

# Surviving the Cure: Late Effects after a Transplant Using Donor Cells (Allogeneic Transplant)

**Celebrating a Second Chance at Life  
Survivorship Symposium**

April 27 – May 3, 2024

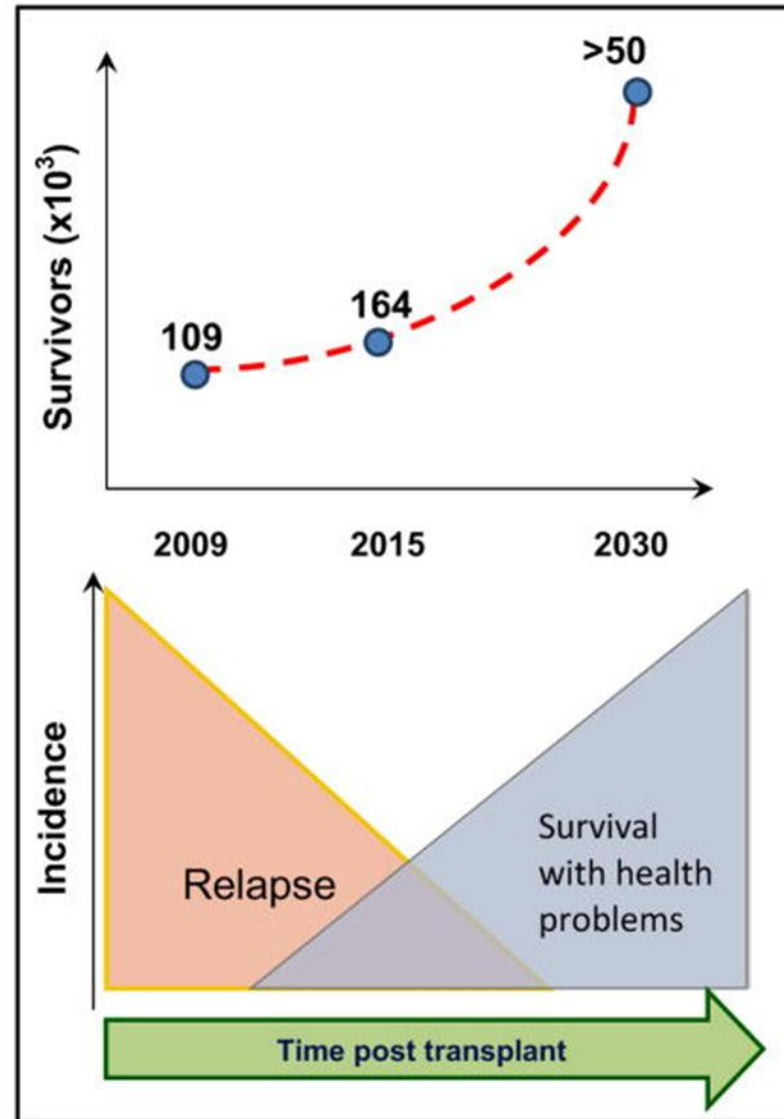


**Betty Ky Hamilton MD**  
Associate Professor of Medicine,  
Cleveland Clinic

# Overview

- Overview of Survivorship and Late Effects after Transplant
- Recognizing the Burden of Late effects and Patient-Centered Outcomes
- Understanding Late Effects and Need for Survivorship Care and Research
- Approach to survivorship- establishing a long-term care plan

# Survivorship after Allogeneic HCT

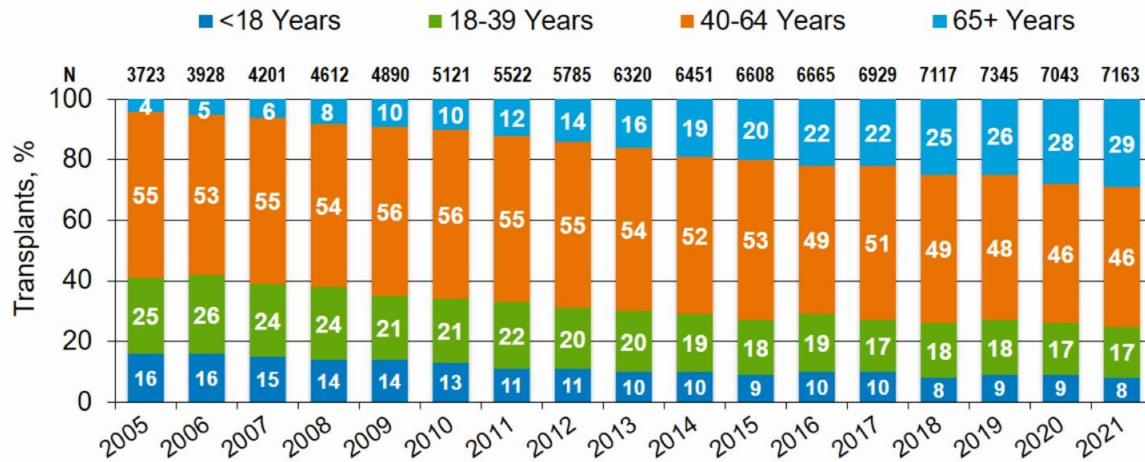


- By 2030, the number of survivors is estimated to be >500,000

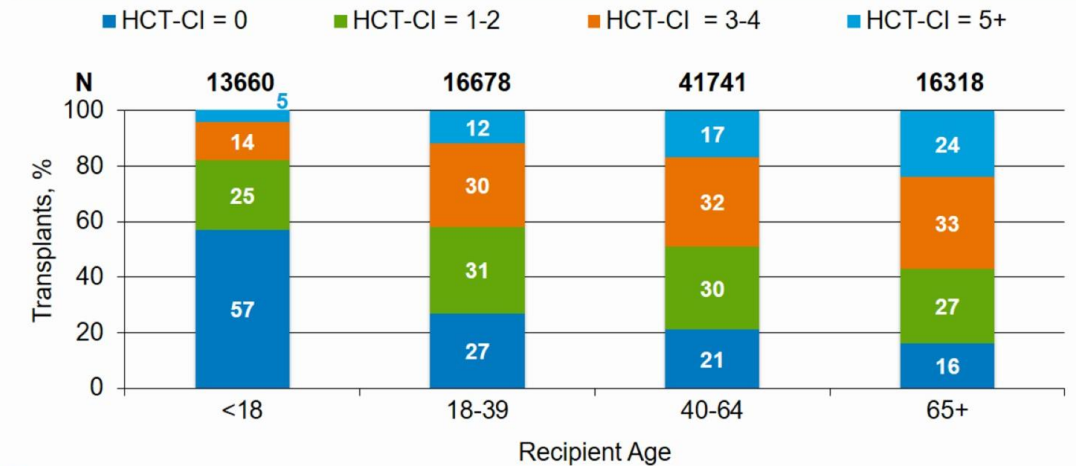
*Battiwalla et al. BBMT 2017; 23: 184-192;  
Majhail NS et al. BBMT 2013; 19(10):1498-1501*

# Survivorship after Allogeneic HCT- Older Survivors

Recipient Age of Allogeneic HCTs for Malignant Diseases in the U.S.



Comorbidity Index in Allogeneic HCTs in the U.S. by Recipient Age, 2011-2021

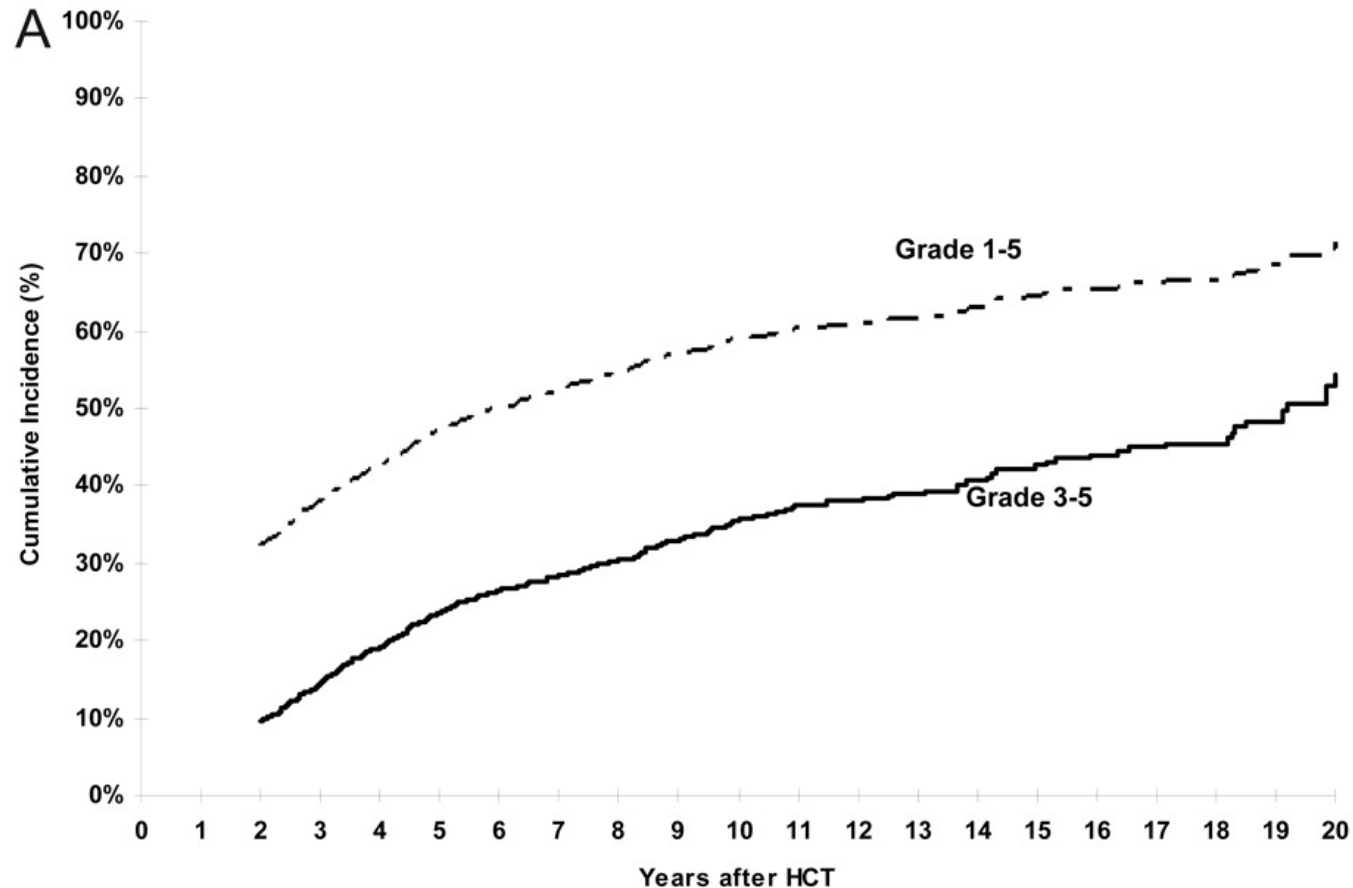


Includes Acute Myeloid Leukemia, Acute Lymphoblastic Leukemia, Myelodysplastic Syndromes/Myeloproliferative Neoplasms, Non-Hodgkin Lymphoma, Hodgkin Lymphoma.



- The age of transplant recipients continue to increase
- Older patients have more co-morbid health issues, complicating transplant and long-term late effects

# Late Effects after Transplant



- **66% of survivors report at least one chronic health condition** compared to 39% of health siblings
- Life expectancy among 5-year survivors 30% lower compared to the general population (cohort from 1970-2002)

# Late Effects after HCT

Grade 3 or 4 chronic health condition	<u>All survivors, %</u>	<u>Siblings, %</u>	RR (95% CI)
Cardiovascular	6.8	2.6	2.85 (1.37-5.90)
Auditory/visual impairment	2.8	1.0	2.89 (0.88-9.47)
Gastrointestinal	2.9	0.7	4.33 (1.03-18.13)
Endocrine	2.4	1.0	2.36 (0.73-7.61)
Musculoskeletal problems	3.4	0.7	5.08 (1.23-21.10)

Sun et al. Blood 2010; 116 (17): 3129-3139

# Late Effects after HCT and Impact of GVHD

Grade 3 or 4 chronic health condition	<u>All survivors, %</u>	<u>Siblings, %</u>	RR (95% CI)	Survivors with chronic GVHD (RR)
Cardiovascular	6.8	2.6	2.85 (1.37-5.90)	<b>2.99 (1.33-6.77)</b>
Auditory/visual impairment	2.8	1.0	2.89 (0.88-9.47)	<b>3.81 (1.07-13.53)</b>
Gastrointestinal	2.9	0.7	4.33 (1.03-18.13)	<b>7.70 (1.73-34.28)</b>
Endocrine	2.4	1.0	2.36 (0.73-7.61)	<b>3.40 (0.94-12.22)</b>
Musculoskeletal problems	3.4	0.7	5.08 (1.23-21.10)	<b>10.87 (2.47-47.95)</b>

# Late Effects after Allogeneic HCT

Transplant



Years

1

3

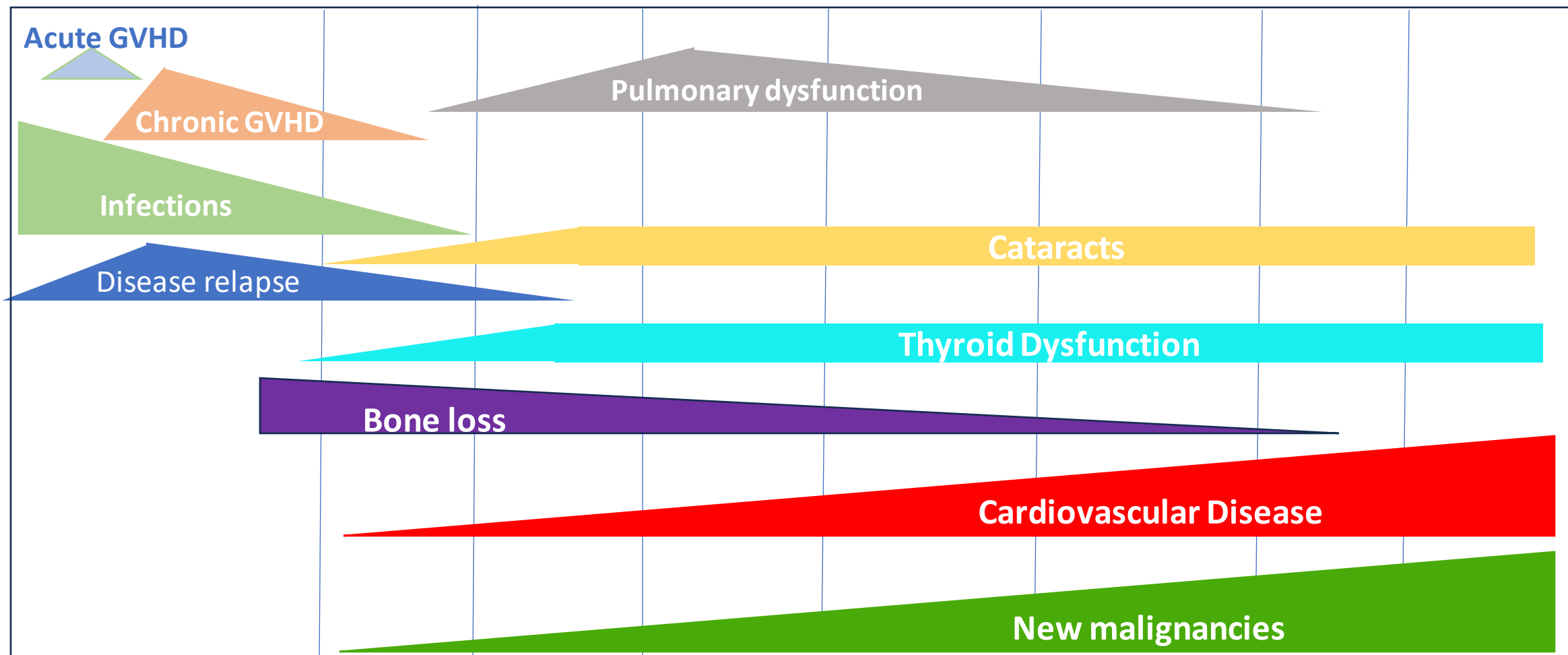
5

10

15

20

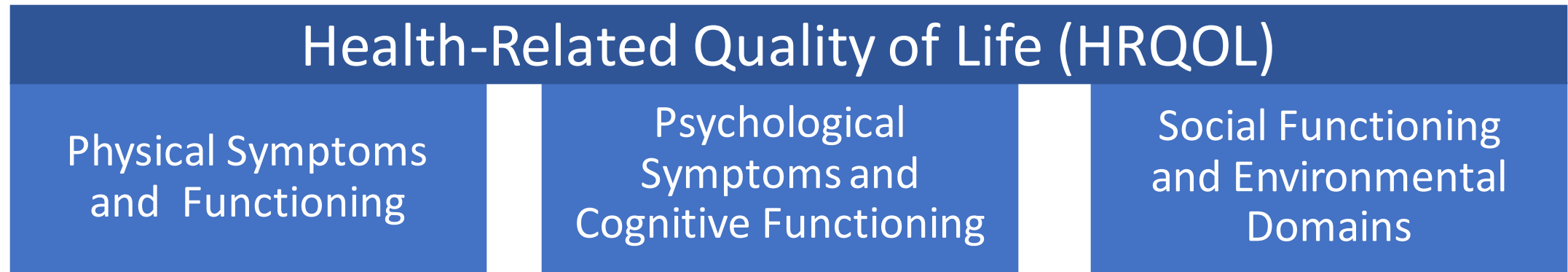
30+





# Patient Centered Outcomes and Late Effects

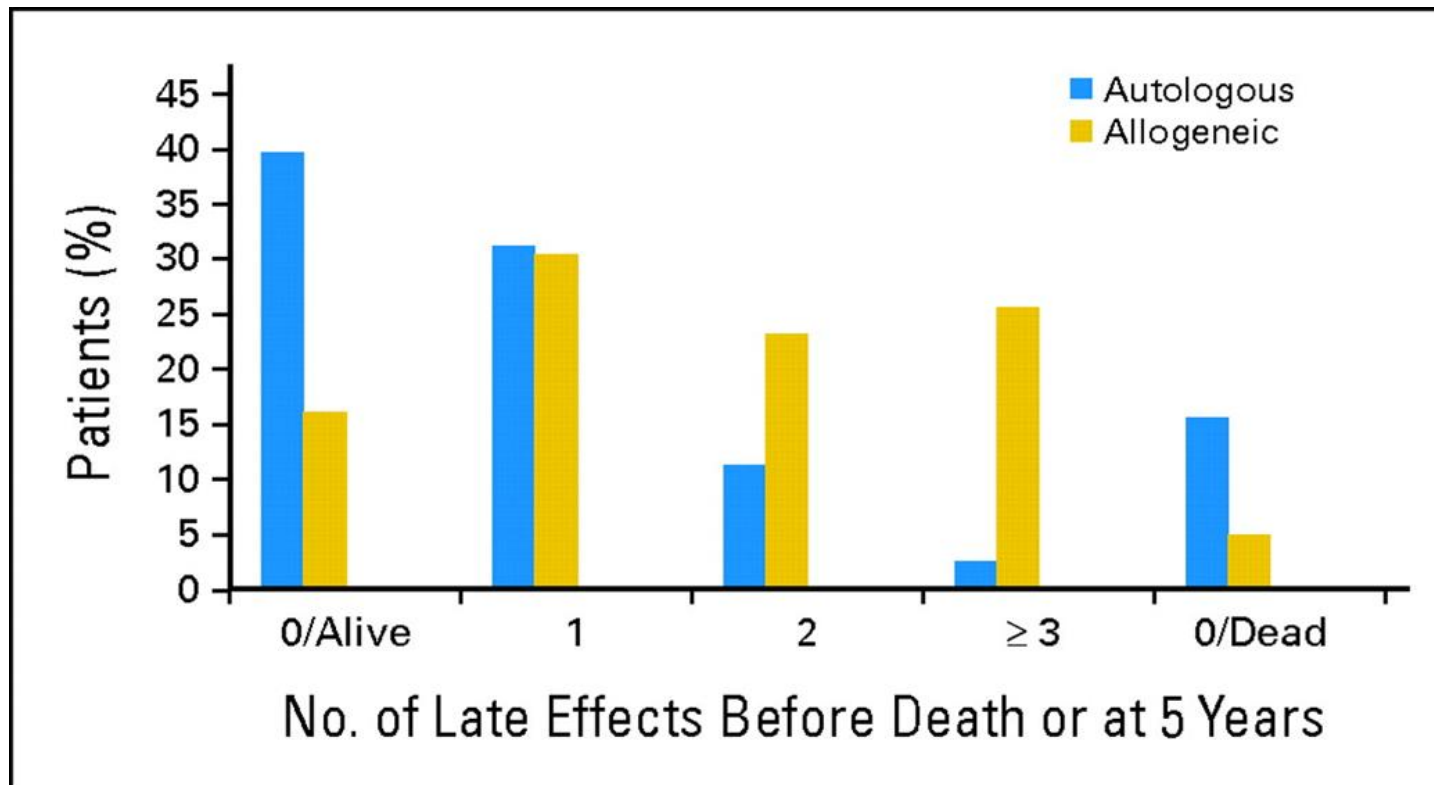
- NIH Late Effects Initiative: Patient Centered Outcomes Working Group



- Limited interventions to improve outcomes in long-term survivors
- Lack of consistency in selection of patient-centered outcomes
- Recommend integration of patient-centered outcomes in survivorship care

# Patient Centered Outcomes after Allogeneic HCT

- Despite positive perception of quality of life recovery in HCT, many long-term survivors report residual deficits

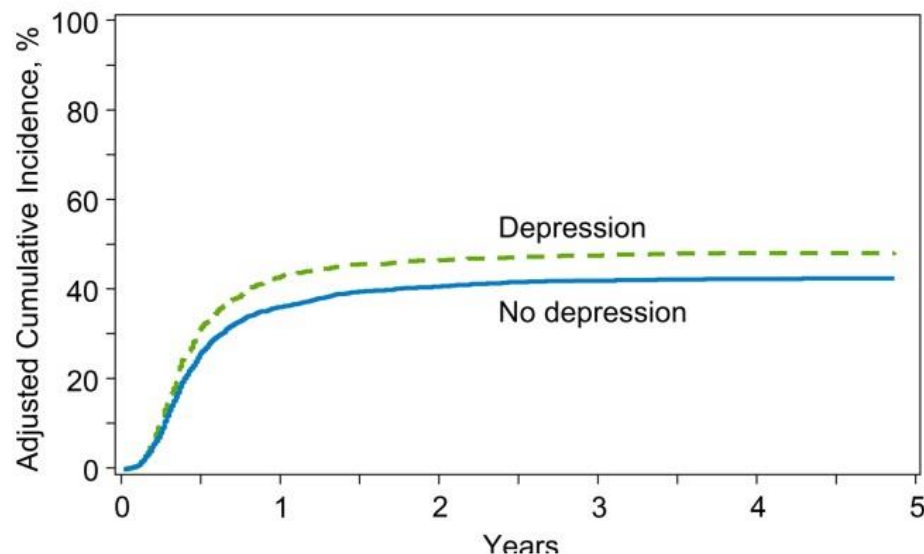


Survivors with  $\geq 3$  late effects had lower physical functioning, lower likelihood of full-time work or study, and higher likelihood of limitations on usual activities

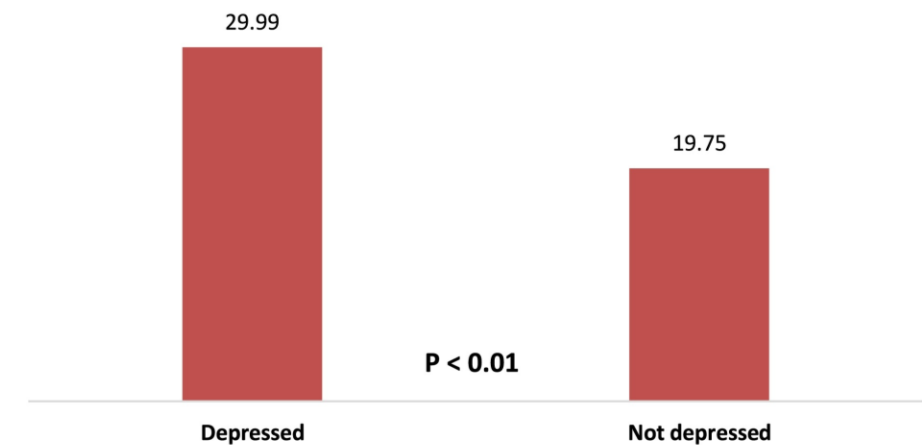
# Patient Centered Outcomes and GVHD

- Quality of Life and Graft-versus-Host Disease
  - Depression associated with survival, hospital stay, acute GVHD, chronic GVHD symptoms
  - Chronic GVHD associated with significant symptom burden and quality of life impairments; PROs are predictors of survival

## Acute GVHD



## Chronic GVHD Symptoms



*El-Jawahri et al. Cancer 2017; 123: 1828-1838*

*Palmer et al. Blood 2016; 127: 160-166*

*El-Jawahri et al. BBMT 2018; 24: 2285-2292*

# Impact of GVHD: Living with Chronic GVHD Survey

- Of 137 respondents of a survey who were identified to be potentially employable in the general workforce:



## Cognitive Disability (score 7-10 “severe”)

- Managing personal finances
- Using a computer
- Interacting socially with friends/family

**47% respondents**



## Work Disability

- Ever taken disability leave because of chronic GVHD
- Ever left a job because of chronic GVHD

**62.8% respondents**



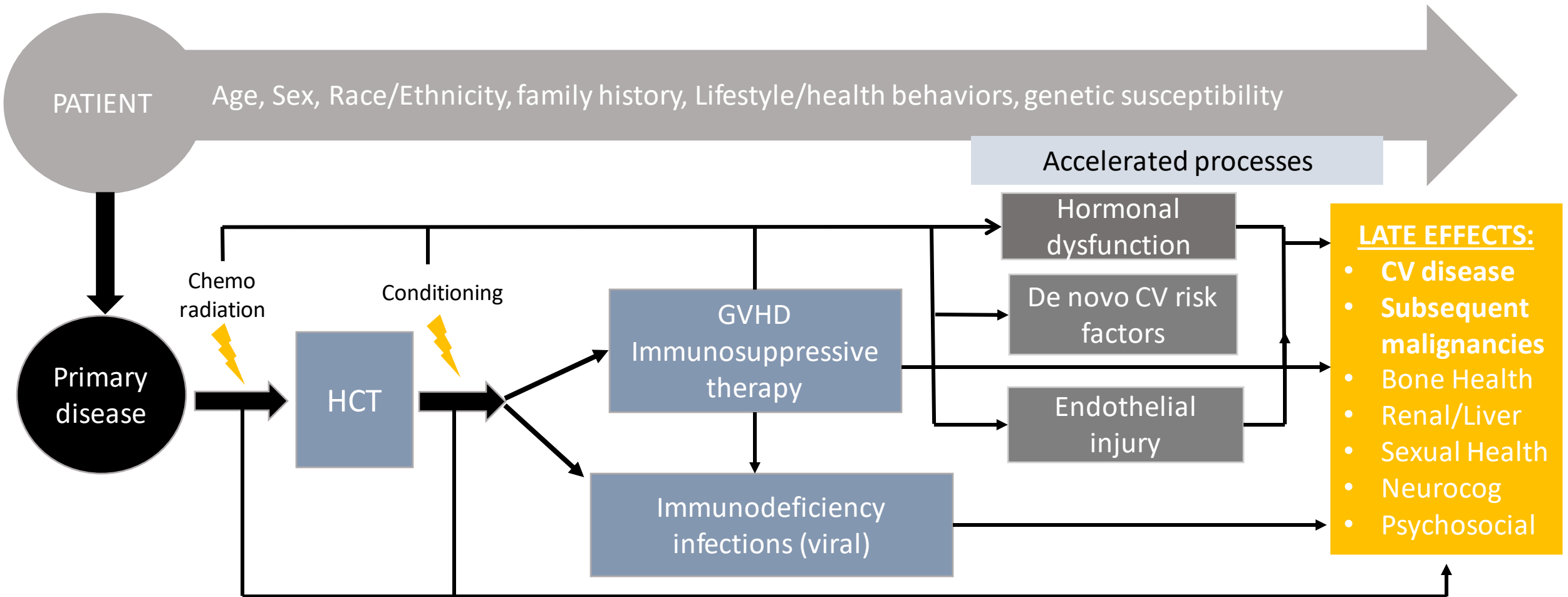
## Physical Disability (score 7-10 “severe”)

- Personal hygiene
- Dressing
- Eating
- Ability to use restroom
- Ability to move around house
- Ability to get around outside of house
- Preparing meals
- Shopping
- Housework

**67.4% respondents**

*Hamilton et al. ASH 2021 abstract*

# Understanding Mechanisms of Late Effects after HCT



# Survivorship Screening and Preventative Practices



Transplantation and  
Cellular Therapy

journal homepage: [www.astctjournal.org](http://www.astctjournal.org)



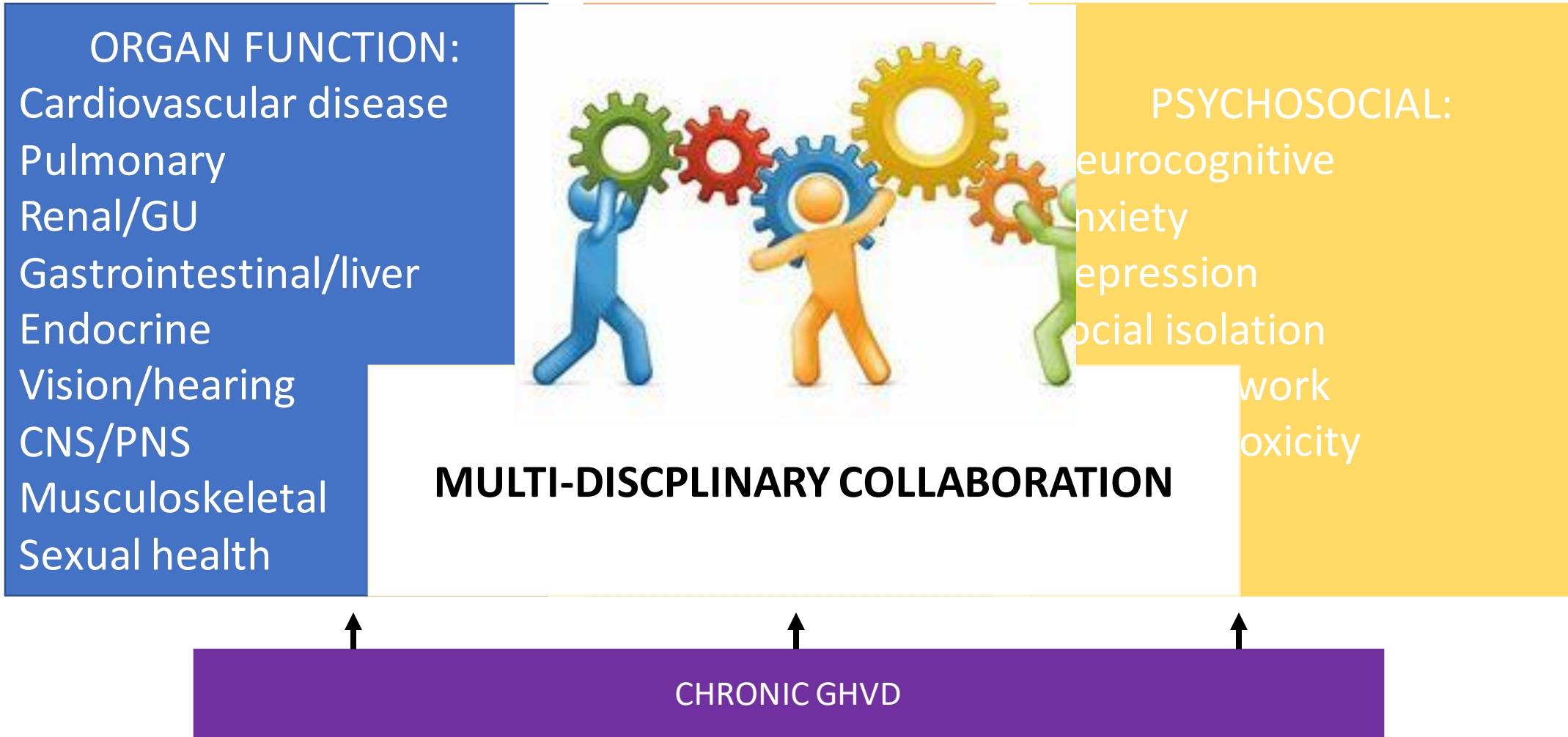
Survivorship

## International Recommendations for Screening and Preventative Practices for Long-Term Survivors of Transplantation and Cellular Therapy: A 2023 Update

Seth J. Rotz<sup>1,2,\*</sup>, #, Neel S. Bhatt<sup>3,\*</sup>, Betty K. Hamilton<sup>2</sup>, Christine Duncan<sup>4</sup>, Mahmoud Aljurf<sup>5</sup>, Yoshiko Atsuta<sup>6</sup>, Kristen Beebe<sup>7</sup>, David Buchbinder<sup>8</sup>, Peggy Burkhard<sup>9</sup>, Paul A. Carpenter<sup>3</sup>, Naeem Chaudhri<sup>10</sup>, Mohamed Elemuay<sup>11</sup>, Mahmoud Elsayw<sup>12</sup>, Gregory MT Guilcher<sup>13</sup>, Nada Hamad<sup>14</sup>, Amado Karduss<sup>15</sup>, Zinaida Peric<sup>16</sup>, Duncan Purtill<sup>17</sup>, Douglas Rizzo<sup>18,19</sup>, Morgani Rodrigues<sup>20</sup>, Maria Belén Rosales Ostriz<sup>21</sup>, Nina Salooja<sup>22</sup>, Helene Schoemans<sup>23</sup>, Adriana Seber<sup>24</sup>, Akshay Sharma<sup>25</sup>, Alok Srivastava<sup>26</sup>, Susan K Stewart<sup>27</sup>, K. Scott Baker<sup>3</sup>, Naouet S. Meikail<sup>28</sup>, Rachel Phelan<sup>19,29</sup>

Rotz et al. *Transplant Cell Ther.* 2024

# Survivorship after Allogeneic HCT

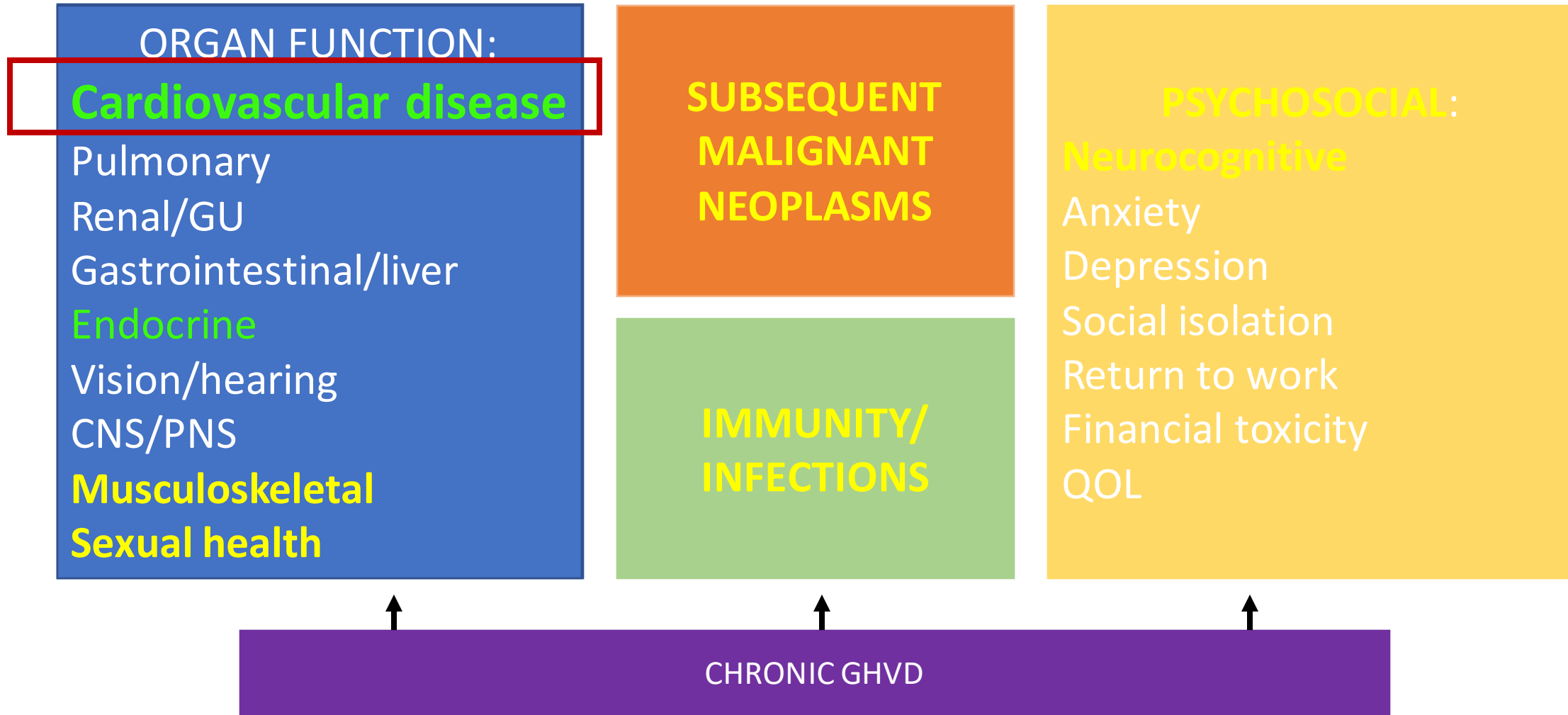


# Sessions Pertaining to Specific Late Effects

- **How to Protect your Skin After Transplant**, Silvina Pugliese MD, *Stanford University*, Saturday April 27, 2:45-3:45 pm
- **New Cancers after Transplants: Steps you Can Take to Reduce Your Risk**, Saro Armenian DO, MPH, *City of Hope*, Sunday April 28, 11:00-12:00 pm
- **Protect Your Bones after Transplant or CAR T-cell Therapy**, Sarah Keller MD, *Cleveland Clinic*, Sunday April 28, 2:45-3:45 pm
- **Women's Sexual Health after Transplant and CAR T-cell Therapy**, Jennifer Vencill, PhD, ABPP, CST, *Mayo Clinic*, Monday April 29, 11:00-12:00 pm
- **Riding the Emotional Roller Coaster of Survival**, Patricia Fank, PsyD and Mooney-Melvin LCSW, *Rush University*, Tuesday April 30, 1:30-2:30 pm
- **Don't Count Sheep! Learn How to Fall and Stay Asleep**, Rini Fox PhD, MPH, *University of Arizona College of Nursing*, Monday April 29, 1:30-2:30 pm
- **Addressing Cognitive Challenges after Transplant and CAR T-cell Therapy**, Thomas Bergquist PhD, LP, ABPP, *Mayo clinic*, Thursday May 2, 11:00-12:00 pm
- **Living Well after Treatment: Coping with Fatigue**, Erin Costanzo PhD, *UW Health Carbone Cancer Center*, Friday May 3, 11:00-12:00 pm
- **Managing Infections after Transplant and CAR T-cell Therapy**, Erik Dubberke Md, MSPH, *Washington University*, Friday May 3, 11:00-12:00 pm



# Survivorship after Allogeneic HCT

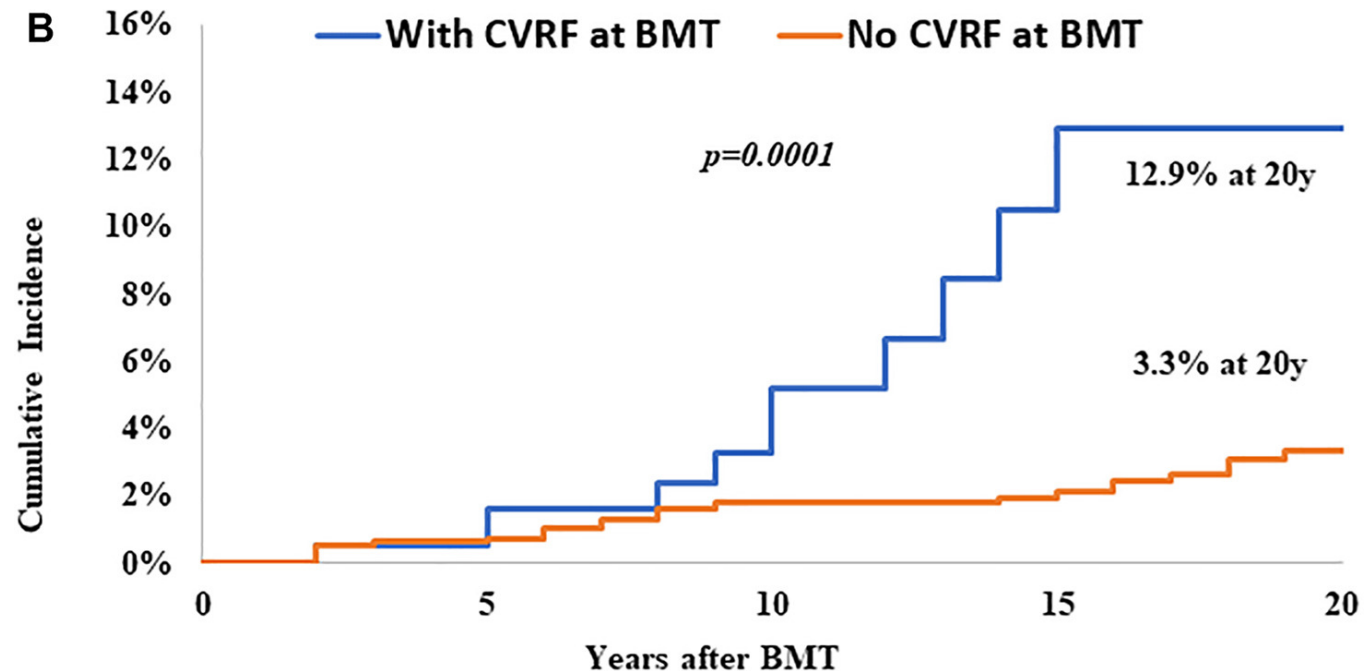


# Cardiovascular Disease and Metabolic Syndrome

- Risk of cardiovascular-related events post transplant increased 2.3-3.7 fold compared to general population
- Metabolic syndrome 31-49% post HCT
  - Obesity
  - Dyslipidemia
  - Insulin resistance/diabetes
  - Hypertension

# Risk of Coronary Heart Disease in HCT Survivors

- Allogeneic transplant survivors were at 2.07-fold higher odds of coronary heart disease compared to siblings
- Cardiovascular risk factors (CVRF): diabetes, HTN, dyslipidemia

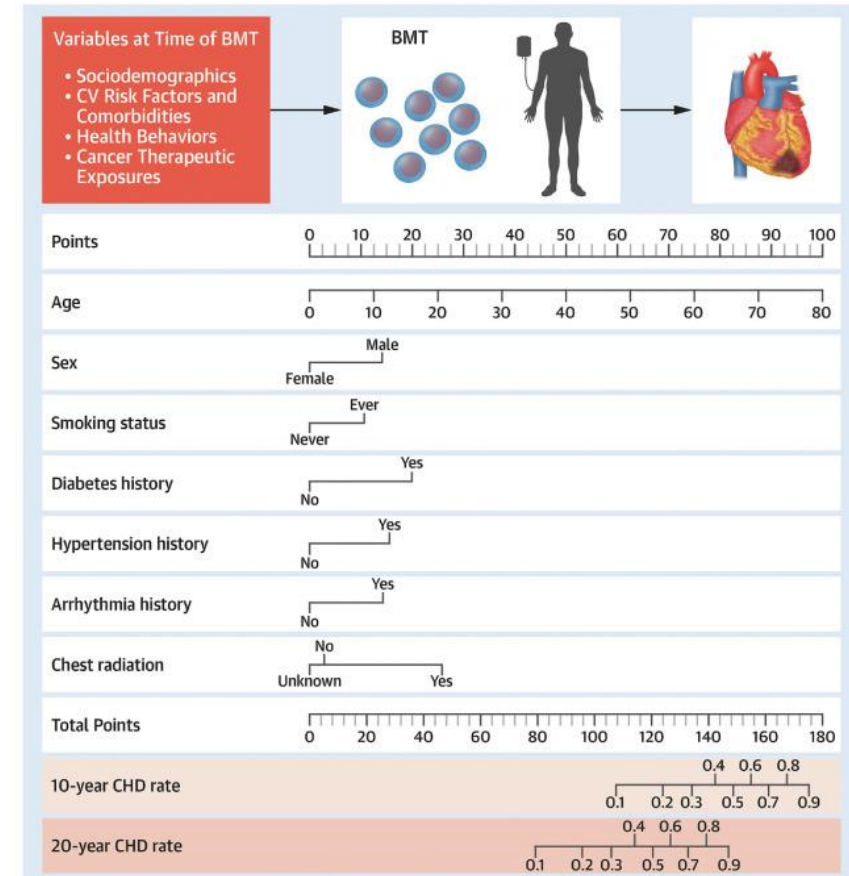


Gangaruaju et al. JACC: CardioOnc. 2023 May 16; 5(4): 504-517

# Other factors important in HCT patients

- Prior exposure to anthracycline chemotherapy
- Chest radiation
- GVHD?

**CENTRAL ILLUSTRATION: Risk Prediction Nomogram for Coronary Heart Disease After Blood or Marrow Transplantation**



Gangaraju R, et al. *J Am Coll Cardiol CardioOnc.* 2023;5(4):504-517.

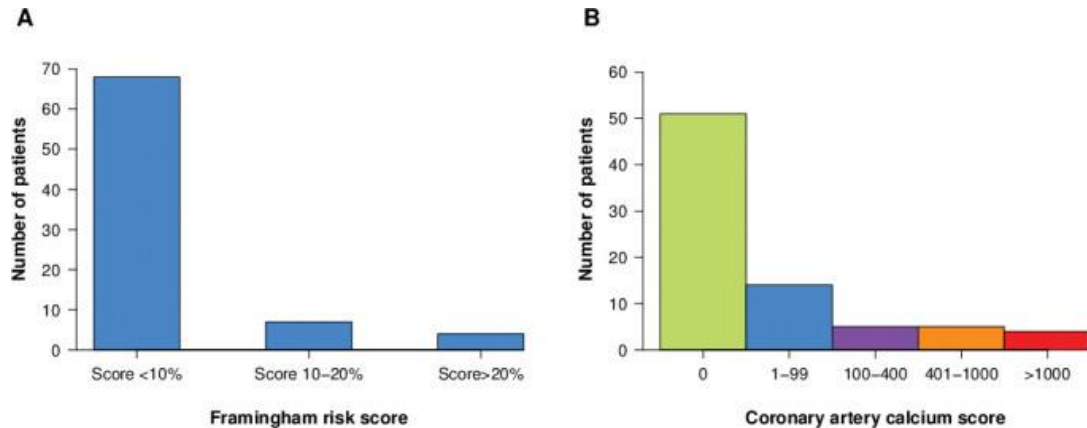
# Cardiovascular Disease and Metabolic Syndrome

Risk Factor	NCEP ATP III Definition for Metabolic Syndrome ( $\geq 3$ risk factors)	Screening Guidelines	Preventative practice and treatment guidelines
Weight, height, Body mass index (BMI)	Waist circumference: Men: >102 cm (>40 inches) Women: >88 cm (>35 in)	<b>Weight, height and BMI assessment at every clinic visit (at least yearly)</b> Waist circumference measurement yearly	<b>BMI <math>\geq 30</math> kg/m<sup>2</sup>, waist circum &gt;40 men or &gt;35 women</b> <b>Discuss interventions to maintain healthy weight by reducing caloric intake and increasing physical activity.</b> -Nutrition consult -Assess access to facilities for physical activity
Abnormal cholesterol Triglycerides  HDL cholesterol	<b><math>\geq 150</math> mg/dL or on treatment for elevated levels</b>  Men: <40 mg/dL or on treatment Women: <50mg/dL or on treatment	<b>Lipid profile</b>  -For high risk patients: (ongoing risk factors: sirolimus, CNI, corticosteroids)- repeat evaluation every 3-6 months. -For patients with elevated cholesterol but not warranting therapy, and/or other risk factors (personal history, family history, history of TBI, hx or current GVHD, use of steroids, repeat evaluation at 6 months, 1 year, and yearly thereafter -For patients with no risk factors lipid profile every 5 years.	-Assess overall cardiovascular risk <a href="http://tools.acc.org/ASCVD-Risk-Estimator-Plus/#!/calculate/estimate/">http://tools.acc.org/ASCVD-Risk-Estimator-Plus/#!/calculate/estimate/</a> according to age group <b>-Emphasis on adherence to healthy lifestyle</b> <b>-Statin therapy is first-line treatment for primary prevention of CVD</b> in patients with elevated LDL ( $\geq 190$ mg/dL), those with DM, who are 40-75 years of age, and those at sufficient CV risk; with the goal of achieving reductions in LDL. -Use of fibrate should be considered for TG>500

# Cardiovascular Disease and Metabolic Syndrome

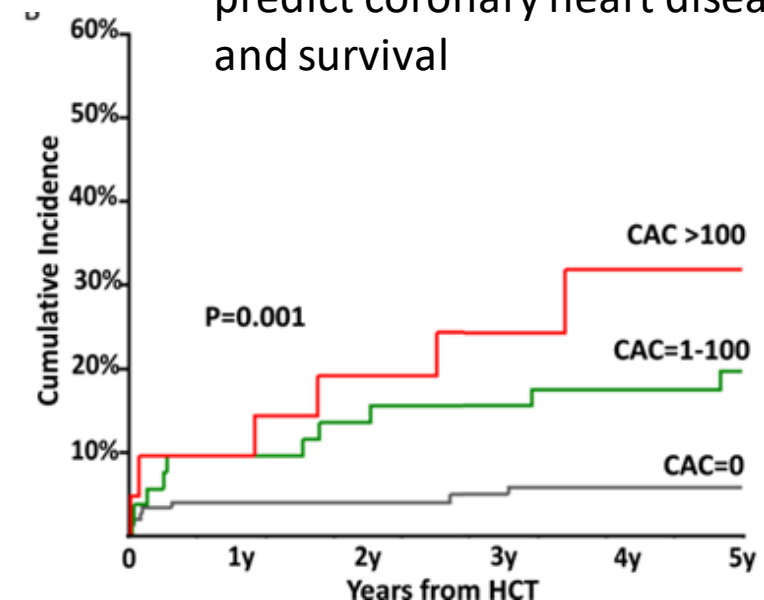
Risk Factor	NCEP ATP III Definition for Metabolic Syndrome (≥3 risk factors)	Screening Guidelines	Preventative practice and treatment guidelines
<b>Blood pressure</b>	≥130/≥85 mmHg or on treatment for HTN	<b>BP assessment at every clinic visit</b> -at least yearly for patients with normal BP (<120/80 mmHg) -every 3-6 months for elevated blood pressure (120-129/<80 mmHg)	-Elevated BP (120-129/<80 mmHg): Non-pharmacologic treatments - <b>Stage I HTN (BP 130-139/80-89 mmHg)</b> : non-pharmacologic therapy, OR if estimated 10-y CVD risk ≥10%, consider BP lowering medication - <b>Stage 2 HTN (BP ≥140/90 mmHg)</b> , pharmacologic therapy (thiazide or ACE/ARB if CKD/DM) is indicated
<b>Hyperglycemia</b>	≥100mg/dL fasting or on treatment for DM	<b>Screening for fasting glucose or HgbA1c</b>  Repeat evaluation every 3-6 months for patients with abnormal levels or those on steroids. For standard risk patients, screen for fasting glucose or HgbA1C every 3 years.	For impaired fasting glucose (glucose 100-126), encourage weight loss and increased physical activity <b>For DM, defined by fasting glucose of ≥126mg/dL, HgbA1c ≥6.5% or random glucose ≥ 200mg/dL</b> ; encourage lifestyle modification as above, and pharmacotherapy (first line metformin, consider SGLT-2 inhibitor or GLP-1R), as needed, to achieve HgbA1C <7%.

# Gaps and Emerging Cardiovascular Research in Cancer Survivorship



- 79 allogeneic HCT survivors
- Coronary heart disease detected in 42% of subjects
- Framingham risk score was less predictive than calcium scores

243 autologous HCT survivors:  
coronary artery calcium scores  
predict coronary heart disease  
and survival



Jain et al. *Clin Hematol Int* 2020 Sep; 2(3): 109-116  
Wu et al. *Cancer* 2024 Feb 15

# Emerging Cardiovascular Research in Cancer Survivorship

**JAMA**

**QUESTION** Does 1 year of treatment with atorvastatin, 40 mg/d, started prior to anthracycline-based chemotherapy among patients with lymphoma, reduce the chance of a significant decrease in left ventricular ejection fraction (LVEF) compared with placebo?

**CONCLUSION** Among patients with lymphoma treated with anthracycline-based chemotherapy, atorvastatin reduced the incidence of cardiac dysfunction.

**POPULATION**  
158 Men  
142 Women  
Patients with lymphoma scheduled to receive anthracycline-based chemotherapy  
Mean age: 50 years

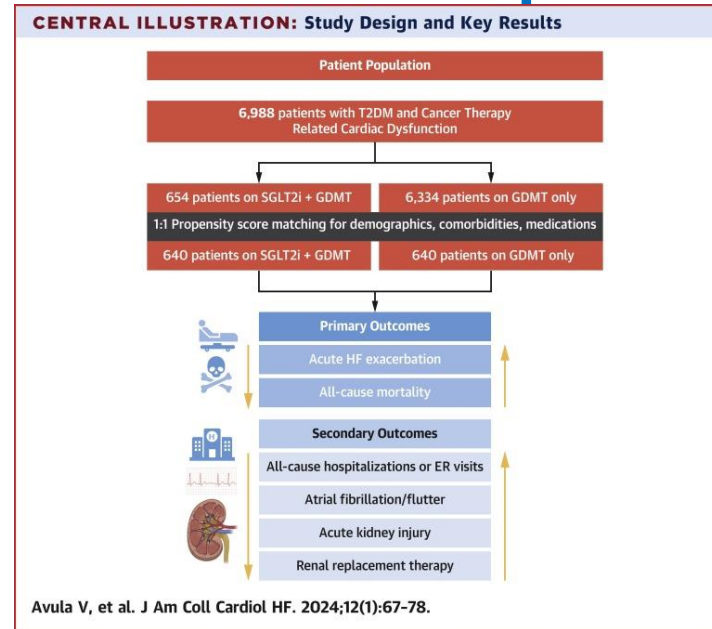
**LOCATION**  
9 Academic medical centers in the US and Canada

**INTERVENTION**  
300 Patients randomized  
150 Atorvastatin (Oral atorvastatin, 40 mg/d, for 12 mo starting prior to first scheduled anthracycline infusion)  
150 Placebo (Oral placebo for 12 mo starting prior to first scheduled anthracycline infusion)

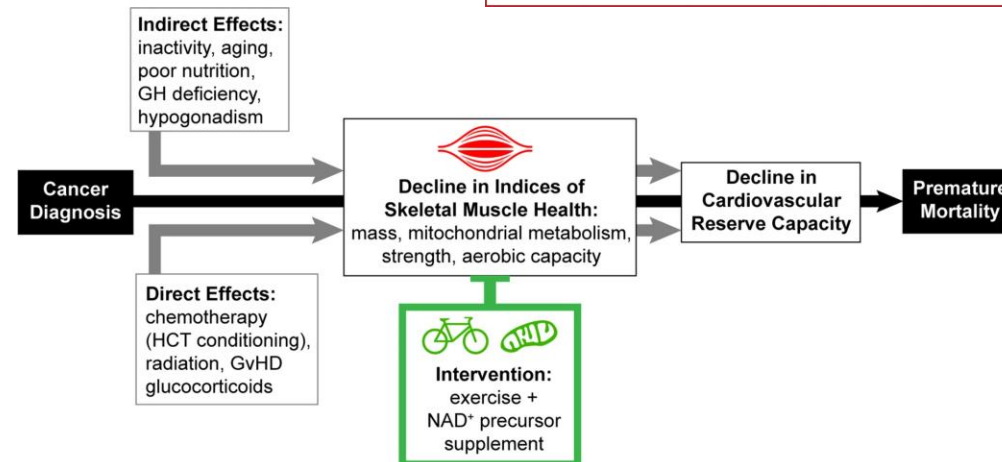
**FINDINGS**  
Incidence of primary outcome  
Atorvastatin: 13 of 150 patients (9%)  
Placebo: 33 of 150 patients (22%)  
Atorvastatin significantly reduced the risk of the primary outcome:  
Odds ratio of outcome with placebo vs atorvastatin, 2.9 (95% CI, 1.4 to 6.4)

**PRIMARY OUTCOME**  
Incidence of an absolute decline in LVEF  $\geq 10\%$  from prior to chemotherapy to a final value of  $< 55\%$  over 12 months

Neilan TG, Quinaglia T, Onoue T, et al. Atorvastatin for anthracycline-associated cardiac dysfunction: the STOP-CA randomized clinical trial. JAMA. Published August 8, 2023. doi:10.1001/jama.2023.11887



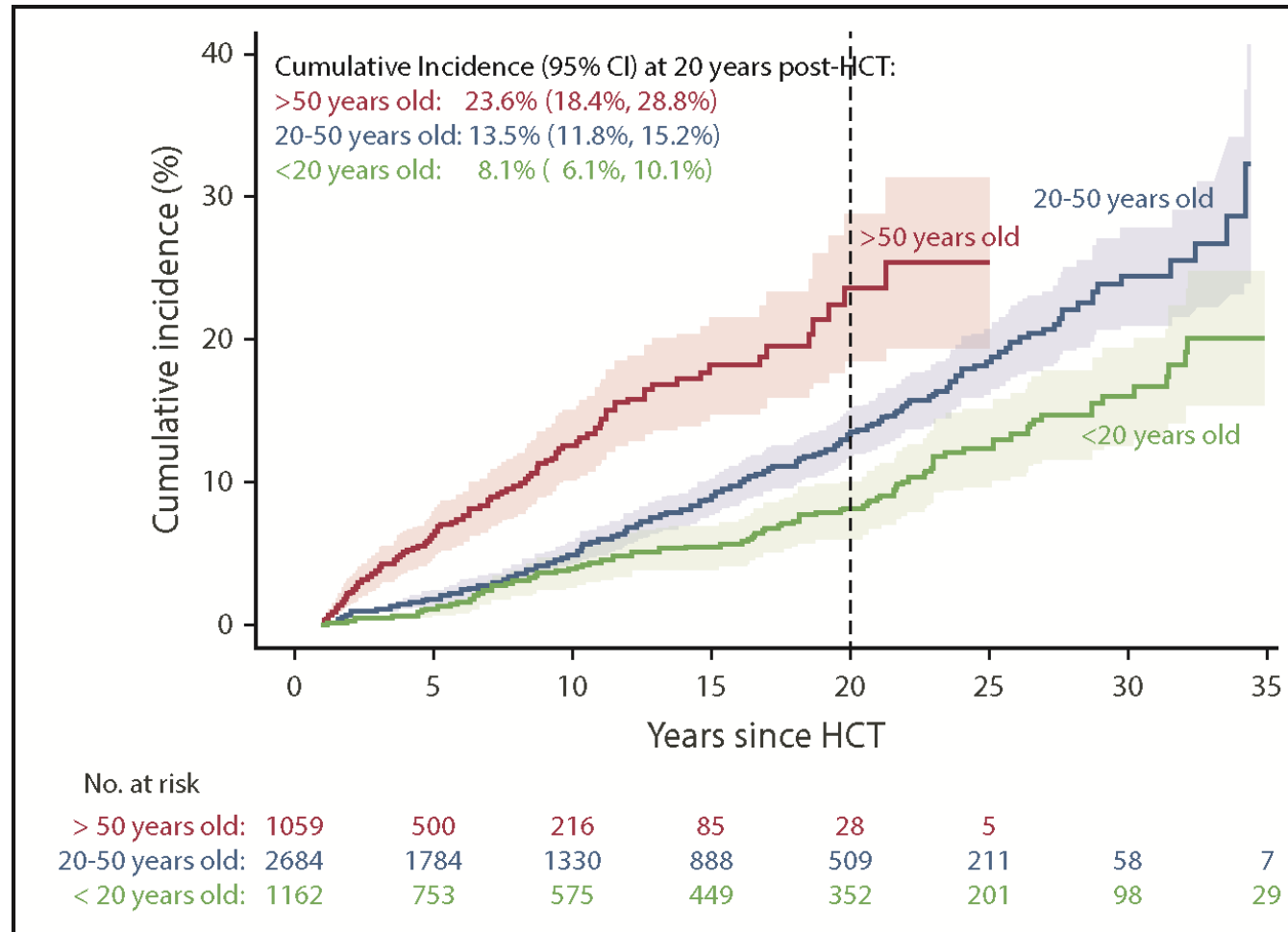
Pharmacologic interventions in cancer survivors



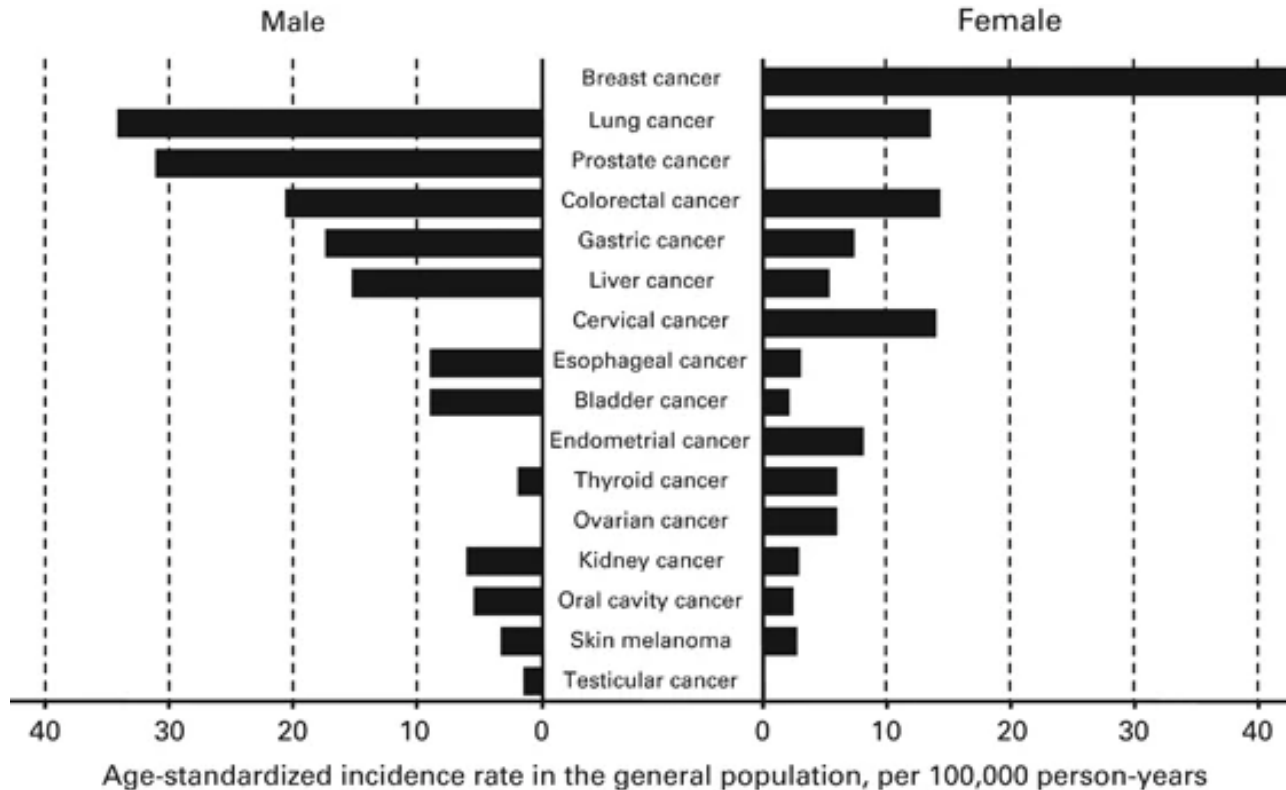
Avula et al. JACC Heart Fail 2024 Jan; 12(1): 67-78  
Neilan et al. JAMA 2023 Aug 8; 330(6): 528-536  
Song et al. BMC Cancer 2022 Jul 19; 22(1):795



# Late Effects/Second Cancers after HCT



# Subsequent Malignancies after Allogeneic HCT



## INCIDENCE AFTER HCT:

- Skin cancer
  - Any skin SIR 7.2
  - Melanoma SIR 1.4-8.3
- Oral cavity cancer SIR 7.3-17
- Thyroid cancer SIR 5.8-6.6
- Esophageal cancer SIR 8.5-11
- Liver cancer SIR 6.3-28

# Subsequent Malignancies after Allogeneic HCT

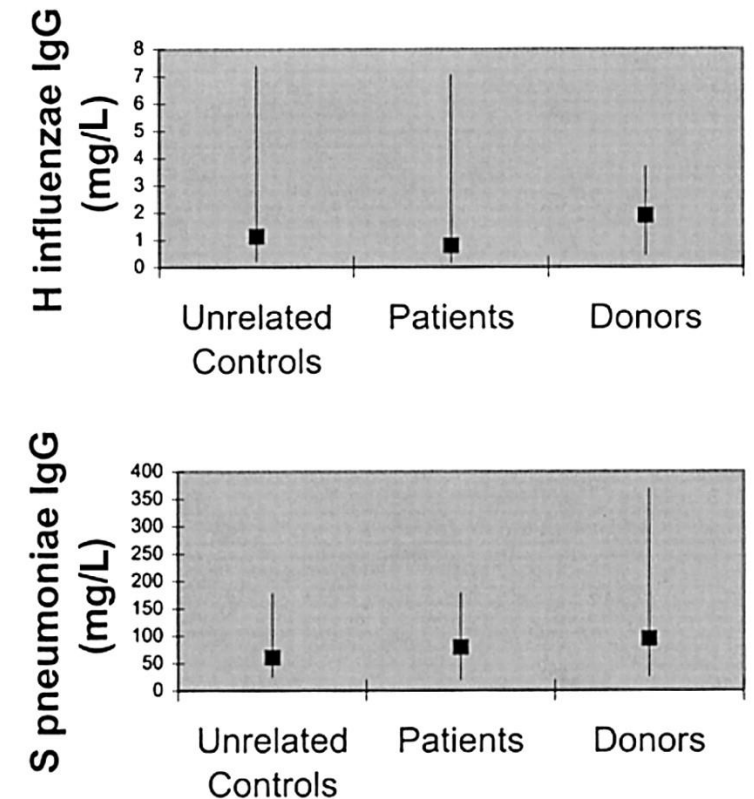
Site	Risk Factors	Screening and Prevention Recommendations
<b>Skin (SCC and BCC, melanoma)</b>	Acute and Chronic GVHD, Myeloablative TBI, HCT at age <18, White, T-cell depletion	<b>Routine skin examination (at least annually)</b> , dermatology consult for suspicious lesions, Sunscreen use
<b>Thyroid</b>	TBI, female, HCT at age <20, chronic GVHD	Annual exam
<b>Oropharyngeal</b>	Chronic GVHD, prolonged immunosuppressive therapy (>24 mos), history of localized field irradiation, HCT at age <10, male, tobacco use, HPV status	<b>Screening every 6-12 months</b> depending on risk factors <b>Dental exam every 6 months.</b> Cessation of tobacco product use <b>HPV vaccination as indicated</b>
<b>Esophageal</b>	Chronic GVHD, prolonged immunosuppressive therapy (>24 mos)	No specific guidelines for screening, but symptom based: upper GI endoscopy for patients with persistent GERD or dysphagia symptoms.
<b>Liver</b>	TBI, HCT at younger age (<34 years), liver cirrhosis, chronic hepatitis C infection	No specific guidelines for screening those at low risk. For those with cirrhosis or chronic hepatitis, consider AFP and U/S every 6-12 months

# Subsequent Malignancies after Allogeneic HCT

Site	Risk Factors	Screening and Prevention Recommendations
Lung	Tobacco use	Screening with low-dose CT considered for high risk groups only: <ul style="list-style-type: none"> <li>- &gt;55 years and ≥30 pack-year smoking history (excluding those who quit smoking &gt;15 years ago)</li> <li>- ≥50 and ≥20 pack-year smoking history with additional risk (e.g., radon exposure and secondhand smoke)</li> </ul>
Breast	<p><b>New Cancers after Transplants: Steps you Can Take to Reduce Your Risk, Saro Armenian DO, MPH, <i>City of Hope</i>, Sunday April 28, 11:00-12:00 pm</b></p>	mammography annual breast exam, annual
Cervical	immunosuppressive therapy, age >34 years	HPV vaccination as indicated
Gastrointestinal (stomach/colorectal)	None reported	Stomach- no specific guidelines but symptom based: upper GI endoscopy for symptoms Colorectal-Starting at ≥50 years of age (average risk) Sigmoidoscopy: every 5 years +/- stool testing Colonoscopy: every 10 years Guiac-based: annually or Cologuard: every 3 years

# Immunity and Late Infections after Allogeneic HCT

- In a study of 72 patients surviving 20-30 years after HCT, similar levels of antibodies. Overall, immunity in long-term survivors normal/near normal.
- However, in adult and pediatric HCT recipients surviving 2-years, post HCT late fatal infection contributed to one-third of all deaths
  - Older age
  - Chronic GVHD on immunosuppression
  - Unrelated donors
- Vaccine preventable infections occurred in 7% of patients



Storek et al. Blood 2001; 98 (13):3505-3512

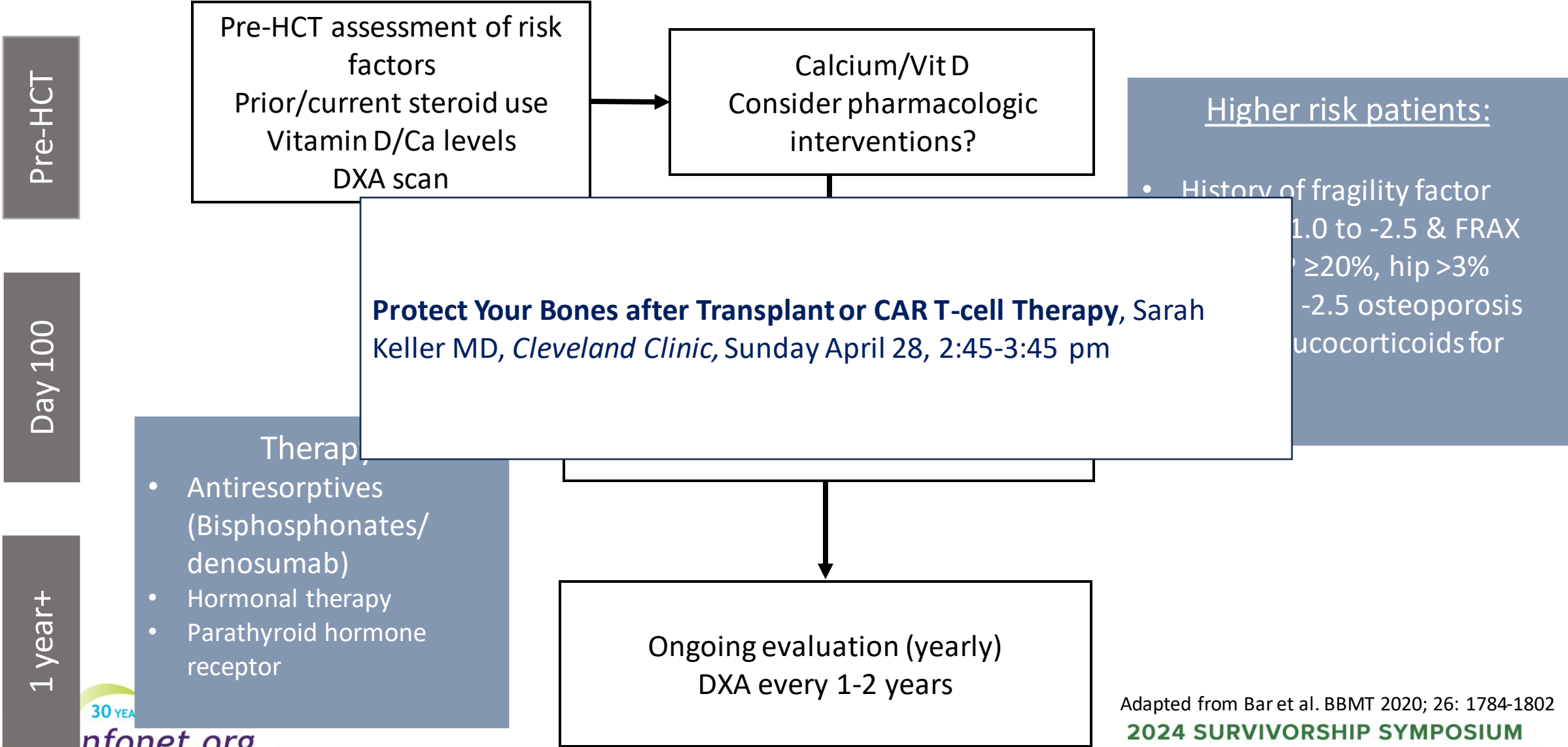
# Infection/Immunity: Vaccine Preventable Diseases after Allogeneic HCT

Vaccine	3 months	6 months	8 months	10 months	12 months	24 months
Pneumonia		X	X	X	X (cGVHD)	
Human Papilloma Virus (HPV)					X (<26 yrs)	
Hepatitis A and B	<b>Managing Infections after Transplant and CAR T-cell Therapy</b> , Erik Dubberke Md, MSPH, <i>Washington University</i> , Friday May 3, 11:00-12:00 pm					
Polio						
Tetanus/diphtheria						
Haemophilus						
Meningococcus						
Shingles (Shingrix)				X	X	
MMR						X (off IS)
Varicella (Varivax)						X (off IS)
Influenza	X (annually)					
COVID	X					
RSV	X					

# Bone Health after Allogeneic HCT

- Osteoporosis or low bone mineral mass occurs in 50-75% of patients after HCT.
- Bone loss and fracture manifest as pain and loss of function and have a significant negative impact on quality of life.
- The majority of bone loss occurs within 3-6 months after transplant
- Risk factors: age, female sex, hypogonadism, nutritional deficiencies, lack of physical activity, liver/kidney disease, glucocorticoid exposure.

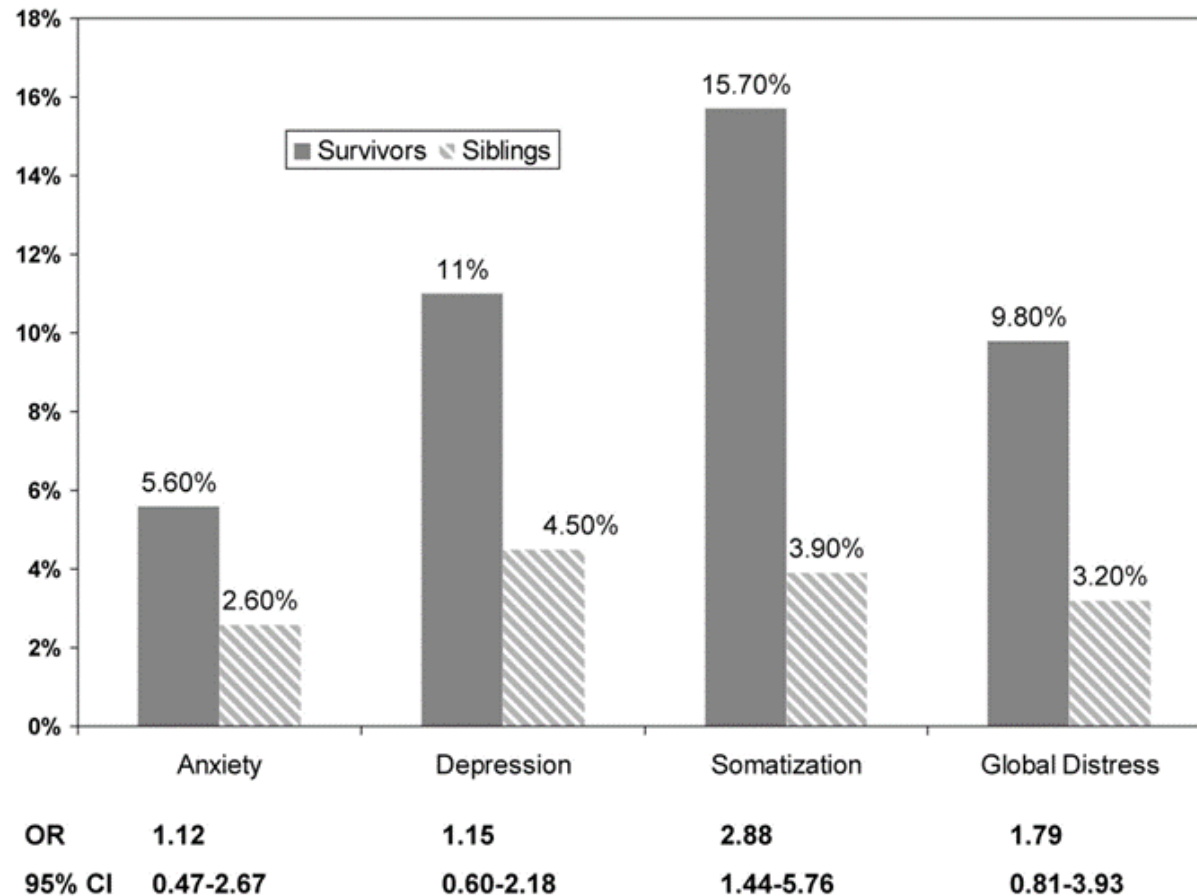
# Bone Health after Allogeneic HCT





# Adverse psychological outcomes after Allogeneic HCT

- Psychological health status was assessed among long-term HCT survivors and their siblings
- Exposure to prednisone was associated with psychological distress
- Low household income and self-reported poor health, active chronic GVHD associated with 2-fold increase of somatic distress



Sun et al. Blood 2011; 118(17): 4723-4731

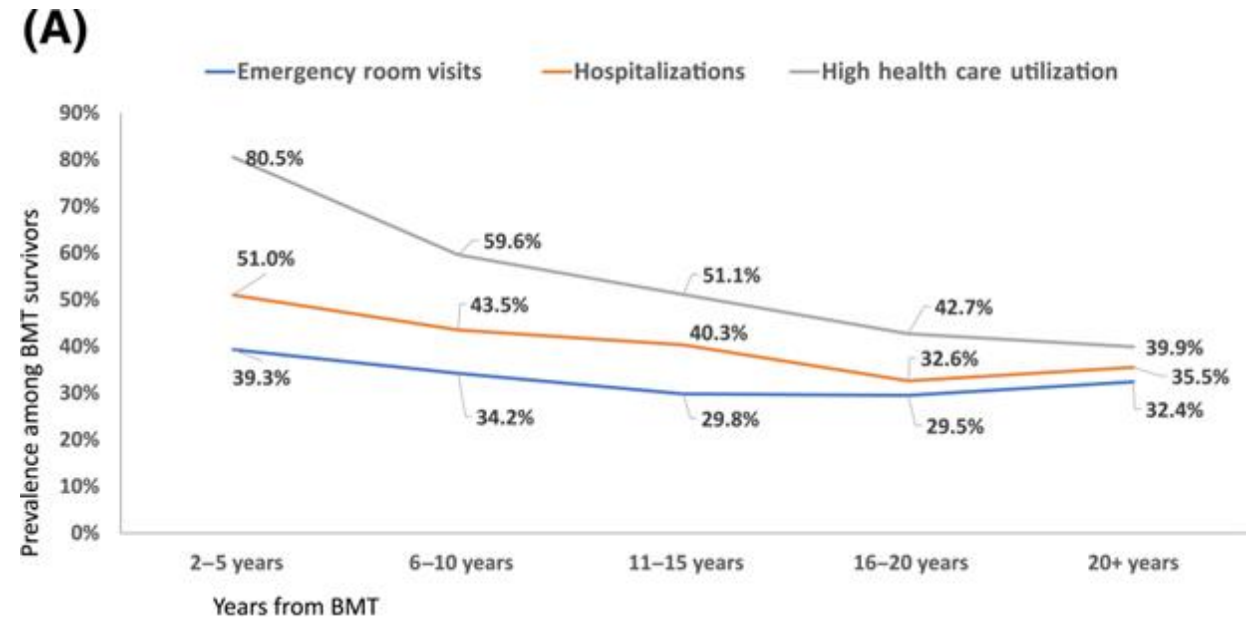
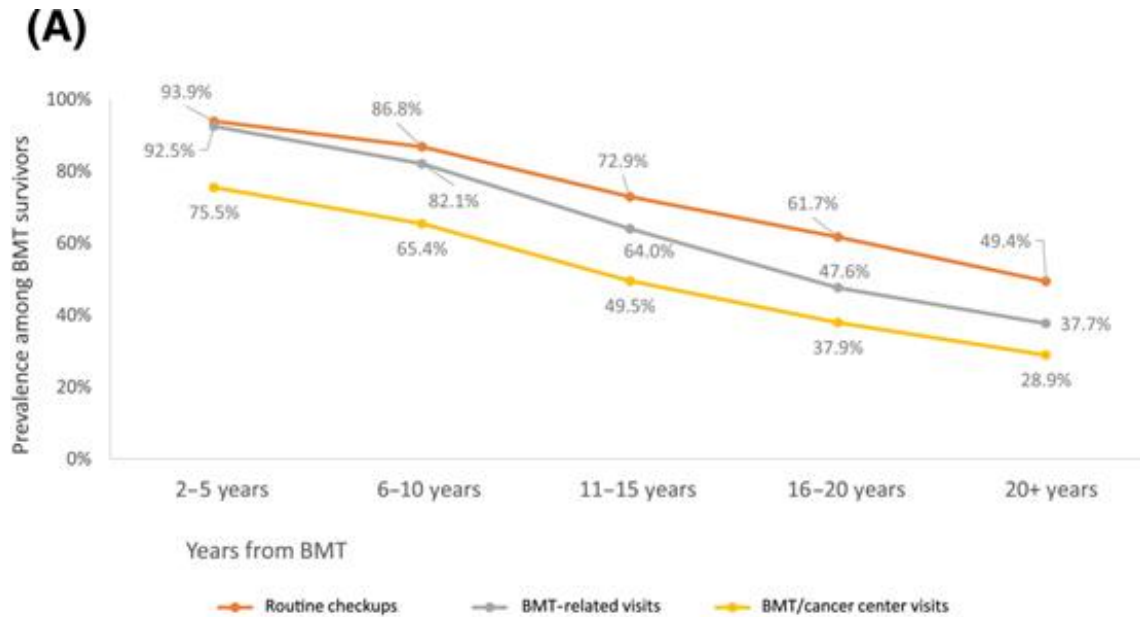
# Other Late Effects after Allogeneic HCT

Late effect	Symptoms	Risk Factors	Screening	Intervention
Hypothyroid	Fatigue, dry skin, weight gain, depression	Radiation, chemotherapy	Annual thyroid hormone levels (TSH, T4)	Thyroid hormone replacement
Hypogonadism	Low libido, fatigue, vaginal dryness/pain, erectile dysfunction, infertility	High dose radiation, chemotherapy	Estradiol, FSH, LH, testosterone	Hormone replacement (if safe), referral to gyn/urology
Iron overload	Abdominal pain, organ dysfunction, musculoskeletal pain	Frequent blood transfusions	Ferritin, transferritin saturation, MRI	Iron chelation, phlebotomy
Peripheral neuropathy	Numbness, tingling, burning, cold/sensitivity	Chemotherapy, neurotoxic medications, diabetes	Clinical assessment, treatment of underlying disorders	Treatment of underlying disorders, (non)-pharmacologic therapies (gabapentin, “scrambler”)

# Other Late Effects after Allogeneic HCT

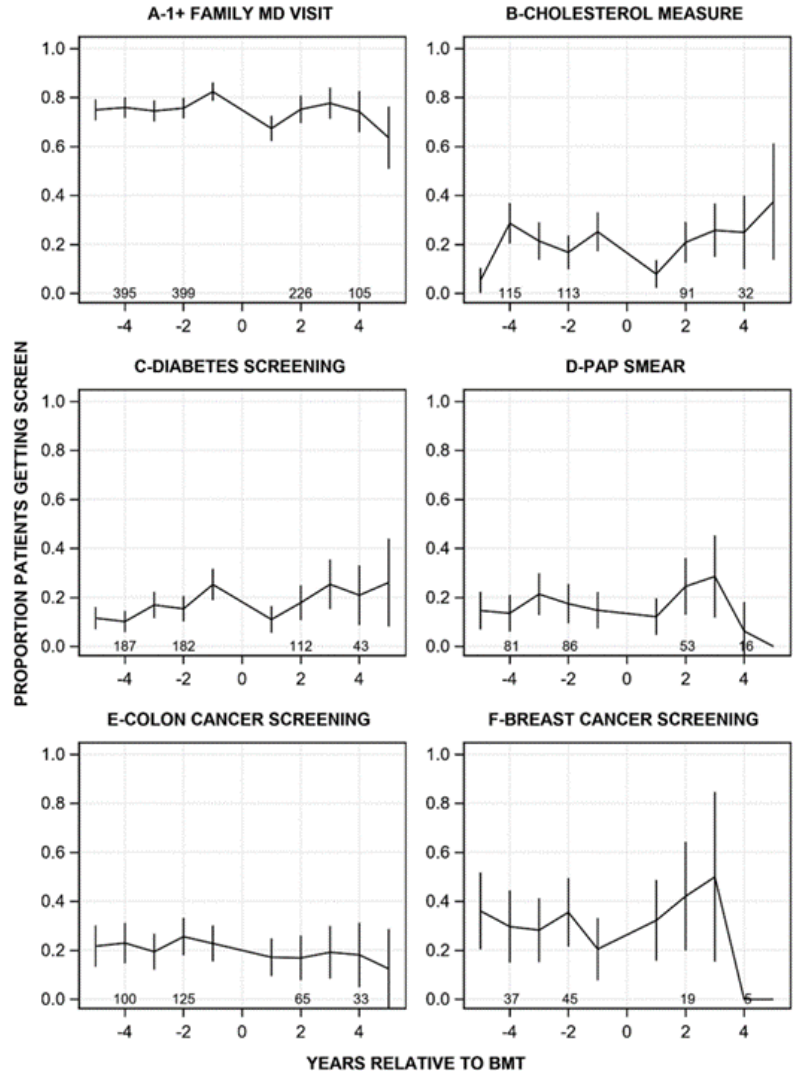
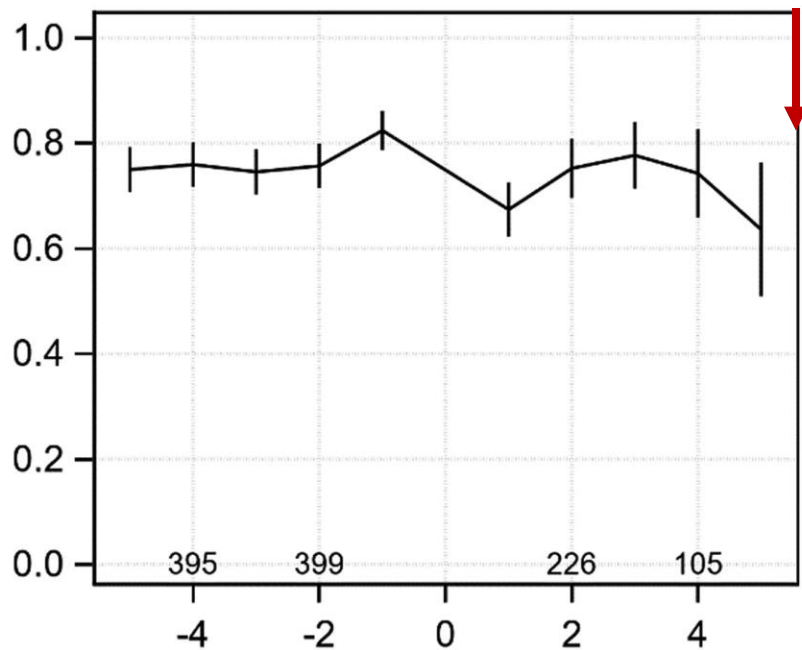
Late effect		Intervention
Neurocognitive dysfunction	<p><b>Women’s Sexual Health after Transplant and CAR T-cell Therapy</b>, Jennifer Vencill, PhD, ABPP, CST, <i>Mayo Clinic</i>, Monday April 29, 11:00-12:00 pm</p> <p><b>Riding the Emotional Roller Coaster of Survival</b>, Patricia Fank, PsyD and Mooney-Melvin LCSW, <i>Rush University</i>, Tuesday April 30, 1:30-2:30 pm</p>	Address reversible contributors (depression, poor sleep, medications), cognitive rehab, modafinil, methylphenidate
Muscle cramping	<p><b>Don’t Count Sheep! Learn How to Fall and Stay Asleep</b>, Rini Fox PhD, MPH, <i>University of Arizona College of Nursing</i>, Monday April 29, 1:30-2:30 pm</p> <p><b>Addressing Cognitive Challenges after Transplant and CAR T-cell Therapy</b>, Thomas Bergquist PhD, LP, ABPP, <i>Mayo clinic</i>, Thursday May 2, 11:00-12:00 pm</p>	Hydration, treat electrolyte abnormalities, magnesium, stretching, quinine
Fatigue	<p><b>Living Well after Treatment: Coping with Fatigue</b>, Erin Costanzo PhD, <i>UW Health Carbone Cancer Center</i>, Friday May 3, 11:00-12:00 pm</p>	Treat underlying abnormalities, exercise, referral to pall med/support onc
Anxiety/Depression		Referral to behavioral health, pharmacologic and non-pharmacologic intervention

# Health care utilization after Allogeneic HCT



# Health Maintenance after Allogeneic HCT

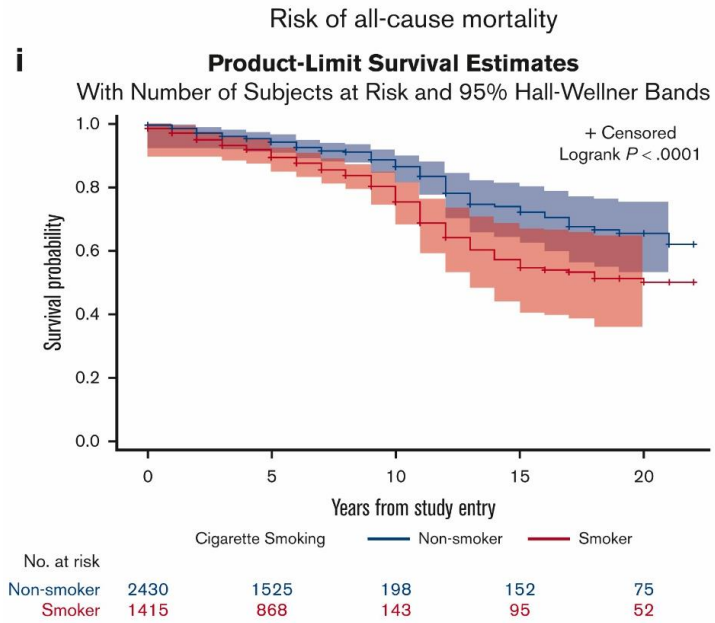
A-1+ FAMILY MD VISIT



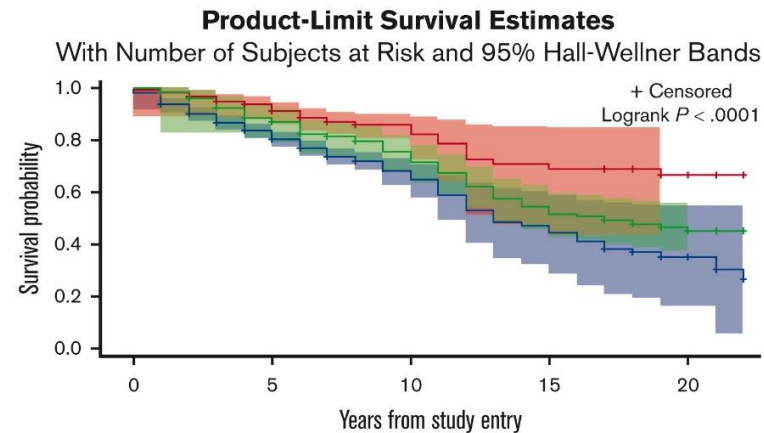
- Pre-HCT, 75-80% of patients had at least 1 annual visit with PCP
- By the 5<sup>th</sup> year post-HCT, 36% of survivors did not visit PCP
- Routine health screening rates are LOW

Fulcher et al. *Transplant Cell Ther.* 2023; 29:131. e1-e6

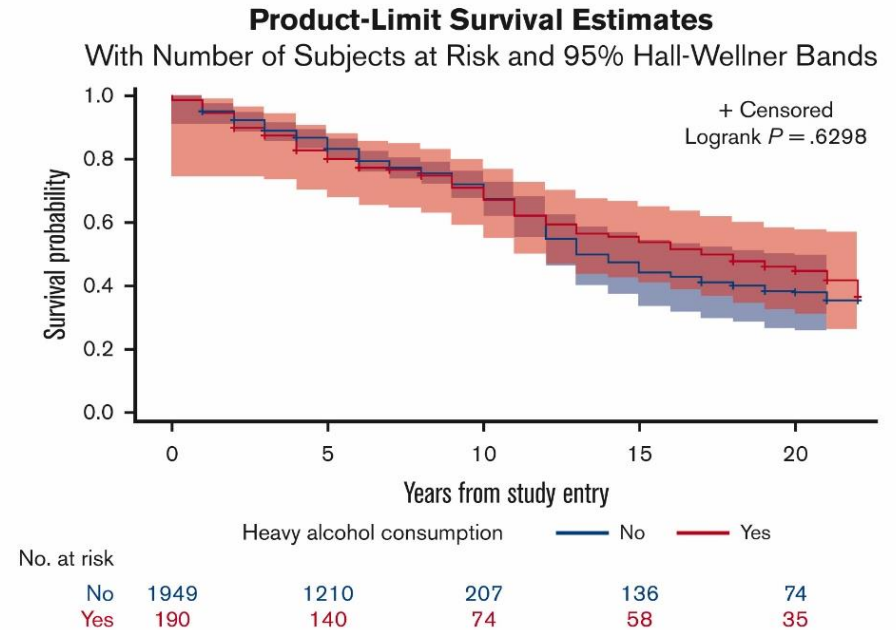
# Risky Health Behaviors and Subsequent Late Mortality



Smoking and mortality risk



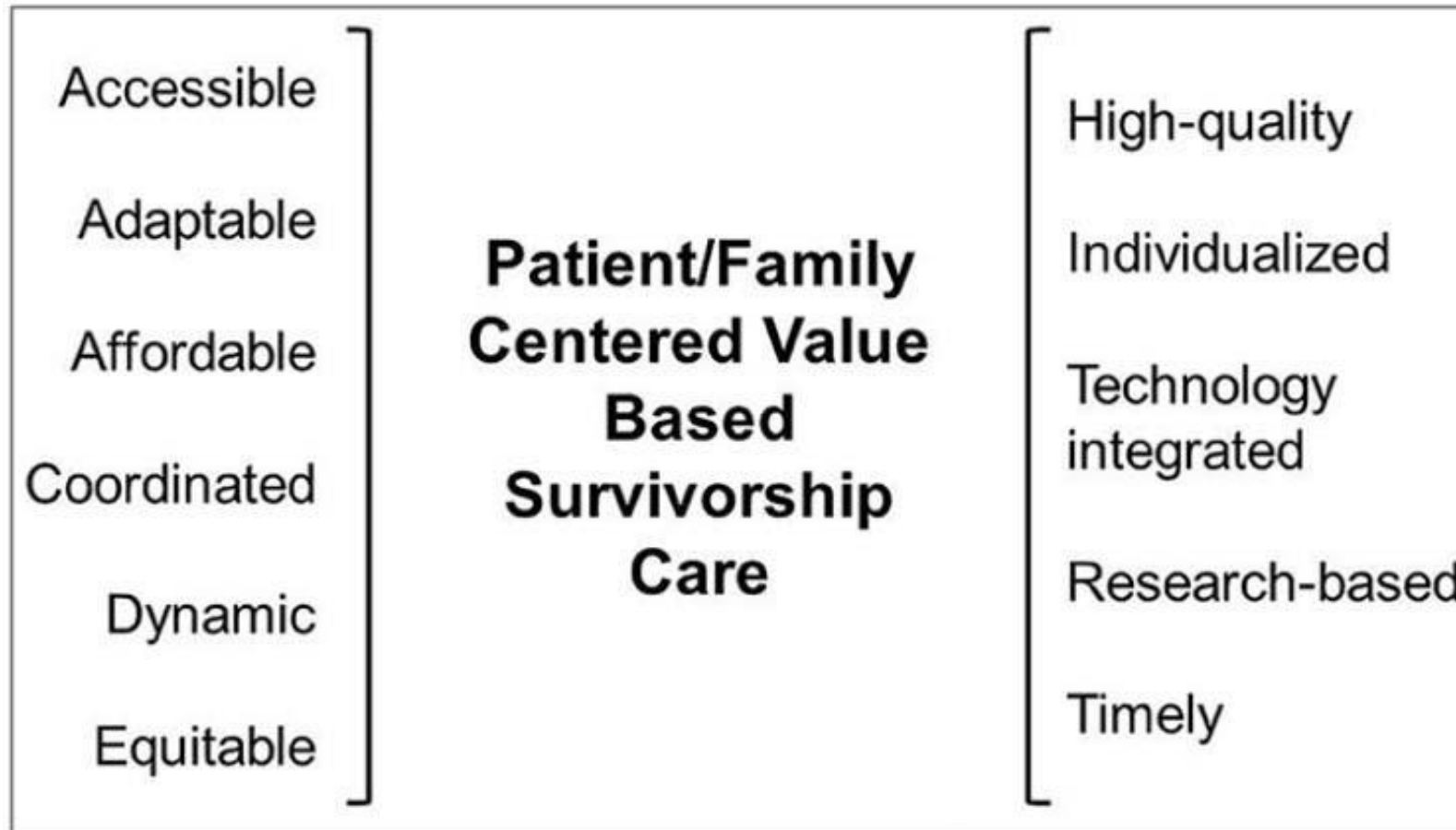
Activity level and mortality risk



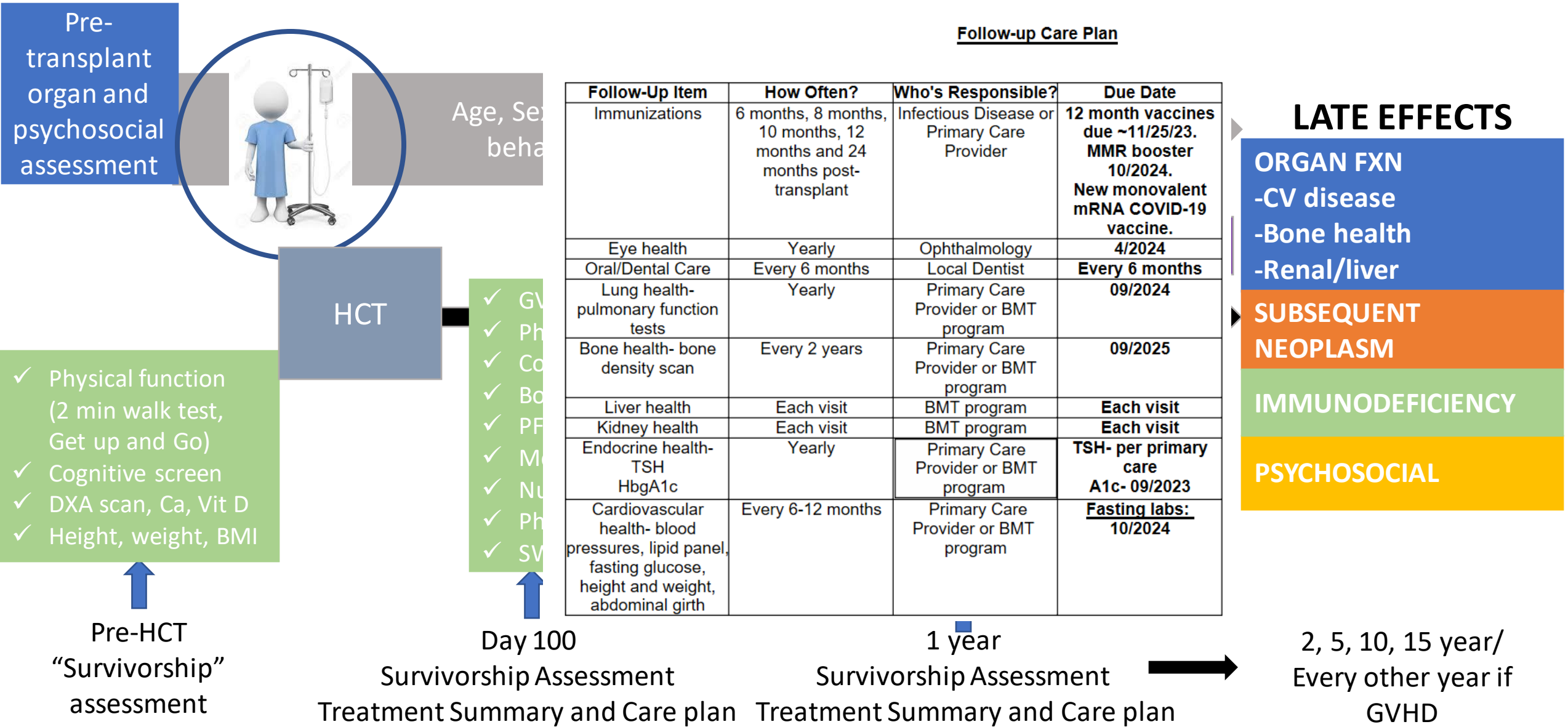
Heavy alcohol and mortality risk

Balas et al. Blood Adv 2023 Nov 28; 7(22):7028-2044

# Survivorship after Allogeneic HCT



# Survivorship after Allogeneic HCT





# Resources: Return to Work/School

## Returning to work:

- [bethematch.org/patients-and-families/life-after-transplant/coping-with-life-after-transplant/returning-to-work/](https://bethematch.org/patients-and-families/life-after-transplant/coping-with-life-after-transplant/returning-to-work/)
- [anthonymolan.org/patients-and-families/recovery-life/returning-work](https://anthonymolan.org/patients-and-families/recovery-life/returning-work)

## Employment and Financial Health:

- [bmtinfonet.org/transplant-article/employment-and-financial-health](https://bmtinfonet.org/transplant-article/employment-and-financial-health)

## Going back to school:

- [bethematch.org/patients-and-families/transplant-for-children-and-teens/going-back-to-school/](https://bethematch.org/patients-and-families/transplant-for-children-and-teens/going-back-to-school/)
- [anthonymolan.org/patients-and-families/recovery-life/returning-education](https://anthonymolan.org/patients-and-families/recovery-life/returning-education)

## Transition of Care

- [gottransition.org](https://gottransition.org)

## NMDP survivorship registry:

- [bethematch.org/tcdirectory/search/advanced](https://bethematch.org/tcdirectory/search/advanced)

Financial, psycho-social support, and evidence-based discussions on medical/health concerns in HCT patients:

- [bmtinfonet.org](https://bmtinfonet.org)
- [my.bethematch.org](https://my.bethematch.org)
- [stupidcancer.org](https://stupidcancer.org)
- [hope4yawc.org](https://hope4yawc.org)
- [cactuscancer.org](https://cactuscancer.org)
- [blog.youngsurvival.org](https://blog.youngsurvival.org)
- [archive.nytimes.com/www.nytimes.com/interactive/health/life-interrupted.html](https://archive.nytimes.com/www.nytimes.com/interactive/health/life-interrupted.html)
- [www.thesamfund.org](https://www.thesamfund.org)

# Resources for Patient/Partner Peer Support

## Financial Toxicity:

- [triagecancer.org/](https://triagecancer.org/)
- [cancer.gov/about-cancer/managing-care/track-care-costs/financial-toxicity-pdq](https://cancer.gov/about-cancer/managing-care/track-care-costs/financial-toxicity-pdq)

## Vocational support:

- [cancerandcareers.org/en](https://cancerandcareers.org/en)

## Patient support from healthcare professional organizations:

- [nccn.org/patientresources/patient-resources](https://nccn.org/patientresources/patient-resources)
- [cancer.net/navigating-cancer-care](https://cancer.net/navigating-cancer-care)

## Peer support organizations:

- [bmtinfonet.org/caring-connection](https://bmtinfonet.org/caring-connection)
- [nbmtlink.org/](https://nbmtlink.org/)

## Peer support podcasts:

- [marrowmasters.simplecast.com/](https://marrowmasters.simplecast.com/)

# Survivorship after Allogeneic HCT Summary

- The number of hematopoietic cell transplant survivors continues to increase.
- There is a significant burden of late effects, including organ dysfunction, second cancers, and a variety of psychosocial effects.
- Active research ongoing to better understand and intervene on late effects
- Survivorship care begins early and should take a patient-centered approach



# Questions?



**Betty Ky Hamilton MD**  
Associate Professor of Medicine,  
Cleveland Clinic

# Let Us Know How We Can Help You

Visit our website: [bmtinfonet.org](http://bmtinfonet.org)

Email us: [help@bmtinfonet.org](mailto:help@bmtinfonet.org)

Phone: 888-597-7674 or 847-433-3313

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