

# NIH News in Health

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## Advances in Childhood Cancer Making Personalized Treatments a Reality

Children often get bumps, bruises, sneezes, and sniffles. It doesn't seem like they could get something as scary as cancer. But they can.

Every year, more than 10,000 kids in the U.S. will get a diagnosis of cancer. Some cases are caused by changes in certain **genes** that are passed from parents to their children. But these are rare. The causes of most cases of cancer in kids aren't known.

Advances made over the last few decades have led to more children surviving cancer than ever before. And a better understanding of the disease means that more children with cancer are getting personalized treatments.

### Treating Childhood Cancer •

Cancer isn't just one disease. There are many different kinds. But all cancers start when some of the body's cells begin to grow uncontrollably. Sometimes, these cells spread to other parts of the body.

"Leukemias are the most common types of cancer that we see in children," says Dr. Nita Seibel, a child-



hood cancer specialist at NIH. These are cancers that start in certain types of blood cells.

Next most common are cancers of the brain, nerves, and spinal cord. Lymphoma—another type of blood cancer—also occurs in kids and teens. Children may be affected by tumors of the eyes, adrenal gland, kidneys, muscles, and bones.

Common treatments for childhood cancers include surgery, chemotherapy, and radiation therapy. These can be used in combination or alone.

Chemotherapy and radiation therapy work by killing fast-growing cancer cells. But these treatments can also damage normal cells. This damage can cause side effects like infection, hair loss, and nausea. But these often go away. Other side effects, like hearing loss, may not go away. And some can appear after treatment stops.

Some kids may need other treatments, such as **immunotherapy** or a

stem-cell transplant. Different types of cancer need different treatments.

Until recently, it was common for all kids with the same type of cancer to receive the same treatments, explains Dr. Will Parsons, a child cancer specialist at Texas Children's Hospital. But the discovery of certain gene changes, called mutations, in cancer cells has started to change this. These mutations cause cancer cells to grow out of control.

A new type of treatment called targeted drugs can

block the effects of these harmful mutations. They cause cancer cells to stop growing, or to die, without causing as much damage to normal cells. Targeted drugs often have fewer side effects than chemotherapy.

"Targeted drugs have gone from a theory to a reality over the past decade," says Parsons. This breakthrough has been aided by faster and cheaper tests to pinpoint cancer mutations, he explains.

Researchers are testing ways to expand gene mutation screening for kids with cancer. One ongoing study is called Pediatric MATCH. The study is trying to match the

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### Definitions

#### Genes

Stretches of DNA you inherit from your parents that define features, like your risk for certain diseases.

#### Immunotherapy

Treatments that train your body's disease defense system to fight cancer.

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mutation found in a child's tumor with a drug targeted for the specific gene mutation, instead of for a specific type of cancer.

### Personalizing Treatment •

CAR T cells are the newest, most personalized cancer treatment. To make CAR T cells, **immune system** cells called T cells are collected from the blood of a person with cancer. The T cells are then modified in the lab so they can find and kill cancer cells. Millions of these designer cells are then grown and infused back into the patient.

"CAR T cells have made a big difference for kids whose leukemia has come back after treatment," says Seibel.

"Right now, they're reserved for patients whose disease has come back, or who have a high risk of relapse," says Dr. Nirali Shah, a child

cancer specialist at NIH. One reason for that is that standard treatments usually work very well. Another is that CAR T cells are expensive to make because they're custom made every time.

Researchers are testing so-called off-the-shelf CAR T cells, which could be made in big batches and used for many kids. This could reduce the cost and time needed to produce them. "But we need to know if their effect is going to last as long, and if the side effects are going to differ," she says. "So they need to be further evaluated in clinical trials."

CAR T cells and many other new treatments for children with cancer are being tested in studies called clinical trials. If your child has cancer, talk with your health care team. They can help you learn about all the treatment options.

**When Less is More •** Personalizing treatment can also mean adjusting the amount of therapy a child gets. That often means a lower risk of side effects.

For some cancer types, researchers can predict which tumors have a low risk of coming back. Kids at low risk of relapse may now be able to get lower doses of chemotherapy or radiation therapy. They may even be able to skip some toxic treatments entirely.

Reducing the amount of treatment can make a big difference in quality of life both during and after treatment. But no matter what treatments are needed, many side effects can be managed. For example, drugs can manage symptoms caused by chemotherapy, like nausea.

Some cancer treatments may have what are called late effects. These are side effects that can occur months or even years after treatment. They include trouble with learning and development, damage to the heart, and increased risk of

other cancers later in life. This is another reason why researchers want to reduce the amount of treatment whenever possible.

For some treatments, late effects are still unavoidable. So personalized care after treatment, called survivorship care, is vital for any child who's been treated for cancer. Survivorship care plans help guide the type of care kids will need to lead their healthiest life possible.

"It's part of the whole package of cancer treatment," says Seibel. "We want to make sure that kids have the highest quality of life possible as survivors." To find advice and information about supporting a child with cancer, visit [bit.ly/3it2BVA](https://bit.ly/3it2BVA). ■

## Definitions

### Immune System

A collection of specialized cells and organs that protect your body against invading germs and other microscopic threats.

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For more about childhood cancers, see "Links" in the online article: [newsinhealth.nih.gov/2023/02/advances-childhood-cancer](https://newsinhealth.nih.gov/2023/02/advances-childhood-cancer)



## Ask Your Doctor

### How to Talk With Your Child About Cancer

- **Who should tell my child?** If you choose to be the one to tell your child, the doctor or nurse can help you decide what to say and how to answer their questions.
- **When should my child be told?** Your child should be told as soon as possible. But they don't need to hear everything all at once.
- **What should I tell my child?** The information you share with your child depends on his age and what he can understand.
- **How much should I tell my child?** It may be hard for many children to process too many details or information given too far in advance.
- **How might my child react?** Each child is different. Expect that some days will be rough, and others will be easier.
- **What can I do to help my child cope?** Being calm and hopeful can help your child.

# Healthy Mouth for Kids

## Start Early to Protect Tooth Health

Oral health is important at every age. A healthy mouth helps you eat and speak, and healthy teeth can give you a winning smile. If you're caring for young children, you can help them get an early start at protecting their teeth, gums, and mouth.

Newborn babies have a cute toothless smile. Even though you can't see the baby's teeth, they're



### Wise Choices

#### Tooth Timeline for Kids

It's never too early to create tooth-healthy habits.

- **During pregnancy**, brush your teeth twice a day, floss daily, and schedule a dental check-up before your due date.
- **Before teeth appear**, gently wipe your baby's gums twice a day with a soft, clean cloth.
- **When teeth emerge**, clean them twice a day with a cloth or very soft toothbrush.
- **At age 1**, take your child to the dentist and schedule regular check-ups. Ask when it's time to start using fluoride toothpaste or get fluoride treatments.
- **Starting at age 2 or 3**, brush your child's teeth with a pea-sized drop of toothpaste. Help them brush twice a day until they have good brushing skills. Make sure they spit out toothpaste.
- **Around age 7 or 8**, kids can brush and floss their own teeth. Help them create a habit of brushing in the morning and before bed. Check from time to time to make sure they're brushing all their teeth.
- **At all ages**, encourage healthy eating. Avoid sugary foods and drinks.

hiding just beneath the gums.

"You can start cleaning your baby's mouth with a clean, soft cloth even before the first teeth come in," says Dr. Tim Iafolla, a dental health expert at NIH. "That way your baby gets used to having his or her mouth cared for."

Baby teeth may start to appear at about 6 months of age. As early as 6 years old, these teeth may begin falling out. Though baby teeth are temporary, they are important.

"Baby teeth are used for chewing food, of course, but they also guide growth of the jaw bones, and they make room for the permanent teeth when they come in," Iafolla explains.

Once teeth start to emerge, tooth decay can become a problem. "Tooth decay can cause early loss of teeth, which can affect speech, nutrition, and appearance," Iafolla says.

Pain from tooth decay might cause kids to miss school. If left unchecked, tooth decay can lead to a serious infection, or abscess, that may spread to other parts of the body.

Tooth decay is caused by sugar-loving bacteria that grow in the mouth. The bacteria use sugar to make acids. Over time, these acids can wear away your teeth's hard enamel coating and create a hole, or cavity. Eating or drinking sugary things, or snacking often throughout the day, feeds the bacteria and creates more acid, which can lead to cavities.

The good news is that tooth decay can be prevented. Start by encouraging kids to eat healthy foods and brush their teeth twice a



day. Consider flossing daily as well.

Regular visits to the dentist also help. Baby teeth can be painted with a thin coating that can prevent or reduce cavities, called a fluoride varnish. Fluoride varnish should be reapplied twice a year.

Once permanent teeth come in, dentists can paint the back teeth with protective coatings called dental sealants. Both dental sealants and fluoride varnish are preventive treatments that are usually covered by insurance.

"Sealants harden to form a protective shield against germs and food," Iafolla says. "They last for years and can prevent 80% of cavities in the back teeth."

"Helping your children develop healthy dental and nutritional habits early in childhood can set them up for a lifetime of good dental health," Iafolla says.

See the Wise Choices box for a timeline of tips. ■



### Web Links

For more about kids' oral health, see "Links" in the online article: [newsinhealth.nih.gov/2023/02/healthy-mouths-kids](https://newsinhealth.nih.gov/2023/02/healthy-mouths-kids)







## Health Capsules

For links to more information, please visit our website and see these stories online.

### COVID-19 Disrupts Gut Microbes

Microbes live all over your body. These include bacteria, fungi, and viruses. People with COVID-19 often have an imbalance in their gut's microbes. In hospitalized patients, this can lead to serious infections in the blood, called secondary infections. A new study showed that COVID-19 can disrupt the gut's microbes and allow harmful bacteria into the bloodstream.

The researchers first studied mice infected with SARS-CoV-2, the virus that causes COVID-19. They found that the virus caused changes

to the gut lining. Mice with the virus also had fewer types of microbes in their guts.

Next, the team studied the microbes in stool samples from 96 people with COVID-19. In one of every four samples, a single type of bacteria dominated. Some of these bacteria were resistant to antibiotics, which makes them difficult to kill. The people who had infections in their blood tended to have a less diverse mix of microbes in the gut. The type of bacteria found in their blood was also seen in their gut.

Together, these results suggest that SARS-CoV-2 can upset the balance of gut microbes. This allows harmful bacteria to thrive in the gut. It also alters the gut lining to let these bacteria more easily spread from the gut to the bloodstream.

"Now that we have uncovered the source of this bacterial imbalance, physicians can better identify those coronavirus patients most at risk of a secondary bloodstream infection," says Dr. Ken Cadwell of New York University, who co-led the study with colleague Dr. Jonas Schluter. ■

### Show Your Heart Some Love!

Heart disease is a leading cause of death in the U.S. for both men and women. But you can take steps to protect your heart and stay healthy.

To start, you can learn and keep track of some important heart health numbers, like your weight, blood pressure, cholesterol, and blood glucose (blood sugar). Then take action to improve your numbers.

One key number to know is your body mass index, or BMI. BMI is an estimate of body fat. Your BMI is based on your height and weight.

Having a higher BMI is one factor that increases your risk for certain conditions, including heart disease and type 2 diabetes.

Get your blood pressure checked at least once a year by a health care professional, and ask what your target numbers should be. Then ask for tips to keep your blood pressure under control. Keep track of your numbers.

Getting enough physical activity can help you meet your heart health goals. Aim for at least 150 minutes

of moderate-intensity activity each week. Consider wearing a device that counts your steps to track how much you walk every day. Or simply jot down how much time you spend each day with different activities.

Eat a heart-healthy diet and keep a record of what you eat and drink each day. This can also help you stay on track.

Find tips and tools for calculating your BMI, tracking your blood pressure, eating a heart-healthy diet, and more at [bit.ly/3IUOaUQ](https://bit.ly/3IUOaUQ). ■



### Featured Website

#### HerbList App

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Want to know what the science says about popular herbs used for health purposes? Find some answers in the palm of your hand

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