

# HOPE GROWS

Garden-based interventions improve physical & mental health of cancer survivors



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## Cancer Continuum

Prevention

Treatment

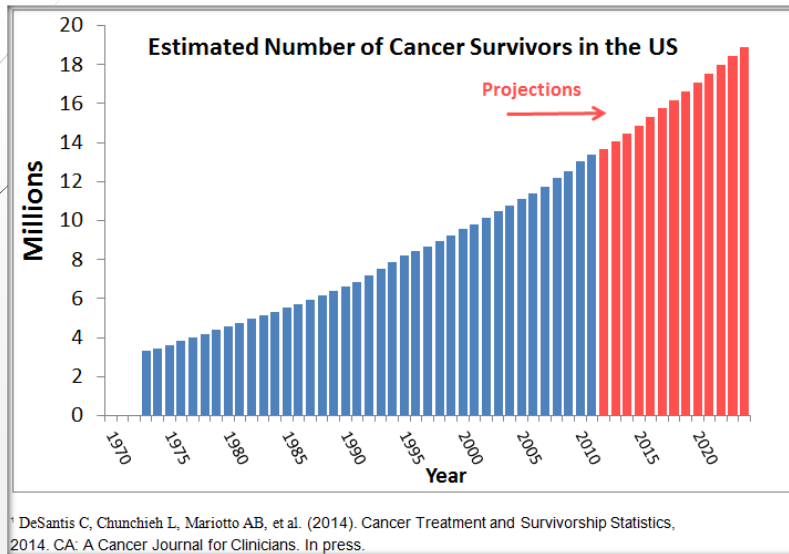
Survivorship



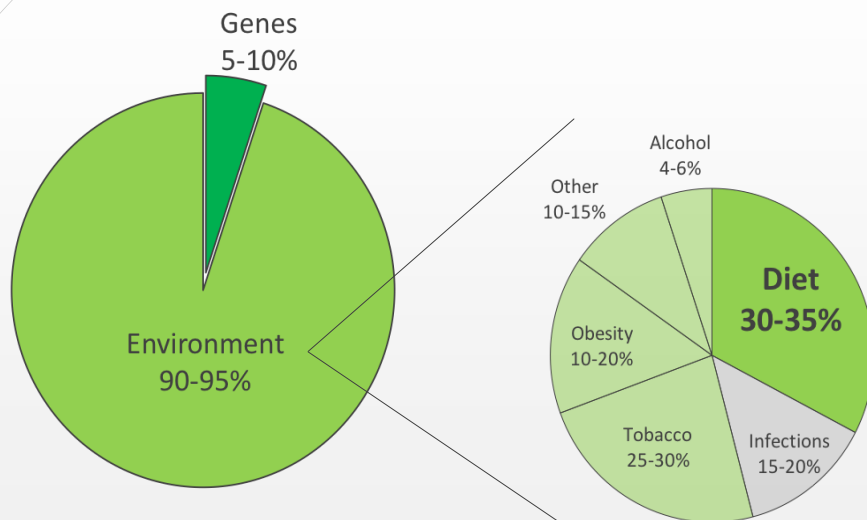
- >60% OW or OB
- Vulnerable
- Teachable moment
- Prevalence rising

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## Prevalence of Cancer Survivors



## What We Know The Causes of Cancer



**“Food intake is the environmental factor to which we are ALL exposed necessarily and permanently from conception to death.”**

Ordovas, 2008

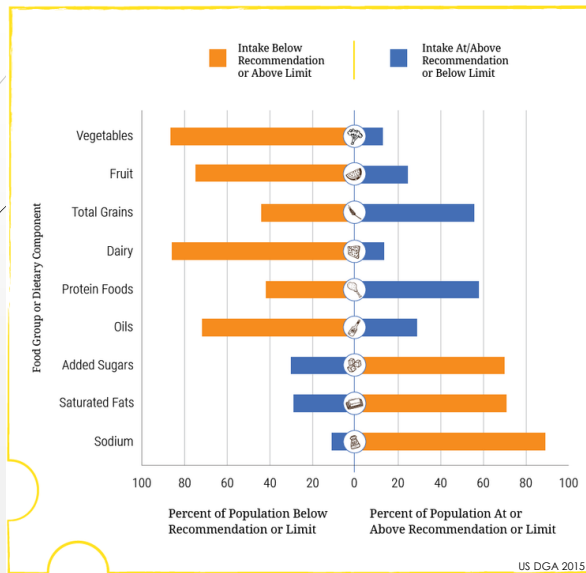
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## Evidence-Based Recommendations

	DGA (Clinton)	AICR/WCRF (Clinton)	ACS (Spees)
<b>Body Weight</b>	Achieve and maintain a healthy weight (BMI 18.5-24.5).	Be as lean as possible without becoming underweight.	Be as lean as possible throughout life without being underweight.
<b>Physical Activity</b>	At least 150 min/wk of moderate-intensity, or 75 min/wk of vigorous-intensity aerobic physical activity.	Be physically active every day in any way for at least 30 min.	At least 150 min of moderate intensity or 75 min of vigorous intensity activity each week, preferably spread throughout the week.
<b>Produce</b>	Consume 2½ cups of vegetables/d and 2 cups of fruit/d. Choose whole fruits and vegetables from all of the subgroups—dark green, red and orange, legumes, starchy, and other.	Base your diet around plant foods. Aim to fill at least two-thirds of your plate with vegetables, fruits, whole grains and beans.	Eat at least 2½ cups of vegetables and fruits each day.
<b>Meat</b>	Consume a variety of protein foods, including seafood, lean meats and poultry, eggs, legumes, and nuts, seeds, and soy products.	Up to 18 oz cooked meat red meat/wk, limit processed meat.	Limit how much processed meat and red meat you eat.
<b>Sugar &amp; Energy Dense Foods</b>	Consume less than 10% of kcal/d from added sugars.	Avoid sugary drinks. Limit consumption of energy-dense foods.	Limit intake of high-kcal foods and drinks as keys to help maintain a healthy weight.
<b>Supplements</b>	Nutritional needs should be met primarily from foods.	The best source of nourishment is food and drink, not dietary supplements.	Food is the best source of vitamins and minerals.

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## U.S. Dietary Patterns



Ave intake >2,500 kcal/d

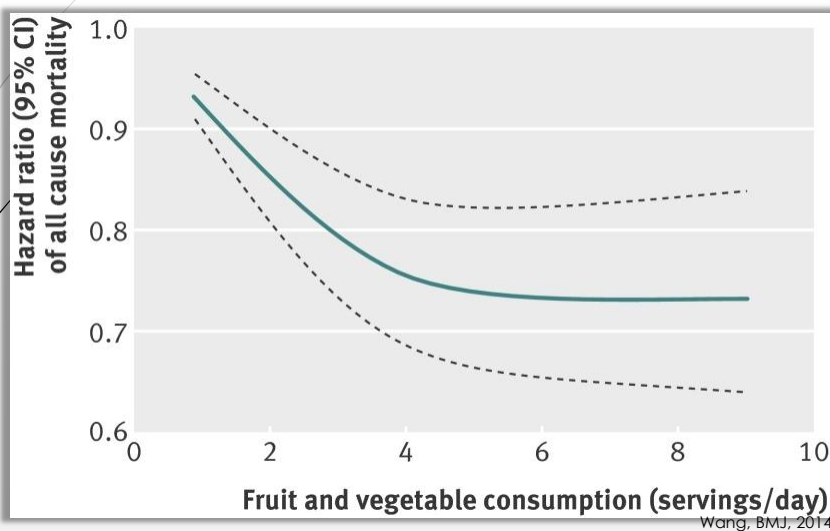
Fats & oils >450 kcal/d

Annual consumption/person:

- 23# cheese
- 109# of flour
- 78# of sugar

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## Plants Matters

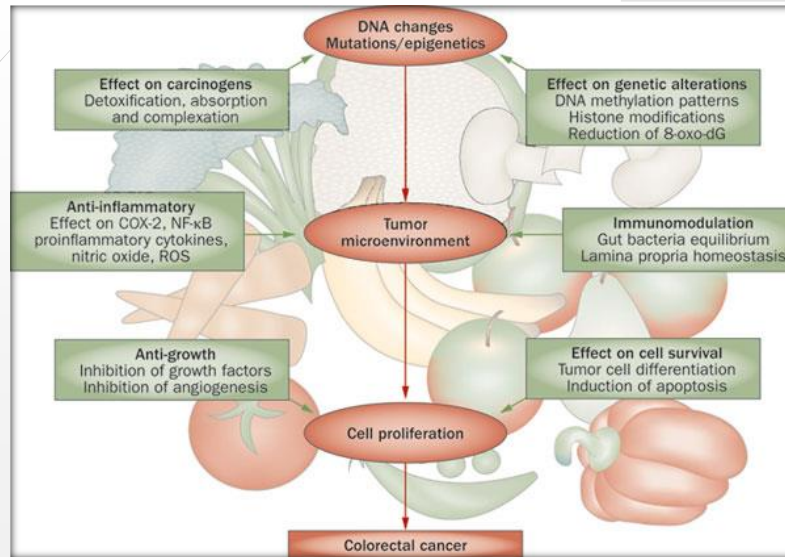


Higher FV consumption associated with reduced risk of all-cause mortality


Dose matters  
Each additional serving (up to 5) associated with 5% risk reduction

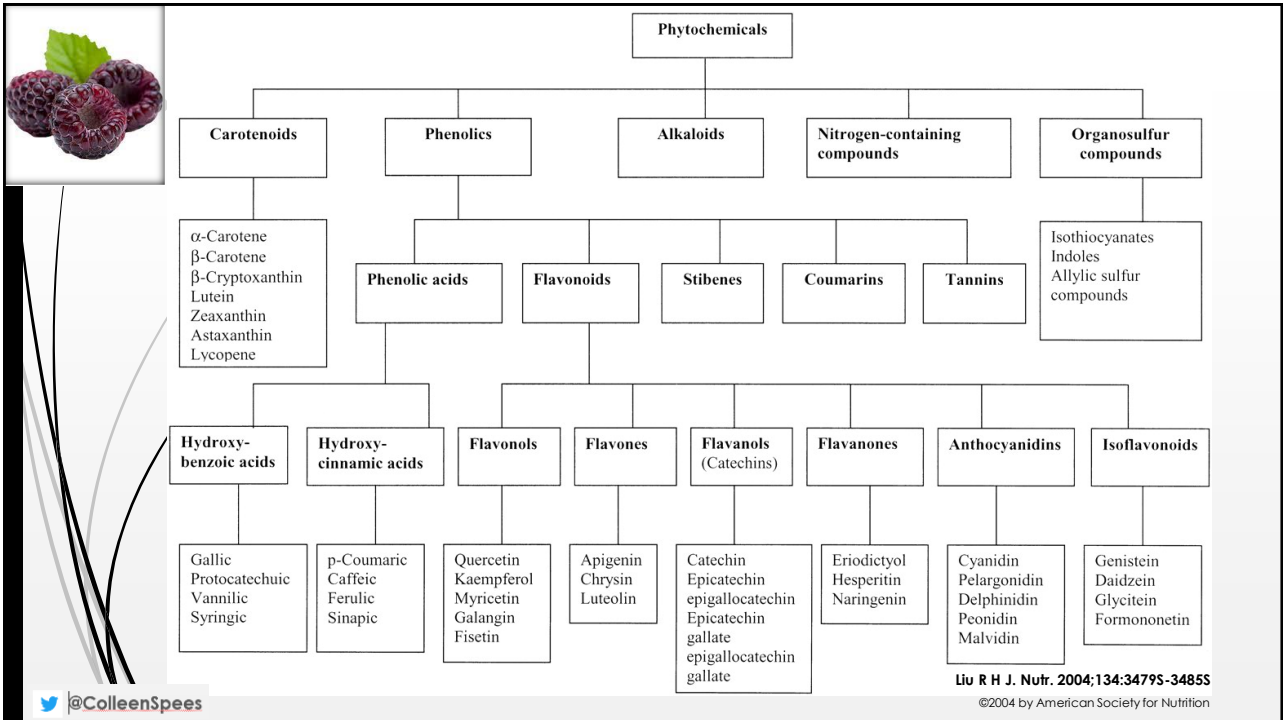
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## Phytochemicals Fight Cancer



Ricciardiello, Nature Rev, 2011

				
Wonderful white	Mellow yellow (and orange)	See red	Get the blues	Great greens
<p>Contain <b>allylic sulphides</b> or <b>alliums</b> to prevent against carcinogens causing colon or stomach cancer and lower cholesterol</p> <p><b>Fruits</b> Brown pears White nectarines White peaches</p> <p><b>Vegetables</b> Cauliflower Garlic Onions Potatoes (white fleshed) White corn</p>	<p>Contain <b>carotenoids beta</b> and <b>alpha carotene</b> for healthy heart, vision and immune system</p> <p><b>Fruits</b> Apricots Cantaloupe Nectarines Peaches Yellow apples Yellow pears Yellow watermelon</p> <p><b>Vegetables</b> Butternut squash Carrots Sweet corn Sweet potatoes Yellow beets Yellow peppers Yellow potatoes Yellow tomatoes</p>	<p>Contain <b>carotenoids, lycopenes, olyphenols</b> and <b>anthocyanins</b> to prevent cancer and improve cardiovascular health</p> <p><b>Fruits</b> Cherries Red apples Red grapes Red pears Raspberries Strawberries Watermelon</p> <p><b>Vegetables</b> Beets Radishes Red peppers Red onions Rhubarb Tomatoes</p>	<p>Blue or purple produce will contain <b>anthocyanins</b> to improve memory, healthy aging and urinary tract health</p> <p><b>Fruits</b> Blackberries Blueberries Dried plums Pitted prunes Purple grapes Plums</p> <p><b>Vegetables</b> Aubergine Purple asparagus Purple cabbage Purple carrots Purple peppers Potatoes (purple fleshed)</p>	<p>Provide <b>carotenoids</b> called <b>zeaxanthin</b> and <b>lutein</b> for good vision and prevention of age-related macular degeneration</p> <p><b>Fruits</b> Green apples Green grapes Green pears Honeydew</p> <p><b>Vegetables</b> Asparagus Broccoli Brussels sprouts Chinese cabbage Courgette Cucumbers Green beans Green cabbage Green onions Green peppers Leafy greens Lettuce Peas Snow peas Sugar snap peas</p>



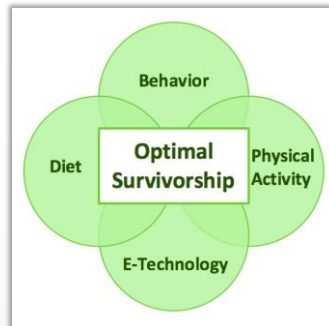
## Waterman Farm Living Laboratory



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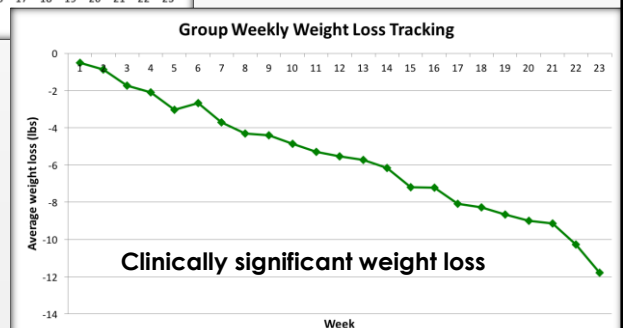
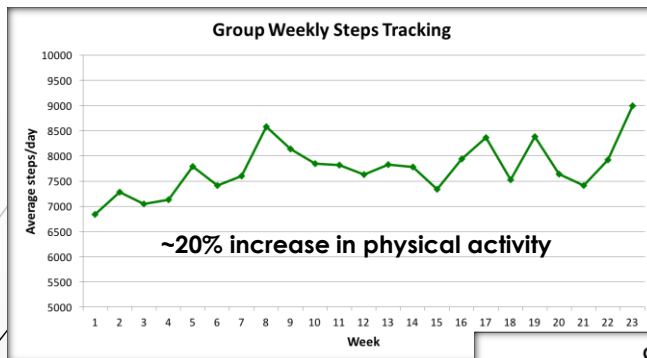
## Growing Hope


- Goal: **Improve health outcomes**
- Biobehavioral intervention
  - Harvesting produce
  - Group education/cooking demos
  - Remote coaching
  - Technology
- Enriched & supportive environment



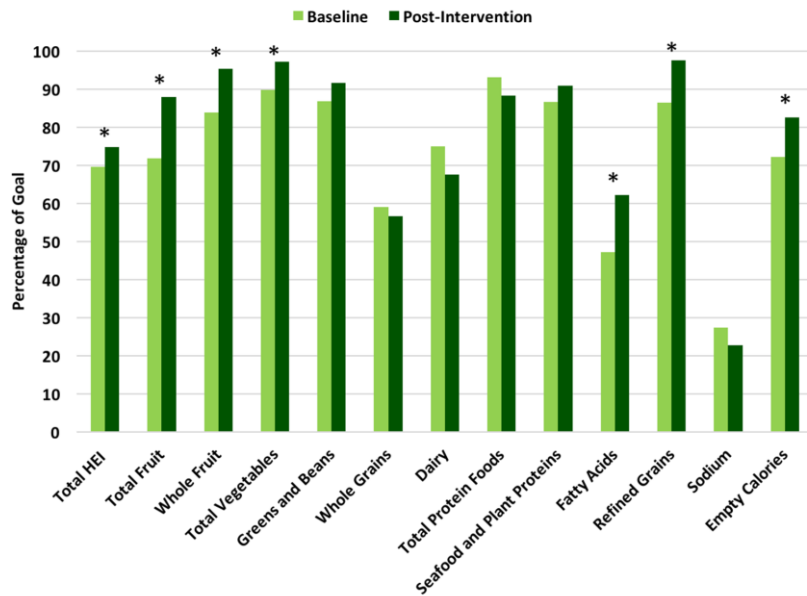
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## Physical Activity and Body Weight



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## Healthy Eating Index (HEI 2010) Scores



Spees, 2015

## Clinical Outcomes

Variable	Baseline Mean (SD)	Post Intervention Mean (SD)	Difference (95% CI)	P-value
Weight (kg)	85.28 (16.21)	81.40 (16.68)	-3.88 (-5.61, -2.15)	< .001*
Body mass index (kg/m <sup>2</sup> )	31.85 (5.13)	30.40 (5.33)	-1.46 (-2.09, -0.82)	< .001*
Waist circumference (cm)	102.03 (13.59)	96.53 (13.56)	-5.50 (-6.90, -4.11)	< .001*
Physical activity (steps/d)	6,560 (3,420)	7,768 (3,523)	1,208 (104.49, 2,313.02)	0.033*
Quality of life (score)	268.72 (51.23)	285.24 (52.16)	16.52 (5.78, 27.26)	0.004*
Systolic BP (mmHg)	127.66 (15.82)	118.14 (12.99)	-9.52 (-16.02, -3.02)	0.006*
Diastolic BP (mmHg)	75.03 (8.27)	73.21 (7.97)	-1.83 (-4.66, 1.00)	0.197
Total cholesterol (mg/dL) <sup>†</sup>	190.41 (29.49)	179.21 (32.20)	0.94 (0.90, 0.98)	0.004*
HDL (mg/dL) <sup>†</sup>	54.90 (13.34)	53.41 (13.04)	0.97 (0.92, 1.03)	0.275
LDL (mg/dL) <sup>†</sup>	113.45 (28.60)	107.72 (28.99)	0.95 (0.89, 1.00)	0.051*
Triglycerides (mg/dL) <sup>†</sup>	133.21 (52.72)	113.10 (44.36)	0.86 (0.76, 0.96)	0.010*
HbA1c (%)	5.68 (0.53)	5.70 (0.45)	0.02 (-0.25, 0.30)	0.879
hs-CRP (gm/L) <sup>†</sup>	3.96 (4.21)	3.25 (4.07)	0.72 (0.58, 0.89)	0.004*
IgFBP3 (ug/mL) <sup>†</sup>	4.74 (0.87)	4.50 (0.84)	0.95 (0.91, 0.98)	0.005*
IgF-1 (ng/mL) <sup>†</sup>	95.59 (34.11)	104.45 (40.13)	1.07 (0.86, 1.33)	0.553
Skin carotenoids (RSS)	29509 (11471)	33963 (14441)	4455 (944.42, 7964.61)	0.0157*
Plasma carotenoids (umol/L) <sup>‡</sup>	1749.51 (871.74)	2330.04 (1220.81)	1.35 (1.15, 1.58)	<.001*

<sup>†</sup>Log transformed; <sup>‡</sup>difference expressed as fold-change; \*p<0.05



## Quality of Life

QOL Item (N=29)	Baseline Mean (SD)	Post-Intervention Mean (SD)	Difference (95% CI)	P-value
Quality of Life (Total Score) <sup>a</sup>	268.86 (51.24)	284.93 (51.75)	+16.07 (5.51, 26.62)	<b>0.004*</b>
Physical Well Being				
Fatigue	5.59 (2.64)	6.52 (2.72)	+0.93 (0.01, 1.86)	<b>0.049*</b>
Psychological Well Being				
How good is your quality of life?	7.17 (2.27)	8.28 (1.22)	+1.11 (0.18, 2.03)	<b>0.022*</b>
How useful do you feel?	7.21 (2.14)	7.76 (1.81)	+0.55 (0.06, 1.05)	<b>0.030*</b>
Spiritual Well Being				
How hopeful do you feel?	7.69 (1.61)	8.28 (1.69)	+0.59 (0.15, 1.02)	<b>0.010*</b>
To what extent has your illness made positive changes in your life?	5.72 (2.76)	6.48 (2.68)	+0.76 (0.06, 1.45)	<b>0.033*</b>

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<sup>a</sup>Quality of Life Patient/Cancer Survivor Version (QOL-CSV)

## Growing Healthy Kids

- 2016 Summer Feeding Program
- Collaboration: OSU + NCH + BGSU



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## GHK Results

- Feasible and acceptable
- Improved FV intake & PA
- Increased adventurous eating
- Healthier snacks
- Improved child/PAC interactions



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## Harvesting Health 4 Kids

- 2017 Survivors of youth cancer
- Results
  - Acceptability and feasibility
  - Significant improvements
    - QOL
    - Parenting behaviors
    - Mealtime interactions
- <https://www.facebook.com/osu/videos/10156719720583858/>



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## What's Next?

- Current Research
  - Obesity Prevention (USDA)
  - Adult Dietary Patterns
- Future Research
  - Youth Survivors
  - Caregivers
  - Mental & Spiritual Health
  - Home Gardening
- Keep Advocating!



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## It Takes a Village!



Support garden-based research at OSU funding #310466

<http://spees11.wixsite.com/hope>