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LYMPHOMA  
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## **BLOOD CANCERS: MANAGING SIDE EFFECTS**

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**Slide 1: BLOOD CANCERS: MANAGING SIDE EFFECTS**



**WELCOMING REMARKS**  
BLOOD CANCERS: MANAGING SIDE EFFECTS



**Lizette Figueroa-Rivera, MA**  
Sr. Director, Education & Support  
The Leukemia & Lymphoma Society

3



## Slide 2: WELCOMING REMARKS

### Lizette Figueroa-Rivera:

Hello, everyone. On behalf of The Leukemia & Lymphoma Society (LLS), thank you all for joining us today for this discussion on side effects management, as this is an important topic that affects your quality of life or how you feel day-to-day.

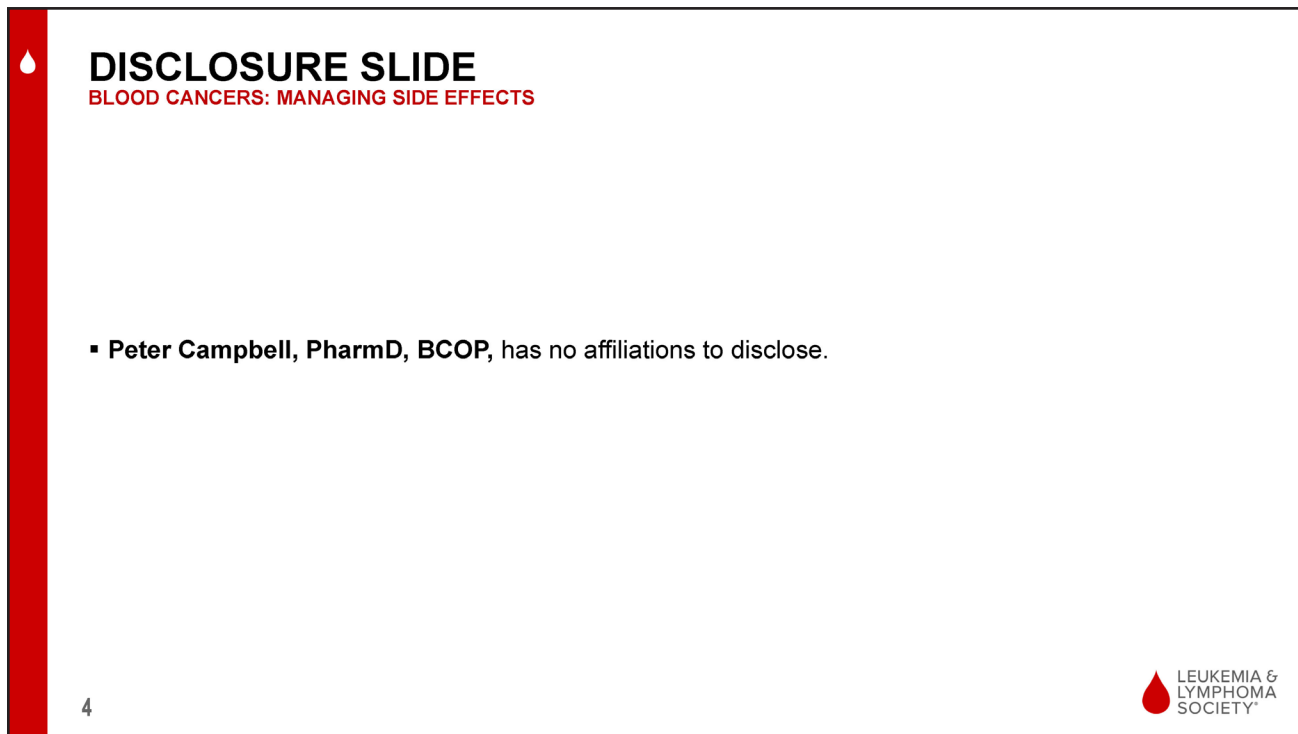
Today, Dr. Ritchie and Dr. Campbell will highlight how your treatment team can work with you to address your side effects, as well as other issues you may be facing since being diagnosed with cancer.

LLS is at the forefront of the fight to cure cancer. As the leading source of free blood cancer information, education and support for patients, survivors, families, and healthcare professionals, LLS helps you navigate affordable and coordinated care. Research will help us achieve an end to cancer. In the meantime, patients and caregivers need help before, during, and after cancer diagnosis and treatment.

LLS is the leading nonprofit that does just that. Please continue to inform us of what you need during this time and please continue to let us be there for you.

For this program we'd like to acknowledge and thank Genentech, GlaxoSmithKline, and Pharmacyclics for their support.


I'm now pleased to introduce Dr. Peter Campbell from New York Presbyterian Hospital, Columbia University Irving Medical Center and Dr. Ellen Ritchie from Weill Cornell Medical College. Dr. Campbell, I'm privileged to turn the program over to you.



**DISCLOSURE SLIDE**  
BLOOD CANCERS: MANAGING SIDE EFFECTS

- Peter Campbell, PharmD, BCOP, has no affiliations to disclose.

4

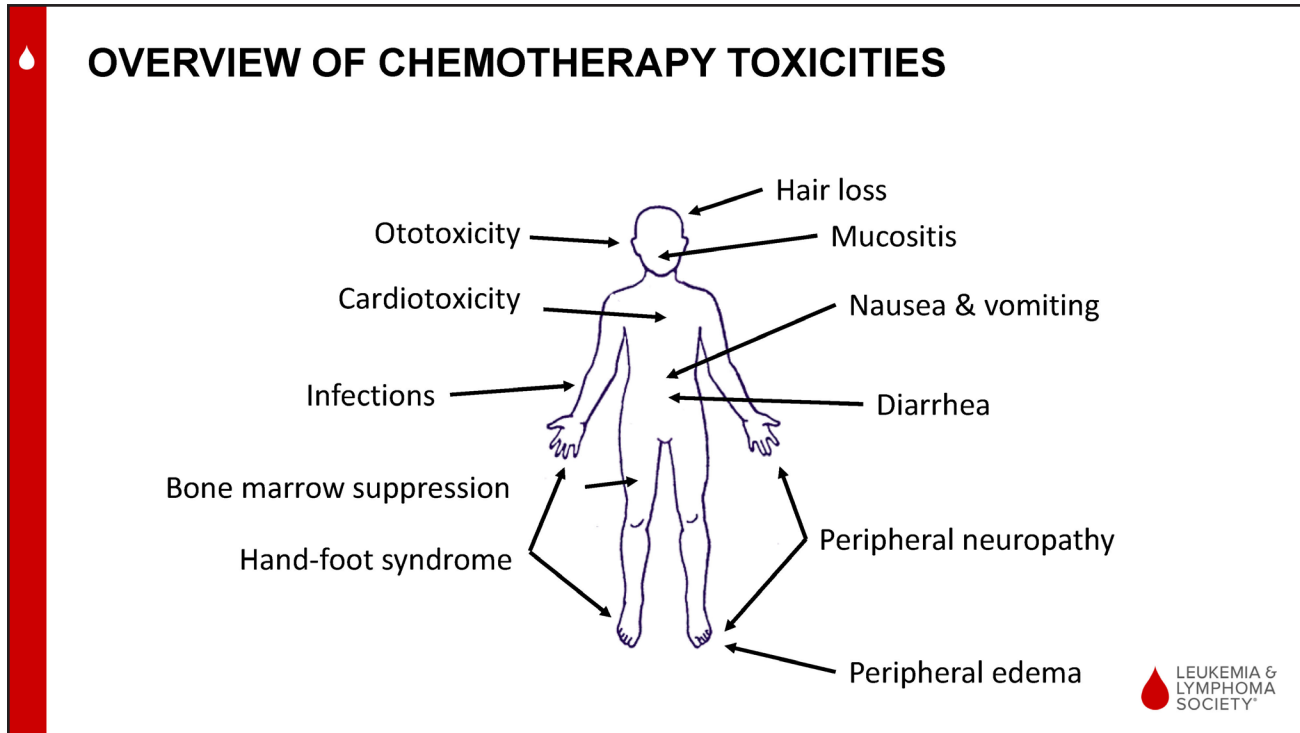


## Slide 3: DISCLOSURE SLIDE

### Dr. Peter Campbell:

Thank you very much for that introduction.

So, for this presentation I have no affiliations to disclose.

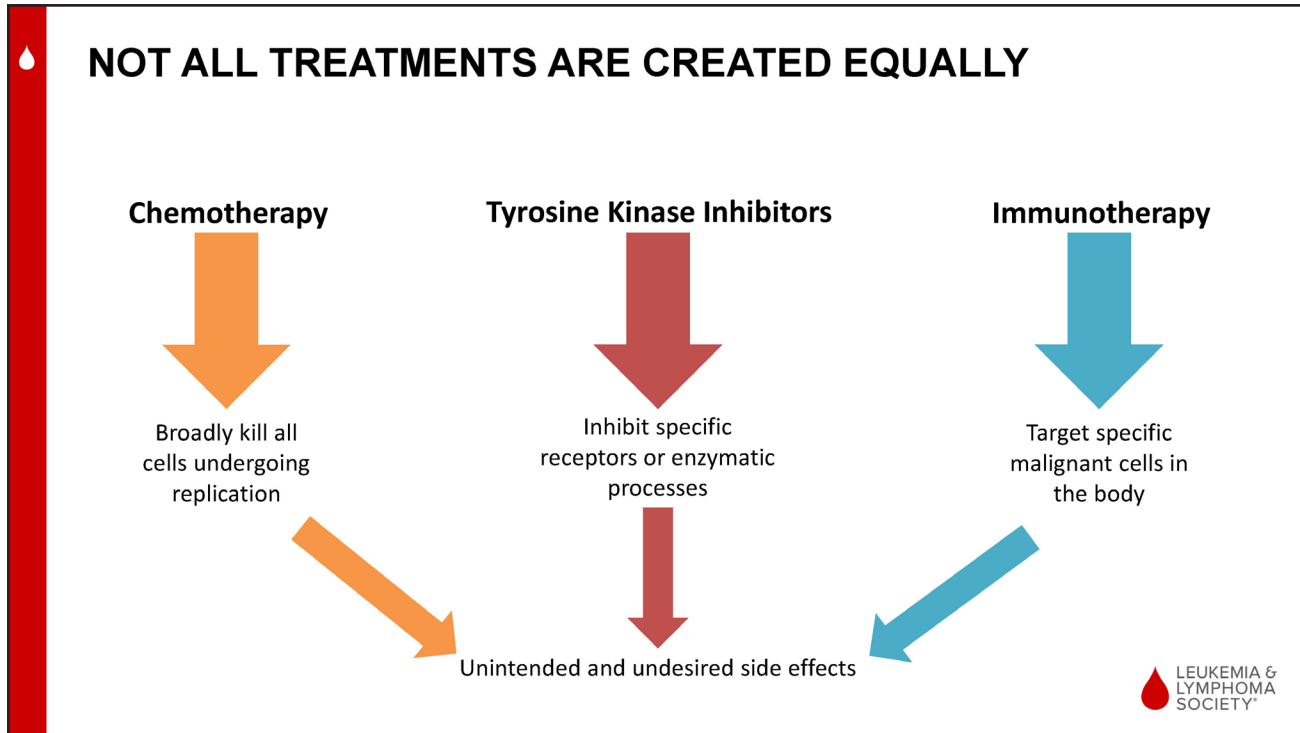


**Slide 4: OVERVIEW OF CHEMOTHERAPY TOXICITIES**

So, to start off, I think it's really important to know that when thinking about the treatments that you're undergoing for your particular cancer, there's a ton of different side effects that we have to think about and it's really going to be dependent on which regimen that you're getting. And nowadays, the regimens are very complex in nature and can include intravenous traditional chemotherapy, immunotherapy, and then oral agents like our tyrosine kinase inhibitors (TKIs).

Now, there's a whole host of different toxicities that we think about as providers and as patients, anything from hair loss to ototoxicity, hearing loss. We worry about infections when patients have chemotherapy that suppresses their bone marrow in particular and can affect their white blood cells. Things like hand-foot syndrome and other skin reactions become common in some patients. The common gastrointestinal ones like nausea and vomiting and diarrhea. And then mucositis, which also has to do with the effects on the gastrointestinal tract. And then peripheral neuropathy, which has become a challenging thing to treat in many patients. So, there's a whole host of toxicities that we've run into and we're going to try to go through these slides and help you come up with ways to address some of those, both on your own and with your treatment team.






**Slide 5: NOT ALL TREATMENTS ARE CREATED EQUALLY**

Now, when we're thinking of chemotherapy, that's sort of a big bucket that a lot of different agents fall into and it sort of becomes a nomenclature that exists out in the world that sort of encompasses all treatments for cancer. However, not all treatments are really created equal because they all have a different mechanism in which they treat your cancer. So if we go back in time, we think about traditional chemotherapy, these are a lot of the drugs that we've had around for a long time, although there are several new ones that have been developed recently. Typically, these can broadly kill a lot of different cells that are undergoing replication. This is good because it does a really good job of targeting your cancer cells, but unfortunately it also kills other non-cancer cells as well. We also have drugs like tyrosine kinase inhibitors. These are oral drugs that are a little bit newer to the market, they've been around a little over a decade or so, and they inhibit specific receptors or enzymatic processes that happen in the body, and sometimes these can be very specific or sometimes these can be nonspecific in their mechanism, which also have a lot of unintended side effects. And then lastly, the other broad class that we think about is immunotherapy. These target specific immunological cells or processes in the body that can help reverse some of the ways in which cancer can mask itself from your natural immune system, which would typically clear and get rid of these cells. But all in all, even though they have a lot of different mechanisms, we have to think that there are unintended and undesired side effects associated with all of these different treatments and that's where we get these side effects.

## DRUG CLASSES AND ASSOCIATED SIDE EFFECTS

Anthracyclines	Vinca Alkaloids	Alkylating Agents	Antimetabolites	Topoisomerase Inhibitors	Hypomethylating Agents	Platinums
Doxorubicin Daunorubicin Idarubicin Mitoxantrone	Vincristine Vinblastine	Cyclophosphamide Ifosfamide Thiotepa Busulfan	Cytarabine Methotrexate Mercaptopurine Thioguanine Cladribine Fludarabine	Etoposide	Azacitidine Decitabine	Carboplatin Cisplatin
Cardiac effects Myelosuppression Hair loss Urine discoloration	Constipation Peripheral neuropathy	Myelosuppression Fatigue Bladder toxicity Neurotoxicity	Myelosuppression Fatigue Mucositis	Fatigue Mucositis Diarrhea Nausea/vomiting Myelosuppression	Myelosuppression Fatigue Injection site reactions Muscle pain	Myelosuppression Cardiac effects Hearing loss Mucositis

\*List of drugs and side effects is not all-inclusive



**Slide 6: DRUG CLASSES AND ASSOCIATED SIDE EFFECTS**

Now, when we're thinking about what side effects do we get, it's really difficult to talk about cancer drugs in general because unfortunately and fortunately for a lot of patients there are so many different treatments. And so, because there's so many different drugs it can sometimes be helpful to group drugs into different classes based on their mechanism, and then associate certain toxicities that we know happen with drugs in those particular classes.

So, for example, here's a table that list some, but definitely not all, of the different drug classes that we see in the treatment of blood cancers. Starting on the left, we can think of anthracyclines. So, these are drugs, such as doxorubicin, daunorubicin, and idarubicin, that have a lot of different toxicities, some of which are myelosuppression so affecting the blood counts which can lead to things, such as low hemoglobin and low platelets and low white cell counts. And then, we also need to think about not just your short-term side effects but also long-term. These drugs are notorious for causing cardiac side effects in the long run, typically if you get a dose that exceeds what we think of as a lifetime limit, which we really try to avoid as practitioners.

Next over is the vinca alkaloids, which are things like vincristine and vinblastine. These typically are associated with side effects, such as constipation and peripheral neuropathy.

And then, if we move over even further, we can think of a class like the antimetabolites, which is a very wide class and has a lot of different drugs in it that have a lot of these same side effects, but one of the main things that we think about is myelosuppression, fatigue, and mucositis.

Now, for the sake of not going through every single one of these drug classes, I wanted to give you this diagram just to plant the seed to think about how these side effects can typically be associated with classes of drugs, but it's very difficult to talk about every single one in particular, so we'll try to go into talking about how to manage specific side effects and then we can always refer back to what classes of drugs those side effects are associated with.

## DRUG CLASSES AND ASSOCIATED SIDE EFFECTS

Monoclonal Antibodies	Enzymes	Tyrosine Kinase Inhibitors	BCL2 Inhibitors	IDH1/2 Inhibitors
Rituximab Obinutuzumab Polatuzumab Daratumumab	Asparaginase Pegaspargase	Each agent carries its own risks and side effects, for which patients should consult their care team for a detailed discussion	Venetoclax	Ivosidenib Enasidenib
Infusion reactions Fatigue Joint/muscle pain Infections	Liver test abnormalities Allergic reactions Hyperglycemia Pancreatitis		Myelosuppression Electrolyte abnormalities	Myelosuppression Fluid retention Fatigue Muscle pain Electrolyte abnormalities

\*List of drugs and side effects is not all-inclusive

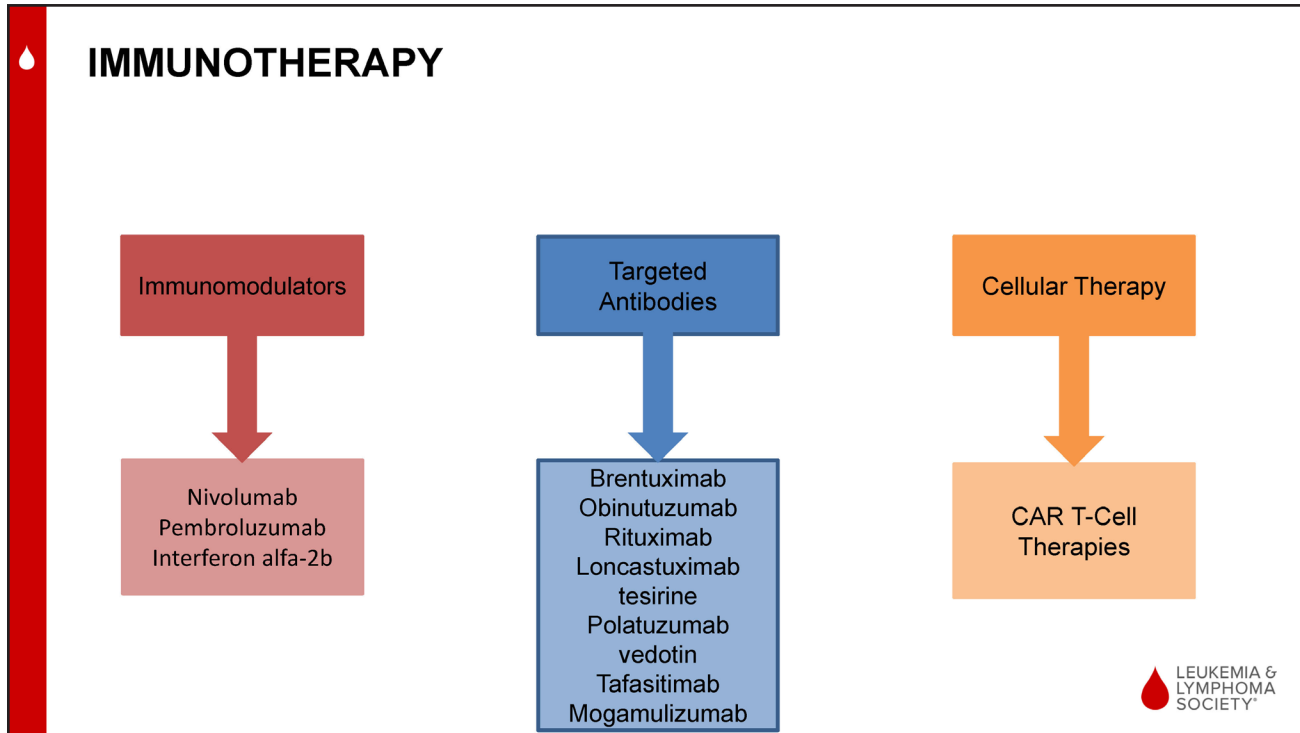


### Slide 7: DRUG CLASSES AND ASSOCIATED SIDE EFFECTS

So, when you move past traditional chemotherapy, then we start to think about the immunotherapy and then oral agents, such as the tyrosine kinase inhibitors. The one thing that I really wanted to stress on this slide is talking about the tyrosine kinase inhibitors, because it becomes very difficult to talk about side effects with some of these drugs because a lot of them have multiple different mechanisms of action.

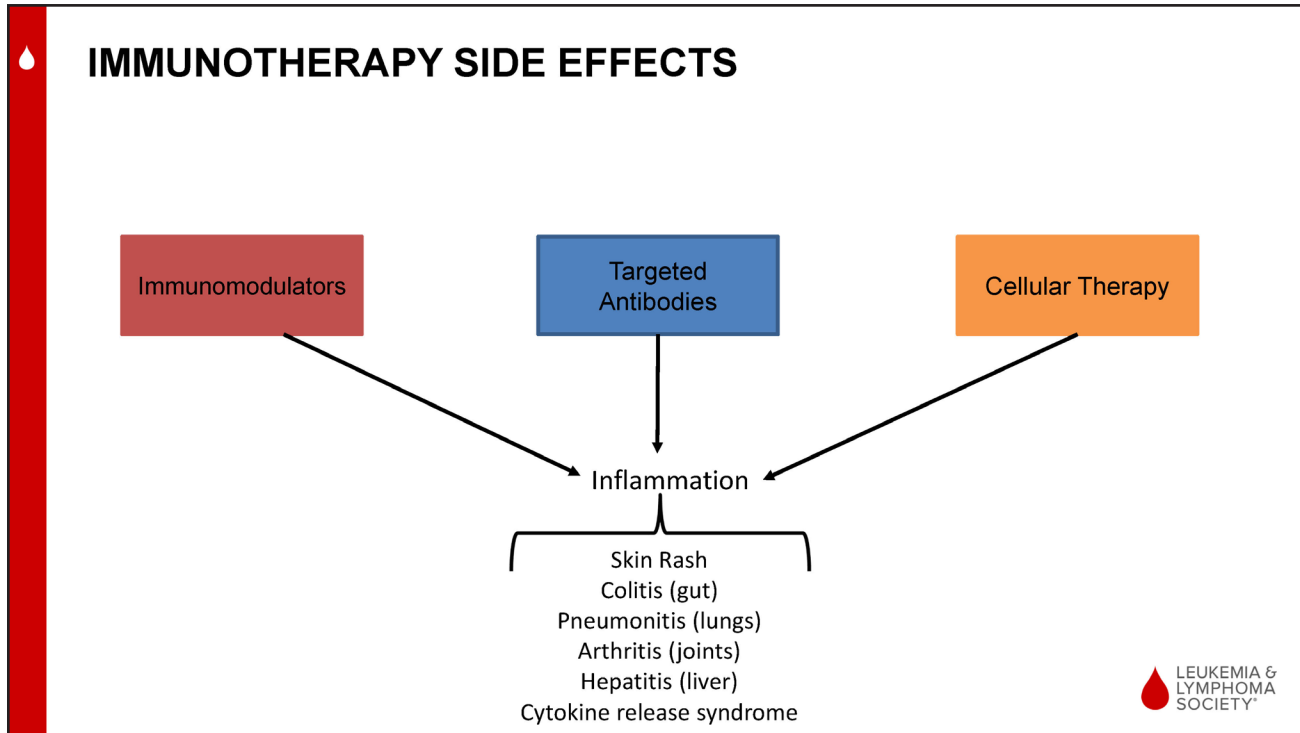
Now, when we think about traditional chemotherapy or even many of the immunotherapy agents, we know that they work in a very specific way targeting a single pathway and therefore we can associate direct toxicities with an entire class.

With tyrosine kinase inhibitors and these oral therapies, it gets a little more difficult because even though they may have one main pathway in which we use to be effective against your particular cancer, they also have a lot of off-site activity, what we would call “not the receptor of interest” that they also tend to work on, and that’s where those side effects tend to come from. And so, each individual agent carries its own side effects and sometimes even if you look at 2 drugs within the same class, they can have very different side effects because they may target other receptors to a different degree.



**Slide 8: IMMUNOTHERAPY**

And then, the last one that I wanted to go over is immunotherapy. Now, immunotherapy can be things like your immunomodulators, these are drugs like nivolumab (Opdivo®) and pembrolizumab (Keytruda®); targeted antibodies, these are things such as obinutuzumab (Gazyva®) or rituximab (Rituxan®), these also can be drugs that are combinations of antibodies plus chemotherapy, so we've now gotten to the point where we can attach a traditional chemotherapy molecule with an antibody to be able to deliver the drug more effectively; and then, we also have cellular therapy, such as CAR T-cells, which carry their own unique sets of toxicities.



**Slide 9: IMMUNOTHERAPY SIDE EFFECTS**

Now, immunotherapy side effects do tend to overlap in some degree, although there is variation between each class and each drug, but typically what we think of with immunotherapy are things that cause inflammation. So, we think of things like skin rashes, colitis, pneumonitis, arthritis, hepatitis, and then cytokine release syndrome, which are all some form of manifestations of inflammation throughout the body. And then, we typically would treat these all in relatively the same way, mostly with corticosteroids, although there are going to be instances in which corticosteroids are not indicated and then your treatment team can really help you with those, especially in the CAR-T realm, that's a different conversation.



## COMBINATION CHEMO/IMMUNOTHERAPY

**While we know the side effects of medications, combinations can present new risks and challenges**

- Some side effects are exacerbated when used in combination with other agents
- Many studies are small in scale and new information is discovered from “real-world” usage
- Just because we haven’t seen it doesn’t mean it can’t happen

**A 5% chance of a side effect becomes 100% if it happens to you**

- Know the toxicities associated with chemotherapy agents, but don’t go fishing



### Slide 10: COMBINATION CHEMO/IMMUNOTHERAPY

So, when we think about side effects, before we get into some specifics, the last thing that I wanted to talk about is combination chemotherapy and immunotherapy. So, what a lot of people do when they first start taking a drug is they ask about common side effects or they will look at the drug information that they can find online, and when you’re looking at that it’s easy to think about, well, this one drug causes this one side effect. However, when it gets a little more tricky is that we’re combining chemotherapy and/or oral therapies for a lot of patients and when you combine agents, sometimes we don’t always know what side effects are going to happen because the different agents can either exacerbate those toxicities when used in combinations or create new toxicities that even the 2 individual drugs don’t typically cause themselves.

Also, many studies that we have to base the side effect profiles on are relatively small in nature compared to the real-world usage, which is the thousands of patients who are taking it after it becomes approved by the FDA.

And then, just because we haven’t seen it doesn’t mean that it can’t happen. So just because there’s a side effect that’s not listed within a package insert or a drug information bulletin doesn’t mean that that drug can’t cause a certain side effect.

And then lastly, I want to stress a little bit that the numbers become hard to interpret sometimes because we may tell you that a side effect is very rare, there’s only a 5% chance of that side effect happening, however, if you’re one of those 5% of patients that it happens to, that number becomes 100% to you, and so it becomes a little tricky to cite specific numbers and just know that each patient is individual and we have to individualize care and supportive care to each patient.



## NAUSEA AND VOMITING

### **Nausea and vomiting can vary based on the drug and/or regimen that you are receiving**

- Dose, schedule, and type of treatment change incidence of nausea and vomiting

### **Prevention is the best medicine**

- Nausea and vomiting is very difficult to manage or stop once the symptoms are felt
- All chemotherapy regimens should include the appropriate antiemetics

### **Learn and understand your body and your triggers**

- Certain sights, smells, or places can trigger nausea and vomiting



### **Slide 11: NAUSEA AND VOMITING**

Okay, so the first thing that we're going to try to tackle is nausea and vomiting. This is probably one of the most common side effects that patients talk about when they start chemotherapy. Now, it's going to vary widely based on what regimen you're getting and every drug and combination regimen is typically associated with a different rating level of what the likelihood of nausea is with that chemotherapy regimen, and this can change based on whether you're getting intravenous chemotherapy, whether you're getting a multi-day regimen or all in one day, and then also remember that it's not just traditional intravenous chemotherapy that can cause nausea and vomiting, a lot of our oral agents also are associated with nausea and vomiting as well.

Now, when we're thinking about nausea and vomiting, by far prevention is the best medicine. It becomes very difficult to manage once a patient is actually nauseous or actually vomiting. And so, you as a patient and as a caregiver can play a huge role in recognizing what your body is telling you in terms of recognizing the signs and symptoms. And so, you should think about are there certain sites that trigger your nausea and vomiting, such as every time you go to the infusion center you feel that you get nauseous. Certain smells or certain foods that trigger it? And those are the things that you can do as a patient or a care provider to help alleviate the nausea and vomiting that's associated with chemotherapy.

## ANTIEMETIC DRUG CLASSES

Drugs from different classes can be utilized together for maximal effect

- Agents used for the management of breakthrough nausea and vomiting should be mechanistically different than those used for prevention
- Agents should be dosed appropriately for single-day versus multi-day chemotherapy regimens

Dopamine antagonists	Selective serotonin receptor antagonist	Neurokinin 1 receptor antagonist	Antipsychotics	Corticosteroids	Benzodiazepines
Metoclopramide Prochlorperazine	Ondansetron Granisetron Palonosetron Dolasetron	Fosaprepitant Rolapitant Netupitant	Olanzapine Haloperidol	Dexamethasone	Lorazepam Clonazepam

Not and all-inclusive list



### Slide 12: ANTIEMETIC DRUG CLASSES

Us and the treatment team should be making sure that we are giving the correct antiemetic therapy prior to every regimen. Now, there’s a lot of different drug classes that we can use to prevent and/or treat chemotherapy-induced nausea and vomiting and typically the principle is that we mix different drugs from different classes in order to target different mechanisms that are triggering the nausea and vomiting.

Now, when we think about patients who have nausea and vomiting on top of the pre-medications that we give, typically the approach that we’d want to take at that point is to give a drug from a different class. So, if you’re already on a drug, such as a selective serotonin receptor antagonist and corticosteroids and you have what we would call anticipatory nausea and vomiting, then we would think about something like a benzodiazepine, so adding a different class than something that you’re already on. So, that’s what we can do as the care team in order to help treat and prevent nausea and vomiting for patients.





## NAUSEA AND VOMITING

### Non-pharmacological treatment approaches

- Eat small, frequent meals throughout the day
- Eat slowly
- Avoid any trigger foods (spicy, fried, greasy, fatty)
- Avoid strong odors that may precipitate nausea and vomiting
- Don't lay down immediately after eating, try to stay upright for 20-30 minutes
- Wear loose fitting clothing, or clothing that is otherwise comfortable

### Always let your care team know how you are feeling


- Your care team can play a large role in adjusting your prophylactic antiemetics, but only if they know how you are feeling



### Slide 13: NAUSEA AND VOMITING

Now, there are non-pharmacological things that you can do as well, such as eating small and frequent meals throughout the day, eat to what you feel comfortable with, so don't necessarily feel like you have to be eating all the time, that you have to eat 3 square meals a day. You can eat slow, small frequent meals throughout the day. Avoid any trigger foods. So, for a lot of people, even if you love it normally, while you're undergoing chemotherapy, things like spicy, greasy, fatty foods can become triggers. Also, strong odors can also precipitate it for a lot of patients, so just learn what your triggers are and make sure that you try to avoid those things.

Also, let your treatment team know what side effects you're experiencing because that's how we can best adjust your medications.




## DIARRHEA

**Can be associated with any chemotherapy regimen, but increased risk with certain agents**

**Patients and their care providers should assess the onset timing, frequency, and severity of diarrhea**

- Treatment will vary based on the above factors, as well as the chemotherapy regimen that the patient is receiving
- Some cases of diarrhea will be self-limiting, while others may need more pharmacological intervention
- In some situations, infectious diarrhea will need to be ruled out



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### Slide 14: DIARRHEA

The next thing I want to talk about is diarrhea and while this can be associated with any chemotherapy regimens, there are certain agents that we know are particularly offending agents. So, it's important to know if you're on one of those drugs that are highly effective for diarrhea.

And so, one thing that you should think about is what is the onset of timing and the frequency. So, if you notice that you're having diarrhea right after you have chemotherapy or notice the next day, knowing your timing can help you determine if there's certain times in which you should preemptively change your diet or take preemptive medication.

Also, if you're having severe diarrhea, it's also important to always let your treatment team know so that we can rule out any infectious causes as well.

Now, when we're thinking about treating diarrhea there's a couple of things that we can do. We can give supportive medications for this and things like loperamide are available over the counter, but there's also things that you can do, again, very similar to the nausea and vomiting, in which you want to make sure that you keep track of what you're eating and avoid any triggers.



### PERIPHERAL NEUROPATHY

**Each patient is affected differently by associated agents, including at different times of onset and doses**

- Symptoms may be present after a single dose or may be due to a cumulative dosing effect
- Symptoms can be permanent or resolve with time

**Symptoms vary from patient to patient and in severity**

- Tingling feeling in extremities
- Pain that is either persistent or fleeting
- Increased sensitivity to touch or to hot/cold stimulus
- Decreased hand/foot sensation or a feeling of extremity muscle weakness

#### Slide 15: PERIPHERAL NEUROPATHY

Next is peripheral neuropathy. Now, this becomes one of the more difficult things to treat unfortunately. Each patient is affected differently by peripheral neuropathy. Some may have more severe, some patients it may resolve over time, and some patients it may become permanent. Typically, what you would manifest this as is tingling in your extremities, typically your hands and your feet. You can have increased sensitivity to hot and cold stimulus or increased sensitivity just to the touch. And then, you can also have decreased sensation of feeling or the feeling of muscle weakness in your extremities



## PERIPHERAL NEUROPATHY

### Pharmacologic treatment

- Very few pharmacologic agents have shown any benefit in the treatment of chemotherapy-induced peripheral neuropathy
- Lidocaine patches may be of benefit depending on the location affected
- Duloxetine, and SNRI, has shown promising results for some patients

### Non-pharmacologic treatment

- Avoid triggers such as hot/cold stimulation
- Physical therapy/occupational therapy
- Make lifestyle alterations such as adjusting your home to limit trips, falls, etc



### Slide 16: PERIPHERAL NEUROPATHY

In terms of how we treat this, unfortunately very few pharmacological therapies, have been shown to be really effective. One thing that we can do is use lidocaine patches. For some patients this is minimally effective. It's one of the treatments we try. Other than that, an agent such as duloxetine or gabapentin have been used, but with mixed effect.

There are non-pharmacological treatments that we can use, such as avoiding any triggers. So, if you notice in particular that touching a really cold thing out of the freezer or touching a very hot coffee mug is a trigger for you, you'll try to want to avoid doing that, or use an insulated container when touching those items. You can do physical therapy or occupational therapy to try to regain some of the function of your extremities, particularly in the hands and upper extremities. And then, you can also make lifestyle alterations, such as adjusting things in your home to avoid any trips or falls that have become prevalent. Or, if you notice that you're having difficulty buttoning your shirt, maybe go to something that has zippers instead of buttons to help alleviate the symptoms and the pain that can be associated with peripheral neuropathy.



## ITCHING/PRURITUS

**Many chemotherapy agents can kill rapidly dividing cells, for which skin is a prime target**

- Itching, dryness, burning, peeling

**Treating dry skin should be the first step for nearly all patients**

- Utilize a non-fragrant emollient, especially after bathing
- Wear non-irritating clothing that is loose
- Avoid any fragrances or dyes that trigger or exacerbate symptoms
- Try using a humidifier in your house, especially in the winter or in dry climates



### Slide 17: ITCHING/PRURITUS

One of the side effects that's really prevalent with a lot of different agents is itching and pruritis. So, because many chemotherapies affect rapidly dividing cells, for which skin is a rapidly dividing cell group, you can have itching, dryness, burning sensations, or even peeling of skin. Treating your dry skin is going to be one of the first steps that any patient can take in terms of alleviating the itching and pruritis.

Now, when you're trying to treat dry skin there's some specific things to pay attention to. Most importantly is to use a non-fragrant emollient, especially after you bathe. The reason that I say non-fragrant is because a lot of times with lotions and ointments, those fragrances and dyes that are in them can be very irritating to the skin, so especially if your skin is already irritated at baseline, applying something that can be even more irritating can be very troublesome. So, at least for the time period in which you're undergoing treatment with chemotherapy, try to avoid any fragrance or dyes if you find that that triggers your dry skin or you're itching.

Also, wear non-irritating clothing that's loose. A lot of times patients who are wearing things, such as leggings or a tight-fitting shirt, they notice that it rubs against their skin constantly, which can create friction and irritation.

And then, try using a humidifier in your house, especially if you live in a drier climate or you're somewhere in the winter, where you notice that the inside of your house is very dry, if you have blown air heating especially, using a humidifier can help put some moisture back in the air and help alleviate some of these symptoms as well.



## ITCHING/PRURITUS

### Pharmacological treatments

- No single drug has been proven to be the most effective
- Patients should experiment to find what works best for them
  - Proxamine lotion has been proven to reduce itching in other patient populations and may be beneficial in malignancy-associated itching
  - Topical “cooling” agents such as menthol or camphor may be beneficial
  - Low strength lidocaine cream is beneficial for many patients but caution should be exercised as excessive quantities may result in increased absorption through the skin
- Topical agents with lacking data
  - Topical antihistamines such as diphenhydramine
  - Capsaicin
- Refractory pruritis
  - System agents such as antidepressants, anticonvulsants, and opioid antagonists have limited data in this setting



### Slide 18: ITCHING/PRURITUS

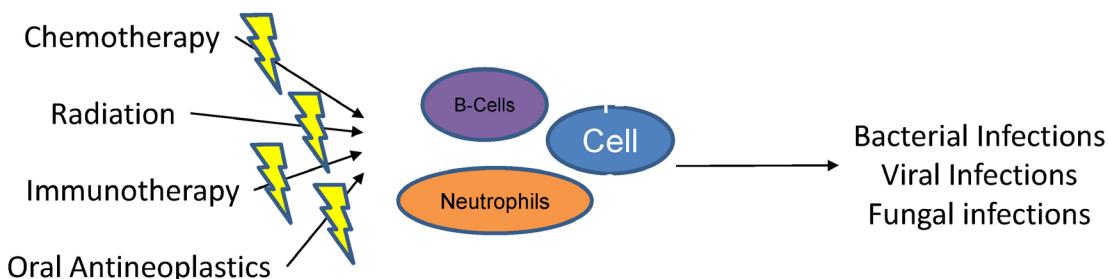
So, some of the pharmacological treatments that we can use, now no single drug has been proven to be the most effective, but there are some things that we can do, such as pramoxine lotion. This has been used in a lot of people with malignancies to help reduce itching. Things that have a cooling sensation, such as menthol and camphor-containing lotions, have been shown to be effective. And then also, if you have more extreme itching and pruritis, talk to your treatment team about maybe a lotion with lidocaine cream, but we really try to avoid this in most patients because if you have any type of skin breakdown, excessive application of this can actually increase absorption through the skin and become problematic. So, I would say that this is sort of a last-ditch effort if you really need it. Talk to your care team about that.

And then, things that we don't really recommend because we don't have a lot of good research to support them, would be topical antihistamines or capsaicin, which is actually a chili powder derived lotion. These things are good for pain and can actually be good for neuropathic pain for some patients, but not typically used for itching.

And then, if you have really refractory pruritis, definitely talk to your treatment team because there are some oral systemic agents, such as antidepressants, or some opioid antagonists that have shown to be somewhat effective. But, if you have really refractory pruritis, for which none of the other things work, it's worth a conversation with your treatment team.

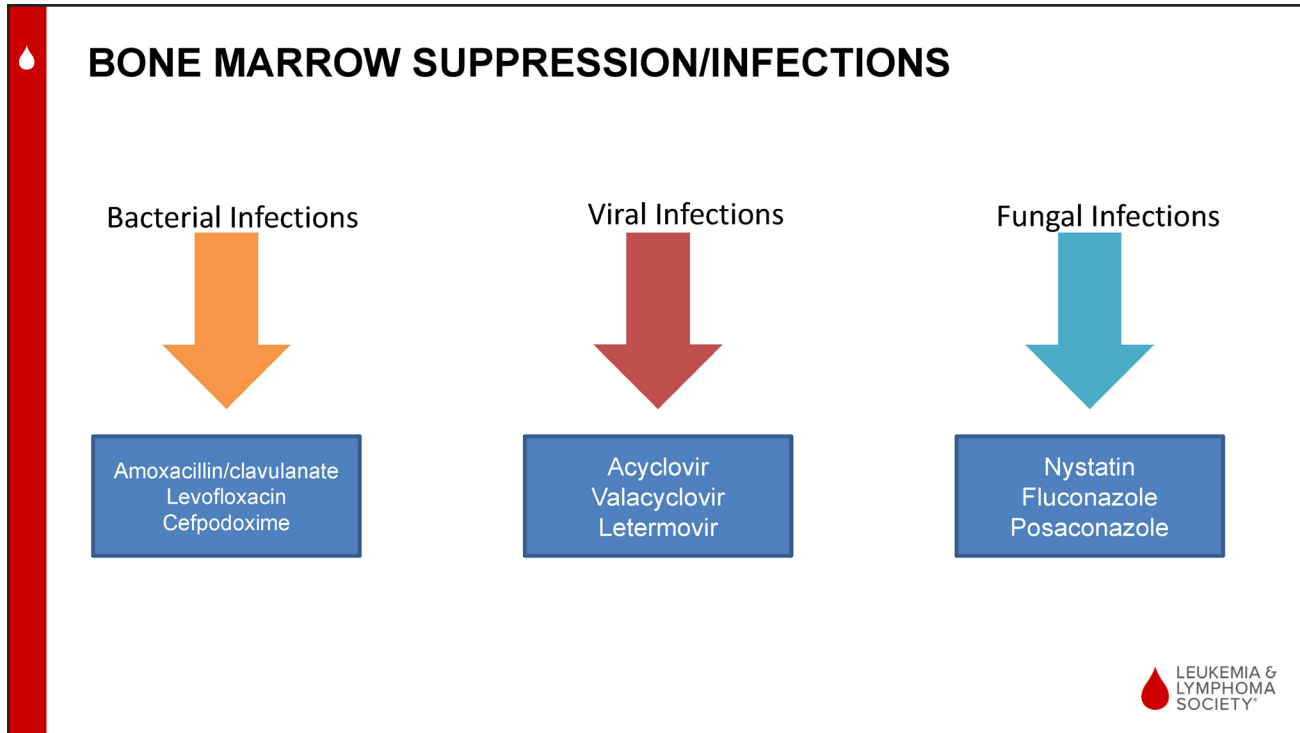
## BONE MARROW SUPPRESSION/INFECTIONS

Many different chemotherapeutics agents/regimens, as well as oral antineoplastic agents, can suppress the immune system and increase the risk for infections



### Slide 19: BONE MARROW SUPPRESSION/INFECTIONS

The next thing, just to put on people’s radar, is a lot of hematological malignancies tend to be associated with a lot of infections, and that’s because whether it’s chemotherapy, radiation, or some of the oral agents, they can affect your bone marrow, which can then affect some of your immune-fighting cells, such as B cells or neutrophils. And then, you can become more susceptible to things like bacterial, viral, or fungal infections.



**Slide 20: BONE MARROW SUPPRESSION/INFECTIONS**

Now, you know, there's supportive care. None of these things are over the counter, none of these things are going to be necessarily addressed by just you, but in a conversation with your care team you may notice that you're put on what we would call prophylactic or preventative medications in order to prevent these different infections. And these are drugs that are widely used for bacterial infections, viral infections, and fungal infections. And even though this is sort of a treatment team-derived supportive care, I wanted to put this out there because it is so prevalent with a lot of these hematologic malignancies.





## HAND-FOOT SYNDROME

### Typically can manifest within the first 2 – 4 weeks after treatment starts

- Affects palms of hands and soles of feet, but can occur on any surface that is high impact or friction

### Preventative measures are generally most effective

- Be aware of any potential area that could be affected
- Wear cotton gloves or socks to protect affected areas
- Avoid excessive friction/use
- Avoid excessive exercise (especially that which affects hands and feet)
- Avoid hot water
- Wear loose fitting shoes



### Slide 21: HAND-FOOT SYNDROME

Now hand-foot syndrome is something that's associated with a handful of different chemotherapy regimens. It's not super prevalent, but if it does affect you, it can be quite severe, especially if you have to deal with the symptoms of it. And this can happen anywhere from 2 to 4 weeks after treatment starts, although truly it can happen later in treatment as well, but it's most common when you first start treatment. And it usually affects the palms of your hands and the soles of your feet, but it could affect any area that is either high impact or has a lot of friction. So, that's why it affects your hands and feet most commonly because from touching things and walking, those are the areas of skin that get the most friction. And what you'll notice is generally a skin breakdown in those areas and pain that's associated with it.

Preventative measures tend to be the most effective for patients. And so, we want to think about things like, be aware of any area that's affected and do what you can to protect it. Wear cotton gloves or socks that can help protect the area of skin. Try to avoid any excessive or frictional use, especially if you need to do something with your hands that you really can't avoid, make sure that you're wearing gloves to help protect the area. You want to avoid really hot water. So, think about when you're washing your hands, maybe turn it down a little bit, maybe use a little bit cooler showers, so that you're not using very hot water. And then, also think about wearing loose-fitting shoes because the super tight shoes can put unnecessary pressure on your feet and sort of exacerbate those symptoms.



## HAND-FOOT SYNDROME

### Prophylaxis

- Ammonium lactate cream twice daily
- “Thick” moisturizer, generally containing petroleum or lanolin twice daily or as needed

### Treatment


- Varies depending on the grading/severity of symptoms
- Comprised of a combination of therapies
  - Urea 20% cream twice daily
  - Clobetasol 0.05% cream daily (or topical steroid equivalent)
  - Pain relievers
    - NSAIDs, GABA agonists, opioids



### Slide 22: HAND-FOOT SYNDROME

Now, in terms of agents that we can use for prophylaxis, you generally want to think about using a thick moisturizer, so something that contains either petroleum or lanolin, either twice daily or more. Whatever you find to be effective. But, keeping your hands moisturized with something that’s thick, so typically not your typical lotion that you would spread on your whole body. You want something that’s going to stay on for a little bit longer.

And then, as a treatment team we think about treating based on how bad your symptoms are. And so, there’s a handful of treatments that we use, such as urea cream or clobetasol cream in certain patients. And then, also strategies to manage the pain, such as non-steroidal anti-inflammatory drugs (NSAIDs) or gamma-aminobutyric acid (GABA) antagonists or in very extreme situations, opioids if needed, although we try to avoid that. And most patients can get away without needing that.



## MUCOSITIS & STOMATITIS

**Breakdown of the oral mucosal lining due to chemotherapy killing rapidly dividing cells**

**Typically manifests 5 – 10 days after chemotherapy**

### Pharmacologic treatment

- Magic Mouthwash (diphenhydramine, viscous lidocaine, & sodium bicarbonate) rinses every 6 hours or as needed

### Non-pharmacologic treatment

- Rinse mouth frequently, particularly after meals
- Use a non-alcoholic mouth wash after meals and at bedtime
- Use a soft bristle toothbrush after meals
- Avoid irritating items such as spicy foods and alcoholic beverages



### Slide 23: MUCOSITIS & STOMATITIS

Mucositis and stomatitis are another common thing that we see with chemotherapy, again, because it kills a lot of rapidly dividing cells for which the lining of your mouth is prone to being targeted by those agents. And this can happen anywhere from 5 to 10 days after chemotherapy. And one of the main things that we do is give something called Magic Mouthwash. This is a combination of diphenhydramine or Benadryl®, viscous lidocaine (Xylocaine® Viscous), and sodium bicarbonate (baking soda). And what this helps to do is to help numb and protect the mouth. Specifically, a lot of patients will take this prior to eating to make eating easier for them. A lot of times patients can feel like I can't eat because my mouth is so sore, and then they'll go days without eating. So, this is something that we can do to help make patients feel more comfortable.

In terms of non-pharmacological things that you can do, is make sure that you're rinsing your mouth frequently. Good oral hygiene. But, in doing so, use a non-alcoholic mouthwash because an alcoholic mouthwash will irritate the skin. If you think, any time that you've rinsed with salt water or an alcohol-containing mouthwash, even if you don't have open sores, it can be a little irritating. Use a soft bristle toothbrush to make sure that you're not irritating your gums unnecessarily. And then, during the periods of time in which you have mucositis, think about avoiding spicy foods or any alcohol-containing beverages for that period of time.

## SAFE HANDLING OF CHEMOTHERAPEUTICS

**There are several steps that patients and caregivers can take to minimize risk of exposure and toxicity of chemotherapeutics**

- Intravenous agents
  - Reduce spread of bodily fluids such as vomit and urine
    - Close the lid of the toilet prior to flushing to reduce splashing
    - Clean toilet and/or seat after each use
    - Caregivers should wear gloves when handling any bodily fluids (such as a urinal or bedpan)
- Oral agents
  - When possible, oral agents should be self-administered
    - If not possible, caregivers should always wash hands thoroughly, put on disposable gloves, administer the medication, remove gloves and place in trash, then wash hands thoroughly
    - The above process should also be followed when filling pill boxes
  - Do not throw out unused medications, return to pharmacy for disposal if possible



### Slide 24: SAFE HANDLING OF CHEMOTHERAPEUTICS

And then beyond toxicities, because I think there's a lot of caregivers on here, I also wanted to throw this quick tidbit in there about safe handling of chemotherapy agents. Because certain side effects can happen, there are some hazards associated with inappropriate handling of medications. And so, for the most part if it's a patient administering their own medications, typically there's less thought that needs to go into it. But, for caregivers you want to think about reducing the spread of bodily fluids, specifically vomit and urine. So, think about things like closing the lid of the toilet prior to flushing so you avoid any splashing. Cleaning the toilet seat after each use. And then, caregivers should always wear gloves when handling any bodily fluids, just to protect themselves largely so that they don't get exposed because a lot of times you can excrete some of the active chemotherapy in your bodily fluids.

And then, beyond that for oral agents, caregivers should usually wash their hands and then wear gloves whenever administering these medications and then remove the gloves, put them in the trash, and wash your hands thoroughly.

This also applies to when filling pill boxes. So I know a lot of patients in order that you remember to take your medications will lay out the week's worth of medications in a pill box. And so, if the caregiver is doing this, they should always make sure they're wearing gloves when putting the medications in the pill box or administering, just to protect themselves.

And then lastly, make sure you don't throw out any chemotherapy agents, especially the oral ones. Try to return them to the pharmacy, if at all possible, for disposal because these are hazardous drugs. So you always can call the pharmacy and ask them what their disposal policy is.



## **BEING A GOOD ADVOCATE**

**Both patients and caregivers should understand the treatments that they are receiving, as well as what to expect from the treatments**

Side effects and toxicities

**Keep a list of all medications that you are taking, as some medications can have drug-drug interactions or side effects that can exacerbate chemotherapy toxicities**

**Ask Questions! Ask Questions! Ask Questions!**



### **Slide 25: BEING A GOOD ADVOCATE**

And then lastly, just encourage everyone to be a good advocate. So, both patients and caregivers should understand the treatments that they're getting and then what side effects you can expect from those things. I highly encourage everyone to keep a list of all medications you're taking. There's drug-drug interactions that we have to think about as a treatment team. There are side effects that can be exacerbated when you start new treatments. So, whether you're going to your oncologist, talking to the pharmacist, or seeing a specialty provider like a dermatologist or cardiologist, they may start new medications that are not a good fit with your chemotherapy regimen, and so it's always important that all of your care team, including yourself, your providers, and your caregivers, are aware of what medications you're taking. And then always, don't be afraid to ask questions, ask questions, ask questions, because we are really here to help you on this journey and we're here to be part of your treatment team that can help you.



### LEVERAGING YOUR TREATMENT TEAM

**Always be open and communicative about side effects or toxicities that you are experiencing, even if you aren't sure if it is related to the treatment, you are receiving**

- Caregivers may need to be advocates for patients
- General feeling of not wanting to be a “bother” to the treatment team

**Utilize specialists on your treatment team**


- Physicians, nurse practitioners, physician assistants, pharmacists, social workers, dieticians, nurses, physical therapists, occupational therapists, psychologists, and many more



#### Slide 26: LEVERAGING YOUR TREATMENT TEAM

And then, this slide just reiterates some of the things that I just said about leveraging your treatment team, making sure that caregivers may need to be advocates for patients. I know a lot of times patients feel like they don't want to be a bother to the treatment team, so they may not want to ask questions, they feel like they're taking up their doctor's time. But make sure that you advocate for yourself or for the patient that you're providing for. And, you have a whole host of people from physicians, nurse practitioners, pharmacists, physical therapists, psychologists, there's a lot of people that you can utilize on this journey.

And with that, I will hand it over to my colleague Dr. Ritchie for her portion of the presentation.



**Toxicities of Chemotherapy Treatment**  
What is and is not discussed with your physician

Ellen K. Ritchie MD  
Assistant Director of the Leukemia Program  
Associate Professor of Clinical Medicine  
Weill Cornell Medicine



**Slide 27: TOXICITIES OF CHEMOTHERAPY TREATMENT: WHAT IS AND IS NOT DISCUSSED WITH YOUR PHYSICIAN**

**Dr. Ellen Ritchie:**

Good afternoon and welcome to everyone who came to listen to this program.

I'm going to talk also about toxicities of chemotherapy treatment, but what things are discussed overtly with your physician and what things are not discussed is a little bit different and different per practitioner.



## DISCLOSURES

- **AbbVie Pharmaceuticals:** advisory board
- **Agios pharmaceuticals:** advisory board
- **Bristol Myers Squibb:** advisory board and speakers bureau
- **Incyte Pharmaceuticals:** advisory board and speakers bureau
- **Gilead:** research funding, advisory board
- **Jazz Pharmaceuticals:** research funding
- **Pfizer:** research funding



### Slide 28: DISCLOSURES


These are my disclosures.





Leukemia Patients are my focus

# What I tell my patients before chemotherapy treatment

 LEUKEMIA &  
LYMPHOMA  
SOCIETY®

**Slide 29: LEUKEMIA PATIENTS ARE MY FOCUS: WHAT I TELL MY PATIENTS BEFORE CHEMOTHERAPY TREATMENT**

So, my patients are generally leukemia or myelodysplastic dysplastic syndrome patients or myeloproliferative disorder patients. And my slant is going to be a little bit more toward what I tell my patients before chemotherapy treatment, but it's not that different from other hematologic malignancies.

## CASE STUDY

61F publisher with a history of breast cancer in remission 10 years ago and otherwise in good health presents with syncope at work to the ER.

EKG and head CT are normal

CBC with wbc 65, hemoglobin 6.2 and platelets 10

Blood sent for analysis and is consistent with acute myeloid leukemia

She is given hydroxyurea (to lower her wbc) and transfusions

She needs immediate chemotherapy and plan for induction chemotherapy with daunorubicin and cytarabine is recommended.

Need for placement of a central line and echocardiogram before treatment can begin discussed with the patient

She is consented for chemotherapy and the following toxicities were discussed.

### Slide 30: CASE STUDY

I'm going to start this presentation with a case study. This patient is a 61-year-old female publisher who had a history of breast cancer that had been in remission for 10 years and was otherwise in good health. She presented at work fainting and was sent to the emergency room. An EKG and head CT were done that were normal, but her blood count was very abnormal with a white blood cell count of 65,000, a hemoglobin with severe anemia of 6.2, and a platelet count that was extremely low at 10. The blood was sent for analysis and was consistent with acute myeloid leukemia. A bone marrow biopsy was done that confirmed that result and she was given hydroxyurea, which is a drug meant just to lower the white blood cell count, and transfusions.

She needed immediate chemotherapy and a plan for induction chemotherapy to be given in the hospital with daunorubicin and cytarabine was recommended. She needed placement of a central line and to have an echocardiogram to look at her cardiac function before beginning treatment. And, when she was consented for chemotherapy treatment, the following toxicities were discussed.

## IMMEDIATE SIDE EFFECTS FROM CHEMOTHERAPY TREATMENT DISCUSSED

- Alopecia
- Pancytopenia with possible need for transfusion of blood products and the administration of growth factors
- Neutropenia: prophylactic antibiotics, antifungals and antiviral medication with the side effects of those treatments
- Neutropenic Fever: will require hospitalization and the need for a course of IV antibiotics
- Other infections: teeth, skin, pneumonia
- Gastrointestinal toxicities: Nausea, Vomiting, Constipation, Diarrhea, mucositis (sores in the mouth) and typhlitis (inflammation of the colon).
- Fatigue and weakness
- Need for prolonged hospitalization approximately 30 days after the start of treatment
- Need for bone marrow transplant or additional chemotherapy if remission is achieved depending on the chromosomes structure in the bone marrow report and what genes are mutated in her disease.



### Slide 31: IMMEDIATE SIDE EFFECTS FROM CHEMOTHERAPY TREATMENT DISCUSSED

So, the first toxicity, which is often most distressing to patients, is that you will lose your hair. This happens with different chemotherapy regimens across the different hematologic malignancies, but it can be one of the most traumatic for patients. One other significant toxicity is the blood counts are going to go down, and there is a possibility that transfusions will be needed of both blood and platelets, and growth factors to stimulate the growth of red blood cells, platelets, and white blood cells may need to be used.

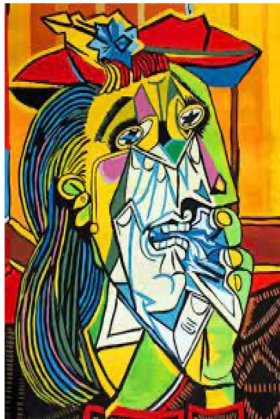
As your white blood cell count goes down, you can develop something called neutropenia, which is where the cells that actually are the infantry that fight infections go to a very low level. And, if you develop a fever with one of those particularly low neutrophil counts, you need hospital treatment and IV antibiotics. In order to try and prevent hospitalizations, prophylactic antibiotics, antifungals, and antivirals are often given to patients.

There're other infections that patients can get even if they don't become neutropenic while they're receiving chemotherapy treatment, including tooth infections, skin infections, and pneumonias. Gastrointestinal toxicities are common, nausea, vomiting, constipation, diarrhea, mucositis, and typhlitis, which is an inflammatory disease of the colon. All of these can occur in leukemia patients. Fatigue and weakness are also common. And, in the case of an acute leukemia patient, the need for a prolonged hospitalization is common, with an approximately 30-day hospitalization after the beginning of treatment.

Some patients may need to have a bone marrow transplant and others additional chemotherapy, even if a remission is achieved, depending upon the structure of the chromosomes and what genes are mutated. That's how we make the decision as to what additional therapy might be needed.

So, those are the basic sort of toxicities that I talk about with my patients when I start them on treatment for acute leukemia.

## CASE HISTORY



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Patient began to lose her hair two-and-one-half weeks after starting treatment

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She developed neutropenic fever and started antibiotics

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She had many bruises secondary to blood draws

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Because of access problems, a central neckline was placed

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She developed neutropenic colitis and a NGT was placed

---

After these interventions, she developed depression

---

She did not discuss her feelings with the primary team or her husband.

### Slide 32: CASE HISTORY

This patient began to develop side effects in a relatively short period into her treatment. She began to lose her hair 2½ weeks after starting treatment. She developed a neutropenic fever and had to start IV antibiotics. She had many, many bruises wherever she had to have blood draws. Because she had difficulty at some point in time having her blood drawn, a central neckline was placed. She developed neutropenic colitis and had to have an NG tube or a tube through her nose into her stomach placed. And, after all these interventions, when she looked at herself in the mirror, she developed depression. She did not discuss her feelings with the primary team or with her husband.



## **SIDE EFFECTS OF DISEASE AND CHEMOTHERAPY NOT FREQUENTLY DISCUSSED THAT CAN IMPACT OUTCOME**

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Changes in Body Image and Self Esteem

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Dependence on a caregiver

---

Sleep disturbance, depression and anxiety

---

Sexual Dysfunction and Relationship changes

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Cognitive Changes Associated with Chemotherapy

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Financial Toxicities of Chemotherapy

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Social Toxicities: Loneliness and alterations in social relationships



### **Slide 33: SIDE EFFECTS OF DISEASE AND CHEMOTHERAPY NOT FREQUENTLY DISCUSSED THAT CAN IMPACT OUTCOME**

This sort of illustrates one of the primary, not talked about, toxicities of chemotherapy and that is that with changes in your body image come changes in your self-esteem. You realize that you feel so poorly during some of the chemotherapy treatments that you depend a lot on a caregiver just to help you go back and forth from the bathroom or even to sit up in bed. There can be sleep disturbances sometimes as a result of the chemotherapy treatment itself, but sometimes from depression or anxiety that develops during chemotherapy treatment. There can be sexual dysfunction and changes in your relationship. You may not feel the same way that you did, for example, toward your husband after starting treatment than you may have felt before.

There are cognitive changes that are sometimes associated with chemotherapy treatment. And there are financial toxicities that can be associated with chemotherapy treatment.

And nearly everyone feels some sort of social toxicity, sort of a loneliness in having this diagnosis and having to be treated with particular chemotherapy regimens. And, that there are alterations in all kinds of social relationships, both with family and with friends.

## CHANGES IN BODY IMAGE

- Wounds and scars from biopsy sites, surgeries
- Bruises from phlebotomy sites
- Alopecia from chemotherapy
- Rashes from chemotherapy treatment or medications needed to tolerate chemotherapy treatment like allopurinol or antibiotics
- Presence of a central line
- Changes in body image led to a decrease in self esteem



### Slide 34: CHANGES IN BODY IMAGE

Changes in body image happen quickly. You develop wounds and scars, potentially from biopsy sites or surgeries that may have to be done. Bruises from phlebotomy sites. Alopecia or loss of your hair from chemotherapy. Rashes from chemotherapy treatment or medications needed to tolerate chemotherapy treatment, like allopurinol or certain antibiotics. The presence of a central line can be in a very visible location and can remind you constantly that you are a patient who has cancer. And these changes in body image really can lead to a decrease in your sense of self-esteem.

## ADJUSTMENTS TO ACCEPT THESE CHANGES IN BODY IMAGE AND TO IMPROVE SELF ESTEEM INCLUDE:

Allow yourself to mourn what you have lost and discuss with loved ones, friends or support groups

Wigs, scarves and new clothing to accommodate changes in appearance

Take new risks with your appearance that "spark joy"

Engage in a gentle exercise program—ie walking outdoors

Maintain a healthy diet

Be open about the changes that bother you with your physician. Drugs and dosages can potentially be adjusted to improve your sense of self

### Slide 35: ADJUSTMENTS TO ACCEPT THESE CHANGES IN BODY IMAGE AND TO IMPROVE SELF ESTEEM INCLUDE:

There're many adjustments which you may have to make to accept these changes in body image and to improve self-esteem. One is to allow yourself to mourn what you have lost and discuss your feelings with loved ones, friends, or support groups.

It's also very important to talk to your physician and to your treating team about your feelings because they may be able to help you to understand the experiences that you're going through and make suggestions as to how you can feel better.

Wigs, scarves, and new clothing sometimes help you to feel better while you're losing your hair and your body shape is changing. And take new risks potentially at that time in your appearance. Maybe you buy a green hair wig or something that you've always felt like you wanted to try, something that could spark joy.

Engage in a gentle exercise program. You may not have been a big exerciser before starting chemotherapy treatment, but maybe walking or setting certain goals after starting treatment, and getting yourself up out of bed, moving every day, will help in your mood and your self-esteem.

Maintain a healthy diet. You don't have to eat 3 square meals a day but try and eat something along the course of a day. And try and eat healthy.

And make sure that you discuss this at length with your doctor and treating team. Drugs and dosages can be potentially adjusted to improve your sense of self. Sometimes antidepressants and other medications can be added, which will make you feel better during your course of treatment.



## CHEMOTHERAPY TREATMENT REQUIRES A CAREGIVER

### Caregiver is a necessity for successful treatment

- **Not feasible to give chemotherapy to a patient without an adequate caregiver**
- **Many toxicities of chemotherapy require assistance from others**
- **For some patients, the need for a caregiver causes guilt and concerns that they are a burden to their family and friends.**

### Relationship between caregiver and patient can be important to outcome

- **Chemotherapy outcome is improved with adequate caregiver support**
- **Relationships deepen between patients and caregivers and can provide solace to both parties**
- **Counseling and support groups can allow for both patients and caregivers to discuss their feelings**



### Slide 36: CHEMOTHERAPY TREATMENT REQUIRES A CAREGIVER

One of the necessities of chemotherapy treatment is that a caregiver is really required. And it's necessary for a successful treatment to have someone who is your caretaker or giver during the period that you are indisposed. It's actually not feasible to give chemotherapy to a patient without an adequate caregiver. Someone needs to be there in case of emergency or in case of an inability to take care of yourself.

Many toxicities of chemotherapy require assistance from others. That can be as simple as getting up and helping you go to the bathroom and come back to the bed.

For some patients, the need for a caregiver causes guilt and concerns that they are a burden to their family and friends. But there is a flip side to that as well, that relationships can deepen between patients and caregivers as they spend more time with each other and can provide solace to both parties. Friendships can become deeper and family relationships can become stronger.

Chemotherapy outcome is improved with adequate caregiver support. And, counseling and support groups, that can be either virtual or in person, can allow for both patients and caregivers to discuss their feelings, and if there are feelings of dependence or burden, that those can be discussed in a safe forum.



## LONELINESS AND DEPRESSION

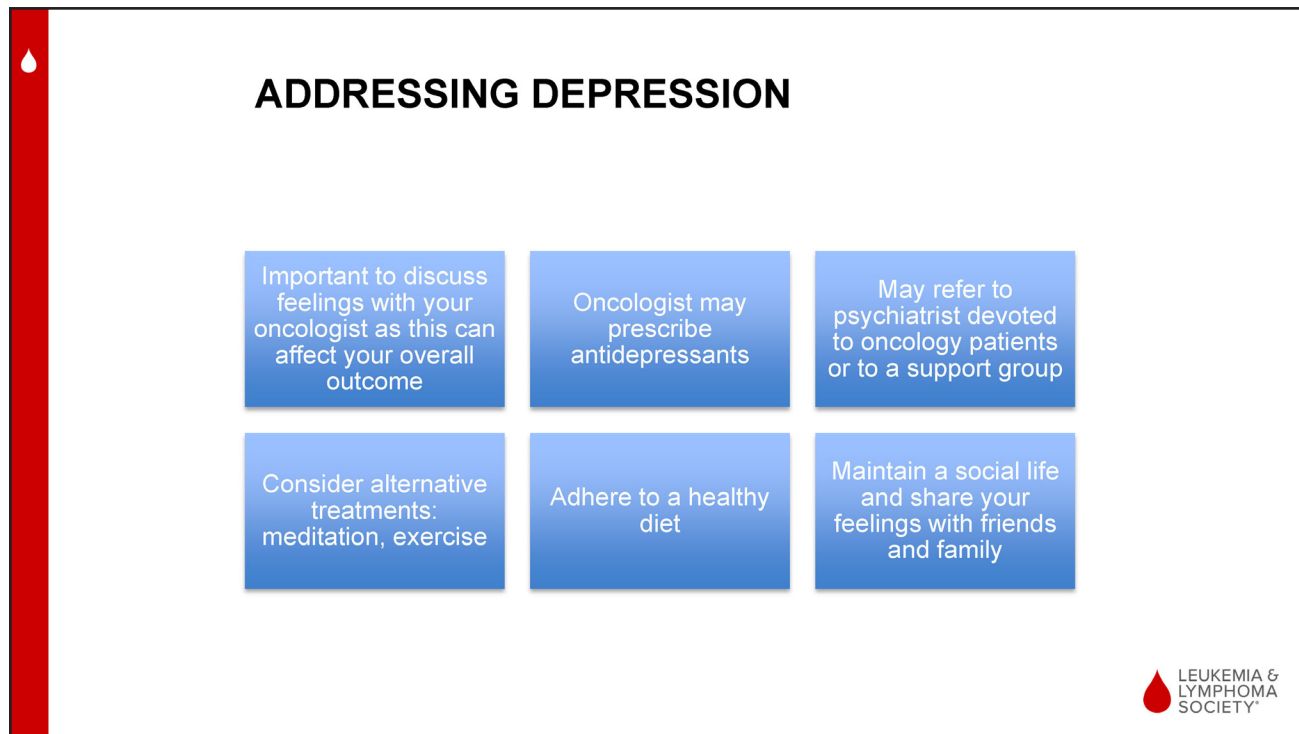


- Depression affects up to 25% of cancer patients
- This can significantly affect treatment outcome
- Depressed patients can't cope with the burden of the illness
- May decrease the acceptance of treatment options
- Can extend length of hospitalization
- Reduce overall quality of life
- Recent abstract at ASH shows that depression can influence prognosis and decrease OS in patients with MDS

(Pleyer et al, EQ-5D-5L Predicts Treatment Outcome, Ash abstract 0064)


### Slide 37: LONELINESS AND DEPRESSION

Loneliness and depression are common in patients being treated with chemotherapy for a new diagnosis of cancer. Depression affects up to 25% of cancer patients. And this can significantly affect treatment outcome. Depressed patients also often can't cope with the burden of illness. It may decrease their acceptance of treatment options. They may turn things down or not sort of pursue treatments that may be the best for them because of their feelings of unhappiness. Depression can extend the length of hospitalization. It can reduce the overall quality of life. And a recent abstract at this last American Society of Hematology (ASH) shows that depression can influence prognosis in some patients and decrease overall survival in patients with myelodysplastic syndrome (MDS). Treatment questionnaires that really look at quality of life and depression, they found that these aspects were greatly important to the overall outcome of patients.



## ADDRESSING DEPRESSION

- Important to discuss feelings with your oncologist as this can affect your overall outcome
- Oncologist may prescribe antidepressants
- May refer to psychiatrist devoted to oncology patients or to a support group
- Consider alternative treatments: meditation, exercise
- Adhere to a healthy diet
- Maintain a social life and share your feelings with friends and family



### Slide 38: ADDRESSING DEPRESSION

Addressing depression often is a complex enterprise. It's very important to discuss your feelings with your oncologist, and your oncologist needs to understand that you are feeling hopeless about your overall situation or very depressed. Oncologists may prescribe antidepressants themselves or may refer to a psychiatrist who's devoted to oncology patients, or to a support group that consists of other patients with your diagnosis.

It's a time that potentially alternative treatments might be useful, such as, the ability to learn to meditate. Or, gentle exercise, walking, walking outside. Adhering to a healthy diet, feeling like you can control what it is that you are eating. And, maintaining a social life and sharing feelings with friends and family, are all very important and need to be encouraged.

SEXUAL DYSFUNCTION AND RELATIONSHIP CHANGES



Karacan et al, AP Journal of Nursing 2021, Jan-Feb;88(1)

Sexual dysfunction is prevalent in patients with hematologic malignancies

Observed at rate of 60% in patients with acute leukemia, 55% in patients with CLL and 73.3 in lymphoma. In patients undergoing stem cell transplant 71.4% of patients.

Many medications, including chemotherapy, can interfere with sex drive

Erectile dysfunction is the most common abnormality in men

Female dysfunction can be related to early ovarian failure

Fertility preservation may not be routinely discussed with oncologists

The psychologic burden of a cancer diagnosis can change the nature of relationships with spouses and other partners

There is a lack of validated interventions for sexual rehabilitation after cancer treatment

Cost effective strategies for addressing these problems are not readily available (ie fertility treatment)

For some patients, medical management can improve sexual function and it is important that this topic be discussed with the primary oncologist.



Slide 39: SEXUAL DYSFUNCTION AND RELATIONSHIP CHANGES

Sexual dysfunction and relationship changes are another toxic side effect of a cancer diagnosis and of chemotherapy treatment. Sexual dysfunction is prevalent in patients with hematologic malignancies. In a study done in 2021, the observed rate of sexual dysfunction was 60% in patients with acute leukemia, 55% in patients with CLL, and 73.3% in lymphoma patients. In patients undergoing stem cell transplant, 71.4% of patients reported sexual dysfunction. And, many medications, including chemotherapy treatments, can interfere with sex drive. In men, erectile dysfunction is the most common abnormality. Female dysfunction often can be related to early ovarian failure. And fertility preservation is not routinely discussed always between oncologists and patients at the start of treatment, which can lead to anxiety and concerns that are never really fully addressed.

The psychologic burden of a cancer diagnosis can change the nature of relationships with spouses and other partners, so that changes that you may have and your feelings toward people that were once close to you are hard to actually put up with and to understand. And that can lead to alterations in your relationships.

Unfortunately, there's a lack of validated interventions for sexual rehabilitation after cancer treatment and cost-effective strategies for addressing these problems are not readily available, i.e., fertility treatments. But, for some patients, medical management can improve sexual function and is an important topic to be discussed with the primary oncologist and may necessitate a referral to, for example, a urologist, who may come up with strategies that can improve this aspect of your life.

## CASE HISTORY

- Patient's sister discussed with team her concerns about depression
- Team discussed the sister's suspicions with the patient who agreed to see a psychiatry consult
- An antidepressant was started, and she participated in a patient support group on the floor held weekly
- Her counts started to recover, and her mood improved
- Her NGT and central line were removed
- Bone marrow showed a remission
- The patient was sent home and started consolidation chemotherapy
- She tried to go back to work but was unable to concentrate on her projects and had some difficulty finding words and felt frustrated



### Slide 40: CASE HISTORY

Back to our case history, our patient's sister discussed with the team her concerns about her sister's depression. The team discussed the suspicions with the patient who agreed to have a psychiatry consult. An antidepressant was started, and she participated in a patient support group on the floor, held weekly. Her counts started to recover, her mood improved, and her NG tube and central line were able to be removed. Her bone marrow showed a remission, and the patient was sent home with the start of consolidation chemotherapy planned to begin.

She tried to go back to work but was unable to concentrate on her projects and had some difficulty finding words and felt frustrated.

## CHEMOTHERAPY AND COGNITIVE FUNCTION

- **Cognitive effects from chemotherapy treatment are common in hematologic and solid tumor malignancies.**
- **Numerous drugs used to treat hematologic malignancies and a deleterious effect on brain function**
- **Mechanisms include direct neurotoxicity of chemotherapeutic agents, oxidative stress, genetic predisposition to metabolizing chemotherapy drugs, histone modification, cytokine provoked damage, immune alternations and the direct action of chemotherapy drugs on structural proteins in brain cells.**
- **There are no efficient treatments for this syndrome, and it is a challenge in clinical practice**
- **Future studies are needed to determine which patients are vulnerable to this syndrome and evaluate ways to mitigate damage.**
- **Cognitive training and physical activity may be methods to improve dysfunction in patients.**

Vitali et al, Crit Rev Onc/Hem,2017 (118): 7-14

Allegra et al, Exp Rev Hematol 2020 Apr;13(4):393.



### Slide 41: CHEMOTHERAPY AND COGNITIVE FUNCTION

Chemotherapy can often lead to something called chemo brain or cognitive dysfunction. And cognitive effects from chemotherapy are common in both hematologic and solid tumor malignancies. Numerous drugs, which are used to treat hematologic malignancies, have a deleterious effect on brain function and sometimes we actually use chemotherapy which is introduced directly into the spinal fluid, with a hope of actually treating the malignancy in the central nervous system that can have a direct toxic effect on brain cells. And, the mechanisms of chemo brain include both direct neurotoxicity of chemotherapeutic agents, but also oxidative stress on cells. Some patients have a genetic predisposition for metabolizing chemotherapy drugs, which may make them more prone to the development of cognitive side effects. Genome modifications or inflammatory damage may also exacerbate cognitive dysfunction. And, as I said before, the direct action of chemotherapy drugs on the structural protein on brain cells can also be an important mechanism for chemo brain.

There are no efficient treatments for this syndrome, and it is a challenge in clinical practice. Future studies are really needed to determine which patients are vulnerable to chemo brain, and to evaluate different ways to mitigate damage.

But cognitive training can be done, reading, doing puzzles, and having strong social interactions with friends and family. And, physical activity, such as getting outside and taking a walk are methods that can improve cognitive dysfunction in patients.

### CASE HISTORY

- Because of her difficulties with concentration, the patient was not able to resume her previous job at full capacity
- She was put on azacitidine maintenance treatment but her monthly copay for the drug was \$3000.00.
- In her current state of employment, this was not a feasible number. She had two children in college with tuitions to pay.
- Insurance did not cover the costs of some of the specialists that saw her during hospitalization, and these were surprise expenses.
- The patient became very worried about her financial situation and that of her family.



#### Slide 42: CASE HISTORY

Back to our case. Because of her difficulties with concentration, the patient was not able to resume her previous job at full capacity. She was put on a maintenance chemotherapy, but her monthly copay for the drug was \$3,000. And, with her current state of only half employment, this was not a feasible number for her. In addition, she had 2 children in college with tuitions to pay. Insurance did not cover the complete cost of her hospitalization and some of the specialists who came to see her were not part of her insurance plan, and these were surprise expenses.

The patient became very worried about her financial situation and that of her family.

## FINANCIAL TOXICITIES AND CANCER TREATMENT

- Financial Toxicities describe problems related to the cost of chemotherapy treatment
- Several studies show that cancer patients and survivors are more likely to have financial toxicity than are people without cancer
- Cancer treatment can directly affect a patient or caregiver's ability to work and pay medical bills.
- The degree of toxicity is dependent on many factors including amount of income earned, savings, and assets.



### Slide 43: FINANCIAL TOXICITIES AND CANCER TREATMENT

Financial toxicities of chemotherapy and cancer treatment are rarely discussed. Financial toxicities really can be defined as problems related to the cost of chemotherapy treatment. And there're several studies that show that cancer patients and survivors are more likely to have financial toxicity than people without cancer.

Cancer treatment can directly affect a patient or a caregiver's ability to work and to pay medical bills. And, the degree of toxicity is dependent on many factors and variables, including the amount of income earned, the amount of savings you have, and the number of assets that you have.



## PROBLEM'S PATIENTS HAVE REGARDING COST OF TREATMENT



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Copayments: amount you pay for each healthcare service such as a doctor's appt or prescription.

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Deductibles: Amount you pay for your medical care before your health insurance plan begins to pay.

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Coinsurance: percentage of costs you pay for a service that your health insurance covers after you have paid your deductible, for example you pay 20% and your insurance pays 80%.

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Cancer survivors report higher out-of-pocket spending than those who do not have cancer. Some cancer survivors report spending more than 20% of their annual income on medical care.



### Slide 44: PROBLEM'S PATIENTS HAVE REGARDING COST OF TREATMENT

There are different aspects of the sort of financial bargain between you and a treatment entity, such as: copayments, which are the amounts that you pay for each healthcare service, such as a doctor's appointment or a prescription; deductibles, which is the amount you pay for the medical care before your health insurance begins to pay; coinsurance, the percentage of costs you pay for a service that your health insurance covers after you have paid your deductible. For example, you pay 20% and your insurance pays 80%. And cancer survivors report a higher out-of-pocket spending than those who do not have cancer. Some cancer survivors report spending more than 20% of their annual income on medical care. And the different insurance plans that you may have may really alter the amount of copayment that you're expected to give, the amount of the deductible expenses that you have, and what the ratio of treatment is, or cost is, between you and your insurance plan. These are really important things for you to begin to understand at the outset of a cancer diagnosis, so you can be prepared to fight for your fair share.





## **CANCER PATIENTS AND SURVIVORS ARE MORE LIKELY TO HAVE FINANCIAL TOXICITY THAN ARE PEOPLE WITHOUT CANCER**

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Cancer is one of the most expensive medical conditions to to treat

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Patients may have multiple types of treatment including surgery, radiation, chemotherapy and are more likely to require hospitalization

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Compared to ten years ago, patients receive much more expensive treatment, namely chemotherapy and immunotherapy treatments.

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Copayments for these more expensive treatments may cause severe financial toxicity even with good insurance coverage.



### **Slide 45: CANCER PATIENTS AND SURVIVORS ARE MORE LIKELY TO HAVE FINANCIAL TOXICITY THAN ARE PEOPLE WITHOUT CANCER**

Cancer patients are more likely to have financial toxicity and that is partially because cancer is one of the most expensive medical conditions to treat. Anymore, patients may have multiple types of treatment, including surgery, radiation, chemotherapy, and immunotherapy, and are more likely to require hospitalization, particularly in hematologic cancers, than in patients who do not have cancer or even some solid tumor cancers.

Compared to 10 years ago, patients receive much more expensive treatment. This is namely from the new targeted chemotherapy regimens and from immunotherapy treatments, such as the CAR-Ts. Copayments for these more expensive treatments may cause severe financial toxicity, even if you have good insurance coverage.

## HOUSEHOLD FACTORS WHICH MAY AFFECT DEGREE OF FINANCIAL TOXICITY

- Who makes the most money in the household?
  - How much do others in the household make
  - How much debt was there before cancer diagnosis
  - What are the total assets
  - Costs related to the cancer treatment
  - Does the cancer diagnosis interfere with the ability to work
  - Whether there is health and disability insurance and degree of coverage
- 
- Possible consequences
  - Less income and assets
  - Debt because of cost of cancer care
  - Trouble paying for food, clothing and shelter
  - Bankruptcy



### Slide 46: HOUSEHOLD FACTORS WHICH MAY AFFECT DEGREE OF FINANCIAL TOXICITY

There're a lot of household factors which affect sort of the degree of financial toxicity and affect the way that different insurance companies or specialty pharmacies may view your role in paying for your treatment. Who makes the most money in the household? Are you the head of the household? How much do others in the household make? How much debt was there before cancer diagnosis? What are the total assets? What are the costs related to cancer treatment alone? Does the cancer diagnosis interfere with the ability to work? Will the patient need to be on disability? And whether or not there is help in disability insurance and what the degree of coverage is.

The possible consequences of not being able to be maximally covered by your insurance company for your expenses is that you did have less income and assets. Your debt, because of the costs of cancer care, can grow exponentially. You can have trouble paying for basic necessities, such as food, clothing, and shelter. And bankruptcy is also a possible outcome of financial toxicity of cancer treatment.



## **EFFECTS OF FINANCIAL TOXICITY ON CANCER PATIENTS**

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Patients may not take their medicine as directed so they can save money on copayments

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Patients who have financial toxicity may have a lower quality of life

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Financial toxicity may lead to debt and bankruptcy



### **Slide 47: EFFECTS OF FINANCIAL TOXICITY ON CANCER PATIENTS**

There are a lot of widespread effects of financial toxicity on cancer patients. Namely, patients may not take their medication as directed, so they can save on money and on copayments. For example, rather than taking the full dose of oral cancer treatment medication that you should be taking, you start cutting those pills in half or in quarters and lowering the dose of medication that you should be taking for your cancer treatment, thereby under-treating yourself because of financial toxicity.

Patients who have financial toxicity may have a lower quality of life, that they're unable to afford the foods that they need, the clothing that they may need, or the necessities they may need for their household to run efficiently. And, with concern about escalating debt and bankruptcy, you can develop despondence and depression, which as we have discussed earlier in the slide deck, may lead to a poorer outcome with cancer therapy.

So, this marks the end of my presentation and there are a lot of toxicities which we see in cancer treatment that we don't always discuss overtly with patients, but they're incredibly important and important to discuss with your provider if a discussion is not initiated.

## ASK A QUESTION

BLOOD CANCERS: MANAGING SIDE EFFECTS

### Ask a question by **phone**:

Press star (\*) then the number 1 on your keypad.

### Ask a question by **web**:

Click "Ask a question"

Type your question

Click "Submit"

Due to time constraints, we can only take one question per person. Once you've asked your question, the operator will transfer you back into the audience line.



49

## Slide 48: ASK A QUESTION

### Ms. Figueroa-Rivera:

Thank you so much, Dr. Ritchie and thank you, Dr. Campbell. It is now time for the question-and-answer portion of our program.

We'll take the first question from the web audience. Julie's asking, how do you differentiate the side effects versus normal aging, like fatigue, joint pain, etcetera? Is a work-up necessary to actually see where the problem or side effect is coming from? Ritchie?

### Dr. Ritchie:

I think you have to really differentiate what side effects come from the underlying disease that you happen to have versus chemotherapy treatment, and that can be very, very difficult to sort out sometimes. So that, generally when people present with a lymphoma or present with a leukemia or myelodysplastic syndrome or multiple myeloma, they're already experiencing things like fatigue, maybe malaise, sort of finding it difficult to walk upstairs or to do some of their normal routines. And that's really something that comes from the underlying disease. That can come from aging, of course, but usually there's sort of your own baseline at a given age that the actual disease that you have developed causes you to develop symptoms for which you seek out medical attention.

A side effect is something once you've been taking a medication for that particular disease, there is an alteration in one of your day-to-day functions which you find new and related potentially to taking that particular medication. For example, if you are starting steroids like prednisone or dexamethasone for a hematologic malignancy, you may not have had trouble sleeping until you started that particular medication. So, that difficulty sleeping, which may cause you to have worsening fatigue, would be directly from the starting of prednisone or dexamethasone, not the same type of fatigue that you felt exactly when you presented to the doctor.

So it's very, very important and sometimes one reason you need to have discussions with the doctor about side effects that you are experiencing, it can be really hard sometimes to differentiate the effects of the underlying disease and the effects of particular cancer chemotherapies.

I hope that answered your question.

**Ms. Figueroa-Rivera:**

Thank you, Doctor. We will go to the phone lines for the next question.

**Operator:**

We have a question standing by from Betty in Nevada. Please go ahead, your line is open.

**Betty:**

Yes, if the rash is itching from the treatment drug, besides the cream and the antihistamine, anything else you can suggest to try to reduce the side effect?

**Dr. Campbell:**

So, I can take this one. In terms of rash, the one thing that we think about is... how severe is the rash, right? If the rash gets to the point where it's limiting your daily function, you're noticing that you're uncomfortable all the time or you're itching to the point of, you know, I've had some patients in the past who've had itching so severe that they actually break down their skin from itching so much. Those are the kind of times in which you want to talk to your treatment team about is there an alternative therapy that we should think about or is a dose reduction something that's appropriate.

Unfortunately, beyond normal treatments like keeping your skin hydrated or using a thicker cream, there's not a ton else that we can do, so I think what it comes down to is really maximizing those approaches. And so, what I know that I've had success with recommending to patients in the past is to use strategies to make applying creams more effective. So, things like, I remember I did this when I was a kid, for example, put on a really thick lotion before you go to bed and then put on cotton gloves, if it's on your hands that's affected. Or, put on a really thick lotion before you go to bed and then put on a shirt or sweatpants that are going to help keep that in. Also, trying to apply these things right after you get out of the shower, so that you're locking the moisture into the skin.

Now, the one caveat that I'll put on there is maybe use a set of pajamas or some clothes that you're not super attached to because, quite frankly, you're going to get them covered in a thick ointment or a thick lotion and sometimes those can be difficult to get out in the wash. But, if you know that going into it, then you can set aside some specific clothes that you want to wear to bed, and that way you're able to really have an effective moisturizing regimen that can last for a longer period of time, because unfortunately, a lot of times with these thinner lotions they work really good for a short period of time but then they wear off. And, you're going to have to apply things more frequently. But the thicker the lotion or cream that you're using, the longer that it's going to stay on. And so, just think about frequent applications, using things like humidifiers, and again, taking a really critical eye and you can actually take some of these over-the-counter products up to the pharmacy and go through the ingredients list with them because some of these lotions can have ingredients that's not explicitly stated on the label, but there may be something in there that's irritating or can exacerbate your itching, and so don't be afraid to go to the pharmacy, ask them to go through the ingredients list with you, so that you can really see what's in the product that you're getting.

And the last thing I would say is to eliminate any irritating things. Sometimes, baby products can actually be really helpful. A lot of products that are geared towards babies and infants don't have a lot of the additives and chemicals that products for adults have and so they can sometimes be really beneficial for patients.

**Dr. Ritchie:**

I'd like to add, just make sure that it is a side effect of your treatment. That sometimes in hematologic malignancies where we're using a lot of immunosuppressive drugs sometimes, like steroids, it is important to delineate whether or not it's from the actual chemotherapeutic agent, or do you have, for example, a yeast infection or you have some

other infection on the skin. So, it's important that you show your rashes to your provider. Sometimes your provider may want to send you actually to a dermatologist to differentiate for themselves what it might be to make sure that we know exactly what it is that we are treating.

And I agree completely with Pete's advice here, Peter is right, that we really have a limited arsenal but going to the simplest product possible that you can find to treat your itching is probably the best thing.

**Dr. Campbell:**

The last thing I would add too, is again going back to keeping a medication list because unfortunately, a lot of times we treat side effects with other drugs and so if you have a comprehensive list, itching is a side effect that can happen with a lot of different drugs. So, we think of things like if you're had opioids for pain that's associated with your malignancy, opioids are very commonly associated with itching, and so we tend to snowball and add drugs on top of drugs on top of drugs, and so it may not even be again your treatment that's causing it, it could be something else that's easier to fix.

**Ms. Figueroa-Rivera:**

Thank you so much, Doctors. Dr. Ritchie, Haley is asking what's the best way for family members to help patients cope with side effects without taking away the patient's sense of autonomy?

**Dr. Ritchie:**

I think the best thing is to have a discussion with your friends, as a friend, and take whatever side effect that's being presented to you, that you know this patient is going to have to just deal with, to just be a good listener and to help make small suggestions that could potentially make them more comfortable. I mean being a good listener, being a good helper, that's really the most important thing that you can do. Sometimes, it just helps for a patient to just over and over again complain about a particular thing which is bothering them, and just listening to it and being tolerant of it is the best thing that you can do.

Being a caregiver is an extremely difficult job because you need to be there just to listen over and over as to what things are bothering the patient and to try and really be helpful. And sometimes, that requires physical strength and sometimes that requires mental stamina. But it's a difficult job and all of us who treat patients commend all the caregivers that come to our clinic with patients and the hard good work that they do every day.

**Ms. Figueroa-Rivera:**

We agree here at LLS, we have a lot more caregiver offerings that are specific to caregivers because you do have a special job, and it is something that warrants your own supports and information. So, thank you.

We'll take the next question from the telephone audience, please.

**Operator:**

Sarah in Delaware, your line is open, please go ahead.

**Sarah:**

Hi, thank you. The first year after my stem cell transplant I was losing weight rapidly and was asked to consume about 2000 calories a day and a lot of medicine also suppressed my appetite. Now that it's been over a year, my weight is going up, so I'm used to eating whatever I could to keep down and it's usually a higher calorie count. Stopping this has been very challenging. So 2 questions. One is, what is the best way to revert back to being healthy? And secondly, does this back-and-forth cause damage to my metabolism? Thank you.

### **Dr. Ritchie:**

You are describing a pretty natural trajectory for a patient like you. All of us really have a set body weight and we want to keep our body weight at that set level. When you are coming off of a stem cell transplant, I usually advise people to choose the same foods but at a higher calorie level, so whole milk, yogurt, a little sugar in that granola, or eggs for breakfast or things that just add that additional healthy food option that's of higher calorie. Cheese to your diet.

But, when you have reached your set point or beyond your set point and you have to lose weight again, I think it's important, just like it would be for any other person, to try and take out of your diet things that you really don't need, which are high fat offerings and high sugar offerings. And try and eat as close as you can to a Mediterranean style diet where you're eating lots of fruits and vegetables and complex carbohydrates, sort of minimal meat, and trying to use olive oils that are polyunsaturated. So, that would be the goal.

Exercise is also something that you can add to a healthy eating regimen that can help you to lose weight. Even more importantly than helping you to lose weight, it can allow you to have muscle mass as sort of a more primary portion of your overall weight rather than fat. So, I think that is a really important aspect to put into your healthy lifestyle after you have had a stem cell transplant.

It's not easy. Losing weight is not easy for anybody. But, trying to concentrate on healthy exercise, a Mediterranean style diet, lots of colors on the plate, as we tell our children, that's really the best way to focus this.

### **Ms. Figueroa-Rivera:**

Yes, thank you.

We also do have free personalized nutrition consults through LLS, and the following slides will be able to give you where you can get a consult. But, if you do go to [LLS.org/Consults](https://lls.org/Consults), we could get you a consult with a registered dietician. Thank you so much for the question.

And the next question for both doctors, is really surrounding COVID. Michelle is asking about the additional pressures related around COVID, the possibility of feeling further isolation, just because some of the support systems may not be there for you, you may not be able to visit or have visitors from your family or friends, and if we can address this concern.

### **Dr. Ritchie:**

COVID's been terrible for everyone actually. It's been terrible for school age children who are not learning in a normal environment and not learning how to behave with one another. It's been horrible for older patients who really have been isolated during this period of time from friends and family. And we're running into another COVID outbreak basically as I speak today.

I think that for cancer patients, it is especially difficult because you're at high risk if you were to contract COVID, of having a worse outcome. It sort of depends upon what hematologic malignancy that you happen to have, but there have been certain malignancies that seem to be more associated with a poor COVID outcome.

I think keeping in touch with other people that you care about and care about you is the most important thing, whether that be by telephone, whether that be by the web, whether that be by Facebook, or whatever your particular mode of communication is that gives you the most pleasure, you should be reaching out to the people who you love and who love you every single day. That's of primary importance.

I think also, if you can, it's an opportunity when we're all sort of holed up in our apartments and our homes to try and take on maybe new interests that we haven't had time to pursue thus far in our lives. Whether it's embroidery or whether it's making bread or whether it's drawing pictures, all over the internet you see things that people started



to pursue during the COVID crisis, which have sort of led in many people to new avenues in their lives. So, trying to pursue a new avenue or read new books or do new things, but taking great care to be in touch with people who you love and who love you, friends and family every single day, is of paramount importance.

**Dr. Campbell:**

I would echo all of those sentiments. I think that having Zoom or FaceTime or any of those apps become your best friend is probably your best tool that you have to make sure that you're not losing touch with the people that are going to support you the best. And, I think leveraging even non-friend and family resources like LLS or support groups online, those are all things that you can do without physically being in the room with someone.

So I think that using all those tools, and then also, I would say, make sure that your friends and family are vaccinated and can help protect you. I know, you know, asking friends and family to get vaccinated could be a difficult conversation, but I think for your best protection, it's a conversation that's worth having so that if you do get together outdoors with people, you're still taking every step you can to facilitate those relationships and get the support that you need.

**Ms. Figueroa-Rivera:**

Thank you. Those are all great points.

We'll take the next question from our telephone audience, please.

**Operator:**

Laurie in New York State, please go ahead.

**Laurie:**

I was diagnosed in 2011 and have been on 100 milligrams of a TKI since then and I just recently had a stroke. When you speak of side effects, I tend to blame most things that happen to me on side effects. But I didn't think the stroke would be one and they said it was due to sticky blood?

**Dr. Ritchie:**

I don't like to comment necessarily on your particular case because a lot of information would be needed to really do a reasonable consultation on something like this. Certainly, the TKIs are a family of drugs, with many different TKIs, with different side effect profiles. There are some TKIs which are more associated with the development of cardiovascular disease than others, but there're also blood disorders that certain aspects of those make you more susceptible to the development of heart and stroke. So, I can't really say from information provided what happens to be the case for you. But it usually is a complicated sort of interaction between your underlying disease and potentially some of the drugs that you might be taking.

Keep in mind that it's not just drugs that predispose you to cardiovascular disease. That age, high cholesterol, high blood pressure, sedentary lifestyle, poor diet, all of these things can predispose you to the development of cardiovascular disease, so it's a complex mix of variables that are often at play when someone has a heart attack or a stroke.

**Ms. Figueroa-Rivera:**

Thank you, Laurie, for your question.

Doctors, the next question is from John. John is asking if anything can be done to prevent or help headaches after IVIG treatments?



### **Dr. Campbell:**

Yes, so headaches are a very commonly reported toxicity or side effect that patients get with a multitude of drugs. But it's going to depend on each patient, how you treat them. For headaches that happen directly after treatment with something like IVIG, a lot of times something as simple as just having some caffeine can help. Caffeine alleviates headaches for a lot of patients. This is something we commonly do after someone has a procedure called a lumbar puncture to give intrathecal medication into the central nervous system (CNS). This also works for a lot of other things, especially treatment-related headaches.

And so, the first thing that I would say is I would try caffeine. It's a relatively benign thing for most patients. If you have any sort of cardiovascular disease or your doctors ever told you to avoid caffeine, then certainly it's not for you. But you can get caffeine over the counter or even something as simple for a lot of patients having a Coke or having a cup of coffee can also provide enough caffeine to alleviate the headache.

And then, over-the-counter drugs, such as NSAIDs, are usually pretty effective at alleviating headaches. I would just make sure that you don't take these too routinely. IVIG administration is relatively infrequent, so if you take it just after IVIG administration it shouldn't really pose too much of a problem. But my caution against routine usage is that there are a lot of side effects with things like NSAIDs, such as causing stomach ulceration or bleeding issues. But intermittent use should be okay. But I would honestly say start with caffeine and see if that works for you and then there's a lot of over-the-counter things that are effective as well.

### **Ms. Figueroa-Rivera:**

Thank you so much. We'll take the next question from our telephone audience, please.

### **Operator:**

Monica in California, please go ahead, your line is open.

### **Monica:**

Hi. I had AML and had a bone marrow transplant last December and I've just had my one-year anniversary in remission. But I got a pretty severe case of shingles about, I don't know, six months ago and it still seems to be hanging on. So, they put me back on an antifungal and said, okay take it for a few weeks. I'm just wondering about the link between leukemia and bone marrow transplant and shingles and if and when you recommend the Shingrix vaccine.

### **Dr. Ritchie:**

So, an ongoing side effect after having had a bone marrow transplant really is vulnerabilities to certain viral infections. And shingles is the sort of re-embodiment of chicken pox that you had as a child, that sort of comes back to haunt you later in life. It can happen even for a healthy person who has not had AML or a bone marrow transplant, shingles can hang around for a while in some patients and can be rather stubborn and the sort of ongoing pain at that site where you have the shingles can last for a long time. It sounds like your doctors have put you back on antiviral medication, at least for the short period, and hopefully that will have a strong effect and will start to allow your shingles to improve.

The Shingrix vaccine is meant to prevent shingles. If you have shingles now or have recently had shingles, it's almost like you had a Shingrix vaccine already, the sense that your body is developing antibodies to the varicella virus. So, at this moment getting a Shingrix vaccine would probably not be a good idea for you. A year or two down the line, it may be reasonable to pursue the Shingrix vaccine just to prevent shingles from ever coming back. And you never really get rid of the varicella virus. It's always with you. You just try and keep it at bay and not allowing it to cause you any problems.

Hopefully you have had a lot of immunizations after your transplant. Usually what happens is, you have all of your

viral immunizations again and hopefully you've had your COVID vaccines and your flu vaccine as well. But when you get shingles, it's like you're having had the vaccine, that you are teaching your immune system again to be reactive against that particular virus.

**Ms. Figueroa-Rivera:**

Thank you. And the next question comes from Lois. Lois is asking, are there everyday things in the house like laundry detergents or various house cleaning products that can adversely affect blood cancer patients?

**Dr. Campbell:**

Certainly. I think that there are household products contain a lot of chemicals, whether that's cleaning products, detergents, soaps, things to clean your car, etcetera. Whether or not that adversely affects a patient with a blood cancer directly is a little bit difficult to say. Certainly we think of hazardous chemicals as not being a good thing in general. I think that it's usually a good sound piece of advice to try to minimize your chemical exposure in general. If you can use products that don't have a lot of fragrances, dyes, chemicals that could potentially be hazardous, that you try to avoid those things in general. This is going to be particularly applicable if you're having any of these toxicities that can be exacerbated by these things.

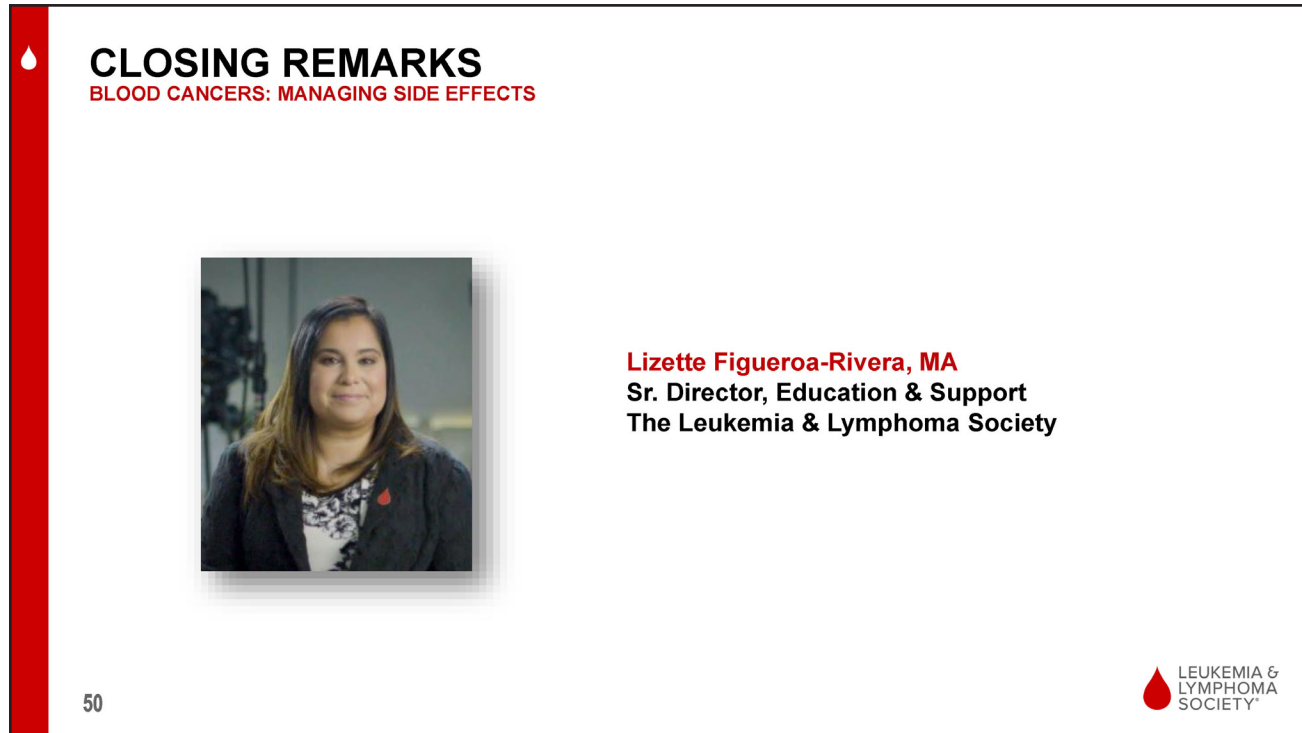
But the question of whether or not household chemicals or cleaners can change the outcome of your blood cancer, I would say I don't think so. There's not really any evidence to say that you shouldn't use laundry detergent, or you shouldn't use things that you'd use to clean your counters, etcetera. So, I'd be interested in Dr. Ritchie's opinion, but I think my viewpoint on this would be in general, minimize your exposure to chemicals as a general rule, but how much that's going to affect your specific blood cancer would be relatively minimal, other than just exacerbating side effects or irritating your skin, things along those lines.

**Dr. Ritchie:**


I agree with what Dr. Campbell had to say, in general. We do know that there are certain chemicals which may predispose to the development of cancers. And those chemicals in cigarettes, benzenes, and those are things that we know are associated with the development of cancer. So, deciding to pick up smoking now that you have developed a hematologic malignancy would not be a good idea, and certainly you should try and avoid industries where there's a lot of benzene production.

But we don't have good data on whether or not if you use All or Tide that there's going to be a difference in your overall outcome.

I think what I would reiterate the way that we talked about skin products before, and that is that the simplest product that can be used to accomplish the goal with the least chemical ingredients is probably the best way to approach your life. You may not need to have super fantastic cleaner for your wall, it may just be fine to have a simpler cleaner, soap and water. So, I think that trying to do things in the most efficient way possible with the least brawn is probably the best way to go forward. And it's not only good for you, but it's good for the overall environment and for the health of others.



**CLOSING REMARKS**  
BLOOD CANCERS: MANAGING SIDE EFFECTS



**Lizette Figueroa-Rivera, MA**  
Sr. Director, Education & Support  
The Leukemia & Lymphoma Society

50



**Slide 49: CLOSING REMARKS**

**Ms. Figueroa-Rivera:**

Thank you, Lois, and that was our last question for today.

I really want to thank you both, Dr. Peter Campbell and Dr. Ellen Ritchie, for volunteering your time today, your expertise, and especially during these busy times that we're having through the pandemic. So, thank you so much.

## LLS EDUCATION & SUPPORT RESOURCES



**HOW TO CONTACT US:**

To contact an **Information Specialist** about disease, treatment and support information, resources and clinical trials:

**Call: (800) 955-4572**  
Monday to Friday, 9 a.m. to 9 p.m. ET

**Chat live online: [www.LLS.org/InformationSpecialists](http://www.LLS.org/InformationSpecialists)**  
Monday to Friday, 10 a.m. to 7 p.m. ET

**Email: [www.LLS.org/ContactUs](http://www.LLS.org/ContactUs)**  
All email messages are answered within one business day.

**CLINICAL TRIAL SUPPORT CENTER**  
Work one-on-one with an LLS Clinical Trial Nurse Navigator who will help you find clinical trials and personally assist you throughout the entire clinical-trial process.  
[www.LLS.org/Navigation](http://www.LLS.org/Navigation)



**NUTRITION CONSULTATIONS**  
Our registered dietitian has expertise in oncology nutrition and provides free one-on-one consultations by phone or email.  
[www.LLS.org/Consult](http://www.LLS.org/Consult)



51

**Slide 50 & 51: LLS EDUCATION & SUPPORT RESOURCES**

And, if we were not able to get to your question today or you want more information, you may speak to an Information Specialist at 1-800-955-4572 or you can e-mail us at [LLS.org/ContactUs](http://LLS.org/ContactUs).

Information Specialists are available to answer your questions about treatment, including clinical trials, and answer other questions that you may have about support, including financial assistance for treatment.

We also have a Clinical Trial Support Center where Clinical Trial Nurse Navigators, who are registered nurses with experience in blood cancers, can assist you in finding a clinical trial and finding out if a clinical trial is right for you at this time. They can be found at [LLS.org/Navigation](http://LLS.org/Navigation).

# LLS EDUCATION & SUPPORT RESOURCES

LEUKEMIA & LYMPHOMA SOCIETY® 877.557.2672

### Help With Finances

The Leukemia & Lymphoma Society (LLS) offers financial assistance\* to help individuals with blood cancer.

The **LLS Patient Aid** Program provides financial assistance to blood cancer patients in active treatment. Eligible patients will receive a \$100 stipend. Visit [www.LLS.org/PatientAid](http://www.LLS.org/PatientAid)

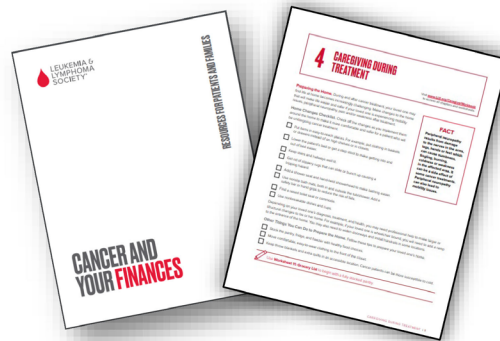
The **Urgent Need** Program, established in partnership with Maggie's Love, helps pediatric and young adult blood cancer patients, or adult blood cancer patients who are enrolled in clinical trials, with acute financial need. The program provides a \$500 grant to assist with non-medical expenses, including utilities, rent, mortgage, food, lodging, dental care, child care, elder care, and other essential needs. Visit [www.LLS.org/UrgentNeed](http://www.LLS.org/UrgentNeed)

The **Susan Lang Pay-It-Forward Patient Travel Assistance** Program provides blood cancer patients a \$500 grant to assist with transportation and lodging-related expenses. Visit [www.LLS.org/Travel](http://www.LLS.org/Travel)

The **Co-Pay Assistance** Program offers financial support toward the cost of insurance co-payments and/or insurance premiums for prescription drugs. Visit [www.LLS.org/Copay](http://www.LLS.org/Copay)

\*Funding for LLS Co-pay Assistance Program is provided by pharmaceutical companies. Funding for other LLS financial assistance programs is provided by donations from individual donors, companies, and LLS campaigns.

The Leukemia & Lymphoma Society (LLS) offers the following financial assistance programs to help individuals with blood cancers: [www.LLS.org/Finances](http://www.LLS.org/Finances)




To order free materials: [www.LLS.org/Booklets](http://www.LLS.org/Booklets)




Slide 50 & 51: LLS EDUCATION & SUPPORT RESOURCES

## LLS EDUCATION & SUPPORT RESOURCES




**Online Chats**

Online Chats are free, live sessions, moderated by oncology social workers. To register for one of the chats below, or for more information, please visit [www.LLS.org/Chat](http://www.LLS.org/Chat).




**Education Videos**

View our free education videos on disease, treatment, and survivorship. To view all patient videos, please visit [www.LLS.org/EducationVideos](http://www.LLS.org/EducationVideos).



**Patient Podcast**

*The Bloodline with LLS* is here to remind you that after a diagnosis comes hope. To listen to an episode, please visit [www.TheBloodline.org](http://www.TheBloodline.org).



53

**Slide 52: LLS EDUCATION & SUPPORT RESOURCES**

As a reminder, you can download and print the slides as well as listen to the audio or view the video of today's program from our website at [LLS.org/Programs](http://LLS.org/Programs)



**Slide 54: THANK YOU**

We'd like to acknowledge and thank Genentech, GlaxoSmithKline, and Pharmacyclics for support of this program.

Again, Drs. Campbell and Ritchie, thank you for volunteering your time with us and on behalf of The Leukemia & Lymphoma Society, thank you all for joining us.