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4 tomorrow

The Tomorrow Project

October 2011





Canadian Cancer Statistics

- In Canada in 2010, it is estimated that:
 - 173,800 new cases of cancer were diagnosed
 - 76,200 people died from cancer
- Every hour of every day, ~20 people were diagnosed with cancer across Canada
- For certain cancers, incidence and mortality rates vary widely across the country

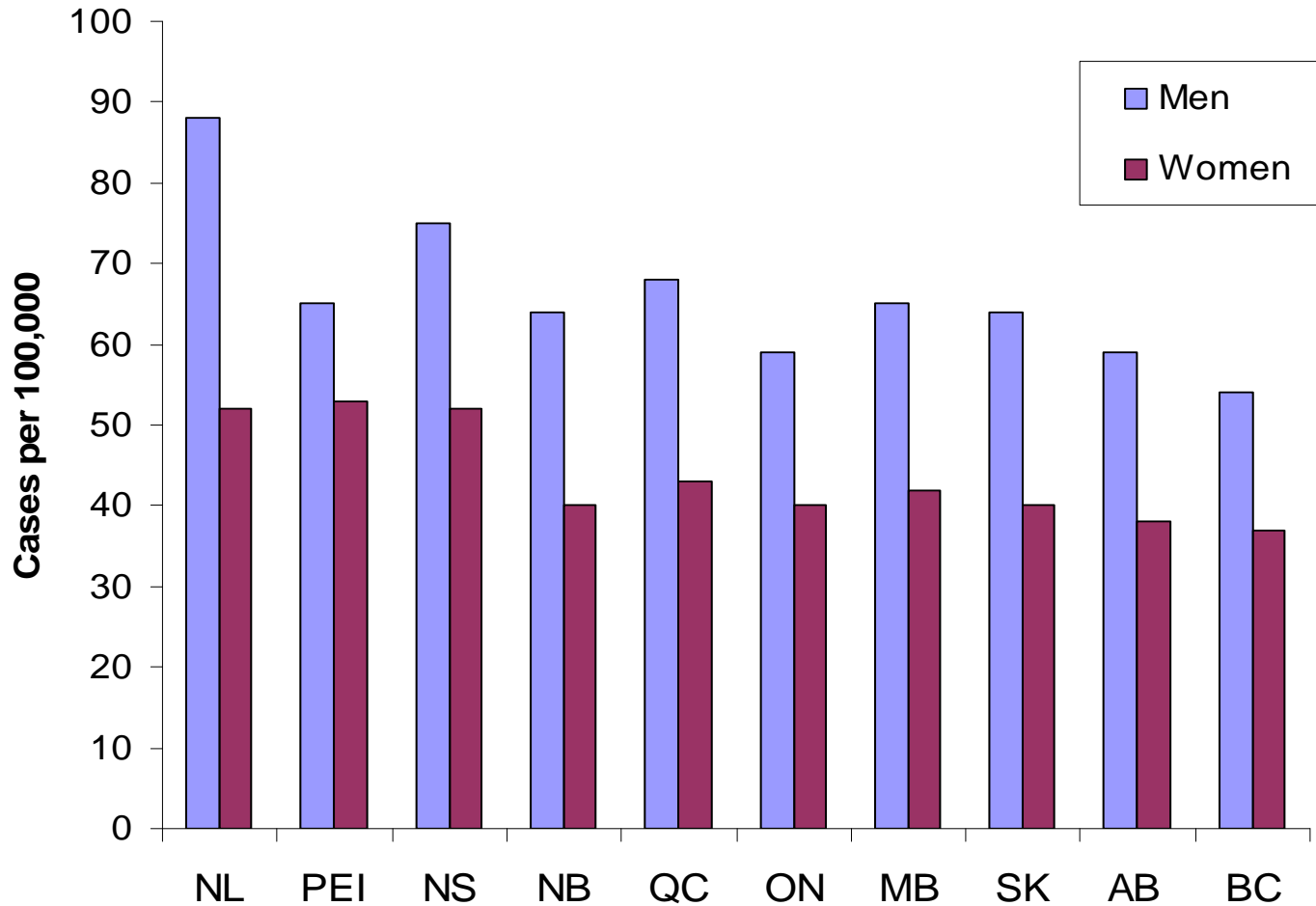
[Canadian Cancer Society's Steering Committee: **Canadian Cancer Statistics 2010**. Toronto: **Canadian Cancer Society**, 2010]



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Estimated age-standardized incidence rates – colorectal cancer; 2010



[Canadian Cancer Society's Steering Committee: **Canadian Cancer Statistics 2010**. Toronto: **Canadian Cancer Society, 2010**]



Alberta Cancer Statistics

- 1 in 2 Albertan men will develop cancer in their lifetime
- 1 in 3 Albertan women will develop cancer in their lifetime
- 1 in 4 Albertans will die from cancer

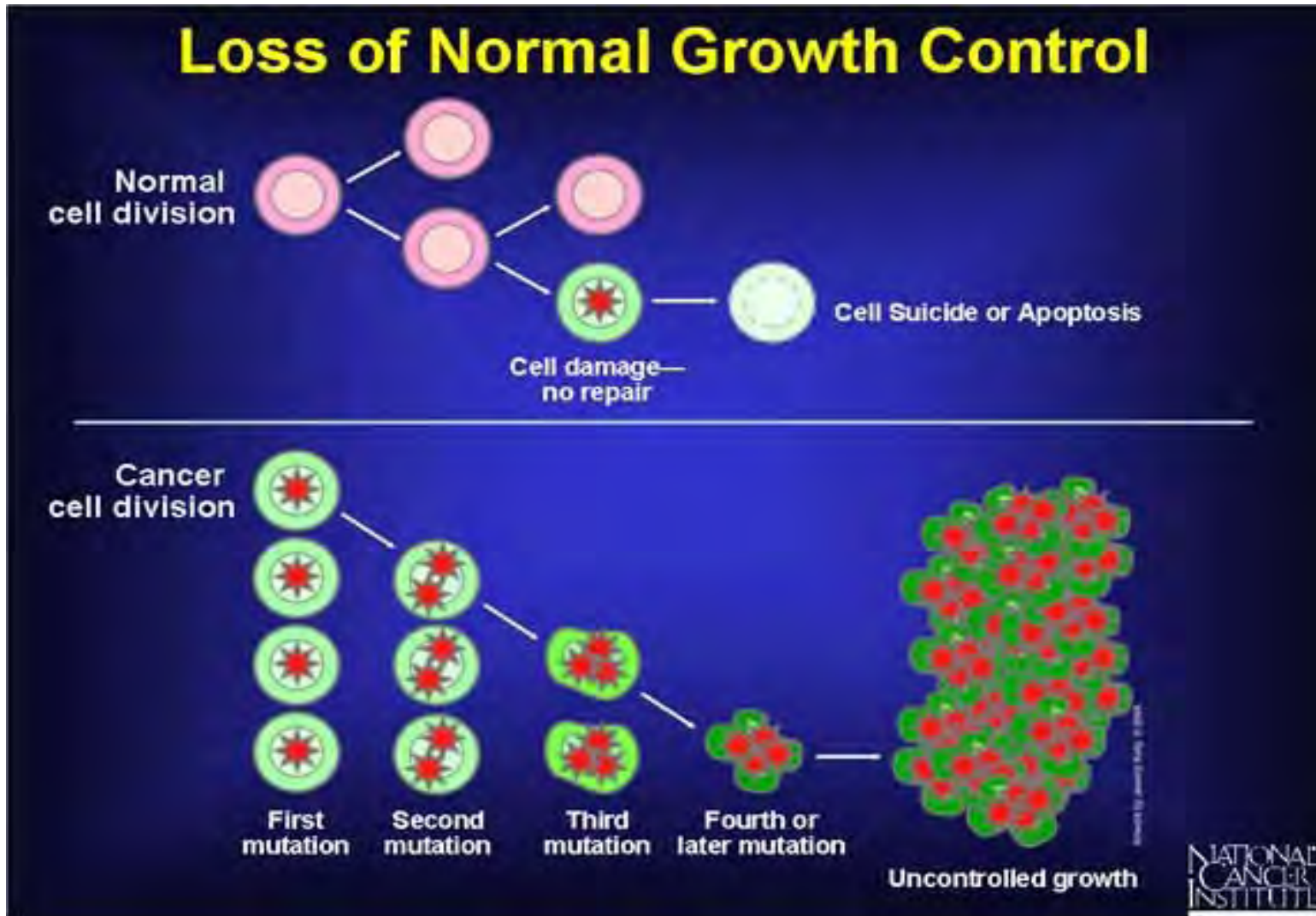
[Cancer Surveillance: 2008 Report on Cancer Statistics in Alberta. Edmonton: Surveillance and Health Status Assessment, Alberta Health Services, 2010].



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So, what is cancer?



Different Kinds of Cancer

Some common carcinomas:

Lung
Breast (women)

Colon
Bladder
Prostate (men)

Leukemias:

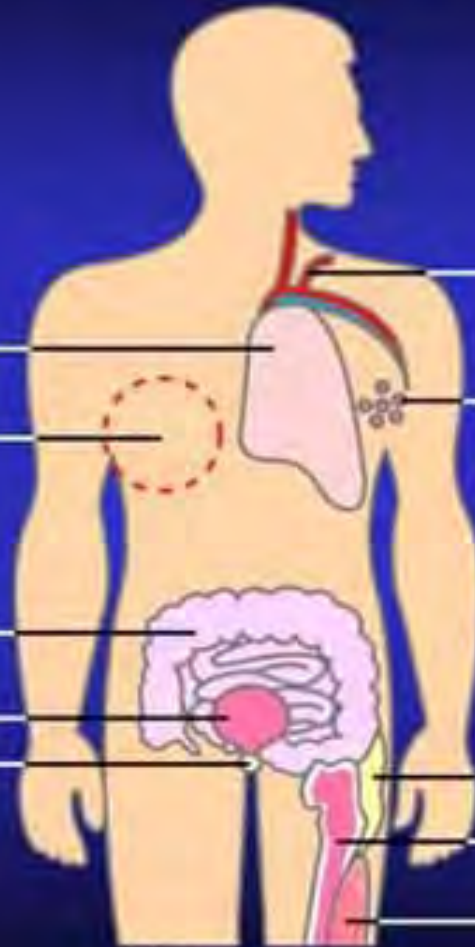
Bloodstream

Lymphomas:

Lymph nodes

Some common sarcomas:

Fat
Bone
Muscle





Cancer control in the 21st century

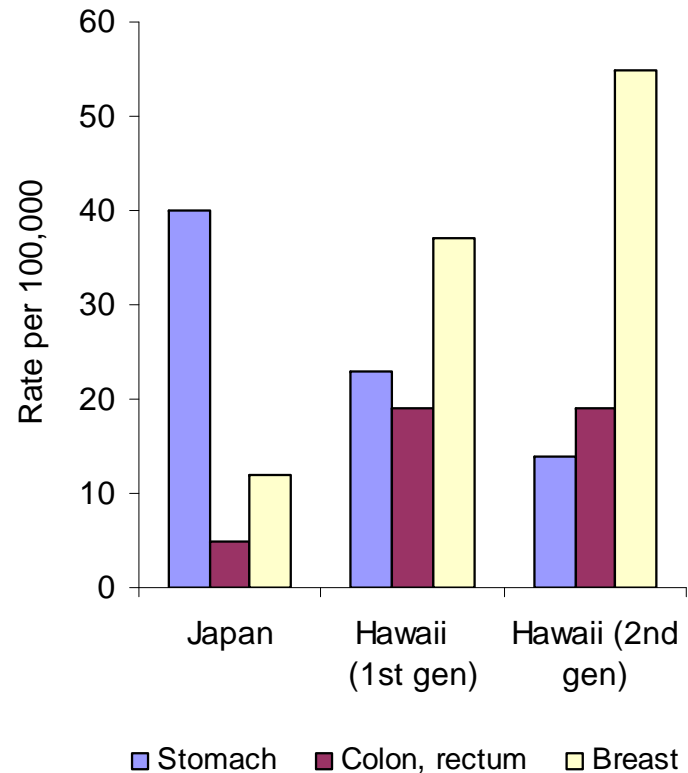
- Many advances made in early detection and treatment in last two decades
- Mortality rates are dropping
- Incidence rates for many cancers are stable
- BUT...growing and aging population means that **numbers** of people diagnosed with cancer will continue to increase
- 'Prevention' is becoming regarded as the most cost-effective and sustainable approach for cancer control





Cancer as a 'preventable' disease?

- 1965 - First reliable statistics on worldwide cancer incidence (UICC, International Union Against Cancer)
- 1970s & 80's - Incidence of most cancers varied between countries, and cancer incidence rates **changed** in migrants





21st century concepts about the causes of cancer

- Complex interactions between an individual's environment and their genetic make-up are likely to impact substantially risk of cancer
- Differences in certain genetic factors are likely to cause different responses to the same types of environment.





What do we mean by ‘environment’?

“ All that which is external to the human host. Can be divided into physical, biological, social, cultural etc., any or all of which can influence the health status of populations.”

JM Last. A Dictionary of Epidemiology. New York: Oxford University Press/International Epidemiological Association



Examples of 'environmental' exposures

- Diet (including foods, cooking methods, nutrients, non-nutrients, nutritional supplements, natural health products etc)
- Physical activity
- Inflammation
- Viral/bacterial infection
- Sun exposure
- Tobacco use or exposure to second hand smoke
- Alcohol use
- Use of exogenous hormones (e.g. HRT, oral contraceptives)
- Use of non steroidal anti-inflammatory drugs
- Arsenic in drinking water
- Radon gas
- Indoor and outdoor air pollution (e.g. use of wood burning stoves)
- Characteristics of the built environment
- Occupational exposures to chemicals/participation in shift work
- etc etc etc



Blow in her face and she'll follow you anywhere.

Hit her with tangy Tipalet Cherry. Or rich, grape-y Tipalet Burgundy. Or luscious Tipalet Blueberry. It's Wild! Tipalet. It's new. Different. Delicious in taste and in aroma. A puff in her direction and she'll follow you, anywhere. Oh yes... you get smoking satisfaction without inhaling smoke.

			
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Smokers of America, do yourself a flavor. Make your next cigarette a **Tipalet.**

New from Muriel. About 5 for 25¢.

Questions that we don't know how to answer

- How is it that some people can smoke all their lives and never get lung cancer, but other people who never smoke, get lung cancer?
- Why does drinking alcohol increase the risk of developing some types of cancer in women, and not others?
- Why does body fatness seem to protect against pre-menopausal breast cancer, but increase risk of post-menopausal breast cancer?
- Is it “true” that eating lots of charred meat and chips will give you cancer?
- and many more besides... ..





Cancer as a 'preventable' disease?

- To prevent cancer, we need to learn much more about what causes the disease in the first place.
- For the majority of sporadic cancers, the specific cause remains unknown or unclear.





Cancer is complicated

- Many cancers can take decades to develop
- Over 200 kinds of different cancers
- 1000s of potential alterations in DNA/genetic make up
- 100s of 1000s of combinations and permutations of environmental exposures over a lifetime





Where do we start...?

- “Disentangling the causal architecture of chronic diseases will be neither cheap nor easy... but it has the potential to return investment many fold with future improvements in promoting health and combating disease.”

Burton *et al*, *Int. J. Epidemiol.* 2009 38: 263-273



In other words...

- Why do some people develop cancer, while others do not?
- If we can figure this out, can we figure out ways to prevent more people from developing cancer?





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Goal – To enrol **50,000** cancer free Albertans into a **50 year** study to learn more about the causes of cancer (and other long-term health conditions).

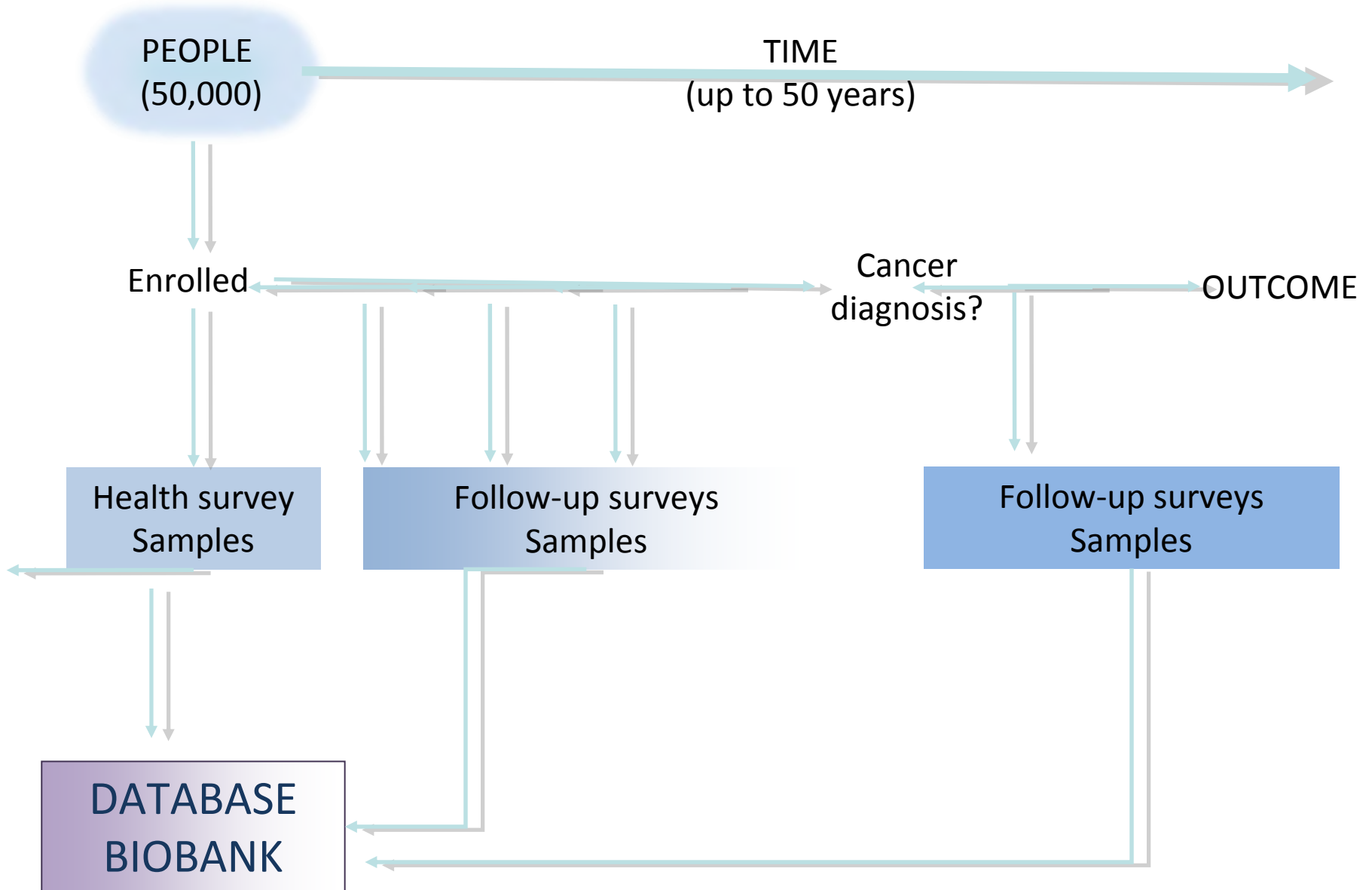
The Tomorrow Project

- Largest research project of its kind ever undertaken in Alberta
- Enrolling 50,000 people aged 35-69y
- No previous history of cancer
- Willing to stay with the Project for up to 50 years



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The Tomorrow Project



The Tomorrow Project

- Over time, some people in the Tomorrow Project will develop cancer – others will not
- What can we learn about the causes of cancer?



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Joining the Tomorrow Project

Come to a study centre

Register
Complete health survey

Visit a study centre

Sign consent form
Measurements
Blood (or saliva)
Urine

OR

Join 'by mail'

Register
Complete health survey

Mail back survey & consent

**Receive saliva collection kit
by mail**

Complete kit & mail it back

Study centre visit

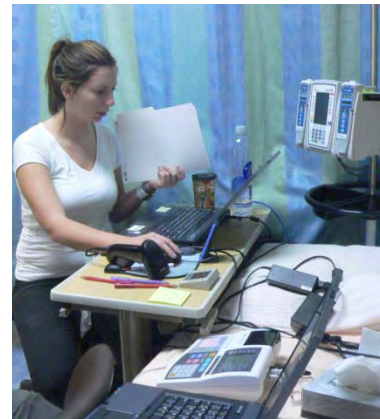
- **Stationary** – Edmonton and Calgary
- **Temporary** – kit in a van, can set up anywhere with sufficient space, electricity and a washroom
 - Temporary centres can do everything that is done in the stationary centres
 - 2 hours to set up
 - 2 hours to take down



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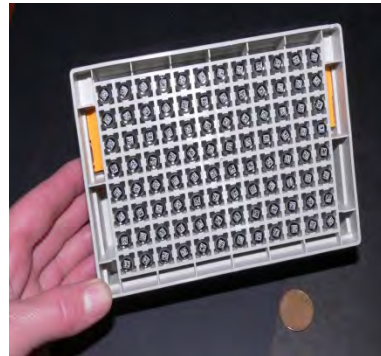
Study Centre Measurements

- Height (sitting and standing)
- Weight
- Waist and hip circumferences
- Body composition - bioelectrical impedance
- Blood pressure
- Resting heart rate
- Grip strength



Study Centre Samples

- Blood (50ml = 2-3 tablespoons)
- If no blood – saliva for extraction of DNA
- Urine



Why do we collect blood (or saliva) and urine at our study centres?

- DNA - genetic variation
- nutritional status (e.g. vitamin D, iron, folic acid etc)
- hormonal status
- markers of immune status
- markers of inflammation
- exposure to environmental pollutants
- exposure to pharmaceuticals (e.g. aspirin)
- early detection markers for specific cancers



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Mobile study centre set up





Tomorrow Project on the road



Survey questions

Personal and family health history

Use of medications

Tobacco use

Exposure to second hand smoke

Alcohol use

Place of birth

Length of residence in Canada

Current address

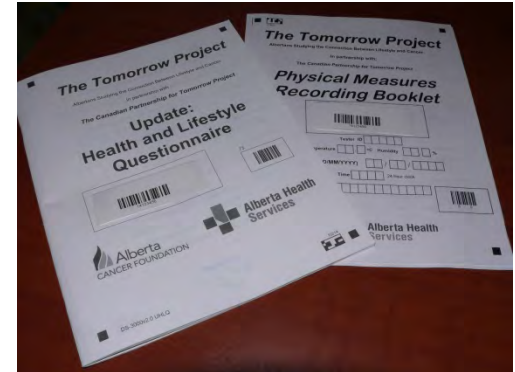
Work history (including participation in shift work)

Reproductive history

Use of cancer screening tests

Physical activity

Demographics (income, education, age etc)



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Putting it all together in the future...

- △ Piecing together data from:
 - △ participants
 - △ samples
 - △ 'external' databases

- △ What can we find that differentiates those who develop cancer from those who don't?



Ultimate goal

To learn more about what causes cancer in our population, so that someday, we can reduce the burden of disease on individuals, families and society.



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Where are we now?

- 14,500 Albertans have joined (60% women)
- Need total of 50,000 Albertans aged 35-69 by mid 2013
- Seeking volunteers to become participants – communities, workplaces, philanthropic societies etc



Thanks to...

- Our participants
- Our funders and supporters:
 - Alberta Cancer Foundation
 - Alberta Health Services
 - Alberta Innovates – Health Solutions
 - Canadian Partnership Against Cancer
- Our partners across Canada
 - BC Generations Project
 - Atlantic PATH
 - Ontario Health Study
 - Cartagene (Quebec)



For more information...

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Examples of research questions for the future

- How do differences in genetic make up influence chance of developing breast cancer?
- Does taking vitamin D supplements help reduce risk of prostate and pancreatic cancers?
- Is taking a folic acid supplement a good way to prevent colorectal cancer?
- How does participating in shift work affect risk of developing breast or prostate cancer?

