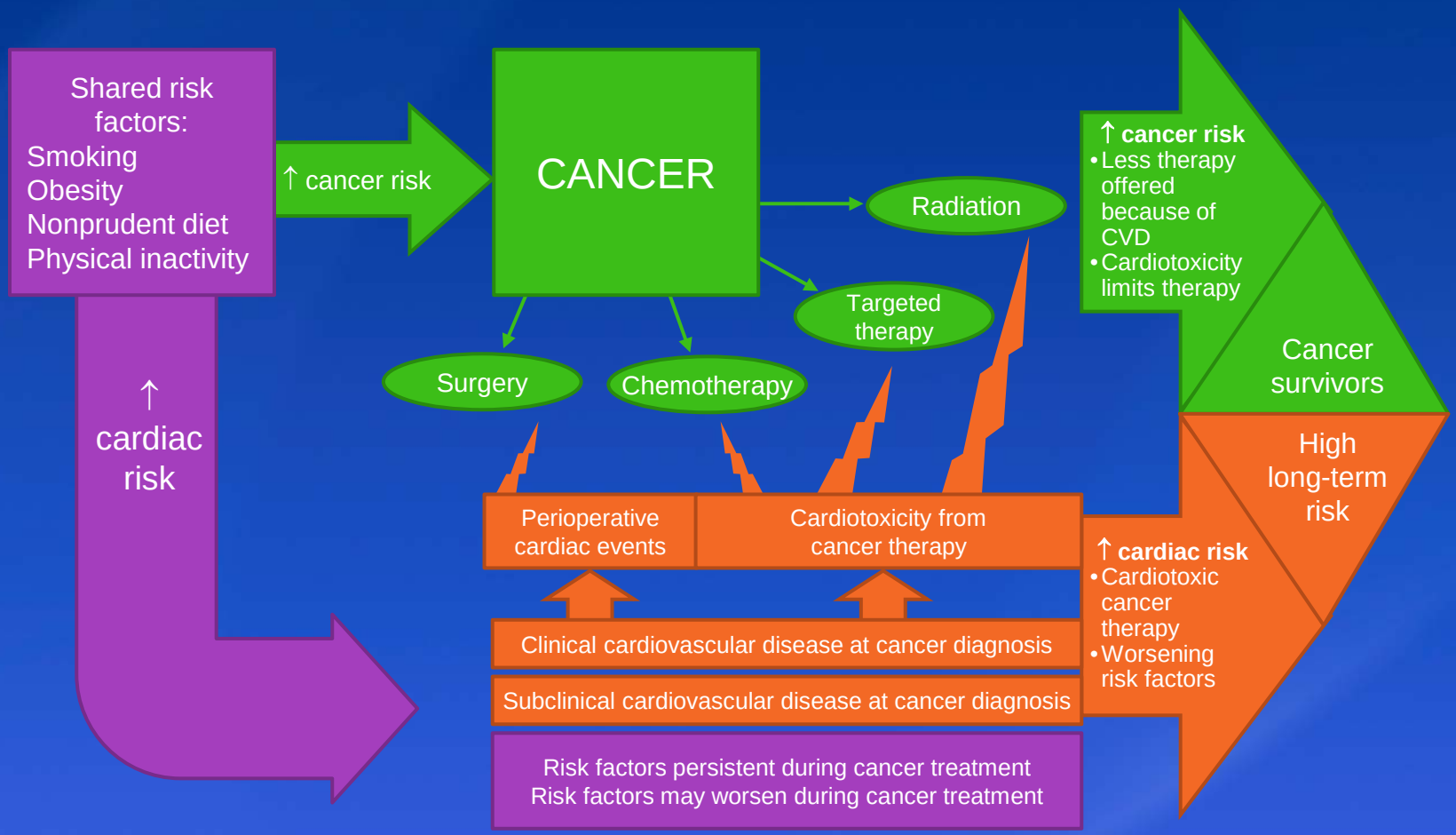
Interaction Between Shared Risk Factors, Cardiac Disease, and Cancer



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Shared Lifestyle Risk Factors for Cancer and Cardiovascular Disease

- Smoking is a well-known shared risk factor for cancer and cardiovascular disease
- Cancer and heart disease account for most of the 2- to 3-fold increased risk of death in smokers compared with nonsmokers
- Worldwide, smoking causes approximately one-third of first myocardial infarctions

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Obesity

- As of 2013, 1/3rd of the world's adults were obese
- 12% of children worldwide were obese,
- Obesity rates have increased in every country, and in 7 countries half of all women are obese
- In Canada, 1 in 5 adults and 1 in 8 children are obese
- and it is projected that by 2031, one-third of the Canadian population will be obese

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Obesity

- Obesity increases the risk of cancer at 9 different sites in men and 11 different sites in women
- Each 1 kg/m^2 of excess weight increases the risk of cancer by 21%
- Weight change as an adult has been linked to cancer risk
- Each 5 kg of weight gained during adulthood increases breast cancer risk by 5%,
- Dramatic weight loss from gastric bypass surgery reduces cancer mortality by as much as 60%

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Sedentary Behavior

- Meta-analysis suggests a dose-response relationship for the protective effects of exercise on reducing coronary mortality
- Compared with being sedentary, 150 minutes of weekly moderate activity reduces mortality by 14%, 300 minutes of weekly activity reduces mortality by 20%
- Women benefit more than men from regular physical activity

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Sedentary Behavior

- A dose-response relationship between increased exercise and reduced incidence of breast and endometrial cancer
- Eg: sedentary woman who adopts recommended 150 mins of weekly activity could reduce breast cancer risk by 6%
- In addition to reducing cancer incidence, exercise reduces cancer mortality, with a 1% reduction in cancer death for each 15-minute increment of daily physical activity
- Compared with being sedentary, small amounts of moderate exercise or longer-duration low intensity exercise, such as walking several hours per week, can reduce mortality from cancer

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Prevalence of Risk Factors and Cardiovascular Disease Among Patients With Cancers

- Given the shared risk factors for cancer and cardiac disease, it is not surprising that the prevalence of cardiovascular disease and many cardiovascular risk factors are higher in cancer populations compared with controls
- In a study of >1500 survivors of breast, prostate, colorectal, and gynecologic cancers, risk factors

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Protective Effects of Exercise on Cancer Incidence: Metaanalyses of Cohort Studies

Cancer site	Cancer cases	RR (95% CI)	Author	Year
Prostate	88,294	0.9 (0.84-0.95)	Liu	2011
Breast	63,786	0.88 (0.85-0.91)	Wu	2012
Bladder	27,784	0.85 (0.74-0.98)	Kiemling	2014
Esophagus	15,745	0.79 (0.66-0.94)	Behrens	2014
Kidney	10,756	0.88 (0.79-0.97)	Behrens	2013
Endometrium	NA	0.82 (0.75-0.9)	Keum	2014

Meta-analyses of cohort studies suggest that individuals who exercise have modest reductions in the incidence of several common cancers

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The flip side

- Cardiovascular disease and risk factors are important predictors of cardiotoxicity associated with cancer therapy
- Coronary artery disease (CAD), hypertension, and diabetes are among the strongest predictors of left ventricular dysfunction among patients receiving anthracycline chemotherapy, whereas CAD, hypertension, and obesity increase the risk of left ventricular dysfunction among patients with breast cancer receiving trastuzumab
- Pre-existing hypertension is the single strongest predictor of severe hypertension requiring interruption of cancer therapy in patents receiving antiangiogenic targeted agents for a variety of malignancies
- CAD increases the risk of coronary artery vasospasm in patients receiving 5-fluorouracil or capecitabine for gastrointestinal cancers

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Predicting Cardiotoxicity From Cancer Therapy

- Accurate identification of patients at low risk for cardiac complications may reduce unnecessary cardiac monitoring in this population, improving quality of life for patients and allowing health care resources to be redirected to higher risk individuals

- Mathematical model identified several risk factors for cardiac toxicity:
- Age >50 years, initial weight >70 kg, Hypertension, Diabetes
- Cumulative anthracycline exposure >100 mg/m^2,
- Eastern Cooperative Oncology Group performance status score ≥1, and number of cycles of current therapy

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