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Jean Ridgeway: ... has the fine job now of being a supervisor. I supervise 20 other nurse practitioners and physician assistants in our department. So, but my focus over these past 20 years has been exclusively in hematological malignancies and really looking at MDS and AML. Why did I do that? Well, when I was a young nurse I started out I worked on a floor and we had patients who had tumors and we had patients who had leukemia and multiple myeloma and it was all very new and interesting and a family friend came through who had Myelodysplastic Syndrome that unfortunately evolved to AML and intrigued me to realize how much I didn't know because at my young age I realized I thought I knew a lot. Now as an older person I know I don't know a lot, but started looking into and investigating hematological malignancies. We also were a clinical trial institution and we actually did the study that brought Vidaza to approval and so from its very early stages with 5-Azacitidine the study was conducted at the University of Illinois and what was very interesting, anybody in here who's received Vidaza, you go to the doctor and get the injection or the infusion. Correct? So, on the clinical trial they gave you the medicine and we taught you how to combine the sterile water with the powder and draw it up and give yourself an injection and once we come back and you bring your coffee can full of needles and syringes back to us and we'd dispose of them. So, it was very interesting. So, I found myself being intrigued by it and as 5-Azacitidine came to the market, MDS which is really a very rare tumor. It's classified as such became to be more on the scope of everyone's radar because for the first time we actually had a therapy for people who had this issue. Up to that point in time the standard of care was giving folks transfusions if they needed it and giving people antibiotics if they needed it as well. So, that's where I came from. We see lots of patients who have MDS. We're considered an MDS center of excellence. A couple of the physicians I work with have been interested in it for many, many decades. Richard Larson and Wendy Stock. They're great people. So, that's where I hailed from. We see patients are newly diagnosed with their Myelodysplastic Syndrome. We see folks coming in for second opinion. We see patients who come in for transplant. We are a transplant center and I work in the outpatient setting. Now, I was in the inpatient hospital for many, many years. I'm like I'm just getting too old for that. So now, I'm on the outpatient side. So, that's where I work.

So, this whole series of programs actually came from the MDS Foundation which is an interesting group. I don't know if any of you have gone online to investigate what is the MDS Foundation? Where did it come from? So, it was started a number of years ago by a patient and his wife because the patient had MDS and it was a grass roots effort to bring the unknown to the forefront and make people aware of something that a lot of people have, but not many people knew about. They raised money. They engaged industry. They engaged other physicians to help bring forward a growing issue. So if you don't know this, the largest group of our population in the United States, the fastest growing group are people over the age of 80. So as we look forward as an aging culture, we need to be aware that this issue is not going to go away and all of us need to be better prepared and being able to get the information out to folks and patients and caregivers who are affected by it.

So, I work with a group of nurses and we've been challenged with trying to help nursing bring up the level of education for nurses so that when you get your treatment or your transfusion, your nurse

knows what she's talking about or he knows what he's talking about. So, that's kind of like where this comes from.

So, Sandy Curtain is a nurse practitioner. She worked with a gentlemen called Dr. Alan List. If you're on a drug called Revlimid, Dr. Alan List did some of the pivotal studies that brought that medication to approval. So, Sandy knows lots about Revlimid and saw patients with diseases, 5Q- and non 5Q- issues as well. So, she serves as one of our writers and has helped put this together. So, if you go to the MDS homepage what you'll see is that the book that you have, some of you have the binder, some of you just picked up the leaflets without the binder, is that this presentation along with lots of other information is available online. Now, I'm not really techy savvy, but I'm going to give this go. So what I'm going to try to do is I'm going to close out of this and I'm going to show you if you go to the website what you will see. So, what you would see is this is the book that you hold in your hands and this is for if you have friends and family at home. If you double-click on the link you'll open up to the book and you'll be able to page through the book electronically and one of the things that it does offer is that you can link onto various videos as well to help educate yourself or other family members. So a lot of thought and time went into this resource. It's almost 150 pages long. There's a whole section as you'll see in your book as well How to Manage Side Effects. So if you're trying to cope with nausea or constipation and diarrhea there's actually a section not only in the written book, but in this as well that helps people get their hands on some usable information and reliable information as well. So, that's what this looks like if you go to their homepage. So, I thought I would just show you that. So if you tried to get to it you would know where to go.

So, this is just a smattering of the different people. So, there's folks from all over the world really because MDS is an international disease. We don't have a corner on the market. People in other countries are also dealing with it as well and depending on what country they live in it depends on what type of therapy they have. So, what's becoming new to us but is really familiar to other patients who live in other countries is national health insurance. For example in England, if you would like to get erythropoietin it depends on your postal code whether or not you'll get it. So, there's some postal codes that allow it and there are some postal codes do not. So, national health insurance. So, it's very interesting.

So, the litany of the things that are involved in this is really kind of understanding it and the physician who was here before did a great job. I'm here to kind of dumb it down a bit hopefully and so you can remember it as some of this is new to you then it's an awful lot of information and it's like going to a new country, not having a map and not knowing the language. So hopefully, we're going to make this a little bit simpler and personal for you so that you can go home with some things that will help you.

So, we're going to look at *The Building Blocks of Hope*. So, that's that book and what's involved in it and what we want to do is just go through some of it. I promise I will let you out of here on time because I'm kind of a nut about being on time. So, it's about eight minutes after. We'll be out of here at two o'clock. If you're going to stay that's okay, but I'm leaving. Two o'clock we're out of here.

So, what is Myelodysplastic Syndrome? So, these little purple circles up there if you've never seen them before... how many people in this room have had a bone marrow exam? How many folks have had a bone marrow? Lots of people. Okay. When the pathologist looks at the material that's taken from you this is a lot of what they're looking at. So on the right, that's actually an aspirate smear under low power and all those little cells are little either red cells, white cells or platelet precursors and this circle on your right is a more amplified image. So the cells in the center that have kind of like those lobes, those multilobulated. Those are neutrophils most likely and the one that has like a kidney shape, that's a monocyte. Plasma cells exactly. So, that's when your material goes down to the hematopathologist because those are the people that look at your material. This is what they're looking at and so why is that important? Because this disease is made by a pathologist. The pathologist has to look at your material and tell your oncologist what do they see. So, what does it look like under the microscope and just like we talked about before, it's really a group of bone marrow cancers. So for some of you that might be new information, but is accurate and in Myelodysplastic Syndrome, similar to other cancers it's a clonal disease. So, most people have forgotten about Dolly, Dolly the sheep. She was cloned. She was cloned from a mammalian cell or a breast cell and that's why they called her Dolly after Dolly Parton. That's your little trivia for the day, but she is a clone. So, what does a clone mean? It means I look like the next... It means rubber stamping something and what do we know about malignancies? We know that the cells all look like each other. Another thing we know about malignancies is that the cells become immortalized. They never die which is not a good thing when they're bad cells and when one cell becomes two cells and two cells become four cells by the end of 30 cell cycles, we have other one million cells. So, you have a lot of growth of malignant cells. So, this is a clonal disorder and we also know that it's a stem cell malignancy. So, the error occurs in the stem cell. That's the mother cell. Now, don't get confused in the media when you hear about all this fancy shmancy stem cell research. That's embryonic stem cell. That is not what we're talking about here. We're actually talking about the precursor mother cell of the blood cell which is called a hemopoietic stem cell. That's fancy Greek for blood.

It's not one disease. It's a group. It originates in the bone marrow. We talked about that and it looks different to every patient. So, for some patients they have anemia. Eighty-five percent of all MDS patients have anemia. So, that's a pretty common finding and the very most common component of having MDS for all patients is being tired and that makes sense if you think about anemia. Our red blood cells were designed to carry oxygen and oxygen is what gives your cells energy. So if you decrease the number of red cells or the ability to hold onto oxygen, you're going to be tired and unfortunately it's a fatigue that really is not well managed with rest or activity. So, people are fatigued. They're also in MDS we know that cells are dysplastic. That's the D in dysplasia. So, what's dysplastic? So, dysplastic is if I drive a car, which I do drive a car by the way. My wheels are round. Right? So now, if my lovely husband who likes to play pranks on me put tires on my car that were square would they work? Not so good. They would be dysplastic. They would be the wrong shape and so they have function but limited and it's very disrupted and it's the same thing with your cells. If your red cell doesn't look the way it's supposed to it's not going to be able to function the way it's supposed to even though it might be there. So, that's dysplasia and the other thing is it leads to ineffective hematopoiesis. So, you heard the reference before about the bone marrow itself is a garden. I don't know if you've heard that before. So if you have a lot of weeds in your gardens and

some people in here I think have not only gardens, but I bet you there's a lot of people in here who farm or are acquainted with farming. So if you don't keep on the weeds, what happens to the good plants? They don't do so well. Even a city girl like me knows this. So, what happens in the bone marrow though just like the weeds in the garden, these cells are very opportunistic and they grow alarmingly quickly and very well and so they start crowding out the good cells and so if you start crowding out the good cells what you're going to start seeing is cytopenias. You're going to see anemia which is the red cell slow. You'll see neutropenia which is the decrease of the white cells or you'll see thrombocytopenia which is the decrease of the platelets and if you lump them all together then you say pancytopenia or all of them, but all of those are a decrease of what the numbers should be and there is a risk of developing acute leukemia in some cases and another way to say that is called leukemic transformation and in general if the disease progresses, if it's not responsive to treatment then the bone marrow function begins to decline. So for some people if they don't respond to treatment or if they lose their response to treatment, some people have talked about that. They've tried different types of therapies and they haven't worked well. This is cells can be very resistant. Then you can have increasing cytopenias.

So, this is a cute little picture and what does it show? It shows that snail a bone. Let's say it's femur bone. So, that very first very large purple cell is the stem cell, the hemopoietic stem cell and they're very interesting cells because they do one of two things and they're the only cell that really does it. It can either self-replicate and become another stem cell or it makes a decision to become one of two major blood type of cells. So, there's something called a myeloid cell or a lymphoid cell. So, the lymphoid progenitor cells you see up above, you see a lymphoid progenitor cell and then we talked about those NK cells earlier today. There's a study with the NK cells. So, NK cells are lymphoid in original and T cells and B cells and if you track that trajectory from that great big purple stem cell it goes into a myeloid progenitor cell and what should be out in the periphery, the grown up cells, are neutrophils, different types of white cells, platelets and red cells. That's what a normal bone marrow should do and when things are in balance things grow and things are replaced as they should be, but in disease it's a different story. So, we have different things that control our... the manufacture of our blood cells, but one of the things like we talked about Epogen a little bit. You could get Epogen injections. That's a hormone that affects it, but when you start having immature precursor cells or blast cells, we measure those when we do your bone marrow. That's an early cell called a blast. There's nothing wrong with a blast cell in very small amounts. If you have less than five percent blasts in your bone marrow aspirate truly is normal, but if you have six or 5 ½ then you've crossed the threshold and that's abnormal. So again, they multiply, they are immortalized and they crowd out the other cells. So, those are those immature precursor cells and that's when we start seeing all the peripheral cytopenias and people can get something called a hypercellular bone marrow. Have you guys every heard that word hypercellular or hypocellular? You heard that before? When you read your report and I would say... and gather your medical records. They belong to you and if you go for a second opinion you take them with you. It'll say that you have a certain cellularity in your bone marrow. To figure it out you take 100, you minus your age and that should be your normal cellularity. So if you're 50 years old, you should have 50 percent cellularity in your bone marrow. If you're 80 years old you should have 20 percent because 100 minus 80 equals 20. Now if you're 80 years old and the bone marrow is done and it says that you have 60 to 80 percent cellularity that's too much.

So, that's hypercellular. If it was less than they expected amount it means you're too low. It means you have hypocellular. So, it's just a terminology that the pathologists use when they look at it.

So, how is diagnosed? So, everybody in this room who is either a caregiver or patient has a story on how they got diagnosed. So, if this is you raise your hand. You were feeling tired for a really long time and somebody finally got you to the doctor and they did a CBC. Who was that? A couple people. You got an infection, lung infection, pneumonia, ear infection, skin infection and while you were there in the hospital they noticed that your blood counts were down, but it was because of the infection. How many people did that? How many people were going to have an elective surgery and they drew a CBC because in primary care, your primary care doctor usually doesn't draw CBC. There's no reason to unless you have some symptoms. So, there's a number of different ways that people get diagnosed, but one of the things that has to be done is that awful bone marrow biopsy and the aspiration and the three components that are critical is we want to look for the number of blasts, we want to look at the cellularity and then we want to look at the dysplasia and then we do something called cytogenetics. So, you touched on this before. We should have 46 chromosomes. I'm XX. I'm a little girl. XY makes you a little boy and it can be without any abnormalities or it can have many abnormalities. Some are better prognostically, for example, if you have something called a 5Q-. So each of these chromosomes are numbered 1 through 26 and chromosomes don't have any legs. They only have arms for your information and the little arm is on the top. So if you ever see a picture of it it looks like a U on the top with little ball in the middle and then an upside U on the bottom. So, the top ones are called P arms and you can remember that because P arms are petite and my arms should be shorter than my legs and the bottom ones are called Q. So, P and Q. So if you have something called 5Q- it means on your fifth chromosome, a portion of that Q chromosome is going to be missing. It could be the whole thing or it could just be a part of it and they call that an interstitial deletion, but that's what it looks like. If you have something called Trisomy 8 it means you have three eight chromosomes. How many should you have? Two. So if I added a fifth wheel to my car not because I'm a bad driver and I tip over, but if I added an extra one does it really help the car function? No. It adds extra weight and extra problems and so that additional chromosome in Trisomy 8 causes problem. Deletion 7 means I'm going to wipe out the seventh chromosome, so there is a method in how they talk about your cytogenetics. We'll look at your iron stain and then other things that needs to be calculated also are you got to look at the B12 and folate level because those are the building blocks for red blood cells and every once in a while someone will come in and they'll be misdiagnosed with MDS and they'll have a B12 deficiency. Those are the people that drink their lunch instead of eat their lunch and so they have macrocytosis. They have big red cells, but they don't have any B12 and in another group are folks who get the lap band surgery, so they have a shortened intestinal track. So, they don't have a lot of B12, but their cells can look abnormal. So, it's important that people go to a good place for the right diagnosis. We can look at TSH which is your thyroid and then testosterone as well and then we want to look at your kidney and liver profiles.

So, you kind of looked at this. The FAB is the French American and British. So, those were the first kids on the block and then the WHO initially came out and then it was revised in 2008. So, it's a little bit different, still kind of complex, but it's in your book and I think maybe a little bit more readable. If you are sleepless you can go online and look up the WHO criteria for MDS, a little difficult to read, but it definitely is there, but the biggest piece is that with FAB there were five classifications

and four of the five contain something called RA and that stands for refractory anemia. So, what did we say earlier about MDS patients? Eighty-five percent have anemia. So, four of the five have refractory anemia and the RS was ring sideroblasts. EB is excess blasts and then the CMML is a whole different type of category, has now been reformulated into that myeloproliferative group that she spoke of. So, there's some overlap and then we talk about the number of blasts and the number of dysplasia. So, from the early '70s where there wasn't much known to now 2014 where there's a lot more known and I agree the more we know the more we can understand and help folks understand their disorders and get some curative therapies.

So, we talked about the IPSS and then she mentioned something about called the IPSS-R. The IPSS-R is the revised and this is that system for expectant survival and we look at three pieces, the number of blasts, the type of cytopenias that you have and your cytogenetics. So, that information was gathered in '97 and Dr. Greenberg was the first author on that paper and they looked at patients who had no treatment. So now, the IPSS-R is the newer, it's more recent and I'm going to show you and it's on the website, too. So, this is if you went to the website you would look at this. So, what we're going to do is we're going to pick a pretend patient and we're going to figure out their IPSS-R because you can do this to yourself. So, let's see. One more time on the Internet for me. So, if you went on the MDS Foundation website you could look at this and this tool is yours to plug in. If you're really snazzy there's an app for it. So, I have an app on my phone because I do this in clinic. So, we're going to have a pretend patient and we'll figure out the IPSS-R. So, let's give this person a hemoglobin. What kind of hemoglobin should we give him? Should we give him... 7.8. Okay, a 7.8 and how about an absolute neutrophil count. What do want to give him? Want to give him 500? 100? Are we going to pick a low risk or a high risk person? Let's pick right in the idle. So, let's give him 800 neutrophils. How many platelets should this person have?

Q1: Forty thousand.

J: Forty thousand. How many blasts in their bone marrow do they have? Fifteen. What about their cytogenetics? Should we pick intermediate? We'll pick intermediate. So, we're going to calculate. Please enter proper value. Oh, brother. What did I do? Oh, see. Look what I did; 7.5. So, their IPSS-R score is 7.5 and they're going to land into a category called very high risk. So, let's go down here and kind of look a little bit more. Age adjusted calculator. Let's make this person 70 years old. Calculate. Now, it's going to recalculate. So, it's still at the same piece. So down below it just gives if you were putting this information in it gives you more information bout how to calculate their cytogenetics. So, we talked about look at all those different ones. If you have a cytogenetic report and you read it and it has a number of different notations, if it lists out three or more abnormalities they call that a complex karyotype or a complex cytogenetics report and then here's the... Then the score values where it gives you the cytogenetics. So if you wanted to do this without the computer, you could do that as well. So, it's there and remember when you do do this score you want to calculate it on pretty much the initial. So, that's what that is. See, look it even tells you that it has app for it.

So, what else do we know? We know that the average age is about 73. We know that there are more men than women that get this disorder. Almost a 2 to 1 ratio men over women and it is incurable, but

it's highly treatable and actually the leading cause of death can be the disease itself. However, when you look at what do people bring with them at the time of diagnosis those are considered comorbid conditions or what other health associated problems do you have when you're diagnosed with the MDS and more and more research shows us that that has a huge impact as well and those risk stratified treatment strategies are key to the best treatments.

So, when to treat? When to treat/when not to treat. How many people in here needed a transfusions? Blood, platelets, a lot of people. So, that's one of the treatment triggers. How often are you needing transfusion or if your cytopenias are getting progressive if they're getting more and more or if we're found out to have increasing blasts in the bone marrow or if you absolutely present like our pretend patient with a high risk disease the discussion with that visit with the hematologist would be let's look at treatment options for you. Now, I'll tell you where I work is not such an easy place to get to and so it's good to know that lots of places across the country and across the world are able to treat people with MDS because you don't need to come to a big university to get good treatment. Sometimes the treatments that are available through a clinical trial you have to travel to U of M or to Mayo Clinic, but Vidaza and Decitabine are therapies that are widely used in the community and so that's a good thing as well as getting Revlimid in the mail. So, that's another therapy that's widely used.

And then what do we look at for individualized treatment? There's something on here that says primary versus secondary MDS. Primary would be you got it and you never had anything before. Secondary would be perhaps maybe you're a Hodgkin's survivor or a breast cancer survivor and as you're going back for your CBCs, you may find out that all of a sudden the counts are drifting down and you may have developed an MDS. So, there's some interesting theories about that just as a side note. Some people think that people who are developing a secondary malignancy may have an innate error in their DNA metabolism that makes them more prone to malignancies. So if you've been unfortunate enough to have one malignancy, perhaps that presupposes you and makes you... maybe you have a weaker immune system and it's allowed those cells to escape. So, there's quite a bit of research that looks at those folks as well as lifestyle. So, we talked a bit about the study that you all... many of you are participating in and it's what we consider an epidemiological longitudinal study. That means they're looking at what's one group has versus a control group that doesn't have it to see if something really can be identified that perhaps can help people change behaviors and make them less prone to it.

Okay. So, we talked about all of these already and we'll talk about them a little bit more and if there's something that you want to talk more about we can. So, these are just some of the studies that are under investigation. Histone deacetylase inhibitors, the HDAC, the Vorinostat type of drugs are out there and increasing in number as well as quite a few. Panobinostat is another one. So, lots of therapies under investigation, but these are going to be available only if you travel to a center that's got the study. Correct?

So, I heard somebody up here talk about siblings being typed and they were matches or half matches or something like that, but an allogeneic stem cell transplant is a therapy that can be used, a really high risk type of therapy. Allogeneic means you're getting the cells from somebody else. Patients

who have multiple myeloma or even some of our lymphoma patients use their own stem cells. That's called an autologous. Age isn't an exclusion factor. We tend to do high risk transplants where I work. We just finished up a little bit of a study and half the patients who we looked not only were they over the age of 50, but they were haplo cord transplants. So, haplo meaning it was either a sibling or a parent that gave them their initial cells. So, lots of those, but the other important piece to remember and if you've been around MDS for just even for a few weeks or months, you'll know that MDS therapies are slow in working and that they need to be given an adequate time course to judge whether or not they're going to work. So, that means four to six months. The other thing for the people in here. You can say yes or no is this true that when you first start therapy especially with Vidaza your counts get worse before they get better. Is that true? That's definitely true and people get disappointed because it's like, "Oh, my gosh. I feel terrible. I'm doing this. I'm doing everything I can and I tend to need more transfusions than less. What's going on?" So, that's very common and why is that? Okay. Back to my garden analogy. So, here's the urban gardener, that be me. So if I go away on vacation and I leave my garden to go and I come back and there's lots of weeds and I get out there on a Saturday morning and I clean out the garden. I get rid of all the weeds and my lovely little plants are there, but they're what? They're kind of straggly, they're kind of weak. So, the cells as you being to remove the malignant cells the normal cells that can be present in that bone marrow are like the plants that are left after you clean out your garden. They just need some time and tending to rebuild and to grow up and sometimes what we found is that actually the malignant cells themselves can give blood counts and so when you get rid of the malignant cells you can also kind of cause a deficit and what you want to do is be proactive in treating your side effects to get the best response. So, that means if you get a fever, if you get treatment and your person says to you, "Okay. You're coming back on Monday and Thursdays for blood counts," because that's what we do, "but if you don't feel well before I see you, please call me." So, that really does mean if you don't feel well, please call me and I'm hopeful that everybody here knows how to contact their provider. I give my patients a little orange card and say put it on the refrigerator with the name and the phone numbers of people because when people don't feel well they can't remember where they put things and their family gets kind of anxious. So, there's no thinking. Just put the phone call, put the names and the phone numbers up on the refrigerator, so it's there for everybody to see. Fevers are a big problem. Don't let a fever go untended; 100.4 or greater you should be calling your provider and get a flu shot. Thirty thousand people a year going to die in the United States of the flu. Don't let (inaudible 34:14). Get a flu shot. You and everybody that lives with you. Question.

Q2: (inaudible 34:21) understand. My husband tried to get a flu shot and when they heard what his neutrophil count was. They said uh-uh.

J: I'd give it somebody's neutropenic. If you're going to come up, if they're going to come up you can give it later but if not... Question.

Q3: My doctor told me my hematologist not get the flu shot.

J: He did? Why did he...? How come? There is some thinking...

Q3: (inaudible 34:52) a problem with (inaudible) early.



J: There are different formulations that you have to work with, but really if you or the folks that you live with you really need to cocoon yourself to be safe and with good hand washing, etc. So, that's kind of a big thing.

Alright. So, here's a picture of the same thing that were talked about. So, what happens? So in this little illustration when the blood counts drop the normal ones are crowded out by the bone marrow. So, this is a little progressive and so what you're looking at in the graph is you can see that the person's white counts started at 3.2 and then they dropped their counts and it went down, down, down to about week six and then you saw a little pickup and then it got better and then it's continued to get better. So, you can see in the first panel there's a lot of these extra little cells that look like they got tentacles or they look fried eggs and then there's less in the second and less in the third and you can see that cells are beginning... Well, they are beginning to have a more normal appearance. The risk discs are your red blood cells and the purple ones with the lobes in them, those are called neutrophils. So, those are segmented neutrophils and those are healthy. So by the end of it, things just look healthier because they are healthier. So, the malignant clone has been removed and the arrow showing where they say early toxicities. That's when blood counts get worse before they get better. Does that make sense? And that's what's going on in the arrow where it's kind of empty you can see there's not a lot of cells and the graph actually shows that for us as well.

So, what do we know about treatment for Myelodysplastic Syndrome? Time is required for the best response. A minimum of four to six months. So, that's four to six cycles. They get worse before they get better and also what can happen during those initial cycles of chemo? Well, if you get a fever and you end up in the hospital you might be delayed. So, things are put on pause basically and when you get well enough and you come on out then they start up again. So, that would be caused like a dose delay. Sometimes things have to be modified, a dose modification. So, if you're on an oral drug like Lenalidomide and your blood counts... as you continue on with the drug, your blood counts might not be able to support the dose that you're on and you may need to be delayed for a while and then restarted at a lower dose. So, that's called a dose modification and then there's things called supportive care which are transfusions if you need them and then just being wise and realistic about what's going on with your treatment. So, setting expectations.

So, this is a real patient and I told you that Sandy worked with Dr. List. So, this is a patient who started treatment in 2010 and what are you looking at? So, the blue triangles at the bottom are the white count. The yellow triangles are the platelet count and the purple squares that's the hemoglobin. So, you can see that during the first part of this slide, the person dropped their hemoglobin and then they bounced up and then they kind of plateaued and they went down and up and down and up and down, but what's really interesting look at that platelet count. It took until cycle three to make a big difference and so the person's platelets got better and this patient actually went forward and had a transplant. So that you can see counts post-transplant and into 2011. So, this is... that's just a diagram of somebody who's been through it and what does it look like on paper to give you may be a step back bigger picture of what does it look like instead of looking at your blood counts on a little board on these time points.

This is somebody... I was talking to someone at lunchtime how long can people be on Lenalidomide. So, here's somebody who's been on it over 10 years. So, here's a graph. I know this is a man. This gentleman's response. So back in 2002 the study opened and this gentleman started. He had 5Q- and you can see that his counts. So again, the white count dipped down in 2002 and then it steadily over the past 10 years... he has his ups and downs. People get sick. If you have a pneumonia or you have some viral illness that affects your blood counts as well and then this gentleman's hemoglobin which has gone from 7 ½ to now maintaining at almost 12 grams per deciliter and it really becomes a new normal. People can accommodate to a lot of different things. So some people in this room have a hemoglobin that's dramatically less than mine. So, I'm going to guess that mine's probably a good 13 ½ or a 14 and I'm standing up here. I'm not short of breath. I'm not tired, but there are people sitting in the audience whose hemoglobin is probably eight and they're not short of breath and they may be tired but your body can accommodate to this slow decline of a hemoglobin level if things become normal. Then I heard someone over here this morning talking about that their platelets were like less than 20,000 or what's going to happen when I get a... when will I need a transfusion? I'm stunned at how many people I've followed through years whose platelets are radically below 50,000 maybe even 20. We have patients who like live between 5 and 10 and they don't spontaneously bleed and they don't get platelet transfusions and they live their life with very, very low platelets because that's their norm. It's pretty interesting.

Alright. What can I do to stay healthy? We have 20 minutes. Balanced diet. Well, Pepsi and Fritos used to be like my staple when I was in college. I've now grown out of that although I still enjoy it, but we want to eat a balanced diet. What that looks like for you might be very different, but you want to kind of eat healthy and eat balanced. Daily activity and exercise. That's a biggie. I would say 15 to 20 minutes if you can a day of some type of activity. So, we've got walking. It hasn't snowed in Minnesota, so you guys can still walk outside. Swimming is good. Stationary bike. One of my patients, she's in her 80s and she goes to this little class a couple times a week. It's called the Silver Sneakers. So, getting involved in some type of group that offers activity, so they don't get bored. We all get bored with exercise. You want to avoid infection and that's where it goes back to people who you live with encourage them to get the flu shot. If you're around small children... if you're a caregiver, ask that the pediatrician give the dead viruses. It's the measles, mumps and rubella. That's the live virus. You have to be careful with that. The best thing you can do to stay healthy is wash your hands. Wash your hands. If you go to the office for a visit and the person sitting two chairs next to you you can tell they're really ill, just move. Wear a mask. I don't know if they have this at the University of Michigan... I mean Minnesota, but we have a station when you enter our clinic building that has masks, gloves, Kleenex and waterless hand wash. So, I encourage people to wash their own hands, don a mask when you're in the doctor's office. People come to the doctor because they're sick. Pick up some Kleenex. So and you don't have to shake hands with people. It's very cultural for us, isn't it, to want to shake people's hands? My dad taught me that I should always shake somebody's hand, look them right in the eye, but it's okay not to shake people's hands when you're the neutropenic person it's fine to kind of not do that. You want to avoid bleeding. Well, that's always really good advice. If you're cytopenic, goodness sakes. Tooth pulling though. You have to think about if you're going to the dentist. They're going to clean your teeth. You need to let them know that your platelets are 50,000. If you have an implantable port, you need a little antibiotics before you go. So avoid bleeding, but really you should be involved with all the things

you like to do. If you like to travel, go travel. For some folks that means getting my transfusion on Monday but being back by Thursday. So, you go on a little trip. I think the worse time for my patients is when the clinic is closed. So, like Thanksgiving. So, I got my folks who got to get transfused. So, long weekends can be problematic if you're not in an area that's set up to transfuse you over the weekend and we will be set up to transfuse over the weekend. We're going to have a unit that's open on the weekends for transfusions. So, that'll be great for the people who need them but kind of stinks for the people who have to staff them. Get enough rest. Rest is a great thing, but do balance that with a little bit of activity and then there's lots of resources. I think that probably one of the best things to do is if you go on the Internet for information just go someplace reputable. The MDS Foundation is a great place. They have great resources. The Leukemia and Lymphoma Society is another great place to go. Most universities will have links with their websites or provider offices no matter where you live will give you some good links, but kind of stay away from Sally's page or Michael's tips. Something like that. You want to avoid that. Ask for help when needed. Other people can mow your grass. Other people can clean your house. Other people can do your gardening.

So, Dee says there's a survey.

Dee: I passed it out to everyone. If you could just fill it out real quick and pass it down.

J: Fill out the survey. I don't know what it asks. And then really be out there in your community. I don't know how many folks are involved in a support group. It's pretty common that no matter where you live in the country that you may be the only person with MDS that your doctor sees. You may be the only person in your town. So, if there is a support group I would encourage you to go ahead and be part of it. Go ahead and start one if you'd like. There are plenty of religious organizations who look for people to have a forum where they can talk about either a patient or being a caregiver. So, where would we be without our caregivers? It's a big job. So, things that you can do to stay healthy. These are a couple of video clips that they talk about healthy body/healthy mind and I think if not in your packet, Dee did have some basic exercises and some general information about things that you can do to just kind of keep healthy and you want to become an active partner in your care. Be engaged with your provider. If you don't have a notebook, get a notebook. A buck at the dollar store will get you a notebook. Write your stuff down. Ask your questions. Write the stuff down before you go to the doctor so that when they walk into the room, you can tell them what's going on. I take your medicine, it makes me itch all over. I don't like that. All my hair fell out. Whatever it is, write it down and bring it to them so that when you go you're an informed consumer. So, write your stuff down and become a partner in that. I showed you the online piece as well for this and that's what it looks like here, but we already looked at it online and this is the format. This is the online format. It's interactive. You can look at the whole handbook and you can search and do thumbnails and there's lots of patient and caregiver resources. You can also create a custom handbook. You can go ahead and print pages of it if you only want some pages as well and there's the link again. If you want to go ahead and customize a plan on page 92 to 98 in your books, it's a working document. It allows you to individualize your plan and it has places for you to put down what your diagnosis is and your health profile and can get... just put the information together of your health team and then tracking things. If you like to track your counts. When was your last transfusion? Because oftentimes that will be a question. When was the date of your last transfusion? So, it's good to keep track of it.

There's other online resources that are linked together in it and you can also save it either on your Kindle or your iPad as well. This is the toll free number for the MDS Foundation or you can send an E-mail to Audrey Hassan at the MDS Foundation.

Q3: Is there a recipe book?

J: Is there a recipe book? I don't know if there's a recipe book. You could start one. Anyway, this is just kind of like the breakdown of the book that the first tab if you've got it in your lap you know it's kind of understanding what is the disorder; talking about seeking treatment under tab two. Three is the quick tips about guidelines for monitoring and managing. Tab number four is iron overload. Tab number five is your individual plan. Staying true to my word as I zip through these slides as well and then tab number six talks about the MDS Foundation with different resources for folks and that is the end of this presentation. So, I guess I would say fill out your surveys. Pass them to the end of the aisle just like when you're in grammar school and questions. Questions for me. You asked lots of questions this morning. You're all questioned out.

Q4: Are all those websites in this?

J: They're all in that book. You betcha. Question over here.

Q5: Can you go back over the information on the flu shots?

J: Flu shots.

Q5: Our oncologist recommended that my wife not get flu shots because of the blood counts were too low.

J: Too low. Okay. So, the very best resource to go to is something called the CDC which is the Center for Disease Control. The thought is if you are neutropenic, you may not have enough immune competency to benefit from a flu shot and that's why oftentimes providers will say you might not benefit, but your family should definitely get a flu shot.

Q5: We all get a flu shot, but she doesn't.

J: Yeah and that's okay.

Q5: One year they did say go ahead and get it, but it doesn't change. The last couple years (inaudible 50:33)

J: So, that's the thinking behind it. Some groups are more concerned that everybody get even not knowing if you're going to benefit or not. If somebody has like absolutely no neutrophils then most likely the rest of their immune system is also very depleted and so they may not benefit. It won't harm them but it may just not be very good. With our transplant population we don't begin re-

immunizations with folks until four months and we actually start with pneumococcal which is the pneumonia shot. So, we'll do the pneumonia shot and then the seasonal flu vaccine at four months.

Q6: A lot just occurred to me if someone (inaudible 51:15) transplant, do they have all their vaccinations?

J: So, the question is if someone's had a transplant do they need to get all their vaccines and the answer is Y-E-S. You betcha. So, how do we do that? We do that starting at four months and then we start with something called pneumococcal pneumonia because it's a deadly infection. So, they don't have enough immune memory to benefit from all the immunizations right away and so at month four, six, eight, ten and twelve, they get a pneumococcal shot and at month 12 they start with re-immunizations. So, that's TDAP, all the other ones. At month 14 they get a booster. At month 24 they get the measles, mumps, rubella. The reason they don't get that initially because it's a live vaccine. So, you don't want to... and if you do have MDS what you probably... well, you should not get the varicella immunization. So, the herpes because that's a live vaccine. So, don't get that. If you happen to get it don't sweat it, but it's not recommended for MDS patients because you may not have the immune response for it. So, you may actually like...

Q7: Does that mean shingles?

J: Yeah. That's shingles. Yeah. So, you shouldn't get the... If you're the MDS patient you shouldn't get the shingles shot.

Q8: What about the spouse?

J: The spouse should. Yes, and the spouse is not going to give it to you because the only way they would give it to you if they developed the vesicles. So like if you remember what chicken pox look like that's what like shingles will look like except in a pattern that follows a nerve anywhere on the body. If they develop it then they're contagious but just getting the shingles vaccine does not make them contagious. Question.

Q9: Are there different strengths of flu shots?

J: Are there different strengths of flu shots? Yes, there are. There's something called a trivalent and something called a quadrivalent. The quadrivalent has the H1N1 in it and it has four components to it and in pediatrics kids are too little to take the full flu shot, so pediatric patients actually get a series. So, they'll get two of them. So, but there's two different types. There's the trivalent and the quadrivalent.

Q9: So which ones do the (inaudible 53:31)

J: So, we recommend and the CDC recommends if you're to get the quadrivalent. It just means four. Yes, sir.

Q10: (inaudible 53:42) that I've seen an ad on TV that there's a special flu shot you can get. Do they recommend that special flu shot for people over 65?

J: So, that question is is that the one on TV? I don't watch television. How about that? But if it's the quadrivalent it probably is, but again if you like to go online and you're curious you can go to the CDC website and that's cdc.gov. I'm sure there'll be... and they have a really nice interactive component for influenza and they've got everything you want to know and then some about ebola.

Q11: No kidding.

J: No... right because they're the Center for Disease Control. That's our taxpayer money at work. What else? Other things? So, let's see. Who travelled the farthest? How many people live in this area? I mean like within 20 miles from here. Oh, wow. A lot of people.

Q12: Rochester.

J: Rochester. Is Rochester...?

Q12: Ninety miles.

J: Ninety miles. Okay. Came from over 100 miles? I'm going to stay out of this. Over 100 miles. Here they are in the back. How about over 200 miles? Wow. See that. Wow. Well, thanks for coming.

Q13: What about parking?

J: What about parking?

Q13: What about the price to park (inaudible 55:01).

J: I'd have to ask Dee. I'm not sure. She's outside.

Q13: (inaudible 55:07). It should be about \$4 or \$5 (inaudible).

J: It should be \$4 or \$5. Sorry. Did I tell you I walked here and then I took the train from the airport? So, I'm not really sure.

Q14: (inaudible 55:18)

J: Sorry about the parking. Well, anything else I can try to help you with? I think you have a great resource in your hand and there are a lot of experts in there. I believe that there's also a Facebook page if you're so included to go ahead and go on. So, lots of good resources and thank you for coming. Here comes Dee.



(Applause)