



## Safeguard Your Health from Late Complications after a Transplant Using Donor Cells

Celebrating a Second Chance at Life  
Survivorship Symposium

April 30 - May 6, 2022



**Minoo Battiwalla MD,MS**

Sarah Cannon Transplant  
& Cellular Therapy Program at  
TriStar Centennial



## CELEBRATING A SECOND CHANCE AT LIFE SURVIVORSHIP SYMPOSIUM

### SAFEGUARD YOUR HEALTH AFTER A TRANSPLANT USING DONOR CELLS (ALLOGENEIC TRANSPLANT)

Minoo Battiwalla M.D., M.S.  
Director of Outcomes Research  
Sarah Cannon Research Institute  
Nashville, TN



## Financial Relationships

**No relevant financial relationship(s) exist**

## Long Term/Late Survivorship Issues in Allogeneic Stem Cell Transplantation

### Overview

- **Why?** Emphasis on quality of survivorship in HCT
- **When?** Time frames for complications
- **What?** Broad spectrum of long term/late health problems including lethal complications
- **How?** Care delivery to survivors

## Increasing HCT survivors

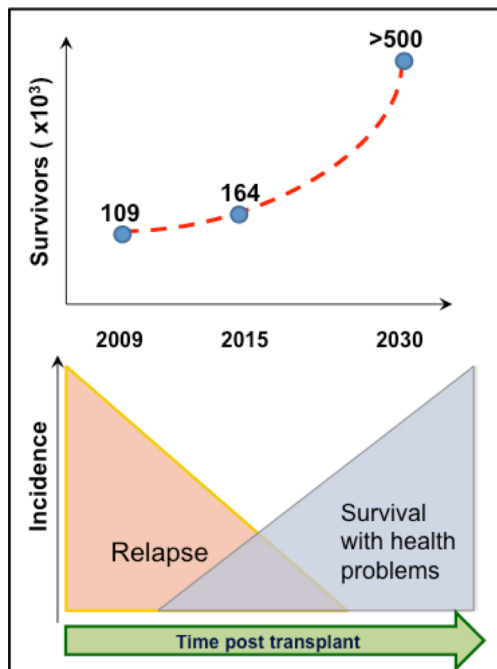
More transplants



New focus on long term survivorship

2020: >250,000  
2030: >500,000

60% auto HCT; 40% allogeneic HCT  
60% aged 18-59



Majhail et al. Biol Blood Marrow Transplant. 2013 Oct;19(10):1498-501

## We can only wish.....



**HELLO**  
I AM...  
**A SURVIVOR!**

**40%**  
OF CHILDHOOD CANCER SURVIVORS HAVE SEVERE ILLNESSES OR DIE FROM SUCH ILLNESSES<sup>13</sup>

**Cured, but at what cost?**

~80% will have **one or more** late effects at 5 years

5-year life expectancy is 30% lower than the general population

Cupit-Link, et al. Hem Onc Stem Cell Ther. 2018

Khera, et al. JCO 2012  
Martin, et al. JCO 2010

### Long term and late effects impact all domains of health

Psycho-social

Emotional

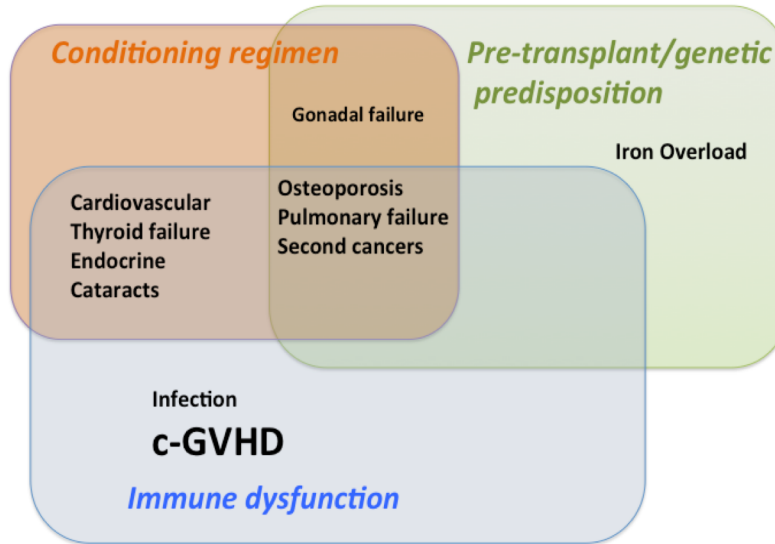
Financial

Sexual

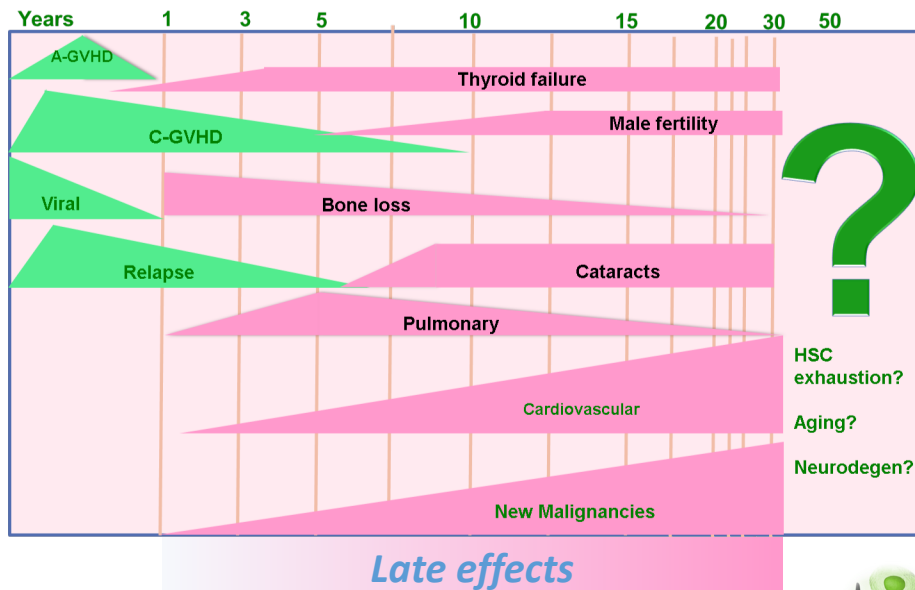
**Physical**

*Battiwalla, et al. Biol Blood Marrow Transplant. 2017 Jan*

## Why do long term and late effects occur?



## Timeframes for complications



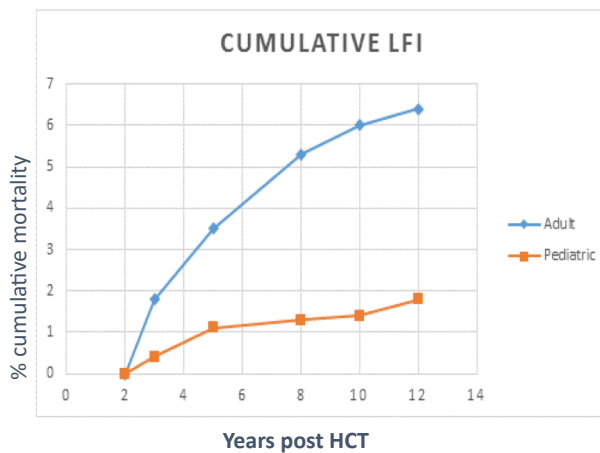
## Key late effects

Infections  
Secondary cancers  
Heart  
Lung

GVHD

Endocrine/metabolic  
Bone  
Sexuality/infertility  
Iron overload  
General health – fatigue,  
cramps, sleep,  
“Chemo-brain”  
Mental /emotional

## Late Fatal Infections 2+ years after transplant



- Bacterial 55%
- Fungal 18%
- Viral 16%
- Multiple 11%

Norkin, et al. BBMT 2019

## Preventing Infections



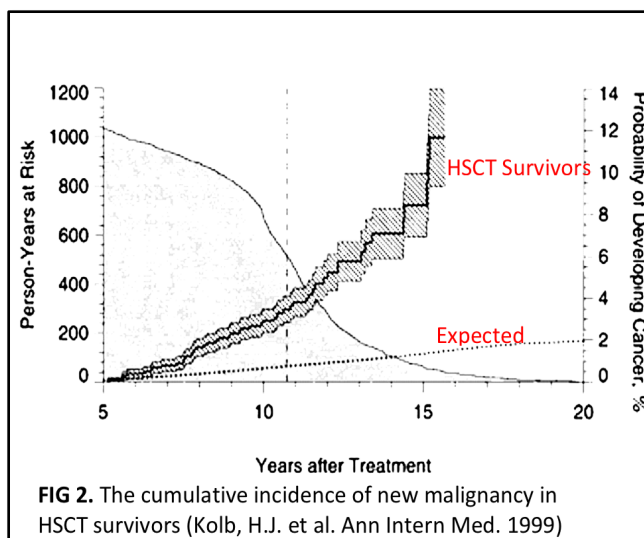
### Prevention [prophylaxis]

- Antifungal [“azole”]
- Antiviral [acyclovir]
- Anti PCP/toxo [Bactrim/dapsone]
- Antibacterial [PCN for cGVHD]

### When to start???

- @ 3months- COVID and Influenza
- @6months PLUS off immunosuppression- routine vaccines

## Second Cancers “Subsequent Neoplasms”



- 3-fold higher risk of another cancer after transplant
- An entirely different cancer
- Cumulative doses of chemo and radiation

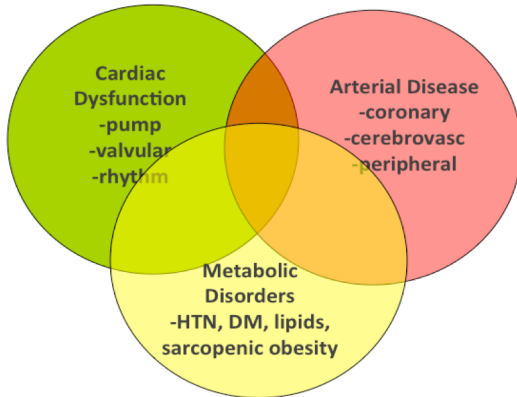
| Site                      | Cancer screening & prevention  |
|---------------------------|--|
| Skin ****                 | <ul style="list-style-type: none"> <li>• <i>Dermatologist skin exam</i> (annually)</li> <li>• <i>Sunscreen</i> (broad spectrum UVA&amp;UVB, high SPF &gt;30)<br/>Avoid peak sun, sunglasses, hats, protective clothing</li> </ul>  |
| Thyroid                   | Annual physical exam   |
| Mouth/throat              | <ul style="list-style-type: none"> <li>• <i>Stop tobacco / alcohol</i></li> <li>• <i>Dental exam every 6 months</i><br/><i>HPV vaccination</i></li> </ul>  |
| Lung                      | <ul style="list-style-type: none"> <li>• Stop tobacco in all forms</li> <li>• <i>Low-dose CT scan</i> for high risk:                             <ul style="list-style-type: none"> <li>• &gt;55 years and ≥30 pack-year smoking history (excluding those who quit &gt;15 years ago)</li> <li>• ≥50 and ≥20 pack-year smoking history with additional risk factor (asbestos, family history, second hand smoke)</li> </ul> </li> </ul> |
| Inamoto Y et al. BMT 2015 |  |

| Site                      | Cancer screening & prevention  |
|---------------------------|--|
| Breast                    | <ul style="list-style-type: none"> <li>• Age 20-40 years: clinical breast exam every 1-3 years</li> <li>• Age &gt; 40 years: annual clinical breast exam; annual mammogram</li> <li>• Radiation: Age 25 years or 8 years after radiation, whichever comes first, but no later than age 40 years:<br/><i>annual clinical breast exam plus annual mammogram or breast MRI</i></li> </ul> |
| Cervical ****             | <ul style="list-style-type: none"> <li>• <i>Annual Pap test and HPV DNA test</i></li> <li>• <i>HPV vaccination</i></li> </ul>  |
| Esophageal                | <ul style="list-style-type: none"> <li>• Symptom-based screening for GERD or difficulty swallowing:                             <ul style="list-style-type: none"> <li>• <i>GI endoscopy</i></li> </ul> </li> </ul>  |
| Colorectal                | <ul style="list-style-type: none"> <li>• Starting at age 50                             <ul style="list-style-type: none"> <li>• <i>Fecal occult blood or fecal immunochemical test</i> annually</li> <li>• <i>Sigmoidoscopy or CT Colonography</i> every 5 years</li> <li>• <i>Colonoscopy</i> every 10 years</li> </ul> </li> </ul>  |
| Inamoto Y et al. BMT 2015 |  |



## Heart (cardiac) and blood vessel (vascular)

### HCT survivors



Armenian, et al. *BBMT*. 2017 Feb

#### ■ Risk:

- 3-4 x higher than general population
- Premature events (first myocardial infarction ~14 years earlier)
- Risk is permanent and tends to increase with time after transplant

#### ■ Screening:

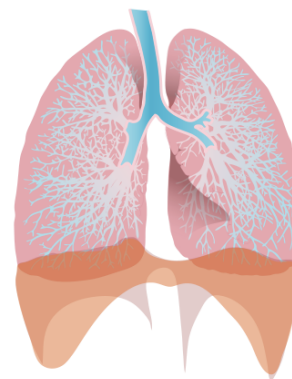
- Start first year after transplant
- Correct blood pressure, cholesterol, diabetes, weight, smoking
- Echocardiogram, CT angiogram/stress test, EKG

## Lung health

#### ■ ***STOP all smoking/vaping***

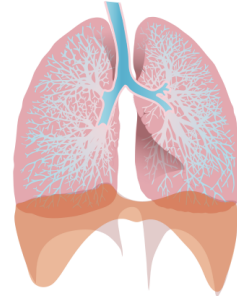
#### ■ ***Infections***

- Get vaccinated
- Seek medical attention early



## Lung injury from GVHD

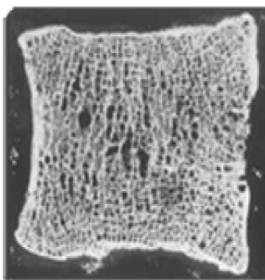
- **COP “Cryptogenic organizing pneumonia”**
  - symptomatic early
  - “pneumonia that does not respond to antibiotics” – fever, cough, breathlessness
  - Chest CT scan
  - Reversible with steroids, 6-12 months of treatment
- **BOS “Bronchiolitis obliterans”**
  - Silent! Generally irreversible once symptoms appear
  - Pulmonary function tests every 3 months if you have cGVHD or 6-12 months otherwise for first 5 years



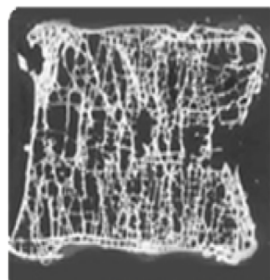
## Bone health

### Osteoporosis/osteopenia

- 20% osteoporosis by 2 years post-transplant
- Compression fractures (spine/hip)
- Risk: F>M, age, steroids, vitamin D, GVHD, low sex hormone, sedentary lifestyle
- Screening : Vit D levels, bone density scan [DEXA]
- Interventions: Exercise, calcium/vitamin D, bisphosphonates, hormone replacement therapy



Normal Bone



Osteoporotic Bone

### Avascular necrosis

- Severe pain and joint fractures (hips/knees)
- Risk Factors: Steroids, radiation
- Detection: MRI
- Interventions: Orthopedics



Jmarchn, CC BY-SA 3.0 <<https://creativecommons.org/licenses/by-sa/3.0/>>, via Wikimedia Commons

## Endocrine and metabolic issues

- Thyroid
  - low thyroid hormone levels
- Diabetes
- Cholesterol
- Sex hormones:
  - low sex drive
  - fatigue
  - vaginal changes and pain
  - erectile dysfunction
  - infertility

**Ovarian failure – hormone replacement up to natural menopause**

**Low testosterone – Testosterone supplementation does not work well**

## General/other health issues

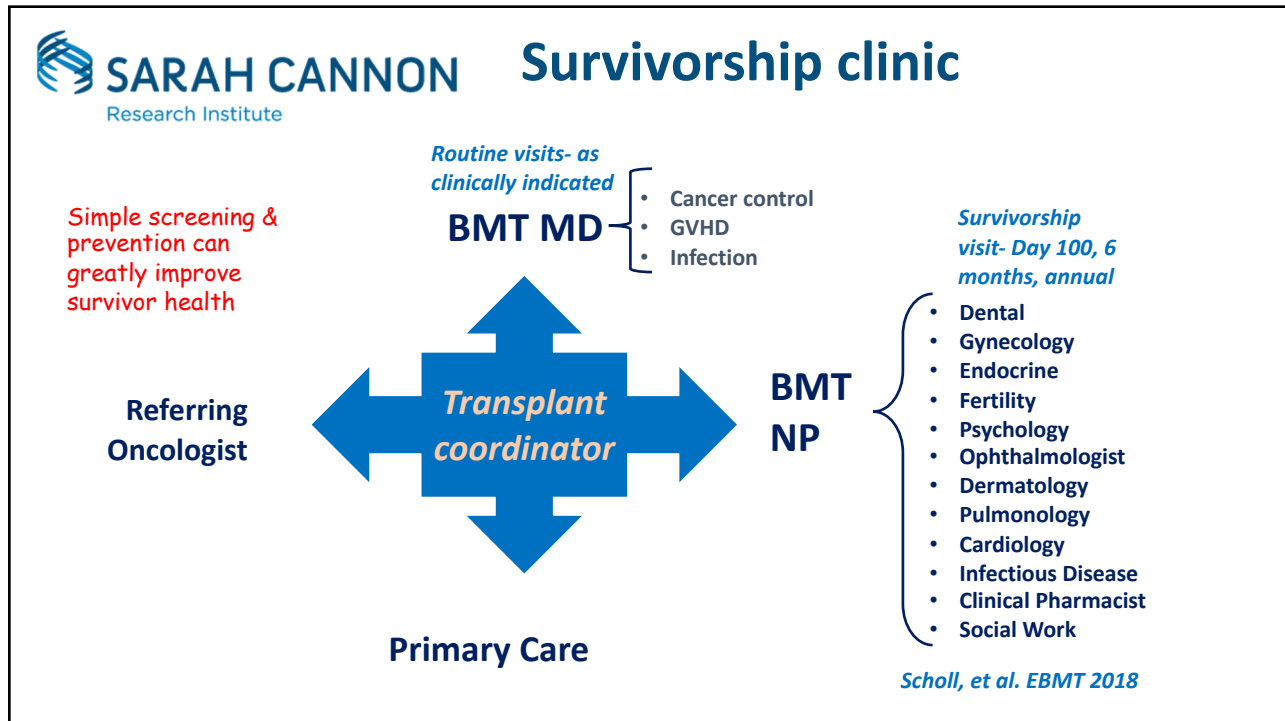
- Fatigue
  - Treat underlying medical cause/pain
  - Reduce work-load to part time
  - Exercise
  - Strategic naps
- Sleep disturbance – CBT, sleep hygiene
- Muscle cramping – hydration, tonic water
- Mental health challenges
- Brain fog (aka chemo-brain):
  - short-term memory loss
  - slow thinking
  - word-finding difficulty
  - learning impaired, executive function
  - may improve 1 to 5 years after transplant
  - cognitive rehabilitation, methylphenidate/modafinil

## General/other health issues cont'd

- Eyes:
  - Premature cataracts
  - Dry eye syndrome - sunglasses, drops
  - Annual eye exam
- Mouth:
  - Dry mouth
  - Cavities
  - Regular dental exam
- Kidney:
  - Check urine protein
- Liver:
  - Avoid alcohol
  - Improve diet & exercise
- Iron overload:
  - Phlebotomy
- Neuropathy:
  - Neurologist, foot care

## Adopt a healthy lifestyle

- DIET
    - healthy, balanced diet including at least five daily servings of fruits and vegetables
    - multivitamins without iron, supplements for calcium and vitamin D
  - EXERCISE
    - weight-bearing, stretching/yoga, ~20-60 min/day
  - INFECTION - hand washing
  - SLEEP- sleep hygiene
  - HABITS- Stop smoking, stop nicotine, moderate alcohol
  - SPECIALIST CARE- GYN, DENTAL, EYE, SKIN
- 
- Diabetes
  - Weight
  - Osteoporosis
  - Cholesterol
  - Heart/vessel health
  - Strong bones
  - Fatigue
  - Memory/brain
  - Flexibility
  - Fatigue
  - Lungs
  - second cancers
  - Second cancer
  - quality of life



**SARAH CANNON** Research Institute **INDIVIDUALIZED SURVIVORSHIP CARE PLAN**

**Your Blood and Marrow Transplant Survivorship Care Plan**

Your survivorship care plan is based on research and developed by doctors and researchers from around the world. It is intended to help you understand what to expect at your check-up appointments, and to discuss your questions or concerns with your doctor.

In the table below, you'll find information on the tests and evaluations that are recommended for you 12 months after transplant. Items in bold are found in the Glossary.

The information below will help you:

- Understand what to expect at your check-up appointments, and
- Discuss your questions or concerns with your doctor.

There are questions you can ask your doctor to help you prepare for these tests and exams. Also, these questions help you understand what the test results mean for you.

**Questions to ask your doctors**

Your care plan is organized by parts of the body (for example, eyes, mouth, and heart). Each section includes questions to ask your doctor that are specific to a body part. There is space for you to take notes in each section at the end of the care plan.

You should share this care plan with your doctors. Also, if you need to go to urgent care or the emergency room, it's helpful to take the care plan with you.

**Your Medical Information**

Patient MRN:

Patient Name:

Date:

Date of birth:

Sex:

Diagnosis:

- Given to patient and referring physician/consultants when they return home ~ day 100
- Lists transplant therapy: chemo - radiation, GVHD prevention
- Occurrence of GVHD
- Recommends care based upon age, treatments, sex, current complications

## Where to seek help

### After Transplant Guidelines for Patients

- Transplant guidelines mobile app
  - Customizable 6-month and yearly **checkup guidelines**
  - Chronic GVHD **symptom checker**
  - **Set reminders** (appointments, medicines, etc.)
  - Search “**transplant guidelines**” in app stores to download
- 6-month and yearly guidelines also available online and print:

[BeTheMatch.org/CareGuide](https://www.bethematch.org/CareGuide)



### Be The Match Survivorship Program

#### Our Goal:

To improve quality of life for BMT patients who do not have access to comprehensive survivorship care.

#### Our Plan:

Be The Match will conduct research studies examining the effectiveness of a virtual survivorship program including:

- Individualized survivorship care plans
- Scheduled follow-up appointments with a nurse practitioner
- Clinical consultation Services
- Care coordination
- Access to critical resources
- Evaluation of the program's impact on patient QOL



### Connect with Be The Match Survivorship:

CALL: 1-866-301-4650

EMAIL: [survivorship@nmdp.org](mailto:survivorship@nmdp.org)

## CONCLUSIONS

- Late complications are frequent following a transplant with donor cells
- Commit to lifelong follow-up
- Multidisciplinary care- Survivorship clinics +/- individual survivorship care plans
- Own your health-
  - Practice good health (diet, exercise, habits )
  - Know your treatment and the complications
  - Understand future risks
  - Ask questions

## OTHER WORKSHOPS WITH MORE INFORMATION

All times Central Time

- **Heart and Vascular Health** (*Saturday, April 30, 1:30 pm*)
- **Managing Fatigue** (*Sunday, May 1, 12:15 pm; Thursday, May 5, 12:15 pm*)
- **Secondary Cancers** (*Sunday, May 1, 1:30 pm*)
- **Infections** (*Monday, May 2, 11 am*)
- **Lung/Breathing Problems** (*Monday, May 2, 1:30 pm*)
- **Sexual Health** (*Monday, May 2, 12:15 pm*)
- **Attention and Memory Problems** (*Tuesday, May 3, 12:15 pm*)
- **Managing Sleep Problems** (*Tuesday, May 3, 1:30 pm*)
- **Bone Health** (*Wednesday, May 4, 12:15 pm*)
- **Build Emotional Resilience** (*Thursday, May 5, 1:30 pm*)
- **Managing Neuropathy** (*Thursday, May 5, 2:45 pm*)

## WORKSHOPS ABOUT GRAFT-VS- HOST DISEASE

All times Central Time

- **Introduction to GVHD** (*Saturday, April 30, 1:30 pm*)
- **Your Eyes and GVHD** (*Saturday, April 30, 2:45 pm*)
- **GVHD of Gastrointestinal Tract and Liver** (*Sunday, May 1, 11:30 am*)
- **Pulmonary GVHD** (*Monday, May 2, 1:30 pm*)
- **Pelvic Floor Exercises for Vulvar GVHD** (*Tuesday, May 3, 11 am*)
- **Skin GVHD** (*Tuesday, May 3, 2:45 pm*)
- **Your Mouth and GVHD** (*Wednesday, May 4, 11:00 am*)
- **How Rehabilitation Medicine Helps GVHD Patients** (*Friday, May 6, 11:00 am*)
- **Rehabilitation Therapies (Exercises and Assistive Devices) to Manage Side Effects of GVHD** (*Friday, May 6, 12:15 pm*)



# Questions?



Minoo Battiwalla MD,MS

Celebrating a Second Chance at Life Survivorship Symposium 2022

[bmtinfonet.org](http://bmtinfonet.org) ♦ [help@bmtinfonet.org](mailto:help@bmtinfonet.org) ♦ 847- 433-3313



## Let Us Know How BMT InfoNet Can Help YOU!



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

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

Give us call: 888-597-7674

We're here to help every step of the way!