

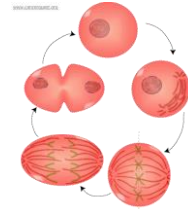
EXERCISE TESTING & PRESCRIPTION IN THE CONTEXT OF A CANCER DIAGNOSIS

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Cancer Fundamentals

- What is cancer?
 - **Uncontrolled cell growth**
 - **Failure to die in an orderly fashion**



Characteristics of Cancer Cells/Tumor

NORMAL	CANCER	
		Large number of dividing cells
		Large, variable shaped nuclei
		Small cytoplasmic volume relative to nuclei
		Variation in cell size and shape
		Loss of normal specialized cell features
		Disorganized arrangement of cells
		Poorly defined tumor boundary

Tumor Characteristics

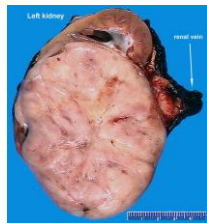
- Tumors
 - **Malignant**
 - Growing worse, resisting treatment, tending or threatening to produce death, harmful
 - **Benign**
 - Not recurrent or progressive, opposite of malignant
 - While not good news, not without consequences

Mechanism of Tumor Injury

- **Mechanical/compressive/destruction**



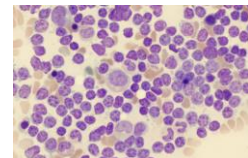
A small cancerous tumor within a human lung



Renal tumor

Mechanism of Tumor Injury

- **Hematologic Defects**

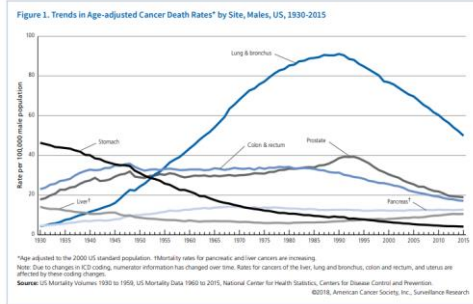


Chronic lymphocytic leukemia cells

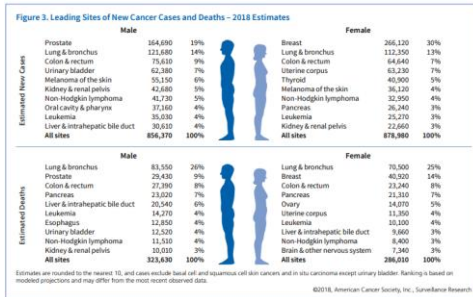
Statistics for 2018

- Estimated New Cases (All sites)
 - Men 856,370
 - Women 878,980
 - Total 1,735,350 68,470 (Ohio)
- Estimated Mortality
 - Men 323,630
 - Women 286,010
 - Total 609,640 25,740 (Ohio)

• Am. Cancer Society



2 Cancer Facts & Figures 2018



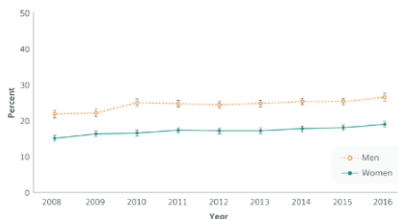
		Birth to 49	50 to 59	60 to 69	70 and older	Birth to death
All sites†	Male	3.4 (1 in 30)	6.1 (1 in 16)	10.4 (1 in 10)	32.2 (1 in 3)	39.7 (1 in 3)
	Female	5.5 (1 in 18)	6.1 (1 in 16)	9.9 (1 in 10)	26.0 (1 in 4)	37.6 (1 in 3)
Breast	Female	1.9 (1 in 52)	2.3 (1 in 43)	3.4 (1 in 29)	6.6 (1 in 15)	12.1 (1 in 8)
	Male	0.3 (1 in 287)	0.7 (1 in 143)	1.2 (1 in 85)	3.4 (1 in 29)	4.5 (1 in 22)
Colon & rectum	Male	0.3 (1 in 300)	0.5 (1 in 196)	0.8 (1 in 122)	3.1 (1 in 32)	4.2 (1 in 24)
	Female	0.2 (1 in 450)	0.4 (1 in 248)	0.6 (1 in 155)	1.3 (1 in 74)	2.1 (1 in 48)
Kidney & renal pelvis	Male	0.1 (1 in 700)	0.2 (1 in 579)	0.3 (1 in 320)	0.7 (1 in 136)	1.2 (1 in 83)
	Female	0.2 (1 in 519)	0.1 (1 in 867)	0.2 (1 in 446)	0.9 (1 in 119)	1.3 (1 in 80)
Leukemia	Male	0.2 (1 in 400)	0.2 (1 in 573)	0.4 (1 in 250)	1.4 (1 in 71)	1.8 (1 in 56)
	Female	0.2 (1 in 519)	0.1 (1 in 867)	0.2 (1 in 446)	0.9 (1 in 119)	1.3 (1 in 80)
Lung & bronchus	Male	0.1 (1 in 682)	0.7 (1 in 154)	1.9 (1 in 54)	6.1 (1 in 16)	6.9 (1 in 15)
	Female	0.2 (1 in 479)	0.6 (1 in 178)	1.4 (1 in 70)	4.8 (1 in 21)	5.8 (1 in 17)
Melanoma of the skin	Male	0.5 (1 in 216)	0.3 (1 in 191)	0.9 (1 in 109)	2.6 (1 in 38)	3.6 (1 in 27)
	Female	0.7 (1 in 152)	0.4 (1 in 254)	0.5 (1 in 202)	1.1 (1 in 91)	2.4 (1 in 42)
Non-Hodgkin lymphoma	Male	0.3 (1 in 362)	0.3 (1 in 349)	0.6 (1 in 174)	1.8 (1 in 54)	2.4 (1 in 42)
	Female	0.2 (1 in 545)	0.2 (1 in 450)	0.4 (1 in 248)	1.3 (1 in 74)	1.9 (1 in 54)
Prostate	Male	0.2 (1 in 402)	1.7 (1 in 58)	4.8 (1 in 21)	8.2 (1 in 12)	11.6 (1 in 9)
	Female	0.3 (1 in 362)	0.3 (1 in 349)	0.6 (1 in 174)	1.8 (1 in 54)	2.4 (1 in 42)
Thyroid	Male	0.2 (1 in 517)	0.1 (1 in 791)	0.2 (1 in 459)	0.2 (1 in 425)	0.6 (1 in 162)
	Female	0.6 (1 in 124)	0.4 (1 in 271)	0.3 (1 in 288)	0.4 (1 in 256)	1.8 (1 in 56)
Uterine cervix	Female	0.3 (1 in 368)	0.1 (1 in 845)	0.1 (1 in 842)	0.2 (1 in 405)	0.6 (1 in 162)
	Female	0.3 (1 in 342)	0.6 (1 in 166)	1.0 (1 in 103)	1.3 (1 in 75)	2.8 (1 in 35)

All sites	All races			White			Black		
	1975-77	1987-89	2007-13	1975-77	1987-89	2007-13	1975-77	1987-89	2007-13
Breast & other nervous system	49	55	60	52	57	59	39	43	43
Breast (female)	75	84	91	76	85	92	62	71	83
Colon & rectum	50	60	66	50	60	67	45	52	59
Colon	51	60	65	51	61	67	45	52	56
Rectum	48	58	69	48	59	69	44	52	66
Esophagus	5	9	21	6	11	22	4	7	12
Hodgkin lymphoma	72	79	88	72	80	89	70	72	85
Kidney & renal pelvis	50	57	75	50	57	75	48	56	76
Larynx	66	66	63	67	67	65	58	56	58
Leukemia	34	41	64	35	44	65	33	35	58
Liver & intrahepatic bile duct	3	5	19	3	6	18	2	3	14
Lung & bronchus	12	13	20	12	13	20	11	11	17
Melanoma of the skin	82	88	94	82	88	94	57	79	89
Myeloma	25	27	51	24	27	51	29	30	52
Non-Hodgkin lymphoma	47	51	73	47	51	74	49	46	67
Oral cavity & pharynx	53	54	68	54	56	69	36	34	49
Ovary	36	38	47	35	38	46	41	34	39
Pancreas	3	4	9	3	3	9	2	4	8
Prostate	68	83	99	69	84	>99	61	71	97
Stomach	15	20	31	14	18	30	16	19	31
Testis	83	95	97	83	96	97	71	88	92
Thyroid	92	94	98	92	94	98	90	92	97
Urinary bladder	72	79	78	73	80	79	50	63	65
Uterine corpus	69	70	69	70	72	71	62	61	58
Uterine cervix	87	82	83	88	84	85	60	57	65

Cancer Survivorship

- As of January 2019, it is estimated that there were 16.9 million cancer survivors in the US or 5% of the population.
- As of January, this number is expected to increase by 29% to 21.7 million
- The number of people who have lived 5 or more years after their cancer diagnosis is projected to increase approximately 33%, to 15.1 million

Figure 1-1. Percentage of U.S. Adults Ages 18 Years or Older Who Met the Aerobic and Muscle-Strengthening Guidelines, 2008–2016



Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey (NHIS).

- Based on the current evidence, cancer care professionals can expect that fewer than 10% of cancer survivors will be active during their primary treatments and only about 20% to 30% will be active after they recover from treatments.

• CL Rock et al. *Ca Cancer J Clin* 2012;62:242-274

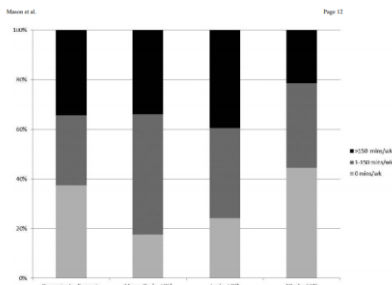


Figure 2. Percentage of breast cancer survivors meeting aerobic physical activity recommendations over 10 years of follow-up.

Mason C, et al. *Cancer Epidemiol Biomarkers Prev*. 2013; 22(6): 1153–1161.

The Cancer Continuum

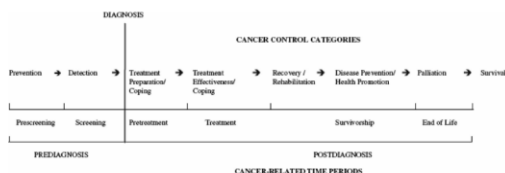
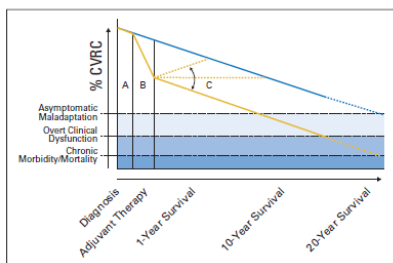


FIGURE 1. Physical activity and cancer control framework. (Reprinted from Courneya KS, Friedenreich CM. Physical activity and cancer control. *Semin Oncol Nurs*. 2007;23:242–252. Copyright © 2007 Elsevier. Used with permission.)

Courneya & Friedenreich. *Semin Oncol. Nurs.* 2007;23:242-252.



Trajectory change in cardiovascular reserve capacity across the breast cancer survivorship continuum. Koelwyn et al. *JCO* 2012;30:4458.

PHYSICAL WELL-BEING		Not at all	A little bit	Some-what	Quite a bit	Very much
101	I have a lack of energy	0	1	2	3	4
102	I have fatigue	0	1	2	3	4
103	Because of my physical condition, I have trouble meeting the needs of my family	0	1	2	3	4
104	I have pain	0	1	2	3	4
105	I am bothered by side effects of treatment	0	1	2	3	4
106	I feel ill	0	1	2	3	4
107	I am forced to spend time in bed	0	1	2	3	4
SOCIAL/FAMILY WELL-BEING		Not at all	A little bit	Some-what	Quite a bit	Very much
108	I feel close to my friends	0	1	2	3	4
109	I get emotional support from my family	0	1	2	3	4
110	I get support from my friends	0	1	2	3	4
111	My family has accepted my illness	0	1	2	3	4
112	I am satisfied with family communication about my illness	0	1	2	3	4
113	I feel close to my partner (or the person who is my main support)	0	1	2	3	4
114 <i>Regardless of your current level of actual activity, please answer the following questions. If you prefer not to answer it, please mark this box [] and go to the next section.</i>						
115	I am satisfied with my sex life	0	1	2	3	4

FACT-G (Version 4)

Please circle or mark one number per line to indicate your response as it applies to the **past 7 days**.

EMOTIONAL WELL-BEING		Not at all	A little bit	Somewhat	Quite a bit	Very much
001	I feel sad.....	0	1	2	3	4
002	I am satisfied with how I am coping with my illness.....	0	1	2	3	4
003	I am losing hope in the fight against my illness.....	0	1	2	3	4
004	I feel nervous.....	0	1	2	3	4
005	I worry about dying.....	0	1	2	3	4
006	I worry that my condition will get worse.....	0	1	2	3	4

FUNCTIONAL WELL-BEING		Not at all	A little bit	Somewhat	Quite a bit	Very much
007	I am able to work (include work at home).....	0	1	2	3	4
008	My work (include work at home) is fulfilling.....	0	1	2	3	4
009	I am able to enjoy life.....	0	1	2	3	4
010	I have accepted my illness.....	0	1	2	3	4
011	I am sleeping well.....	0	1	2	3	4
012	I am enjoying the things I usually do for fun.....	0	1	2	3	4
013	I am content with the quality of my life right now.....	0	1	2	3	4

GENERAL MEASURES

FACT-G: Functional Assessment of Cancer Therapy - General (constitutes the core of all subscales; the FACT-G can be used with patients of any tumor type)
 Download WORD | Download PDF | Language Availability
 Scoring & Interpretation Materials

FACT-G7: Functional Assessment of Cancer Therapy - General - (7 item version; be used with patients of any tumor type)
 Download WORD | Download PDF | Language Availability
 Scoring & Interpretation Materials

FACT-GP: Functional Assessment of Cancer Therapy - General Population
 Download WORD | Download PDF | Language Availability
 Scoring & Interpretation Materials

FANLTC: Functional Assessment of Non-Life Threatening Conditions
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 Scoring & Interpretation Materials

<https://www.facit.org/FACITOrg/Questionnaires>

CANCER SPECIFIC MEASURES

FACT-B: For patients with Breast cancer
 Download WORD | Download PDF | Language Availability
 Scoring & Interpretation Materials

FACT-BE: For patients with Bladder cancer
 Download WORD | Download PDF | Language Availability
 Scoring & Interpretation Materials

FACT-BR: For patients with Brain cancer
 Download WORD | Download PDF | Language Availability
 Scoring & Interpretation Materials

FACT-C: For patients with Colorectal cancer
 Download WORD | Download PDF | Language Availability
 Scoring & Interpretation Materials

SYMPTOM SPECIFIC MEASURES

FAACT: Functional Assessment of Anorexia/Cachexia/Treatment
 Download WORD | Download PDF | Language Availability
 Scoring & Interpretation Materials

FACT-AD: For patients with Abdominal symptoms
 Download WORD | Download PDF | Language Availability
 Scoring & Interpretation Materials

FACT-AS: For patients with Ascites
 Download WORD | Download PDF | Language Availability
 Scoring & Interpretation Materials

FACT-CD: For patients with Cervical Dysplasia
 Download WORD | Download PDF | Language Availability
 Scoring & Interpretation Materials

FACT-D: For patients with Diarrhea
 Download WORD | Download PDF | Language Availability
 Scoring & Interpretation Materials

FACT-F: Functional Assessment of Chronic Illness Therapy-Fatigue
 Download WORD | Download PDF | Language Availability
 Scoring & Interpretation Materials

FACT-Fatigue: Functional Assessment of Chronic Illness Therapy-Fatigue: a 13-item FACT Fatigue Scale

Assessing Exercise Behavior

Oncology Clinician's Guide to Referring Patients to Exercise

Step 1: ASSESS

Question #1: How many days during the past week have you performed physical activity where your heart beats faster and your breathing is harder than normal for 30 minutes or more?
Question #2: How many days during the past week have you performed physical activity to increase muscle strength, such as lifting weights?

Campbell et al. Med Sci Sport Exer. 2019 (In Press)

Do you assess the physical activity levels of your patients? If not, why not? Do you think you should?