer with the PSA test

- The CTFPHC found that the potential small benefit from PSA screening is outweighed by the potential significant harms of the screening and associated follow-up treatment.
- Men should understand that PSA screening may result in additional testing if the PSA level is raised.
- To save one life we would need to diagnose an additional 27 men with prostate cancer

RESULTS OF SCREENING 1,000 MEN WITH THE PSA TEST
(age 55–69 years, screened over a 13-year period, and with a PSA screening threshold of 3.0 ng/ml)

What are my risks if I don't get screened?

- Among men who *are screened* with the PSA test, the risk of dying from prostate cancer is **5 in 1,000**
- Among men who *are not screened* with the PSA test, the risk of dying from prostate cancer is **6 in 1,000**

720 men will have a negative PSA test

178 men with a positive PSA in whom follow-up testing does not identify prostate cancer

4 of these 178 will experience biopsy complications such as infection and bleeding severe enough to require hospitalization

102 men will be diagnosed with prostate cancer

33 of these 102 prostate cancers would not have caused illness or death
Because of uncertainty about whether their cancer will progress, most men will choose treatment and may experience complications of treatment

5 men will die from prostate cancer despite undergoing PSA screening

1 man will escape death from prostate cancer because he underwent PSA screening

Complications of treatment for prostate cancer

For every 1,000 men who receive treatment for prostate cancer:
- 114–214 will have short-term complications such as infections, additional surgeries, and blood transfusions
- 127–442 will experience long-term erectile dysfunction
- up to 178 will experience urinary incontinence
- 4–5 will die from complications of prostate cancer treatment

Statistics for benefits and harms were calculated from the European Randomized Study of Screening for Prostate Cancer (ERSPC).

Canadian Task Force on Preventive Health Care

Lung Cancer Screening

We recommend screening for lung cancer using low-dose computed tomography (low-dose CT) in adults who

- are aged 55–74
- are current smokers or former smokers who quit within the last 15 years
- have smoked one pack a day for at least 30 years (or two packs a day for 15 years or equivalent; i.e., 30 "pack-years")

If you think you meet all of these criteria, you should talk to your primary care provider about being screened once a year for up to three years in a row.

We do not recommend being screened for lung cancer with a chest x-ray.

Screening 1000 eligible people with low-dose CT (annually for 3 years)
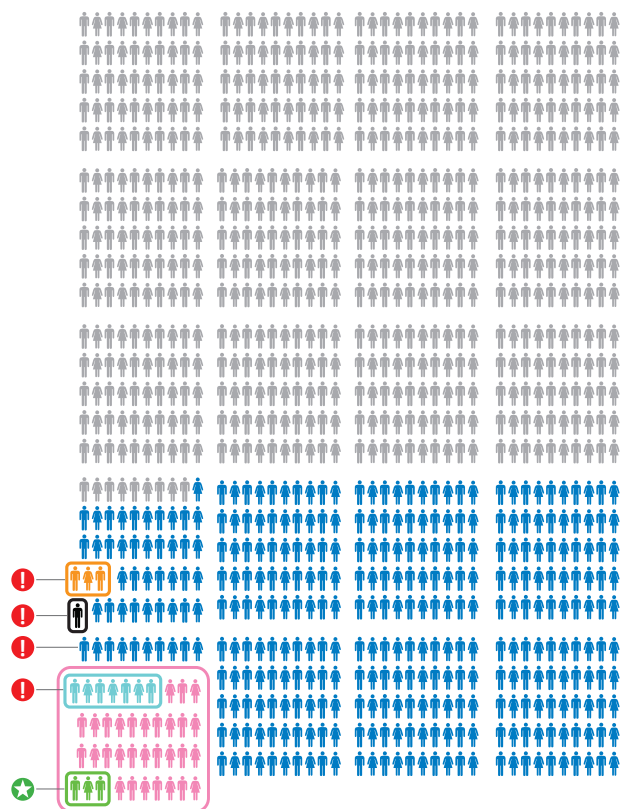
👤	**609**	will have a negative low-dose CT scan result
👤	**40**	will be diagnosed with lung cancer
👤	**351**	will have a positive scan result and find out after further testing that they do not have cancer (false positive)
👤	**7**	of the 40 diagnosed lung cancers would not have caused illness or death (overdiagnosis)
👤	**3**	will have major complications from invasive follow-up tests
👤	**1**	will die from invasive follow-up testing
👤	**3**	fewer people will die from lung cancer (vs. when screening with chest x-ray)

Harm ❗

Benefit ⭐

1. What is low-dose CT and why should I be screened with it?

- Low-dose CT is a very detailed scan of your lungs and it can pick up much more than a chest x-ray can.
- By being screened with low-dose CT, you are more likely to detect lung cancer when the disease is at an early stage, which can make treatment more successful.

2. Why should I not be screened with chest x-ray?

- There is no demonstrated benefit of screening for lung cancer with chest x-ray (e.g., better survival after treament), an abnormal chest x-ray test result could lead to harms from an invasive follow-up test.

3. Why should I be screened only once a year for 3 years?

- Currently, we have evidence only on the benefits and harms of annual screening for three years in a row.

4. What happens if I receive a positive low-dose CT scan result?

- Most people who receive a positive low-dose CT scan result do not really have lung cancer (these are called false positives).
- If you receive a positive scan result, you may go through additional testing to confirm whether or not you have lung cancer. Some of these follow-up tests can be invasive, and there is a risk of major complications or, possibly, death.

Being screened is an individual preference. Because of the small chance of benefit, and the risk of possible harms, you should discuss your decision with your primary care provider.

Should I be screened with mammography for breast cancer?

For women between 40 and 49 years of age:

Among women who do not screen, the risk of dying from breast cancer is: **1 in 313**

With regular screening your risk of dying of breast cancer is: **1 in 370**

However, with regular screening:

... your risk of having a false positive mammogram requiring further screening is: **1 in 3**

... your risk of having a biopsy is: **1 in 28**

... your risk of having part or all of a breast removed unnecessarily is: **1 in 200**

Be informed!

You may hear the risks or benefits of breast cancer screening described as either **absolute** or **relative**. But what does all this mean and how does it apply to you?

The main difference is that absolute risk takes into consideration the fact that whether or not you get screened or treated, you still have a baseline risk of dying of breast cancer: **1 in 313** or **0.32%**. With regular screening that risk changes to: **1 in 370** or about **0.27%**. Relative risk does not consider baseline risk in the same way and may lead to confusion about how regular screening reduces risk.

Risk of Breast Cancer
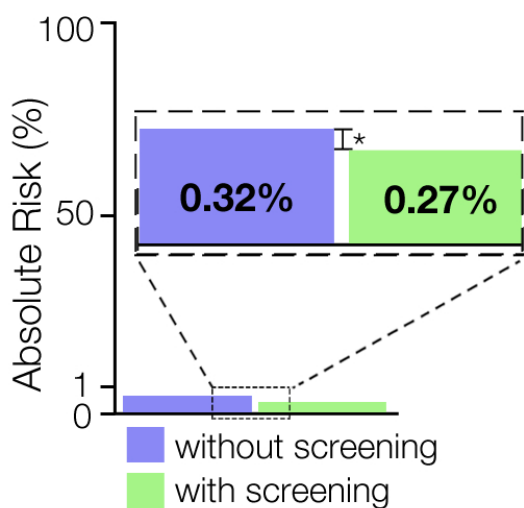
* screening reduces risk by **0.05%**

The absolute risk is simply the difference in risk between regular screening (0.27%) and no screening (0.32%).

$$0.32\% - 0.27\% = 0.05\%$$

Therefore screening in women aged 40-49 reduces your *absolute risk* of dying of breast cancer by **0.05%**.
So the *absolute benefit* of screening is **0.05%**.

Relative risk only looks at the reduction in risk as a proportion of the total risk (so it doesn't consider that you are already at risk of cancer, this can lead to larger values than absolute risk).

$$0.05\%/0.32\% = 15\%$$

Thus, screening in women aged 40-49 reduces your *relative risk* of dying of breast cancer by **15%**. So the *relative benefit* of screening is **15%**.

So how does this translate into actual numbers? Among 100 000 women aged 40 to 49 who are:

Screened **EVERY** 2 years for 11 years:
- **270** would die of breast cancer
- **32 700** would experience a false alarm
- **3600** would have a biopsy
- **500** would have part or all of a breast removed without having cancer
- **50** would escape a breast cancer death

NOT screened for 11 years:
- **320** would die of breast cancer
- **99 680** would not

For more info visit:
**http://www.canadiantaskforce.ca**

Should I be screened with mammography for breast cancer?

Absolute Benefit of Screening with Mammography

If we wanted to describe the previous information in regards to the effect on an individual woman then we can look at what would occur in a base of 2100 women instead of 100 000.

In the graphic below, each dot represents 1 woman (● = 1 woman)

If we screened **2100** women, aged 40-49 years, at average risk of breast cancer every two years for 11 years...
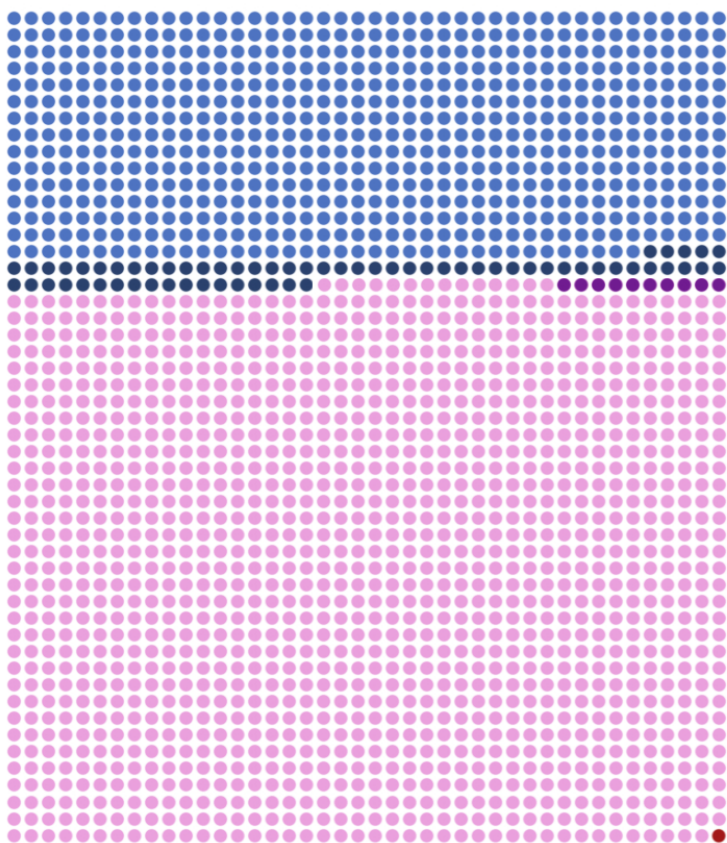
...about **700** women would experience a false positive mamogram requiring further imaging...

...**75** of these women would have a biopsy, all to confirm that they do not have breast cancer

...at least **10** women would have part or all of a breast unnecessarily removed and bear the burden of over- diagnosis

...**1** woman would escape a breast cancer death

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Should I be screened with mammography for breast cancer?

For women between 50 and 69 years of age:

Among women who do not screen, the risk of dying from breast cancer is: **1 in 155**

With regular screening your risk of dying of breast cancer is: **1 in 196**

However, with regular screening:

... your risk of having a false positive mammogram requiring further screening is: **1 in 4**

... your risk of having a biopsy is: **1 in 28**

... your risk of having part or all of a breast removed unnecessarily is: **1 in 200**

Be informed!

You may hear the risks or benefits of breast cancer screening described as either **absolute** or **relative**. But what does all this mean and how does it apply to you?

The main difference is that absolute risk takes into consideration the fact that whether or not you get screened or treated, you still have a baseline risk of dying of breast cancer: **1 in 155** or **0.64%**. With regular screening that risk changes to: **1 in 196** or about **0.51%**. Relative risk does not consider baseline risk in the same way and may lead to confusion about how regular screening reduces risk.

Risk of Breast Cancer

0.64% 0.51%

Absolute Risk (%)

■ without screening
■ with screening
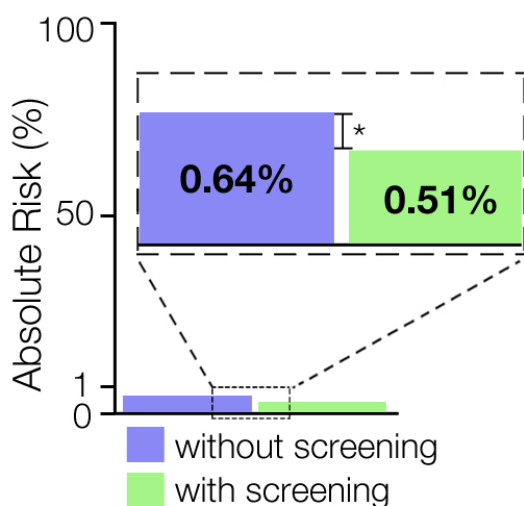
* screening reduces risk by **0.13%**

The absolute risk is simply the difference in risk between regular screening (0.47%) and no screening (0.64%).
   0.64% - 0.51% = 0.13%
Therefore screening in women aged 50-69 reduces your *absolute risk* of dying of breast cancer by 0.13%.
So the *absolute benefit* of screening is 0.13%.

Relative risk only looks at the reduction in risk as a proportion of the total risk (so it doesn't consider that you are already at risk of cancer, this can lead to larger values than absolute risk).
   0.13%/0.64% = 21%
Thus, screening in women aged 50-69 reduces your *relative risk* of dying of breast cancer by 21%. So the *relative benefit* of screening is 21%.

So how does this translate into actual numbers? Among 100 000 women aged 50 to 69 who are:

Screened **EVERY** 2 years for 11 years:
- **510** would die of breast cancer
- **28 200** would experience a false alarm
- **3700** would have a biopsy
- **500** would have part or all of a breast removed without having cancer
- **138** would escape a breast cancer death

NOT screened for 11 years:
- **640** would die of breast cancer
- **99 360** would not

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Should I be screened with mammography for breast cancer?

Absolute Benefit of Screening with Mammography

If we wanted to describe the previous information in regards to the effect on an individual woman then we can look at what would occur in a base of 720 women instead of 100 000.

In the graphic below, each dot represents 1 woman (● = 1 woman)

If we screened **720** women, aged 50-69 years, at average risk of breast cancer every two years for 11 years...

. .. about **204** women would experience a false positive mammogram requiring further imaging...

...**26** of these women would have a biopsy, all to confirm that they do not have breast cancer

...at least **4** women would have part or all of a breast unnecessarily removed and bear the burden of over- diagnosis

...**1** woman would escape a breast cancer death

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Should I be screened with mammography for breast cancer?

For women between 70 and 74 years of age:

Among women who do not screen, the risk of dying from breast cancer is: **1 in 146**

With regular screening your risk of dying of breast cancer is: **1 in 217**

However, with regular screening:

... your risk of having a false positive mammogram requiring further screening is: **1 in 5**

... your risk of having a biopsy is: **1 in 38**

... your risk of having part or all of a breast unnecessarily removed is: **1 in 200**

Be informed!

You may hear the risks or benefits of breast cancer screening described as either **absolute** or **relative**. But what does all this mean and how does it apply to you?

The main difference is that absolute risk takes into consideration the fact that whether or not you get screened or treated, you still have a baseline risk of dying of breast cancer: **1 in 146** or **0.68%**. With regular screening that risk changes to: **1 in 217** or **0.46%**. Relative risk does not consider baseline risk in the same way and may lead to confusion about how regular screening reduces risk.

Risk of Breast Cancer
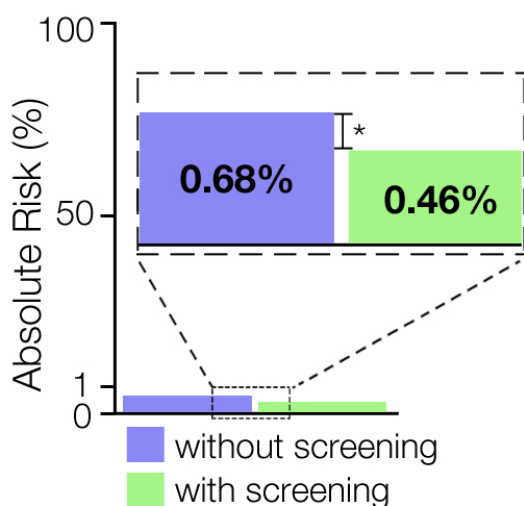
* screening reduces risk by **0.22%**

The absolute risk is simply the difference in risk between regular screening (0.46%) and no screening (0.68%).

   0.68% - 0.46% = 0.22%

Therefore screening in women aged 70-74 reduces your *absolute risk* of dying of breast cancer by **0.22%**.
So the *absolute benefit* of screening is **0.22%**.

Relative risk only looks at the reduction in risk as a proportion of the total risk (so it doesn't consider that you are already at risk of cancer, this can lead to larger values than absolute risk).

   0.22%/0.68% = 32%

Thus, screening in women aged 70-74 reduces your *relative risk* of dying of breast cancer by **32%**. So the *relative benefit* of screening is **32%**.

So how does this translate into actual numbers? Among 100 000 women aged 70 to 74 who are:

Screened EVERY 2 years for 11 years:
- **460** would die of breast cancer
- **21 200** would experience a false alarm
- **2600** would have a biopsy
- **500** would have part or all of a breast removed without having cancer
- **222** would escape a breast cancer death

NOT screened for 11 years:
- **680** would die of breast cancer
- **99 320** would not

For more info visit:
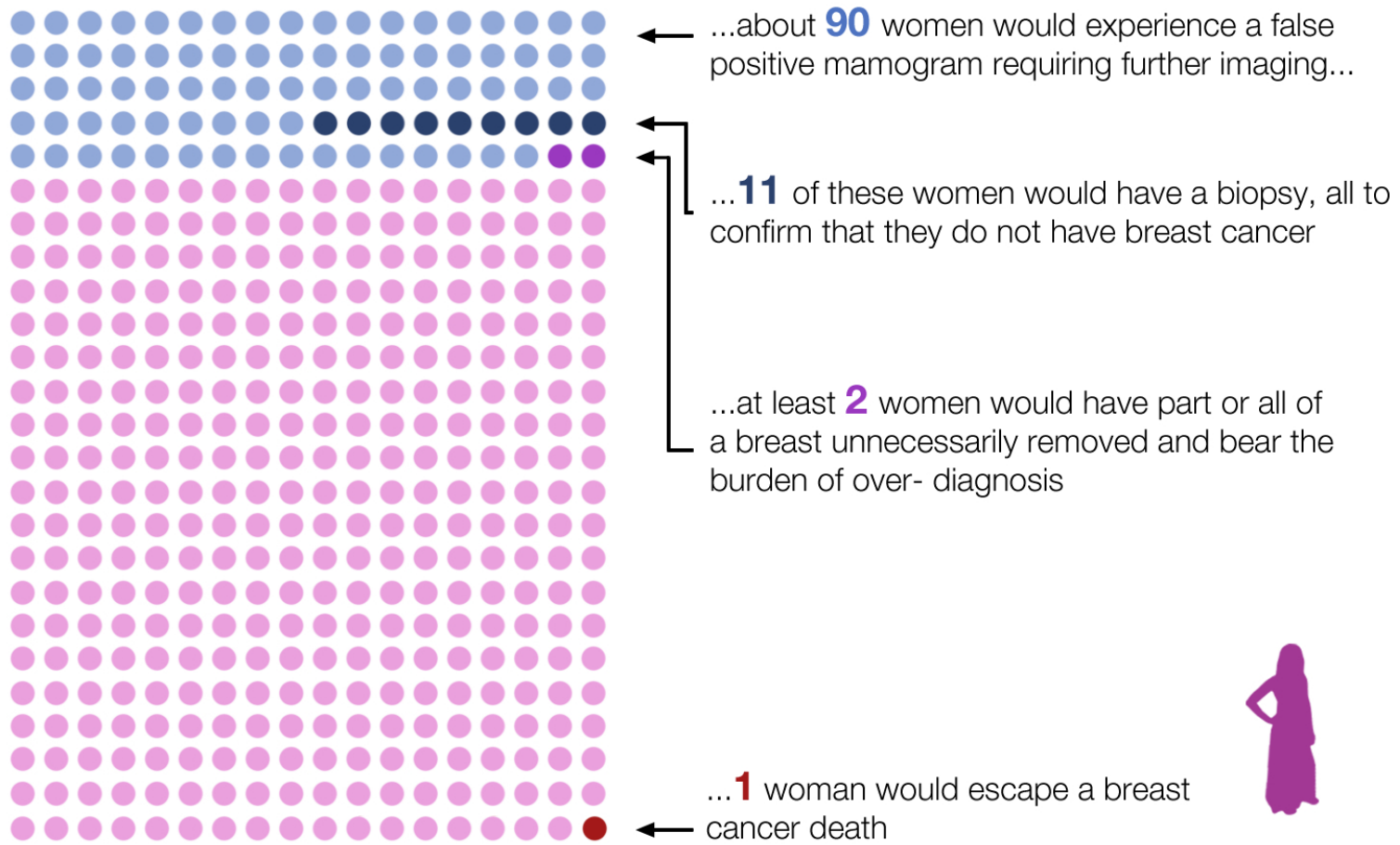**http://www.canadiantaskforce.ca**

Should I be screened with mammography for breast cancer?

Absolute Benefit of Screening with Mammography

If we wanted to describe the previous information in regards to the effect on an individual woman then we can look at what would occur in a base of 450 women instead of 100 000.

In the graphic below, each dot represents 1 woman (● = 1 woman)

If we screened **450** women, aged 70-74 years, at average risk of breast cancer every two years for 11 years...

← ...about **90** women would experience a false positive mamogram requiring further imaging...

...**11** of these women would have a biopsy, all to confirm that they do not have breast cancer

...at least **2** women would have part or all of a breast unnecessarily removed and bear the burden of over- diagnosis

...**1** woman would escape a breast cancer death ←

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