

## REHABILITATION OF THE CANCER SURVIVOR AND SPECIAL POPULATIONS

"One death is a tragedy. A million deaths is a statistic."  
-Josef Stalin



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## Population Statistics

Currently, 1 in 4 deaths is attributed to cancer.

It has surpassed heart disease as the

# 1 killer in North America

(cancer = 27.2% of deaths, Heart disease = 26.4% [2004])

47% of people diagnosed with cancer (all causes) will die from it

In 2005, 149,000 diagnoses will be made in Canada, and 69,500 people will die from cancer

The highest survival rates are for prostate and breast cancer

The WHO estimated that in 2002, 10 million new cancer cases were diagnosed world wide, with 62% of diagnoses resulting in death.

Estimated New Cases and Deaths for Cancer Sites by Sex, Canada, 2005 Canadian Cancer Statistics 2005, National Cancer Institute of Canada

	New Cases 2005 Estimates			Deaths 2005 Estimates			Deaths/Case Ratio 2005 Estimates		
	Total	M	F	Total	M	F	Total	M	F
All Cancers	149,000	76,200	72,800	69,600	36,700	32,900	0.47	0.48	0.45
Lung	22,200	12,000	10,200	19,000	10,700	8,300	0.86	0.89	0.82
Breast	21,900	130	21,800	5,300	45	5,300	0.24	0.30	0.24
Prostate	20,900	20,900	-	4,300	4,300	-	0.21	0.21	-
Colorectal	19,800	10,000	9,800	8,400	4,500	3,900	0.43	0.42	0.43
Non-Hodgkin's Lymphoma	6,400	3,400	3,000	3,000	1,600	1,500	0.46	0.47	0.46
Bladder	5,900	3,700	2,200	1,650	1,150	500	0.34	0.32	0.40
Kidney	4,500	2,800	1,650	1,500	950	570	0.34	0.34	0.34
Melanoma	4,400	2,300	2,000	880	540	340	0.20	0.23	0.17
Leukemia	4,000	2,300	1,700	2,200	1,300	940	0.56	0.59	0.56
Body of Uterus	3,900	-	3,900	710	-	710	0.18	-	0.18
Pancreas	3,400	1,650	1,750	3,300	1,600	1,750	0.96	0.98	0.96
Ovary	3,200	2,100	1,050	1,050	710	350	0.33	0.34	0.33
Thyroid	3,100	710	2,400	470	95	400	0.05	0.09	0.04
Stomach	2,800	1,800	1,000	1,900	1,150	730	0.68	0.65	0.72
Brain	2,500	1,350	1,150	1,650	940	720	0.67	0.69	0.65
Ovary	2,400	-	2,400	1,550	-	1,550	0.66	-	0.66
Multiple Myeloma	1,850	1,000	850	1,250	680	590	0.68	0.67	0.69
Esophagus	1,450	1,050	400	1,000	1,200	420	1.13 <sup>1</sup>	1.16 <sup>1</sup>	1.05 <sup>1</sup>
Cervix	1,350	-	1,350	400	-	400	0.30	-	0.30
Larynx	1,150	800	210	510	420	95	0.43	0.44	0.41
Testis	850	850	-	30	30	-	0.04	0.04	-
Hodgkin's Disease	850	400	390	120	70	55	0.14	0.15	0.14
All Other Sites	12,000	6,400	5,600	6,900	4,800	4,100	0.75	0.75	0.74

## POPULATION TRENDS

**Breast Cancer: Survival rates increasing (11 008 diagnoses in 1992, 82% five year survival; 21 600 diagnoses in 2005, 86% survival rate) 1 in 9 women expected to develop breast cancer**



**Prostate cancer survival rates increasing (11 289 diagnosed in 1992, 88% survival; 20 500 diagnoses in 2005, 91% survival)**

**Colorectal survival rates have not changes, but incidence is decreasing**

**Lung cancer survival rates are the same, but incidence among young people is rising!**

Estimated Population, New Cases and Deaths for All Cancers by Sex and Geographic Region, Canada, 2005

	Population (000s) 2005 Estimates <sup>1</sup>			New Cases 2005 Estimates <sup>2</sup>			Deaths 2005 Estimates		
	Total	M	F	Total	M	F	Total	M	F
Canada	31,949	15,806	16,144	149,000	76,200	72,800	69,500	36,700	32,800
Newfoundland and Labrador	519	256	263	2,200	1,200	990	1,300	750	560
Prince Edward Island	140	68	72	770	420	350	340	190	150
Nova Scotia	943	461	482	5,200	2,700	2,500	2,500	1,300	1,200
New Brunswick	760	376	384	3,900	2,100	1,850	1,800	1,000	830
Quebec	7,475	3,687	3,789	37,400	18,800	18,700	18,800	10,000	8,700
Ontario	12,457	6,149	6,308	56,200	28,500	27,700	25,600	13,300	12,300
Manitoba	1,161	575	586	5,800	2,900	2,900	2,600	1,350	1,250
Saskatchewan	989	489	500	4,800	2,600	2,200	2,300	1,250	1,050
British Columbia	4,172	2,064	2,108	19,300	10,200	9,100	8,700	4,800	4,100
Yukon	27	14	14	90	45	45	50	30	20
Northwest Territories	40	21	20	90	45	45	50	25	20
Nunavut	31	16	15	65	30	35	45	20	20

<sup>1</sup> 2005 population projections were provided by the Census and Demographic Branch, Statistics Canada.  
<sup>2</sup> Figures exclude non-melanoma skin cancer (basal and squamous).  
Note: Total of rounded numbers may not equal rounded total number. Please refer to Appendix II: Methods.  
Source: Surveillance and Risk Assessment Division, CCDC, Public Health Agency of Canada

## EARLY vs. LATE DETECTION

Both prostate and breast cancer have much higher survival rates if treated early than if treated late.

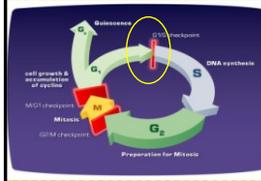
Many types of cancers are asymptomatic, and only present symptoms when they have reached advanced stages, like lung cancer. Survival rates are much lower in these types of cancers.

## CANCER CAUSES



- \* Cancer can be caused by many factors, all playing a role either individually or combined.
- \* Common causes are: internal hormonal environment, external environmental factors (pollution, UV exposure, etc.) smoking, genetics, age, diet, lifestyle, physical activity, other diseases, radiation, viruses, bacteria, .....
- \* *You can reduce your risk of getting cancer, but you can never remove your risk of getting cancer*

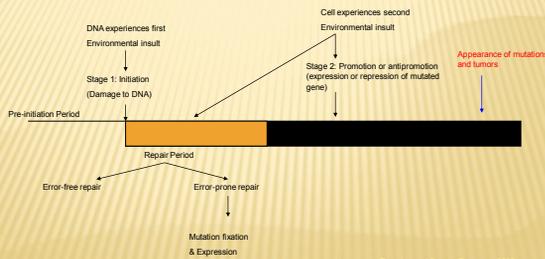
## LIFE CYCLE OF CANCER



Loss of regulation between G1 & S phases leads to uncontrolled cell division of cancerous cells

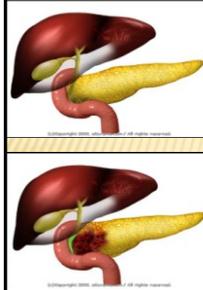
- \* exposure to some variable that mutates the DNA of a cell, causing it to lose ability to repair itself, or to regulate cell division ie. Cell can grow and reproduce without control.
- \* Division of newly damaged cell, causing a growth of tumor tissue that the bodies immune system does not, for whatever reason, destroy.

## Multiple-Hit Theory



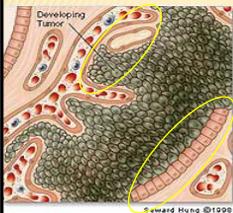
Exercise and Cancer Recovery, 2003

## LIFE CYCLE OF CANCER (CONTINUED)



- \* Normal cell growth stops when tissues grow into other tissues... **NOT WITH CANCER CELLS!!**
- \* Cancer cells continue to grow, even after hitting other tissues, essentially creating a "crowding" situation
- \* Tissues being pushed against are exposed to forces they're not used to, can herniate or stop functioning all together.
- \* major problem with "benign tumors"

## LIFE CYCLE (CONTINUED)



- \* With continued growth it gets so large that it has difficulty containing itself, begins to fragment cells, which migrate via either circulatory or lymphatic system to other parts of body
- \* These fragments eventually lodge themselves in distant tissues from original tumor, continue in their uncontrolled division, creating new growths
- \* "Metastatic."

## LIFE CYCLE (CONTINUED)

- \* These new tumors set up in new tissues, continue to divide, and create more crowding on organs.
- \* Leads to organ failure, internal hemorrhaging, and infection.
- \* Determined by blood supply into the tumor (angioplasia), the proximity of the tumor to circulation (blood & lymph vessels), and the level of division of the tumor (higher levels have a more unstable structure, and thus slough off the original tumor much easier)



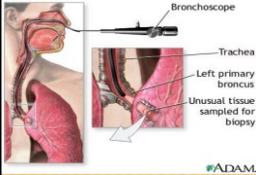
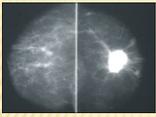
Healthy Lung Photo



Lung Cancer Photo

## Detection Procedures

Breast cancer – annual mammography, biopsy, monthly self checks



Prostate – Digital rectal exam, biopsy, blood PSA concentration (my thesis)

Others: MRI, X-Ray, physical examination, blood antigen concentrations, etc.

## X-RAYS



## nMRI Imaging



## BENIGN VS. METASTATIC

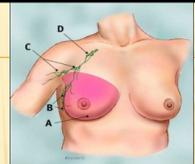
- ✘ Benign tumors are ones that do not spread, they just grow as a single mass. The major risk with these types is compression on other organs, nerves or blood vessels, and the future chance of becoming metastatic.
- ✘ Metastatic tumors grow uncontrollably, and divide, sending tumor cells throughout the body, where they can begin growing completely new tumors. This is the stage of cancer that is deadly (*terminal*)

## BREAST CANCER



### BREAST CANCER

- ✘ The only type of cancer where weight gain (specifically fat gain) occurs - -> many theories as to why this is, but no clear reason.
- ✘ Surgical options include the mastectomy (complete removal of a breast) or a lumpectomy (removal of a smaller portion of breast tissue). Each option can have drastic effects on the persons' body image

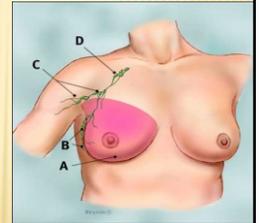


## BREAST CANCER (CONTINUED)

- ✦ Typically occurs in women near menopause, but has a common range of occurrence between **35-65 years old**.
- ✦ Thought to be attributed to many factors, like lifetime estrogen exposure (age of menarche), body composition, genetic affiliation, breast tissue density, late-life pregnancies and diet.
- ✦ Lifetime physical activity has been considered, but not clinically proven to have a major impact....yet

## BREAST CANCER (CONTINUED)

- ✦ Many surgical treatments involve removal of breast tissue and nearby lymph nodes.
- ✦ This can cause improper lymphatic drainage from the limb being considered, resulting in *lymphatic edema*



## BREAST CANCER



**This causes some difficulties with exercise, let alone daily activities of living. In most instances, the person's arm will be wrapped in a tensor bandage, or a compression machine will be used to encourage drainage of the lymphatic fluid.**



Figure 10.1 Group Exercise

## BREAST CANCER (CONTINUED)

- ✦ In most cases, post-surgical care includes physiotherapy to reinstate shoulder mobility - - symptoms very similar to frozen shoulder
- ✦ Typical chemotherapy & radiation therapies can ablate estrogen production, significantly altering other circulating hormones
- ✦ Weight gain - specifically body fat gain- is believed to be due to the alteration in sex hormones as a result of treatments - - weight gain is not seen in situations of *non-treatment*.

## BREAST CANCER (CONT)

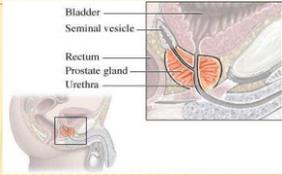
- ✦ The vast majority of people who develop breast cancer will *survive* (75.6%).
- ✦ Major effects attributed to breast cancer and not to treatment include altered sense of body image, psychological manifestations (body is not theirs anymore), reduced feelings of sexual attractiveness, decreased feelings of self worth.
  - Exercise has been shown to improve every one of these symptoms in the entire population, not restricted to cancer survivors

Prostate Cancer



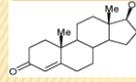
## PROSTATE CANCER

- ✗ This type of cancer is one of the easiest to catch early, treat, and cure, but can cause large detriments to quality of life in the patient.
- ✗ The prostate is responsible for controlling urine flow, ejaculatory function, and hormonal secretion control from the testes.



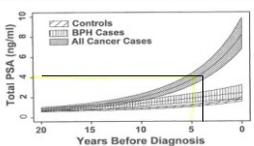
**Accounts for 26.9% of ALL cancer diagnoses**

## PROSTATE CANCER (CONT)



- ✗ Total lifetime exposure as well as increased serum testosterone, have both been cited as *potential causes of prostate cancer*
- ✗ People who train to increase their testosterone levels (ex. Body builders), or who take steroids, have been shown to have a greater incidence of prostate cancer (Friedenreich, et al)

## PROSTATE CANCER (CONT)



**FIGURE 1.** Average PSA levels and 95% confidence intervals for controls without prostate cancer ( $n = 254$ ) or with benign prostatic hyperplasia (BPH;  $n = 38$ ) and for cancer patients ( $n = 52$ ) as a function of years before diagnosis or exclusion of prostate disease. Reprinted, with permission from Carter HB, and Pearson JD. PSA and the natural course of prostate cancer, in Schroder FH (Ed): Recent Advances in Prostate Cancer and BPH. New York, Parthenon Publishing Group, 1997, pp 187-193.

- ✗ (PSA), amount of which is related to total number of prostate cells.
- ✗ This concentration has been shown to increase in prostate cancer, a situation where there is an increased number of prostate cells (normal or abnormal)

## PROSTATE CANCER (CONT)

- ✗ There are many forms of preventative treatment for prostate cancer. **This is the only type of cancer where prudent prevention measures are considered**, due to the timeline of the disease.
- ✗ Treatments include chemical/surgical castration (testosterone ablation) – these have been shown to stall increase in PSA & prostate size, **but it eventually increases again**
- ✗ Watchful waiting is another “treatment” option

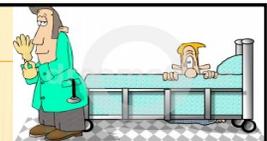
## PROSTATE CANCER



- ✗ Exercise has yet to be researched conclusively as a treatment modality for prostate cancer prevention.
- ✗ A major area is in modalities of exercise that would cause either a reduction in the amount of testosterone, or prevent any further increase (ie. Endurance/cardio exercise)

## PROSTATE CANCER

**1 in 7 men will develop prostate cancer.**



- ✗ Typically occurs in men between 50-75 years old.
- ✗ Side effects of the disease can be urinary incontinence, lack of erectile function, and pressure sensitivity (bike seats, hard surfaces, etc)
- ✗ Typically it may take ~ 15 years to go from elevated PSA levels to being diagnosed through digital rectal exam or tissue biopsy

## PROSTATE CANCER



- ✘ Treatments usually include brachytherapy (insertion of permanent radioactive “seeds” into the prostate itself), chemotherapy, and radiation therapy.
- ✘ These treatments are most successful in early detection cases

## Colorectal Cancer



## COLORECTAL CANCER



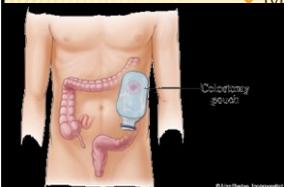
- ✘ Direct link to the type of diet the person consumes.
- ✘ People who eat diets high in saturated fats, red meat and excessively processed foods; and low in vegetables, grains, fiber, and tomatoes are at an increased risk of colorectal cancer.



## COLORECTAL CANCER (CONT)

- ✘ Early warning signs are very subtle & easily missed.
- ✘ Many people seek treatment when they see blood in their feces, or when they have trouble with a bowel movement. By this time, the cancer is already beyond the early stages.
- ✘ Colorectal cancer can take up to 10 years to go from a benign cyst to an actual tumor capable of metastasis.
- ✘ Stages of growth characterized based on how many layers of intestine cancer has penetrated

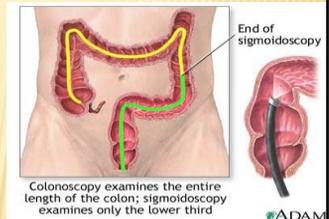
## COLORECTAL CANCER (CONT)



- ✘ Typical surgical treatment could involve removal of only the affected section, then rejoining the two ends of the colon (anastomosis), or removal of the colon altogether (colonectomy). Follow-up treatment involves chemotherapy, but no radiation therapy.
- ✘ 19,600 people will be diagnosed, and 8,400 will die

## COLORECTAL CANCER (CONT)

- ✘ This type of cancer does not usually occur in people younger than 50, and as mentioned before, can be caught with regular checkups and testing (colonoscopy/ sigmoidoscopy, fecal blood occult tests, etc)



## ADDITIONAL NOTES

- ✦ Leukemia – blood & bone cancer that spreads VERY quickly, and may require multiple bone marrow transplants and blood transfusions
- ✦ Childhood cancers can have long-lasting effects in adult life. They vary person to person, and can manifest in many different ways
- ✦ Many types of cancer require blood transfusions to stave off chemotherapy-induced anemia

## CHEMOTHERAPY



## CHEMOTHERAPY

- ✦ *“Treatment of cancer or other malignant diseases by the use of specific drugs that selectively destroy rapidly growing cells. Extremely high doses of these drugs are sometimes needed to kill tumor cells in advanced cases of some malignancies. These high doses will also kill the body’s stem cells in the bone marrow and peripheral blood stream.”*

-ViaCell Technologies

## CHEMOTHERAPY (CONT)

- ✦ Essentially, chemotherapy is a poison, used to interrupt the cell cycle of cancerous cells, leading to cellular death
- ✦ Chemo does not know what is cancer & what is a normal cell, which produces the systemic side effects of treatment.



## CHEMOTHERAPY (CONT)

- ✦ Chemo works on principle that normal cells still possess ability to repair themselves & regenerate, whereas cancerous cells, by nature, do not, and will eventually die without having divided.
- ✦ Normal cells, while damaged, will have the ability to regenerate as normal, and be able to produce new functional cells again.
- ✦ Chemo given in cycles, allowing body time to regenerate new cells before the next cycle is given
- ✦ Areas of the body with a high rate of cellular turnover (ie. Mouth, digestive tract, etc.) have highest rate of side effects due to chemo’s action on cellular division

## CHEMOTHERAPY, SIDE EFFECTS



- ✦ Depending on the type of cancer, type of medication, and the individual themselves, the side effects of chemo can be mild to very severe, even life threatening
- ✦ The most common are fatigue (the body is repairing itself, expending a lot of energy), hair loss, swollen joints, and reduced immune function (easily get colds and other contagious diseases)

## CHEMO, SIDE EFFECTS (CONT)

- ✗ Fatigue (carries for up to 6-12 months after treatment)
- ✗ Nausea, feelings of being sick
- ✗ Hair loss
- ✗ Inflammation of mucosal areas (mouth, nose, genitals, etc.)
- ✗ Effects on the heart (altered heart rate, blood pressure, SA rhythm)
- ✗ Skin disturbances (rashes, bruising, itchiness (extreme), sensitivity to light, sore)
- ✗ Loss of fertility (males and females)
- ✗ Allergic reactions
- ✗ Diarrhea, loss of appetite
- ✗ Development of chemotherapy-related tumors
- ✗ Massive, fast weight loss (up to/more than 30 lbs in one week!!!)
- ✗ Numbness or tingling in extremities
- ✗ Psychological damage (depression, hopelessness, social awkwardness, etc.)
- ✗ Increased sensitivity to smell

✗ **NOTE: NOT EVERYONE WILL GET ALL THESE SIDE EFFECTS, BUT THEY MUST BE CONSIDERED WITH ANY CANER PATIENT**

## FATIGUE

- ✗ Considered by many to be the worst side effect of chemotherapy
- ✗ 72-95% of patients experience fatigue  
- NCI, 2002
- ✗ Many become incapacitated following treatment, and many require sick leave from work
- ✗ Going to the gym does **NOT** sound like an option to many people on chemo



*"Before my cancer, I was always full of energy, working full-time, coming home to family activities, playing tennis, and enjoying an active social life. Now, I have to conserve my energy and plan my schedule around my chemotherapy. Many days I am so tired, it's an effort to just get out of bed."*

## Healthy People

Tired

Exercise

Vitalized

## Cancer Patients

Fatigued

Exercise

Vitalized

## FATIGUE (CONT)



- ✗ Many people become "sick and tired of being sick and tired", and desperately want to get back to normal
- ✗ Adding low intensity exercise can help to improve their tolerance of treatment, improve their immune function, and make them "feel human again"

## IMMUNOSUPPRESSION

- ✗ While receiving treatment, most patients experience a marked decline in immune function, leading to easy susceptibility to colds, flu's, and other illnesses and infections
- ✗ **"It's bad enough having to fight cancer but also having a cold all the time makes life even more difficult"** - Rocky Mountain Cancer Rehabilitation Institute Patient

## CHEMOTHERAPY (CONT)

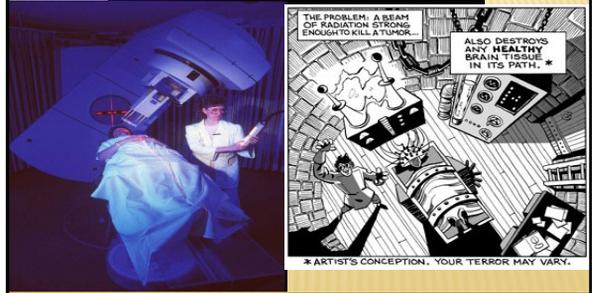


- ✗ Many chemos are considered "cardiotoxic". It can have the same effect on cardiac muscle and nerve conduction as doing **maximal eccentric** resistance training for 6 months straight.
- ✗ Patients can exhibit excessively high resting heart rate (as high as 140bpm resting observed), high or low resting blood pressures (200/110; 80/58), altered heart rhythm ("I hear a lub, but not a dup" - Dr. Nick Riviera)

## RATING OF PERCEIVED EXERTION

- ✘ May not be the best measure of how hard the person is working, but with their altered responses, its all that can work.
- ✘ Some safety zones should be established for the individual (ie. Maximal heart rates allowed prior to exercise, maximal blood pressures allowed, etc.)
- ✘ Also, **TALK WITH THE CLIENT!!** Find out how they are feeling, what they are experiencing, if it feels too hard or not hard enough, whether it hurts or not – be a “personable” trainer

## RADIATION THERAPY



## RADIATION THERAPY



- ✘ Typically used as its own combined with chemo
- ✘ Two types: external beam - precision beams of radiation targeted to right tissue depth & angle to hit tumor – many patients get semi-permanent tattoos to mark correct spots
- ✘ intravenous radiation therapy – IV line is hooked up with radioactive solution

## RADIATION THERAPY



- ✘ concept behind radiation therapy is same as chemo: damage cells so that they can't reproduce or divide completely again, effectively killing them.
- ✘ Radiation therapy is found to not have drastic side effects of chemo, the major ones being fatigue (not as severe as chemotherapy), skin irritation around beam site, decreased blood count, nausea, increased susceptibility to infection
- ✘ often given prior to surgery to shrink/control the size of tumor, or after surgery to kill any existing cells in the area

## RADIATION THERAPY (CONT)

- ✘ Used where surgery is not an option, or where chemotherapy would not be considered an option (ability to cross the blood-brain barrier, non-vascularized tissues, etc.)
- ✘ Given 4-5 times per week, for as many weeks as the referring oncologist determines necessary



## RADIATION THERAPY (CONT)

- ✘ Major side effect is fatigue, although not as severe as with chemotherapy.
- ✘ Exercise can help in the same way as with chemotherapy, but the radiation therapy patient may be able to push harder than the chemo patient because their fatigue is not as severe – slightly higher training intensities can be used at your discretion



### ALTERNATIVE THERAPIES

- ✦ Many practitioners are beginning to include various alternative therapies for their clients to improve their quality of life, aid in reducing the effects of their side effects, as well as for treatment of their disease
- ✦ Some of the most popular alternative therapies recommended for improving quality of life are: yoga, art therapy, aromatherapy, acupuncture, massage therapy, and...

EXERCISE!!!

### EXERCISE AND DIET

- ✦ 1/3 of breast, colon, esophagus, kidney, and uterus cancers are attributed to excess body weight and physical inactivity
- ✦ 30-40% of all cancer diagnoses can be prevented by following a healthy diet, regular physical activity, and maintaining a healthy body weight.
- ✦ More than 60% of Canadians consume less than their required amount of fruits and vegetables
- ✦ More than half of Canadians are considered to be physically inactive

Canadian Cancer Society/National Cancer Institute of Canada: [Canadian Cancer Statistics 2005](#)

### ANTANGIOGENESIS THERAPY

- ✦ Designed to cut off the blood supply to a growing tumor, limiting its size.
- ✦ Cuts off the bodies supply of Vascular Endothelial Growth Factor (VEGF), which is found to be used by tumors to create new blood vessels into itself to supply it with nutrients & remove waste (parasitic)

### ANTIANGIOGENESIS THERAPY (CONTINUED)

- ✦ Used to prevent a small tumor from becoming a big tumor, and from becoming a metastatic tumor.
- ✦ Has not been shown to be effective at eliminating the tumor, or reducing the size of the tumor, but prevent its progression in order to have improved odds of success of chemotherapy or radiation therapy

### HORMONAL ABLATIVE THERAPY

- ✦ Removal of a hormone (either surgically or pharmacologically) can reduce the chance of having a tumor begin, as in prostate cancer, colorectal cancer, and thyroid cancer
- ✦ Can have drastic side effects on the person, both physically and emotionally.

**VASECTOMY UNIT**

*"Anybody for a quick round of Meaky Back before we wrap up here?"*

## ACTIVITY AS ALTERNATIVE THERAPY

- \* **Side effects of treatment**
  - + Fatigue
  - + Loss of muscle mass, gain of body fat
  - + Decreased self confidence, body image, anxiety, tension and depression
  - + Reduced immune function
  - + Reduced functional capacity
  - + Decreased overall quality of life
- \* **Effects of Exercise**
  - + Increased energy
  - + Gain/retention of muscle mass, loss of body fat
  - + Increases confidence, body image, and stabilizes mood
  - + Increased immune function
  - + Increased functional capacity
  - + Improved overall quality of life

## "BIOPSYCHOSOCIAL"

- \* BIO – prefix for biological
- \* PSYCHO - prefix for psychological
- \* SOCIAL – how the person is perceived by others, or how they act when with others
- \* Cancer has a massive effect on a persons body, mind, and their relations with friends and loved ones, as well as anyone else they encounter

## BIOPSYCHOSOCIAL (CONT)

- \* Culture views cancer patients as people near death, and who should be handled with the greatest of care.
- \* Vast majority are vibrant, active people who had their lives dramatically altered.
- \* They want to be treated normally, **as people with cancer, not cancer patients**
- \* Their greatest fear is that their body is not theirs anymore, that it has turned against them. **Your body is your only true possession, and without it, what do you have??**



## BIOPSYCHOSOCIAL (CONT)

- \* Depending on their insurance, type of treatment required, or whether they are enrolled in a research study or not, their treatments can cost up to **\$24,000** per cycle....
- \* That translates into between **\$10,000-\$150,000** for their treatments, not including peripheral costs (lost wages, wigs, mobility aids, transportation to doctor's, parking fees (\$4.50 per day @ CCI)
- \* This can leave the person VERY hesitant to spend more money on something like personal training, so it is up to you to show them what you can do for them, and how exercise can help improve their quality of life.

## QUALITY OF LIFE



- \* Considered by many cancer professionals to be the biggest challenge facing cancer patients
- \* Exercise can help improve quality of life in cancer patients by enhancing functional capacity, increasing muscular strength, reducing fatigue, improving self concept, enhancing vigour, and reducing stress, anxiety, and depression (Courneya et al, 2000)

## DESIGNING AN EXERCISE PROGRAM FOR CANCER PATIENTS



### EXERCISE PRESCRIPTION

- ✦ Major areas of concern:
  - + Increasing cardio fitness
  - + Increasing strength, maintaining muscle mass
  - + Maintaining/increasing flexibility, especially around areas of surgical incision
  - + Maintaining/improving coordination and balance
  - + Giving them an outlet

### EXERCISE PRESCRIPTION (CONT)



- ✦ Precautions:
  - + Check for any swelling in major joints and in fingers (common), as this can hinder what the person may be able to do for exercises
  - + Be aware of their treatment schedule, and allow your plan for them to be flexible
  - + Ensure the areas to be used are wiped down with disinfectant first

### COMMON PROBLEMS & PRECAUTIONS

- ✦ Hematological abnormalities – decreased RBC's & WBC's. Reduce exercise intensity on all parameters, ensure the areas used are disinfected before using
- ✦ Neurological abnormalities – decreased balance & coordination. Use a stationary bike for cardio & spot on standing exercises
- ✦ Bone pain – reduce weights used
- ✦ Electrolyte disturbances – can become nauseous or feel faint easily. Reduce intensity and ensure they drink plenty of fluids
- ✦ Fever – do not exercise. Have the client return after the fever has reduced

### EXERCISE PRESCRIPTION (CONT)

- ✦ Cardio:
  - + Perform some type of aerobic capacity test to determine their personal limitations, and build your program around that. Obviously, if they cannot get very high scores, or have not exercised in years, you shouldn't give them high intensity workouts for a little while.
  - + Monitor their resting and exercise heart rate, blood pressure, and rating of perceived exertion

### EXERCISE PRESCRIPTION (CONT)

- ✦ Resistance Training:
  - + Tailor your program around their capabilities, and remember that things can change fairly quickly...
  - + Alter grip sizes, ROM, and duration as needed.
  - + A program that is too intense can have a negative effect on the person to a greater degree than a healthy individual, so be mindful of how hard they are working.

### EXERCISE PRESCRIPTION (CONT)

- \* **The rules still apply:** progression, overload, periodization, individualization, adequate stimulus, and over training.
- \* They can all improve on their current level of fitness, even while receiving treatment, and allow themselves to feel better about themselves by having a trainer who obviously cares about them and their progress
- \* They are told by their doctors, friends and relatives what they should not be doing, how they should be living, and what they *can't* do. You can have a huge impact on their life by having confidence in them, and telling them they *can*.

# QUESTIONS??

### CONTACT INFORMATION

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