Funding for Yale Cancer Answers is provided by Smilow Cancer Hospital.
Welcome to Yale Cancer Answers with Doctor Anees Chagpar.
Yale Cancer Answers features the latest information on cancer care by welcoming oncologists and specialists who are on the forefront of the battle to fight cancer.
This week, it's a conversation about childhood cancer with Doctor Mary Jane Hogan.
Dr Hogan is an associate professor of clinical Pediatrics and hematology oncology at the Yale School of Medicine, where Doctor Chagpar is a professor of surgical oncology.
So, Doctor Hogan, maybe we can start by you telling us a little bit more about yourself and what it is you do.
Sure. I am currently working in our Smilow cancer clinic in New Haven, as well as our clinics located in Trumbull and Greenwich, CT.
I've come by way of a lot of different avenues. My research initially has focused on treating brain tumors in mice in the laboratory, but more recently have done more research in childhood cancer survivorship issues.
And currently am also doing the clinical education issues.
for colleagues and trainees, as well as helping families and patients with learning about cancer.

Terrific, we’re talking here about childhood cancers and that’s something that everyone always finds really distressing, the fact that children can get cancer. So can you tell us a little bit more about the epidemiology of childhood cancers? I mean, how many children in the US get diagnosed with cancer every year and how common is it and what kinds of cancers are we talking about here?

Well, childhood cancers are more rare compared to adult cancers. There are approximately 2,000,000 adults every year diagnosed with cancer in the United States, and this is compared to about 15,000 children and teens in the United States diagnosed every year. And cancer, I’ll just sort of describe it a little bit here, is an abnormal increase in cells in the body of abnormal cells that don’t function or don’t work in the body and they take up space and this doesn’t allow the regular body organs to do their job and keep us healthy.

And so the most common cancers in children...
0:02:50.15 –> 0:02:51.766 are leukemia,
0:02:51.766 –> 0:02:53.786 and this is an abnormal
0:02:53.786 –> 0:02:55.749 accumulation of white blood cells.
0:02:55.75 –> 0:02:57.79 White blood cells typically fight infection,
0:02:57.79 –> 0:03:00.46 but in leukemias
0:03:00.46 –> 0:03:02.64 they just take up space and so
0:03:02.64 –> 0:03:05.16 that you cannot fight infection.
0:03:05.16 –> 0:03:06.984 The second most common type of
0:03:06.984 –> 0:03:09.009 cancer in children are brain tumors.
0:03:09.01 –> 0:03:11.71 This is where there's an abnormal
0:03:11.71 –> 0:03:14.878 growth or mass in the brain.
0:03:14.88 –> 0:03:17.436 The third most common are lymphomas.
0:03:17.44 –> 0:03:20.257 This is a cancer found in the lymph nodes,
0:03:20.26 –> 0:03:21.94 which are glands located throughout
0:03:21.94 –> 0:03:26.21 our body that help us fight infection.
0:03:26.21 –> 0:03:29.167 And then the remaining cancers involve
0:03:29.167 –> 0:03:30.829 the soft tissues of the body,
0:03:30.83 –> 0:03:33.278 such as the muscles or the
0:03:33.278 –> 0:03:35.43 various organs of the body,
0:03:35.43 –> 0:03:39.567 including the nerves outside the brain or
0:03:39.567 –> 0:03:45.058 the kidney or the bone anywhere in the body.
0:03:49.44 –> 0:03:50.194 So it's very rare
0:03:50.571 –> 0:03:52.079 compared to adult cancer,
0:03:52.08 –> 0:03:55.03 but still obviously very important.
0:03:55.06 –> 0:03:59.396 When we think about adult cancers,
0:03:59.396 –> 0:04:02.136 very often there's an exposure.
0:04:02.14 –> 0:04:04.462 So for example, in lung cancer
0:04:04.462 –> 0:04:07.519 we know that there is a great
0:04:07.519 –> 0:04:09.415 association with cigarette smoking
0:04:09.415 –> 0:04:12.244 or any smoking really. In Melanoma,
0:04:12.244 –> 0:04:14.776 we know that there's an exposure
0:04:14.78 0:04:17.09 to radiation often from the
0:04:17.09 0:04:19.4 sun that occurs.
0:04:19.4 0:04:20.19 For children,
0:04:20.19 0:04:22.165 one would anticipate just
0:04:22.165 0:04:24.416 because they are children that
0:04:24.416 0:04:26.916 they've had less exposures to
0:04:26.916 0:04:28.416 potential carcinogens.
0:04:28.42 0:04:30.562 So can you talk a little bit
0:04:30.562 0:04:33.192 more about the risk factors for
0:04:33.192 0:04:34.83 developing childhood cancers?
0:04:34.83 0:04:37.098 Are many of these genetic or are
0:04:37.098 0:04:39.103 there other things that predispose
0:04:39.103 0:04:41.035 some children to developing
0:04:41.035 0:04:42.967 childhood cancers versus others?
0:04:44 0:04:46.488 Overall, most causes of
0:04:46.488 0:04:48.976 childhood cancer are unknown.
0:04:48.98 0:04:51.708 We have learned over the past 50 years
0:04:51.71 0:04:57.299 though, that about 5 to 10% may be inherited.
0:04:57.3 0:05:01.512 There are about 50 cancer predisposition
0:05:01.512 0:05:06.141 syndromes that we call based on genetic
0:05:06.141 0:05:09.783 mutations that a child may inherit.
0:05:09.79 0:05:11.694 Passed on through the
0:05:11.694 0:05:14.77 family or are born with.
0:05:14.77 0:05:17.815 In which there are many other symptoms.
0:05:17.82 0:05:20.308 So when we discover a condition like this,
0:05:20.31 0:05:24.24 we recommend looking at the child
0:05:24.24 0:05:28.04 every couple of months to years,
0:05:28.04 0:05:30.288 looking for cancer itself.
0:05:30.288 0:05:32.536 Some cancers have been
0:05:32.536 0:05:34.959 associated with viral illness.
0:05:34.96 0:05:37.795 Epstein Barr virus has been
associated with lymphomas.
HIV has been associated with certain cancers and people might have heard of human papillomavirus, which we are now giving vaccines in the teenage years to people to prevent several cancers in adulthood. A parent who has been exposed to radiation while the child is in the womb. The child may be affected with cancer. There have been some reports, possibly of pesticides during exposure while in the womb or as a very young child causing cancers. These are not directly effective, but there have been several reports. And in our children who have had previous cancers, they are at an increased risk of having cancer because of either their genetic predisposition or they’ve been exposed to certain treatments that can increase risk of cancer. But in general, most causes are unknown. Cancer is not something that is contagious. And it’s not something necessarily that you can avoid or something that you’ve done to yourself necessarily so nobody is really to blame for the cancer.
When you think about most causes being unknown and only about 5 to 10% being genetic, and then the other etiologic factors that we know about, viral infections and intrauterine exposures to various toxins and so on, which one would presumably think would be a fairly small proportion that leaves the vast majority to be something that you can even anticipate. Given if you’re a new parent and you have a healthy child, you’re not really expecting that child will develop cancer. Can you tell us a little bit more about some of the side effects, some of the symptoms that you should be looking for that might tip you off that there might be something wrong that might be a cancer? Is there a way that we can diagnose these early? It’s very difficult to diagnose cancers early in children. You’d need a sizable amount of these abnormal cells to actually show themselves and to show a sign or symptom. Please note that I will describe a whole long list of signs and symptoms,
but typically children present with a combination of these symptoms. So not just one symptom means cancer. There’s a combination, and often the symptoms that people present with, our children present with and grownups too, the signs are persistent. And they worsen over time and they typically can’t be explained by an infection or an injury that the child has had. So it’s mostly unexplained but worsening of symptoms. And there’s a long list of symptoms, unexplained weight loss. So not that the child’s not eating enough or losing weight from too much exercise and so not eating, it’s weight loss that you can’t explain. Fevers that you can’t explain that persist and worsen. Not from a simple infection or even a complicated infection, but fevers that just cannot be explained. Night sweats, not getting a little damp at night, but if your T-shirt and bedding and pillow and hair are soaked and you
0:09:48.559 –> 0:09:50.94 have to change it and you’re like,
0:09:50.94 –> 0:09:52.936 where did this come from? I’m not even warm.
0:09:52.936 –> 0:09:54.64 I don’t even have a fever.
0:09:54.64 –> 0:09:57.796 What is going on? Headaches.
0:09:57.796 –> 0:10:00.126 Headaches are a common sign.
0:10:00.608 –> 0:10:04.91 The headaches are common for a lot of people,
0:10:04.91 –> 0:10:08.302 but the ones that are more worrisome
0:10:08.302 –> 0:10:11.01 usually occur in the early morning,
0:10:11.01 –> 0:10:13.142 are associated with vomiting,
0:10:13.142 –> 0:10:15.807 sometimes awaken you at night,
0:10:15.81 –> 0:10:19.45 and they don’t respond to Tylenol or
0:10:19.45 –> 0:10:22.21 ibuprofen or simple remedies that
0:10:22.21 –> 0:10:24.37 we use for headaches or hydration.
0:10:26.4 –> 0:10:31.333 If a parent notices swelling or pain in
0:10:31.333 –> 0:10:35.519 arms or legs or at the back of a child,
0:10:35.52 –> 0:10:39.956 if you notice a mass in the neck or in
0:10:39.956 –> 0:10:43.916 the armpits or in the abdomen or pelvis,
0:10:43.92 –> 0:10:47.2 that’s just sticking out,
0:10:47.2 –> 0:10:50.245 that can be a sign of cancer if
0:10:50.245 –> 0:10:52.315 they’re in combination with all these
0:10:52.315 –> 0:10:54.442 other signs and symptoms. If there’s
0:10:54.442 –> 0:10:56.494 a lot of bruising or bleeding.
0:10:56.5 –> 0:11:00.382 Or rash that just doesn’t go
0:11:00.382 –> 0:11:02.97 away with simple interventions.
0:11:02.97 –> 0:11:07.162 If somebody seems very pale and
0:11:07.162 –> 0:11:11.194 it worsens overtime or is tired
0:11:11.194 –> 0:11:14.91 not explained by
0:11:14.91 –> 0:11:18.694 only sleeping for five hours a night or
0:11:18.7 –> 0:11:24.466 being tired without really knowing why.
0:11:24.47 –> 0:11:27.23 If anybody has any vision changes
0:11:27.23 –> 0:11:29.15 that’s not explained or corrected
0:11:29.15 –> 0:11:32.91 with simple glasses, NOTE Confidence: 0.941908941428571
0:11:32.91 –> 0:11:34.83 these in combination,
0:11:34.83 –> 0:11:38.508 along with a good physical exam
0:11:38.508 –> 0:11:41.874 by the pediatrician is very
0:11:41.874 –> 0:11:45.88 important to see if a person has
0:11:45.88 –> 0:11:47.655 the signs or symptoms that
0:11:47.655 –> 0:11:49.43 seem to be like cancer.
0:11:50.67 –> 0:11:53.27 And many of those really
0:11:53.27 –> 0:11:55.749 seem like they would be commonplace.
0:11:55.75 –> 0:11:57.982 And I think one of the things that
0:11:57.982 –> 0:12:00.63 you made clear is that while these
0:12:00.63 –> 0:12:02.246 symptoms may seem commonplace,
0:12:02.25 –> 0:12:03.53 a little bit of fatigue,
0:12:03.53 –> 0:12:07.55 a little bit of
0:12:07.55 –> 0:12:11.379 fever, maybe a headache, if these
0:12:11.379 –> 0:12:14.32 are persistent and unexplained,
0:12:14.32 –> 0:12:16.415 that’s really when you
0:12:16.415 –> 0:12:18.896 want to see your pediatrician and
0:12:18.896 –> 0:12:20.78 kind of get this checked out.
0:12:20.78 –> 0:12:23.186 One question that our listeners might
0:12:23.186 –> 0:12:25.799 have is how persistent is persistent?
0:12:25.8 –> 0:12:27.936 Like, should I wait a week,
0:12:27.94 –> 0:12:30.152 two weeks, two months?
0:12:30.152 –> 0:12:33.47 When would you suggest that if
0:12:33.579 –> 0:12:36.915 if a child is not doing so well?
0:12:36.92 –> 0:12:38.992 How long should you wait before you
0:12:38.992 –> 0:12:41.5 you go and and seek medical advice?
0:12:42.37 –> 0:12:45.562 It’s a great question and I think
0:12:45.562 –> 0:12:48.369 it’s dependent on each situation.
0:12:48.37 –> 0:12:53.034 Definitely if a child is getting worse each
0:12:53.034 –> 0:12:57.1 day or each hour and your child,
they'll run around and play and when they're not feeling well, they don’t.
And if you’re noticing more of that, they’re not playing, they’re not eating, they’re not doing the things they need to do, then you need to contact your pediatrician and tell them of your concerns and have the pediatrician take a look so I wouldn’t wait too long. On the other hand, if the symptoms are very mild and they come and go, they don’t impact the child’s activities and their symptoms resolve for months on end, then that is not a time to necessarily contact your pediatrician. Whatever happened, it has resolved.
OK, great. Well, we’re going to dive more into the diagnosis and treatment of childhood cancers right after we take a quick break for a medical minute. Please stay tuned to learn more about the care of childhood cancer with my guest, Doctor Mary Hogan. Funding for Yale Cancer Answers comes from Smilow Cancer Hospital, where the gynecologic oncology program brings together a team of
Clinicians whose focus is to care for women with gynecologic cancers.

There are over 16.9 million cancer survivors in the US and over 240,000 here in Connecticut.

Completing treatment for cancer is a very exciting milestone, but cancer and its treatment can be a life changing experience. The return to normal activities and relationships may be difficult and cancer survivors may face other long term side effects of cancer including heart problems, osteoporosis, fertility issues and an increased risk of second cancers.

Resources for cancer survivors are available at federally designated Comprehensive cancer centers such as Yale Cancer Center and Smilow Cancer Hospital to keep cancer survivors well and focused on healthy living.

The Smilow Cancer Hospital Survivorship Clinic focuses on providing guidance and direction to empower survivors to take steps to maximize their health, quality of life, and longevity.
Welcome back to Yale Cancer Answers.

This is doctor Anees Chagpar and I'm joined tonight by my guest, Doctor Mary Hogan.

We're talking about the care of patients with childhood cancer in honor of childhood Cancer Awareness Month.

And right before the break, Mary, you were telling us about all of the symptoms you should really be watching for.

Tell us more about how the diagnosis of childhood cancers are made.

Your pediatrician and child’s pediatrician may order some blood tests or some simple imaging such as X-rays or an ultrasound, and when they find something abnormal or alarming or are not sure, they’ll refer to a pediatric oncologist and we will often get blood tests.

We will often get other more advanced imaging such as CT scans or MRIs. And based on those, then we get our experts, pediatric surgeons to help us get a biopsy of a mass that we might have found on the imaging.

Or we ask our specialists in pathology to take a look at the blood samples to
see if there’s any abnormal cells there. And then once we have an idea that it is a cancer, we do even more extensive testing to find out the exact kind of cancer so that we can deliver the most appropriate therapy for the best outcomes. I can only imagine that when that diagnosis comes down and you tell a child’s parent that their child has cancer, that can be just devastating for that family. Tell me more about how you get patients and their families, through that kind of a diagnosis. Cancer is a devastating diagnosis. Everybody has been touched by cancer in some way or form, whether it be relative or a neighbor, and they bring their own experiences with them to this. So once you hear your child has cancer, as you said, it is devastating and everybody is in shock. And it is difficult to deliver that news, however, at the same time, we want to get the child better and we want a cure, and we want to get moving on treatment so we can get there. So we don’t want to wait too
long in belaboring it.
So we want to be supportive of the family.
We have social workers and psychologists help us so that we can deliver the news to where the family is and understanding from their experiences, but also the child at different ages you have different cognitive abilities,
and so it’s important to answer their questions appropriately and make them aware of this.
They are directly involved in the treatment, they will need blood tests and imaging as I mentioned and the therapies that we give have to be sometimes taken by mouth or given intravenously or you have to sit still for radiation therapy.
So the child needs to be aware of why they’re getting the therapy and what it means to complete your treatment of therapy.
It’s a very difficult conversation and we all are upset by it.
And at the same time, we want to help.
And I do find that a lot of kids are really pretty resilient and they will power through even when their parents may be more
devastated than the child sometimes.

For sure. Kids are amazing.

They’re like, how long is this going to take?

I need to get to baseball practice.

Is this going to interfere with the prom?

Because we need to rearrange this

treatment schedule

and so we ask the kids,

where are you at?

What do we need to do?

How do we get you to the clinic?

And how do we get you to the more

important things of your life as well?

So kids are amazing.

And so are the parents.

Talk to us a little bit

more about the the various treatment

modalities that are used to treat

children with cancer and

I realize that it’s a little

difficult given the fact that there

are so many different kinds of cancer

that are kind of all clumped under

the umbrella of childhood cancer.

But talk to us a bit about the types

of therapies and their duration so that

we can get a sense of what exactly does

treatment look like for these kids.

Sure, treatment

directed toward the specific type of cancer.

And every year we become more specific
about the type of cancer you have. We just don’t lump it under leukemia. Now we literally go down the path of directed targeted therapies and the reason why we do that is to reduce toxic effects from these medications. If you don’t need as much therapy to achieve a cure, we would like to eliminate those therapies. Whereas if you have a more difficult cancer to treat, we want to give you all the available therapies, and therapies, as I mentioned before, can be taken by mouth or intravenously given in a variety of different ways. So our basic treatments are called chemotherapy. They’re given in combinations because they act on the cancer cells differently. And over the past 50 years, based on children who have enrolled in our clinical trials, we’ve come up with standard of care throughout the nation. How best to treat this. And we’re always trying to improve upon this. More recently to our chemotherapies, well not more recently, but standardly to chemotherapy
certain cancers may need radiation therapy, where special ionized particles are delivered to the cancer site to kill cancer cells. Surgery is also very important in our treatment of cancers for certain types where the tumor is removed. And we now have more recently immune therapy where we can give medication to target a protein on the tumor which will allow our immune system to attack the tumor or cancer as if it was foreign. And that’s really cool. And our targeted therapies work by attacking the gene that’s in the gene mutations that are in the cancer cells so that we’re leaving our normal healthy cells alone. So we have very strong therapies called hematopoietic stem cell transplant or bone marrow transplant where strong medicines are given to eliminate the cancers. Not many cancers require this. We also have even stronger therapy called chimeric antigen receptor T cell therapy also used in very rare instances. Cancer therapy may last as long as two to three years in certain cases. And as short as you know,
three to six months,
so it really is on us to find
the exact cancer you have and
to treat it appropriately.
And so one would imagine that with
whatever type of therapy kids get
treated with for their childhood cancer,
that’s going to cause some side
effects and so whether this is a
three month course of therapy or
a three-year course of therapy,
how do you deal with some
of those side effects?
Can you talk to us about those
side effects that kids may
face going through cancer therapy
and how that kind of affects their
lives both in terms of the time in
which they’re getting the therapy?
How does that affect
them going to school and
in interacting with their friends?
And so on and so forth as well as long term,
I mean are there effects that people
should be cognizant of in terms of
the long term side effects of some of
these therapies for childhood cancer?
One of our secondary goals
during our cancer therapy is to
make sure kids get back to school
and keep up with their school work
and all their fun activities.

Sometimes the children will be back in the classroom, sometimes we will need to provide tutors because they’re in the hospital setting.

So some of the short term side effects of her medication range from mild where you don’t really notice it to more severe where we need to give supportive medications so that it eliminates these side effects.

A common side effect is nausea and vomiting, and this is dealt with mild to very strong anti-nausea medications. We have multiple combinations of them and compared to 30 years ago, many of our children need to be hospitalized for intravenous fluid because they’re having excessive nausea and vomiting.

Another common side effect is with certain therapies is hair loss. It is temporary but also very upsetting. We haven’t found a supportive cure for that just yet.

but some children will wear hats or wigs to make them feel more comfortable. Another side effect is to our blood cells.

Our blood cells help us fight infection. Those are the white blood cells, or red blood cells, carry oxygen to a body.

Those are red cells.
And the platelets help us clot our blood when we’re injured. And so sometimes a person may need transfusions or injections of medications to stimulate the production of these cells so that you don’t feel tired and that you don’t have nosebleeds and that you don’t have infections. We are giving many preventative medications for infections so that there are less hospitalizations for bacterial infections or fungal infections. Those are some of the short term side effects. I think the main one that I didn’t talk about was feeling tired and we try to improve energy levels with nutrition and supporting the red blood cell count as much as we can, but we often will recommend not going full tilt on all your activities until the therapy is over. But do what you can, because we really support you going to school and seeing your friends and continuing with your activities over the long term. Some children may suffer a severe side effect from their medication at the time of the chemotherapy treatments and so may...
have residual side effects later on.
Most children who have completed their therapy do well,
but approximately 40% of our childhood cancer survivors may have one or more late effects.
Those are signs or symptoms in other parts of the body that it can cause issues.
Doctor Mary Hogan is an associate professor of Clinical Pediatrics and hematology oncology at the Yale School of Medicine. If you have questions, the address is canceranswers@yale.edu, and past editions of the program are available in audio and written form at yalecancercenter.org. We hope you’ll join us next week to learn more about the fight against cancer here on Connecticut Public Radio. Funding for Yale Cancer Answers is provided by Smilow Cancer Hospital.