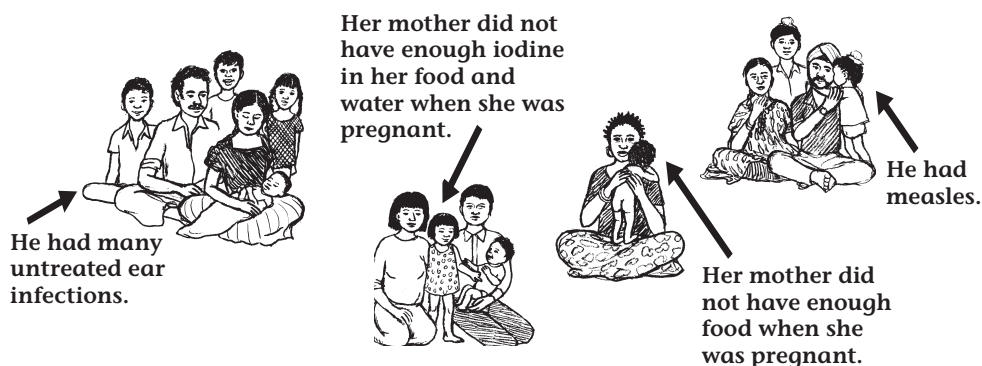




Chapter 15

Why children lose their hearing and what we can do

There are millions of children all over the world who are deaf or have hearing problems. Most of them are poor. Out of every 3 children with hearing problems, 2 live in poor countries. Their deafness is often caused by infection and poor nutrition. For most of these children, deafness could have been prevented by taking care of basic needs—like good food, clean drinking water, a safe, clean place to live, and access to health care.



This chapter can help you learn about the causes and medical treatments for some hearing problems. To prevent deafness, communities must work together to solve the social causes that medicine cannot fix.

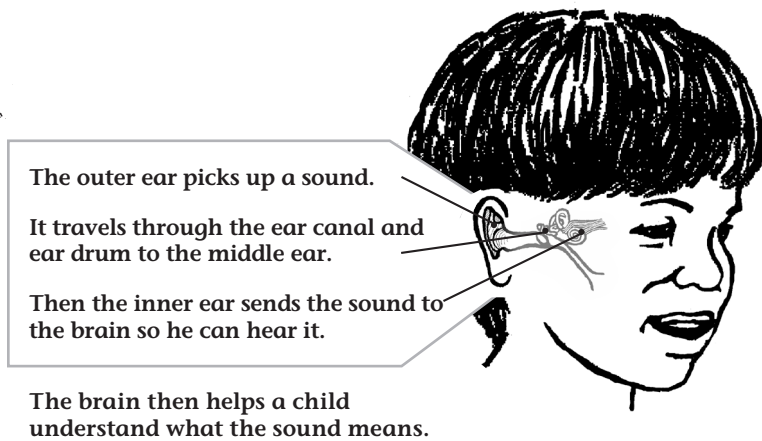
Children's health and hearing benefit when communities have clean air (free of smoke and dust), good sanitation, plenty of nutritious food for everyone, and are free of violence. Good health care, including health education, immunizations, and early treatment of illness, is key to protecting children's hearing.

Wrong beliefs

Some people believe a child is deaf because the parents did something wrong. Other people believe a child is deaf because someone has done evil to the child's mother, and the child is "witched." Neither of these things causes deafness.

How the ear works

The ear is made up of 3 main parts: the outer ear, the middle ear, and the inner ear. The outer ear is the part you can see. The middle and inner ear are inside the head and cannot be seen. All 3 parts of the ear must work for a child to hear.



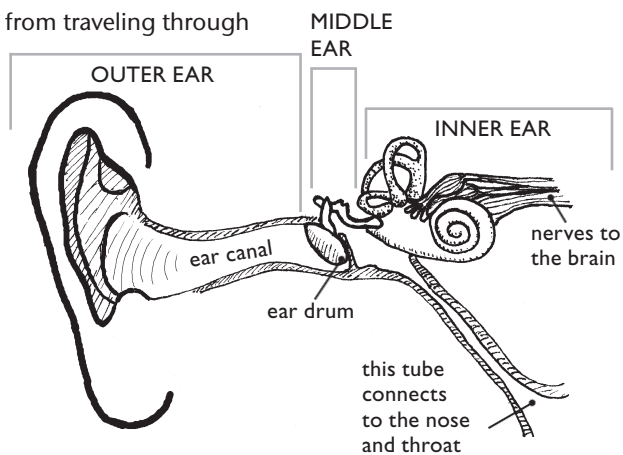
Problems in any part of the ear can cause deafness

Problems in the outer ear and middle ear:

- ear infections (page 193)
- something blocks sound from traveling through the ear (page 198)
- injury (page 214)

Problems in the inner ear and the nerve leading to the brain:

- infection during pregnancy (pages 209 to 212)
- baby's brain injured during labor or birth (page 212)
- childhood illness such as meningitis (pages 201 to 205)
- lack of iodine in mother's food during pregnancy (page 208)
- medicines that damage hearing (page 206)
- deafness passed down in families (page 215)
- damage from loud noises (page 213)



Ear infection

Ear infections are one of the most common childhood illnesses and without treatment, they can cause permanent hearing loss. Ear infections often start with an infection of the nose and throat. The infection travels from the throat along the tube into the middle ear.



Children get these infections easily because the tube from the throat to the ear is shorter than in adults. When the ear is infected, the fluid and infection cannot drain out of the middle ear. And if a child has a cold, the tube from the throat that leads to the middle ear often gets blocked. As children grow older and stronger, they develop more resistance and get fewer colds and throat infections.

SUDDEN EAR INFECTIONS (ACUTE)

Sudden middle-ear infection can occur at any age, and is common even in babies and infants. The child may cry, be irritable, and have a fever. Often the infection gets better in 1 or 2 days without any treatment. A mild pain reliever such as acetaminophen may help the child feel better but will not cure the infection. Sometimes an antibiotic is needed to cure the infection. The ear drum may burst and pus leaks out through a small hole. This hole usually heals quickly.

LONG-LASTING EAR INFECTIONS (CHRONIC)

When children do not get treatment for repeated sudden ear infections, the infection can become long-lasting. An ear infection is long-lasting if pus drains from the ear and there is discharge for 14 days or more. This can damage the ear drum. The ear drum may become pulled inward or have a hole that does not heal. Both of these problems lead to more infection with discharge.

Without proper and early medical care, children may lose their hearing, or have dizziness, weakness on one side of the face, or an abscess draining behind or below the ear. Rarely, an ear infection may also cause a serious complication like a brain abscess or meningitis (see page 204).

More poor children lose their hearing because of ear infections than any other cause. Hearing loss due to ear infections can be prevented by improving general health and living conditions, and by access to medical care (see pages 197 to 198). Every community needs people trained to identify ear infections early, or clinics or hospitals that are affordable and easy to get to.

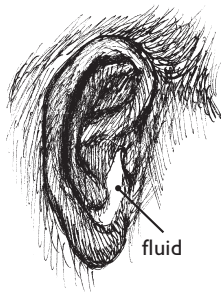


Glue ear

Sometimes after sudden ear infections, thick and sticky fluid collects in the middle ear (this is called glue ear). Glue ear does not usually hurt and drains away down the tube to the nose after a few weeks, but sometimes it lasts for years. Glue ear often affects both ears and causes hearing loss as long as it lasts. Most cases of glue ear will heal without treatment. But if there is any pain, give an antibiotic by mouth as for acute infection (see pages 195 to 196).

Signs of ear infection:

- Pain—a young child may cry, rub the side of his head, or pull on his ear.
- Fever between 37.7°C and 40°C (100°F and 104°F).
- Runny nose, sore throat, cough.



- Fluid may drain from the ear. It may be yellow, white, watery or sticky. The fluid may have some blood in it. A heavy flow of sticky, clear fluid is probably from a hole in the ear drum. This fluid may stop with medicines, but it can happen every time the child has a cold, or puts his ears under water or swims.

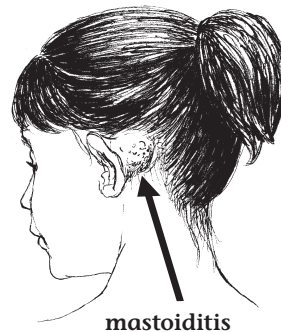
A slight fluid discharge that smells and may be yellow or green is probably from damage to the ear drum. An operation may be needed to repair the ear drum.

- Hearing loss—temporary or permanent—in one or both ears.
- Sometimes nausea and vomiting.
- Sometimes infection spreads to the bone behind the ear (mastoiditis). This is very painful and antibiotics must be given.

Go to a hospital!

Different signs may be present at different times—for example, the pain may stop when fluid starts flowing out of the ear.

Check the ear in 3 to 4 months after any ear infection, even if there is no pain and check the child's hearing (see pages 50 to 58).



TREATING EAR INFECTIONS

Note: When children need antibiotics, it is best to calculate the dose based on weight. See *Where There Is No Doctor*, page 340, for how to do this. If you cannot weigh the child, calculate the dose based on their age.

To treat sudden (acute) ear infections

For pain and fever:

- give paracetamol (acetaminophen) by mouth, every 4 to 6 hours as needed. Do not give more than 5 doses in 24 hours. To dose by age:

| | |
|------------------------|---|
| Less than 1 year | 62 mg (1/8 of a 500 mg tablet), every 4 to 6 hours |
| 1 to 2 years | 125 mg (1/4 of a 500 mg tablet), every 4 to 6 hours |
| 3 to 7 years | 250 mg (1/2 of a 500 mg tablet), every 4 to 6 hours |
| 8 to 12 years | 375 mg (3/4 of a 500 mg tablet), every 4 to 6 hours |

or

- give ibuprofen by mouth, every 6 to 8 hours as needed. Do not give more than 4 doses in 24 hours. To dose by age:

| | |
|---------------------------|-----------------------------------|
| 6 months to 2 years | 50 to 100 mg, every 6 to 8 hours |
| 2 to 6 years | 100 to 150 mg, every 6 to 8 hours |
| 6 to 12 years | 200 to 300 mg, every 6 to 8 hours |

Note: Do not give ibuprofen to children less than 6 months old or who weigh less than 6 kg. Give with milk or food to prevent stomach ache.

If paracetamol or ibuprofen alone does not lessen pain, using both together may help. For how to do this, see page 258 of *Helping Children Live with HIV*.

For the infection:

- give amoxicillin by mouth for 7 to 10 days.
Give 50 mg for every kilogram (per kg) of body weight each day, divided into 2 doses. Do not give more than 1500 mg each day. If you cannot weigh the child, dose by age:

| | |
|---------------------------|-----------------------|
| less than 3 months | 125 mg, 2 times a day |
| 3 months to 3 years | 250 mg, 2 times a day |
| 4 to 7 years | 375 mg, 2 times a day |
| 8 to 12 years | 500 mg, 2 times a day |

After 3 days, if the child's ear pain and fever are not improving or if symptoms are worsening, stop giving amoxicillin and give the treatment below instead.

If ear pain and fever are not improving or symptoms are worsening after 3 days:

- give amoxicillin + clavulanic acid (*Augmentin*) by mouth for 7 to 10 days.
This medicine is a combination of the drugs amoxicillin and clavulanic acid. Give 40 mg of amoxicillin + 5.7 mg of clavulanic acid per kg of body weight each day, divided into 2 doses. This can be done using forms of the medicine that have 400 mg amoxicillin for every 57 mg clavulanic acid, or that have 875 mg amoxicillin for every 125 mg clavulanic acid. Do not give more than 1750 mg amoxicillin each day.

(box continues on next page)

If the child is allergic to penicillin:

- give cefuroxime by mouth for 7 to 10 days.
For children ages 3 months to 12 years, give 30 mg per kg of body weight, divided into 2 doses a day. If you cannot weigh the child, give 250 mg, 2 times a day. Do not give more than 1 g (1000 mg) in 24 hours.

or

- give cefaclor by mouth for 7 to 10 days.
Give 40 mg per kg of body weight, divided into 2 doses a day. If you cannot weigh the child, dose by age:

1 month to 1 year 125 mg, 2 times a day

1 to 5 years 250 mg, 2 times a day

5 to 12 years 500 mg, 2 times a day

Do not give more than 1 g (1000 mg) in 24 hours.

or

- give erythromycin by mouth for 7 to 10 days.
Give 30 to 50 mg per kg of body weight, divided into 2 or 3 doses a day. If you cannot weigh the child, dose by age:

1 to 2 months 62.5 mg, 2 times a day

2 months to 1 year 125 mg, 2 times a day

1 to 8 years 250 mg, 2 to 3 times a day

8 to 12 years 500 mg, 2 to 3 times a day

If there is fluid draining from the ear, wipe it away, but **do not stick anything in the ear to clean it**. Encourage the child to rest and drink a lot of liquids. The child can bathe, but should not put his ears under water or swim for at least 2 weeks after he is well.

If you think the child may have a complication, take him to a hospital. If you suspect meningitis, give medicine immediately (see page 204).

To treat long-lasting or repeated (chronic) ear infections (discharge for 2 weeks or more)

- give antibiotic ear drops for 7 to 10 days.

The safest drops to use are ciprofloxacin or ofloxacin. If these are not available framycetin, gentamicin, gramicidin, neomycin, or polymyxin B are sometimes used, although these can cause hearing loss themselves. If using an antibiotic that could cause hearing loss, carefully check the child's hearing throughout treatment (see page 51).

If symptoms are not improving after 10 days of antibiotic drops, stop giving drops and give an antibiotic by mouth instead. Use the same antibiotic as for sudden ear infection (see page 195).

If antibiotic ear drops are not available:

- give antiseptic ear drops such as povidone iodine (*Betadine*).

Make a 5% solution of povidone iodine by mixing 20 parts water that has been boiled and cooled with 1 part povidone iodine. Then give 3 drops in the ear, 3 times a day for 10 days.

Antiseptic ear drops are not as effective against ear infections as antibiotic ear drops. Use antiseptic ear drops only if they are the only option available.

Povidone iodine itself can cause hearing loss. If using ear drops made with povidone iodine, carefully check the child's hearing throughout treatment (see page 51).



Repeat the same treatment if infection and discharge occurs again. A health worker or doctor can teach parents to clean out the discharge with cotton wool before each dose of ear drops.

Keep all water out of the ear. Carefully dry the ear two times daily with cotton wool or gauze for several weeks (until it remains dry).

When the ear drum bursts, sometimes an operation is needed to repair it. This is done by a specially-trained health worker in a hospital, usually when the child is at least 10 years old.

PREVENTING EAR INFECTIONS

To prevent ear infections, breastfeed babies—for up to 2 years if possible. Breast milk helps a baby fight infection. Breastfeeding also helps strengthen the muscles that keep the tubes between the throat and middle ear open.

**HIV and breastfeeding**

HIV infection can be passed to a baby in breast milk, but usually only if the person breastfeeding is newly infected or is very sick (the virus level can be very high then), and is not taking antiretroviral therapy (ART). In many places, the risk of diarrhea and malnutrition from other foods and unclean water is greater than the risk of HIV, especially in a baby's first 6 to 12 months. For this reason and because breast milk protects the baby from so many illnesses, giving only breast milk for the first 6 months is usually still safest. After 6 months, when most babies are stronger and have less danger of dying from diarrhea, the family can add complementary foods. The baby can then be weaned at 12 months if the family can meet the baby's nutritional needs.

Other ways to prevent ear infections

- If a baby has to be fed from a bottle or a cup, keep his head higher than his stomach as you feed him. Otherwise the milk can flow from his throat into the tubes and into his middle ears, helping to cause infection.
- Teach a child to wipe his nose instead of blowing it. If he does blow his nose, he should do it gently.
- When your child has a cold, find out if he also has ear pain. As much as possible, keep your child away from people with colds.
- As much as possible, keep children away from smoke, including smoke from stoves and cooking fires. Smoke can make the tube between the throat and middle ear swell and close. Then fluid builds up in the middle ear and it can get infected.
- Make sure children have enough nutritious food to eat. Malnourished children are more likely to develop infections, including ear infections. These last longer and are more likely to cause serious health problems than when children have enough to eat.



Something blocks sound from traveling through the ear

Children can lose their hearing temporarily when something like hard ear wax or another object blocks sound from traveling through the ear.

EAR WAX PLUGS

Ear wax forms a protective layer on the delicate skin in the ear, helps keep the ear clean, and makes the skin waterproof. A small amount of wax is normal and should not be touched. Usually, the wax gradually moves out of the ear, but sometimes it builds up, hardens, and becomes stuck. This can happen because of cleaning ears with cotton buds (small sticks with cotton on the ends) or other objects that push the wax deep into the ear canals. This hard plug of ear wax causes hearing loss and can cause an infection. Ear wax can also be a problem for children who use hearing aids, so these children's ears should be checked regularly and their hearing aids should be cleaned if necessary.

Signs:

- A child seems to hear less well than usual.
- You may see the plug of hard wax in the ear.
- The child may have an earache with pus draining out.

For ear wax

If there is no pain, fever, or discharge from the ear, too much wax or a wax plug can be removed by washing out the ear with warm water.

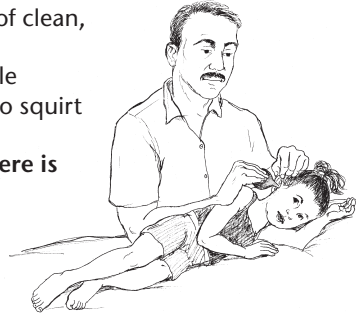
1. First, soften the wax by putting several drops of warm, mild vegetable oil into the ear. Keep the child lying down on her side with her ear up for 15 minutes.

2. Next, wash the ear well by pouring several cups of clean, warm (not hot) water into the ear with a spout. If this does not work, use a syringe with no needle (preferably 20 ml size) or a rubber bulb syringe to squirt the warm water into the ear.

WARNING: Do not squirt water in the ear if there is fluid draining from the ear!

- Remove the needle from the syringe and fill the syringe with warm water from a cup.
- Gently pull the ear away from the head. Carefully squirt the water into the ear canal.

Do not point the syringe directly down the ear toward the ear drum. Point it sideways toward the back wall of the ear canal. Stop if your child starts to feel dizzy.



With a bulb syringe, do not put the tip far or tightly into the ear canal. Try to keep the tip steady in the ear while squeezing the bulb.

Repeat this 3 times a week for 2 weeks and then once again after 1 or 2 weeks. Doing it more often can damage the ear.

Get medical advice for a hard plug of wax that does not dissolve easily.

INSECT IN THE EAR

Signs:

- The child may say he can feel or hear scratching, crawling, or bumping in the ear.
- Fluid or pus may drain from the ear.
- A child may hear less well than usual in the affected ear.



For an insect in the ear

Fill the ear with clean mineral or vegetable oil. The insect may drown and then float out. If this does not work, try to wash the ear in the same way as for removing wax.

For objects in the ear

Children sometimes put small objects into their ears. How quickly an object must be removed and in what way depends on the object.

Button batteries (like those in hearing aids and cochlear implants), live insects, and sharp objects can all injure the ear and must be removed quickly and carefully. See the previous page for removing live insects. Button batteries and sharp objects should be removed by a health worker with special tools right away.

Other objects are not an emergency. If you do try to remove the object yourself, do not use tweezers or anything that could push the object farther into the ear. If the object is soft, and if a health worker or you can easily reach behind the object with a small wire hook, try carefully removing it. If the object is hard, like plastic or metal, then try to wash it out with warm water as with wax. Do not do this for vegetable objects like seeds because they will swell and become more difficult to remove.

Stop if the object starts to move further into the ear or if your child cannot keep still. You could damage the ear canal or the ear drum. See a health worker.

INFECTION OF THE EAR CANAL CAUSED BY OBJECTS OR WATER IN THE EAR

Infection in the outer ear can be caused by insects, wax, water, or other material getting into the ear, or if a child scratches inside the ear. This infection is more common in adults than in children.

Signs:

- Wiggling the outer ear causes pain.
- The ear canal itches.
- The ear feels blocked or full.
- The ear canal is swollen.
- There is hearing loss in the affected ear.



Prevention:

Older children can help by checking younger children's ears regularly for a lot of wax (or pus, or objects). Ask them to tell you right away if they see anything wrong. Teach them never to put anything in the ear to remove objects or wax. This can push the material in farther and injure the ear.

Prevent children from scratching inside their ears, as this can cause infection. After swimming or bathing, teach children to shake their heads gently to clear the water out. If possible, children should not swim or bathe in dirty or polluted water. If a child has had infections before, try putting a few drops of rubbing alcohol or diluted vinegar (see box on next page) into his ears after swimming or bathing.

For infection of the ear canal

If there is mild pain, itching, and swelling of the ear canal:

Make a 2% solution of vinegar by mixing 50 parts water that has been boiled and cooled with 1 part vinegar. Then give 3 to 4 drops in the ear, 3 to 4 times a day for 7 days.



If there is moderate pain and the ear canal is partially blocked by swelling:

Give 0.3% ciprofloxacin antibiotic drops, 3 drops in the affected ear, 2 times a day for 7 days.



If there is severe pain and swelling in the ear canal, fever, or swelling around the ear:



- give cephalexin by mouth for 10 days.

Give 75 to 100 mg per kg of body weight, divided into 3 doses a day. Do not give more than 4 g (4000 mg) in 24 hours. If you do not have this medicine, or if you give the medicine and there is no improvement in 3 days, get medical help immediately.

Note: The child can bathe but should not put his ears under water or swim for 2 weeks after the infection is gone.

Childhood illnesses

Infection during childhood by diseases such as malaria, measles, mumps, or meningitis can damage the hearing nerve. Sometimes only one ear is affected, but meningitis usually affects both ears. For more about these illnesses, see Hesperian's book *Where There Is No Doctor*.

Prevent childhood illnesses with immunizations

Immunize children against all the childhood diseases—especially those that can cause deafness, such as measles, mumps, and rubella (German measles). Vaccinations are usually given free. It is better to take your children to be immunized than to take them for treatment when they are sick or dying.

If health workers do not immunize in your village, take your children to the nearest health center to be immunized. Or work together with other people in your area to bring health workers to your community. Immunizations save lives and hearing—they should be made easily available.

Treatment for childhood illnesses

Children should stay in bed, drink lots of liquids, and eat nutritious food. If a baby cannot breastfeed, give breast milk in a spoon.

For fever

Give paracetamol (acetaminophen, see page 195).

If fluid starts draining from the ear

Give an antibiotic by mouth as for sudden infections (pages 195 to 196).

If signs of chronic ear infection develop

See pages 196 to 197.

If the child has diarrhea

Give rehydration drink in small sips, 1 glass for each watery stool.

In 1 liter of clean water mix half a teaspoon of salt with 8 teaspoons of sugar. Or make a watery porridge with 1 liter of clean water, half a teaspoon of salt and 8 heaped teaspoons of powdered cereal (rice flour, maize flour, wheat flour, sorghum, or cooked and mashed potatoes).

If signs of pneumonia, meningitis, or severe pain in the ear or stomach develop, get medical help.

MEASLES

Measles causes ear infections in many children. Measles may damage the inner ear and also may cause a middle ear infection with an ear discharge and hole in the ear drum. A few children also get encephalitis, an inflammation of the brain that can lead to fits, and can leave children deaf.

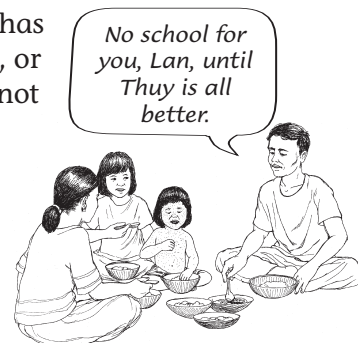


Sometimes there are black spots caused by bleeding into the skin. This means the infection is very severe. Get medical help.

Prevention:

Children from other families should not go to a house where someone has measles. They should stay away from children with measles and their brothers and sisters. To prevent the illness from spreading, children in a family where someone has measles should not go to school, stores, markets, or other public places for 10 days, even if they are not sick themselves.

Children who are weak, poorly nourished, or who have tuberculosis or HIV/AIDS need to be carefully protected from measles. It is especially dangerous for them.



MUMPS

Mumps infection begins with fever, and pain when opening the mouth or eating. In 2 days, swelling develops on the side of the neck. Sometimes mumps can cause severe hearing loss, usually in only one ear. The swelling goes away after about 10 days, without need for medicine. For pain or fever give paracetamol (see page 195). Feed the child soft, nutritious foods and keep his mouth clean. **Get medical help if signs of meningitis appear (see page 204).**



MALARIA

Children who are seriously ill with malaria can become deaf. Malaria is an infection of the blood, spread by mosquitoes, that causes chills and high fever (40°C or 104°F or more). Sometimes this deafness may go away within 2 to 3 days. But children who have been sick with malaria are weaker and get ear infections more easily, which can also cause deafness.

To treat malaria

- In areas where malaria is common, treat any unexplained fever as malaria.
- When children have repeated fevers or if you suspect malaria, see a health worker, and if possible go to a health center for a blood test. In areas where an especially dangerous type of malaria called falciparum occurs, seek treatment immediately.
- If a child who may have malaria begins to have convulsions (fits) or other signs of meningitis (see the next page) he may have cerebral malaria. Get medical help immediately.



Note: The treatment for malaria is different in different places. Medicines that work well in one place may not be effective in another place. Find out from a health worker which malaria medicine works best in your area. Some medicines used to treat malaria can also cause deafness (see page 206).

Prevention:

- Cover beds and cradles where children sleep with mosquito nets or a thin cloth. Nets treated with insecticide work best.
- Reduce standing water, which is the breeding ground for the mosquitos that pass malaria. Clear away cans, pots, or old tires that collect water. Drain, fill, or release fish into pools of water, or marshes. Fill the tops of bamboo posts with sand.
- Prevent or reduce the effects by taking anti-malaria medicines.

If malaria is suspected, get treatment quickly. This will keep malaria from being passed to others.

MENINGITIS

Meningitis (brain fever) is a serious infection of the brain that can spread to the ear nerves and cause deafness. An ear infection can also spread to the brain and cause meningitis. Meningitis may begin after another childhood illness, such as measles, mumps, or whooping cough. It may also be caused by a virus.

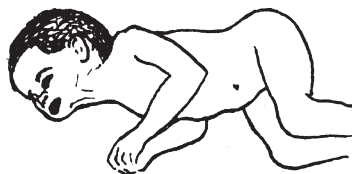
Signs of meningitis:

The signs of meningitis are severe headache and fever. The child may be sleepy and have fits or jerks. Sometimes there is vomiting and a rash. A child with meningitis may faint (quickly go unconscious).

soft spot bulges up
(babies under 1 year)



stiff neck



back arched,
knees forward

Every minute counts.

Take the child to the hospital right away!

To treat meningitis while taking the child to a hospital

Inject **one** of the following combinations of medicines in the muscle or in the vein. Inject in the vein only if you have been well trained to do so. If not, inject into the muscle.



• **ampicillin and ceftriaxone**

Dilute a 500 mg vial of ampicillin powder for injection with 2.1 ml sterile water. This makes a concentration of 500 mg per 2.5 ml.

Dilute a 1 gram vial of ceftriaxone powder for injection with 3.5 ml sterile water. This makes a concentration of 1 g per 4 ml.

ampicillin..... inject 100 mg for every kilogram (per kg) of body weight, 2 times a day for at least 5 days

AND

ceftriaxone..... inject 100 mg per kg of body weight, once a day for at least 5 days. Do not give more than 4 g (4000 mg) each day

If you cannot weigh the child, dose by age:

1 to 12 months 2 ml ampicillin 4 times a day, **AND**
2 ml ceftriaxone once a day, for at least 5 days

1 to 3 years 3 ml ampicillin 4 times a day, **AND**
4 ml ceftriaxone once a day, for at least 5 days

4 to 5 years 5 ml ampicillin 4 times a day, **AND**
6 ml ceftriaxone once a day, for at least 5 days

or

• **ampicillin and gentamicin**

Dilute a 500 mg vial of ampicillin powder for injection with 2.1 ml sterile water. This makes a concentration of 500 mg per 2.5 ml.



Use an undiluted 2 ml vial of gentamicin at 40 mg per ml.

ampicillin..... inject 100 mg for every kilogram (per kg) of body weight, 2 times a day for at least 5 days

AND

gentamicin inject 7.5 mg per kg of body weight, once a day for at least 5 days

If you cannot weigh the child, dose by age:

2 to 4 months 1.5 ml ampicillin 4 times a day, **AND**
1 ml gentamicin once a day, for at least 5 days

4 to 12 months 2 ml ampicillin 4 times a day, **AND**
1.5 ml gentamicin once a day, for at least 5 days

1 to 3 years 3 ml ampicillin 4 times a day, **AND**
2 ml gentamicin once a day, for at least 5 days

4 to 5 years 5 ml ampicillin 4 times a day, **AND**
3 ml gentamicin once a day, for at least 5 days

Note: Gentamicin is a very strong antibiotic that can damage the kidneys and hearing, and should only be used in emergencies. If the child is dehydrated (very dry mouth or not urinating), give oral rehydration drink until signs of dehydration improve before you give the gentamicin. See *Where There Is No Doctor* for how to make and give oral rehydration drink.

JAUNDICE

Sometimes a baby becomes yellow soon after birth. This is a sign of jaundice. If the baby is energetic and breastfeeding well, a little yellow color is normal between 2 and 5 days old—the mother should breastfeed often and let the baby get plenty of sun. The jaundice may be more severe if the yellow color starts from the first day after birth, if it extends to the hands and feet, or if the baby is unusually sleepy and sucks poorly. **Get medical help.** Severe jaundice can be dangerous and may also cause hearing loss.



HIV/AIDS

Children with HIV/AIDS have low resistance to infections and more risk of serious infections such as cytomegalovirus (CMV), syphilis, tuberculosis (TB), and some types of meningitis. All these illnesses can damage the ear.

Medicines that damage hearing

Some medicines can damage the hearing of children who take them. Several medicines can cause hearing loss in unborn babies when the medicine is taken by the pregnant mother. The risks with these medicines are increased if the child or the mother also has kidney disease. Some common medicines that damage hearing are:



- Some aminoglycoside antibiotics can cause deafness in children (such as amikacin, garamycin, gentamicin, kanamycin, neomycin, netilmicin, streptomycin, or tobramycin). This can happen when the child himself is given the antibiotic, or when his mother was given the medicine during pregnancy. These antibiotics usually have to be injected. They should be used only for serious infections that could cause death.
- Children under 12 should not take aspirin. For pain and fever children can take paracetamol (acetaminophen). Aspirin can damage the hearing when taken at higher than recommended doses. It can also cause temporary deafness and buzzing in the ear (tinnitus) but these usually stop soon after stopping the aspirin.
- Quinine and chloroquine (which are used to treat malaria) can both sometimes damage hearing in the person taking them.
- If a mother uses thalidomide in pregnancy (to treat cancer, leprosy, or conditions associated with HIV/AIDS), it can cause many disabilities in a baby, including hearing problems.

Traditional ear medicines

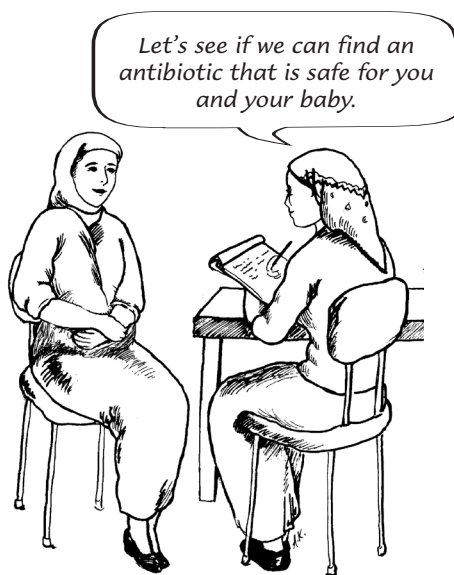
Traditional medicines and treatments are sometimes used to treat ear problems. Some traditional treatments can be harmful. Here are some general things to remember about traditional cures for health problems:

- Never use human or animal excrement as a cure. It can give the person an infection.
- The more the cure looks like or resembles the sickness, the more likely its effect comes only from people's belief in it.
- Ears are very fragile. Do not put anything very hot in or near the ear. It can also be dangerous to pour liquids or put things in the ear.



Prevention:

- Help mothers avoid using medicines during pregnancy that can cause deafness in children. Pregnant women should always consult a doctor or health worker before taking medicine during pregnancy.
- Tell a health worker immediately if you think a medicine is affecting hearing.
- Do not allow untrained people to inject antibiotics.
- Do not inject antibiotics like gentamicin unless it is necessary to save a life and there are no other medicines available.



Women's health can damage or protect children's hearing

It is important that girls and women, especially pregnant women, have enough good food and access to health care. A baby can be born with hearing loss because:

- his mother was sick or did not eat well as a young girl, or during her pregnancy. For example, a baby born to a mother who did not get enough to eat can often be born early or have low birth weight and his hearing can be damaged.
- sickness or poor nutrition caused problems during birth. For example, if a woman has a small pelvis from poor nutrition, her baby may get stuck during birth. This could cause hearing loss from brain injury.
- some infections can pass from the mother to the baby during pregnancy and damage the baby's hearing. These infections include rubella (German measles), tuberculosis, cytomegalovirus (CMV), and syphilis.



LACK OF IODINE IN THE DIET DURING PREGNANCY

Iodine is a mineral found in the soil and water—and in foods like liver, onions, egg yolks, seafood, and plants from the ocean. When a pregnant woman does not get enough iodine, her baby may be born with cognitive delay or other disabilities including deafness. In some places in the world, the soil contains very little natural iodine so vegetables and crops that grow in the soil also contain little iodine. In these places, swelling of the thyroid gland in the neck is common. This is called goiter. If many people in your community have this swelling, then everyone needs more iodine.



A child with iodine deficiency may have cognitive delay, be deaf or unable to speak, and have weak neck and leg muscles. Many children only have hearing loss, some weakness in the legs, and take longer to learn. But others may have noses with a flat wide base, squinting eyes, hair low on the forehead, puffy eyelids and face, and have physical problems such as growing slowly and being short.



Treatment:

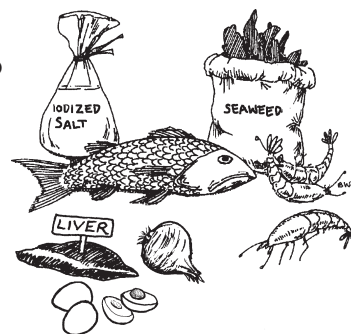
Get medical advice as soon as you can. A medicine called thyroxine, if started in the first months of life, may help a child with iodine deficiency grow better, though it will not help a child hear better.

The whole community, including the affected child, needs iodine supplements, but this will not help any nerve or brain injury that has already occurred.

Prevention:

Goiter and iodine deficiency are easy and cheap to prevent. Women must get iodine before becoming pregnant. Taking iodine after the first few weeks of pregnancy is too late.

- The easiest way to get enough iodine is to use iodized salt instead of natural or rock salt. You can find packaged iodized salt in most places.
- Iodized oil taken by mouth is available in some countries. You need to take only 1 dose every 1 to 5 years.
- If iodized salt or iodine-rich foods are hard to get, you can make an iodine solution at home with Lugol's iodine. This is an antiseptic that is often available where medicines are sold.



Foods from the ocean, as well as liver, egg yolks, and onions, can be good sources of iodine.

To make an iodine solution to drink:

Add 1 drop of Lugol's iodine to 1 glass of clean drinking water or milk.
 Drink this once a week. **Store iodine at room temperature and in dark containers to protect it from light.**

**RUBELLA (GERMAN MEASLES)**

Rubella usually causes only a slight rash and gives the person no other problems. But if a woman who is pregnant gets rubella during the first 3 months of pregnancy, her child may be born deaf or with other disabilities.

Prevention:

- Give rubella vaccination to girls before they are old enough to have babies. If vaccination is not available, let young girls build a resistance to rubella before they are old enough to have children. They can visit people in the community who have rubella. They may catch the infection and develop resistance.
- If girls and women have not been vaccinated or have not had rubella by the time they are old enough to have children, they should prevent deafness in their babies, if they are or might be pregnant, by staying away from people with rubella.

**TUBERCULOSIS (TB)**

Children of mothers who have tuberculosis during pregnancy sometimes get a type of meningitis called "tubercular meningitis" in the first few months of life. This can cause deafness.

To treat tuberculosis

If anyone in a household has tuberculosis, encourage the family to get tested, and begin treatment at once if positive for TB. Many governments give the medicines for free. Early and full treatment is the key to prevent the spread of TB. For more information on treating tuberculosis see *Where There Is No Doctor* or another general health book.

Prevention:

- Immunize children against tuberculosis with the BCG vaccine.
- Everyone, especially children, should get enough nutritious food so they stay healthy and can fight infections.

SYPHILIS

Syphilis is a sexually transmitted infection that can also pass to a baby during pregnancy. Untreated syphilis can affect many parts of the body. It can damage the inner ear and the nerves that affect hearing and cause deafness.

Signs:

Many babies born with syphilis do not have symptoms. Those that do may have jaundice (yellow skin and eyes), runny noses, rashes (often on palms and soles), swollen bellies, and enlarged lymph nodes. Children who develop symptoms after 2 years of age may have vision loss, hearing loss, cognitive delay, and abnormal tooth development. Some of these signs are different from those in adults.

Anyone who may have syphilis, including children, should see a health worker right away for testing and treatment. Everyone who is pregnant should get a blood test to check for syphilis. If the person cannot go to a health center or hospital to be tested, give the treatment for syphilis (see the box on the next page).

To treat syphilis in a child 1 month of age or less

- benzathine benzylpenicillin.
Inject slowly into the muscle 50,000 Units per kg of body weight, 1 time only. Do not give more than 2.4 million Units in each dose.



or

- procaine benzylpenicillin.
Inject slowly into the muscle 50,000 Units per kg of body weight, 1 time each day for 10 days. Do not give more than 2.4 million Units each day.

or

If the child is allergic to penicillin

- erythromycin.
Give 62.5 mg by mouth, 2 times a day for 14 days.



To treat syphilis in a child older than 1 month of age

If the child tests positive for syphilis but has no symptoms:

- benzathine benzylpenicillin.
Inject slowly into the muscle 50,000 Units per kg of body weight, 1 time each week for 3 weeks. Do not give more than 2.4 million Units in each dose.



If the child has syphilis symptoms:

- procaine benzylpenicillin.
Inject slowly into the muscle 50,000 Units per kg of body weight, 1 time each day for 10 days. Do not give more than 2.4 million Units each day.

continued on next page

If the child has had syphilis for more than 1 year:

- procaine benzylpenicillin.
Inject slowly into the muscle 50,000 Units per kg of body weight, 1 time each day for 10 days. Do not give more than 2.4 million Units each day.



and

- benzathine benzylpenicillin.
Inject slowly into the muscle 50,000 Units per kg of body weight, 1 time only, after course of procaine penicillin is complete. Do not give more than 2.4 million Units in each dose.



If the child is allergic to penicillin:

- erythromycin.
Give 7.5 to 12.5 mg per kg of body weight by mouth, 4 times a day for 30 days.

**To treat syphilis in an adult
If the person has had syphilis less than 2 years**



- benzathine benzylpenicillin inject 2.4 million Units in muscle, 1 time only

or

If the person is allergic to penicillin:



- erythromycin give 500 mg by mouth, 4 times a day for 14 days

or

- azithromycin give 2 g (2000 mg) by mouth, 1 time only

If the person has had syphilis for 2 years or more, or if you don't know how long the person has had syphilis

- benzathine benzylpenicillin inject 2.4 million Units in muscle, 1 time each week for 3 weeks



or

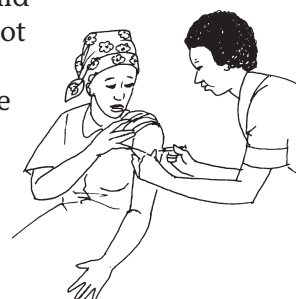
If the person is allergic to penicillin:



- erythromycin give 500 mg by mouth, 4 times a day for 30 days

To cure syphilis completely, the full treatment is essential.

Hearing loss caused by syphilis may develop when the child is an infant, or later as a teenager. Treating syphilis will not fix any hearing loss that has already occurred, but it will prevent any hearing loss that could still be caused. See the books *Where There Is No Doctor* or *Where Women Have No Doctor*, published by Hesperian Health Guides, for more information about syphilis.



Note: If a child is born with syphilis, the child's mother and father will also need treatment.

CYTOMEGALOVIRUS

Most people with cytomegalovirus (CMV) are not sick. But babies of mothers who become infected during pregnancy can have severe deafness, blindness, or physical and mental disability. The germs that spread CMV can be found in body fluids—like saliva, urine, stool, semen, vaginal fluids, and breast milk. To prevent the spread of CMV, wash hands with soap and water, especially after contact with stool, urine, or saliva.

BRAIN INJURY DURING BIRTH CAN CAUSE HEARING LOSS

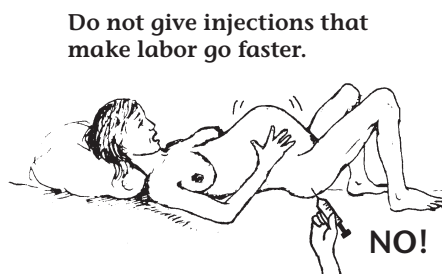
If a baby's brain is injured during labor or birth, he may be born deaf. The baby's brain can be injured if there is not enough oxygen reaching it. This is more likely to happen if labor is very long, if the baby is in a difficult position for birth, or if there are twins.

To prevent brain injury during birth

Midwives and others caring for pregnant women can learn about the danger signs during pregnancy and labor when a woman must get medical help at a hospital. Community members can organize to make sure there are ways to get women to the hospital if there is an emergency.



- Some methods to make labor go faster can injure the baby's brain, which can cause deafness. To protect the baby, avoid these ways to make labor go faster:



- Get medical help right away if the labor is taking too long, if the baby is in a difficult position, or if the cord is around the baby's neck. For more information about safe birth, see *A Book for Midwives*.

Loud noises and injury can damage hearing

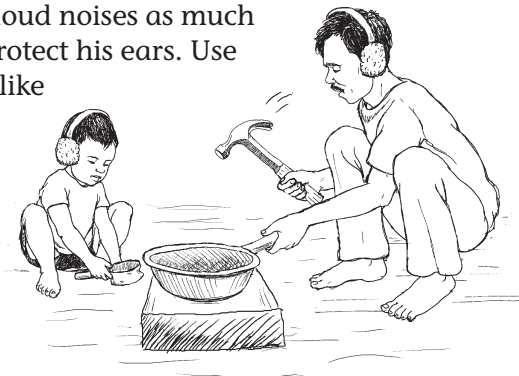
Some children lose their hearing because of very loud sounds or because of injury to their ears.

LOUD NOISES

Very loud noises—like bombs, gunfire, firecrackers, loud machinery, and loud music—can damage the inner ear and cause hearing loss. The amount of hearing loss depends on how loud the sound is, how long it lasts, and how often a child hears it. In countries affected by war, many children lose their hearing because of bombs, landmines, and gunfire. Noise damages the nerves in the inner ear. Explosions can damage the ear drum.

Prevention:

Try to keep your child away from loud noises as much as possible. If you cannot, try to protect his ears. Use something thick to cover his ears, like a thick blanket wrapped around his head, or thick ear muffs. You also need to protect your own ears from noise!



INJURY

A child can cause infection or poke a hole in the eardrum if she puts a sharp object (like a matchstick, feather, or pencil) in the ear. If the hole is very small, the ear drum usually heals and a child's hearing will return to normal. But if the ear drum is badly damaged, it may not heal, and the child's hearing may be lost or reduced in that ear.

Slapping or punching a child on the side of her head across her ear can burst her ear drum and cause deafness.

Head injuries with skull fractures can cause severe hearing loss. Bomb explosions and other very loud noises can burst the ear drums.



Prevention:

- Teach children not to put things in their ears.
- Never hit a child on the head, and work to reduce family violence.

War causes more and more childhood disability

We must all work to reduce the use of violence and war to solve political problems, and ban weapons that kill, disable, orphan, and make homeless thousands of children each year.



Hearing loss that is passed down in families

Some children's ears do not develop fully. This is passed down in families, inherited from earlier generations (called a "genetic condition"), although no one else in the family may show signs of deafness.

Grandfather was deaf, just like Lihua. I wonder how much deafness there has been in our family...

Hearing loss because parents are related

Some kinds of hearing loss can happen when close family members, such as first cousins, have children together. This is common in some village communities. If you, your children, or your family members have difficulty hearing, other children born later may also have hearing problems.

Sometimes a child who has an inherited hearing loss may also have other conditions, such as difficulty seeing; different-colored eyes or white streaks in the hair; goiter or heart trouble; or abnormally-shaped bones of the head, hands, feet, arms, legs, or neck. But sometimes the only inherited condition is the hearing loss. Hearing loss may be partial or full, and may be from the time of birth, or may develop later.



Prevention:

Avoid having children with close relatives such as cousins. Genetic counselors (people who know about the risk of certain diseases being passed from parents to their children) are available in some cities. Try to talk to a health worker if you are concerned about hearing loss in your family.

This is my son Pratap. He is deaf, and so is my uncle.

Will our other babies be born deaf, too?



Working for change

Ruk's story

When Ruk was born in a village in Nepal, his mother struggled a long time to give birth. At first she thought her baby would not breathe. As a baby, Ruk would cry at night and he always seemed to have a cold or fever.

Ruk played on the mud floor and outside the house where his family spread the millet and corn to dry and separated the rice grain from the chaff and dust. Chickens, goats, and their dog lived in the same small area. Ruk loved to sit and watch his mother cook at the open stove, even though the wood smoke stung his eyes and made his nose run.

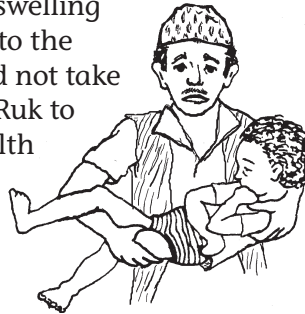
As Ruk grew older, he always seemed to have a runny nose. Sometimes he had very painful earaches in both ears, which often drained pus. He loved to swim in the small river below the village, but this made the pus drain even more.



When Ruk started going to school, he took longer to learn and had difficulty reading. The teacher got angry because he thought Ruk was ignoring what he said. But it was hard for Ruk to hear the teacher. So, to avoid getting into trouble, Ruk sat at the back of the class. Children teased him. He spoke in a funny way and was difficult to understand.

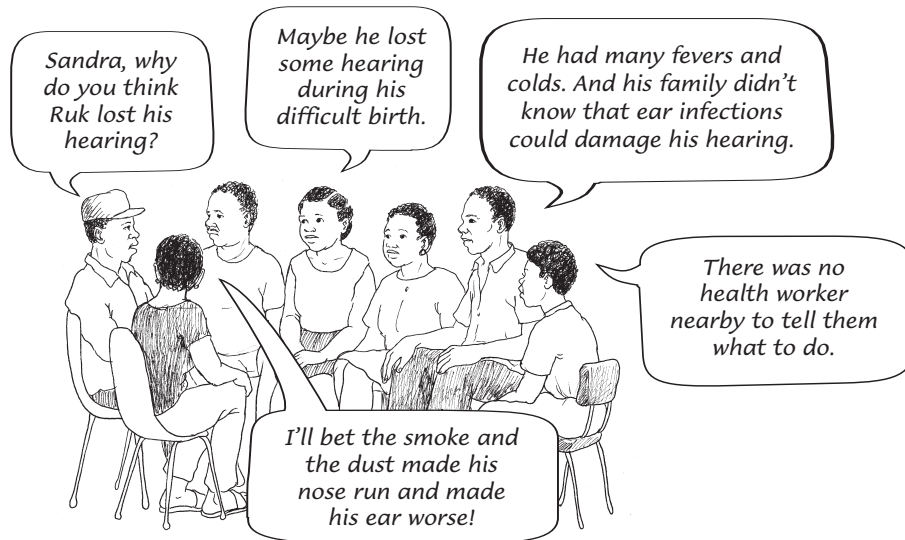
Finally Ruk's parents decided it was not worth spending money to pay for his school uniform, books, and pens if he was not going to learn. So Ruk stopped going to school. Instead, he carried wood for the fire, fed the animals, and scrubbed the cooking pots for his mother.

One day, Ruk got a terrible earache that lasted for several days. His ear filled with pus and he developed a swelling behind the ear. Finally his father took him to the village herbal healer, but the medicines did not take away the swelling. His father had to carry Ruk to the health post in another village. The health worker there drained an abscess behind Ruk's ear and gave him an injection and some antibiotic syrup to take for a week.



After some time, Ruk had severe pain again. Both his ears always smelled bad and lots of pus came out of them. His neck got swollen and he had very high fever. The health worker told Ruk's parents to take him to the hospital in the city. Ruk's parents had little money and did not know where they would stay, but they followed the health worker's advice.

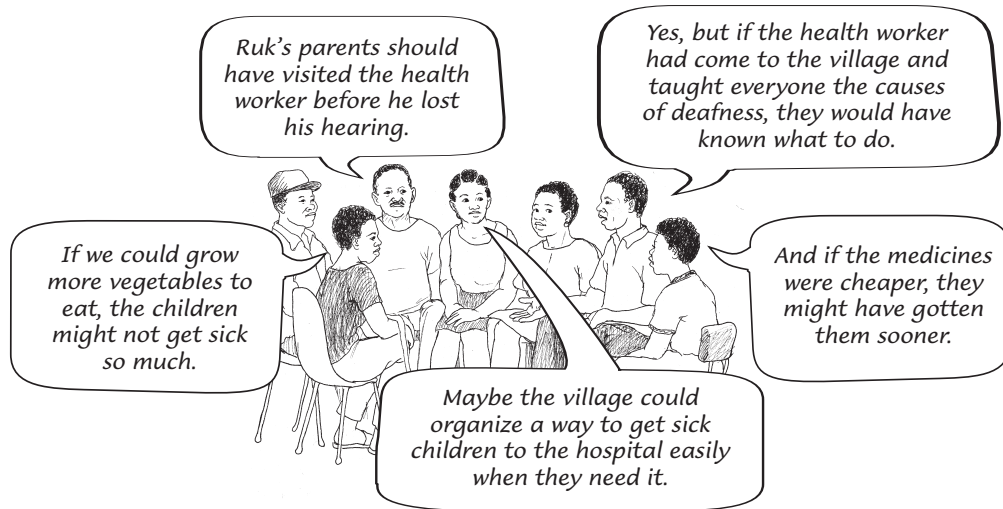
Ruk almost died because the infection got into his brain and bloodstream. At the hospital, the health workers gave him a lot of medicines but he was still very ill. Luckily, a visiting ear doctor drained the pus from the abscess, removed a lot of infected bone, and repaired his ear drum. The doctor explained how to take care of Ruk's ears and said Ruk should use a hearing aid. Ruk's parents just looked at the doctor and nodded.



WHY DID RUK HAVE DIFFICULTY IN SCHOOL?

Ruk wanted to go to school and learn with the other children. But the school did not know he could not hear well and they did not try to teach or communicate with him differently, in a way that would help him learn. And so Ruk could not learn. How much hearing loss will affect a child in school depends on if the school knows about the hearing problem and gives the child support. Disability happens when teachers, students and others do not know how to communicate with a child with hearing loss. If Ruk's family had understood that he had a hearing problem, told the school about it, and together helped him learn, Ruk could have learned more, made friends, and had a better future.

PEOPLE CAN CHANGE THE CONDITIONS THAT MAKE CHILDREN LOSE THEIR HEARING



There is power in communities working for change. Here are some examples:

- People can organize local or national immunization campaigns against common childhood illnesses. Health workers can use simple health education materials with parents, children, teachers, and others.
- Health workers, teachers, and child care workers can be trained to recognize, treat, and prevent chronic ear infections and other causes of hearing loss in children.
- People can demand that the government make affordable medicines available to treat childhood illnesses, including ear infections, and that pharmacies and clinics in their communities keep them in stock.
- People can also work together to remove the communication barriers that make deafness a disability. They can learn sign language themselves, and they can work to provide educational opportunities for children who cannot hear well.

Improving the well-being of the whole community will help prevent and heal many of the problems that cause hearing loss. When a country's wealth is shared for the good of all its people, everyone—men and women, mothers and children—can have adequate health care, good roads and communication to receive medical attention when needed, and enough good food and clean water to help them grow strong and stay healthy.