CHAPTER 19

Aids for Learning to Use Medicines and Equipment

In this chapter we look at two fairly unrelated areas of medical skill: **the use of antibiotics** and **the measurement of blood pressure.**

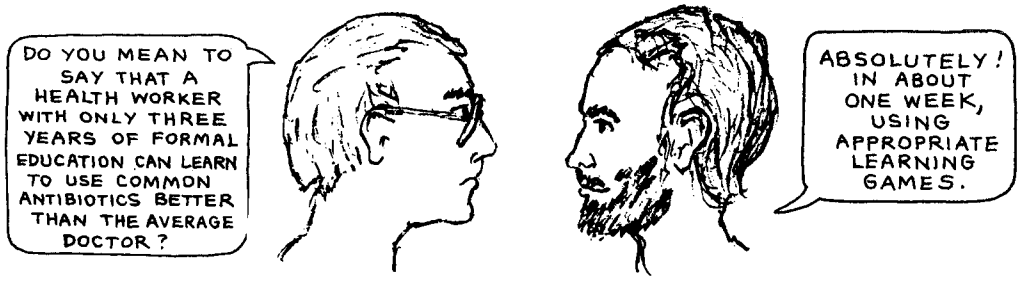
What these two topics have in common is that the training health workers receive about them is frequently inadequate—even dangerously so. We have, therefore, chosen these two subjects for a detailed exploration of learning methods. In each case, imaginative teaching aids can help health workers discover and grasp the basic principles. This, in turn, leads to safer, more capable practice.

LEARNING TO USE ANTIBIOTICS WISELY

In Chapter 18 we discussed the misuse of medicines. The misuse and overuse of antibiotics is an especially common and dangerous problem. It leads to unnecessary suffering and death, due to harmful side effects. It creates resistant forms of infection (see ***WTND,*** p. 58). It wastes millions that could be better spent for health. And it leads to countless cases of incorrect, inadequate treatment.

Teaching health workers to use antibiotics correctly is a special challenge. Even among doctors and health authorities, there is a great deal of misuse and misunderstanding of these important medicines.* Some programs decide not to permit health workers to use antibiotics at all. But in many areas this simply results in health workers using antibiotics without permission, and without any training in their use.

Yet we have found that **after a few days of appropriate training and practice, village health workers can select and use common antibiotics more wisely than the average doctor.**



*For example, neomycin has been shown to make diarrhea, dehydration, and nutritional losses worse. Yet it is still produced by drug companies and prescribed by many doctors for diarrhea. The money spent by one Central American ministry of health in 1 year for neomycin-kaolin-pectin medicines could have paid for 3 million packets of oral rehydration salts—enough to treat all the cases of diarrhea in children under two for 16 months.

THE TEACHING METHODS AND AIDS

It is important not to use medicines when they are not needed. But for certain infections caused by bacteria, the correct use of antibiotics is of great benefit and can save lives. Health workers need to have a clear understanding of. . .

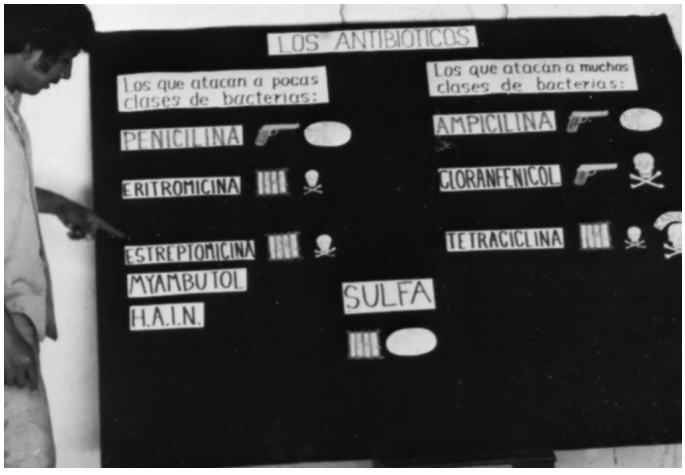
- when antibiotics are needed
- when they are not needed or are likely to be harmful
- which of the common antibiotics to use for different infections and why
- the relative advantages and disadvantages of different antibiotics (effectiveness, risks, side effects, and cost)
- how to give them and with what advice

On the following pages, we describe a set of teaching aids that has been used very successfully for learning games about antibiotics. They help health workers understand the basic principles behind the proper use of these medicines. The aids were developed by Project Piaxtla, in Mexico, and can be made by the students themselves (although this takes a good deal of time and is perhaps best done in advance).

Two learning games have been developed. The second follows from the first. Both require sets of cards and figures, which can be made by following the patterns we show on these pages. Or you can adapt them by using local symbols. If you prepare the figures for use on a large flannel-board, everyone will be able to see them clearly.

After using these games to learn the basic principles for the use of antibiotics, students can play with the games to test each other.

The first learning game helps health workers understand how common antibiotics work and what their effects are— both beneficial and harmful. These different effects are summarized on the next page.



THE FIRST ANTIBIOTIC LEARNING GAME
demonstrated by Pablo Chavez of Ajoya, Mexico

Beneficial effects

Different antibiotics fight infections in different ways:

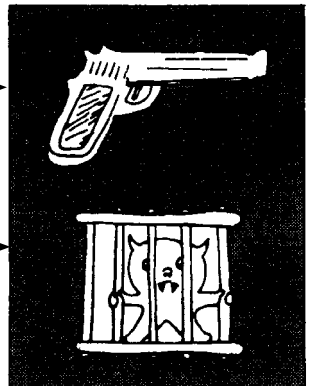
1. Some antibiotics attack relatively few kinds of bacteria. Others attack many different kinds. So, as a start, students learn to divide commonly used antibiotics into 2 groups, which they list on the flannel-board under cut-out signs like these:

ANTIBIOTICS THAT ATTACK FEW KINDS OF BACTERIA:	ANTIBIOTICS THAT ATTACK MANY KINDS OF BACTERIA:
(NARROW-RANGE ANTIBIOTICS)	(BROAD-RANGE ANTIBIOTICS)

2. Also, some antibiotics are 'stronger' than others:

Some antibiotics **kill** bacteria. →

Other antibiotics only **capture** them or slow them down. →



Students can use cutout figures like these to represent antibiotics that kill bacteria and antibiotics that only capture them. Color the pistol black and the cage white (or yellow).

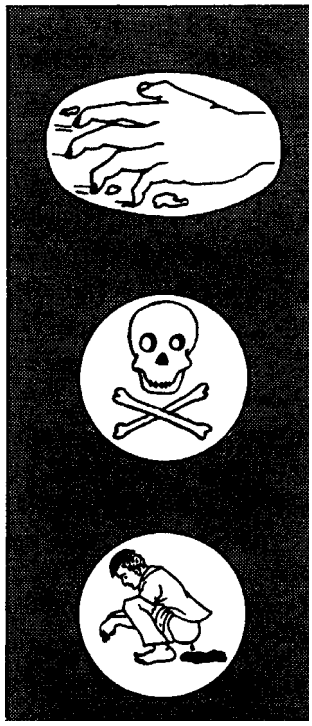
Harmful effects

Possible harmful effects also differ with different antibiotics:

3. Some antibiotics cause **allergic reactions** in certain persons. Reaction does not depend on the amount of medicine taken, but on whether the person is allergic. (See *WTND,* p. 350)

4. Some antibiotics cause **poisoning or 'toxic' reactions**—especially if more than the recommended amount is used. (See *WTND,* p. 58, 356, and 358.)

5. Broad-range antibiotics sometimes cause **diarrhea, 'thrush', and other problems.** This is because they attack 'good' bacteria along with the bad. (See *WTND*, p. 58.)



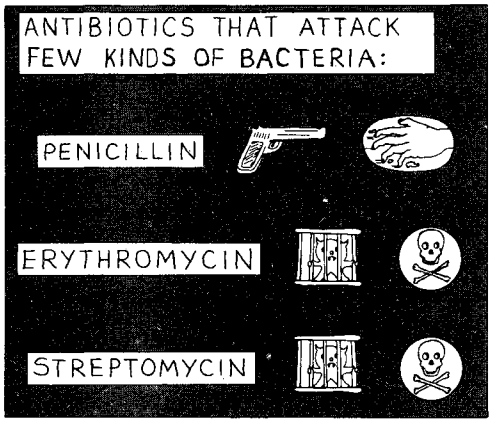
A scratching hand represents allergic reactions because itching is the most common sign.

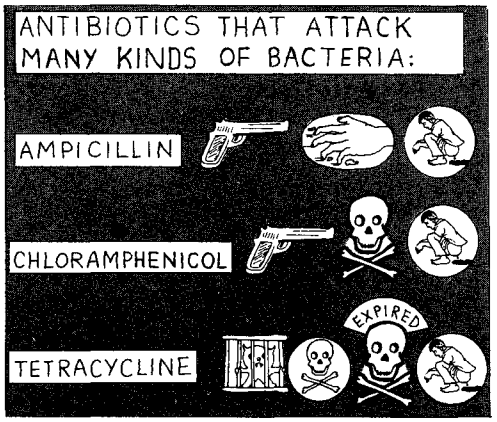
A skull represents a poisonous reaction. Different sizes of skulls can be used to show greater or lesser danger.

A person with diarrhea represents problems that result from attacking good bacteria as well as bad.

THE FIRST LEARNING GAME

The students read from their books, discuss, and tell of their own experiences with the beneficial and harmful effects of different antibiotics. As they do this, they can begin to group the antibiotics in 2 columns and place the cut-out symbols where they belong.





Note: Sulfas, if included, probably fall midway between these 2 columns.

To help themselves remember how each antibiotic works—its beneficial and harmful effects—the students can mix up the cards on the flannel-board and then take turns grouping them correctly.

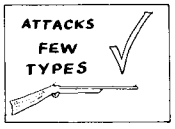
Developing guidelines for choosing antibiotics

Students must first realize that **certain antibiotics work only for certain kinds of infections,** and that for any specific infection **some will work better than others.** The instructor can then use the information on the flannel-board to help develop a set of guidelines on which antibiotics to use for specific infections.

First guidelines: When choosing between antibiotics known to fight a particular illness or infection, as a general rule . . .

1. USE AN ANTIBIOTIC THAT KILLS BACTERIA RATHER THAN ONE THAT JUST SLOWS THEM DOWN. This usually gives quicker results and prevents the infection from becoming resistant to treatment.

2. USE AN ANTIBIOTIC THAT CAUSES FEWER SIDE EFFECTS AND IS LESS RISKY. For example, if the person is not allergic, it is safer to use penicillin or ampicillin rather than an antibiotic like erythromycin that can cause poisoning.



3. WHEN POSSIBLE, USE A NARROW-RANGE ANTIBIOTIC THAT ATTACKS THE SPECIFIC INFECTION RATHER THAN ONE THAT ATTACKS MANY KINDS OF BACTERIA. Broad-range antibiotics cause more problems—especially diarrhea and thrush—because they attack good bacteria along with the bad. The good bacteria prevent the growth of harmful things like *moniliasis* (fungus that can cause diarrhea, thrush, etc.).

4. USE A BROAD-RANGE ANTIBIOTIC ONLY WHEN NO OTHER WILL WORK, OR WHEN SEVERAL KINDS OF BACTERIA MAY BE CAUSING THE INFECTION (as with infections of the gut, peritonitis, appendicitis, some urinary infections, etc.).

Additional guidelines for further learning:

5. USE ANTIBIOTICS ONLY FOR BACTERIAL INFECTIONS! Do not use them for viral infections, because **antibiotics do nothing against viruses** (common cold, measles, chicken pox, etc.).

Take care not to burden students with too much at once. These additional guidelines can be introduced little by little when playing the games and discussing the uses of different antibiotics.

6. BE CAREFUL NEVER TO GIVE MORE THAN THE RECOMMENDED DOSE OF A TOXIC (POISONOUS) ANTIBIOTIC. However, it is usually not dangerous to give higher doses of an antibiotic that is not poisonous (penicillin or ampicillin). For example, it is all right to use penicillin for months or even years after it has expired, and to increase the dose to allow for any loss of strength. (But **tetracycline becomes more poisonous when old. It should never be used beyond the expiration date or in more than the recommended dose.)**

7. DO NOT USE AN ANTIBIOTIC THAT SLOWS DOWN BACTERIA TOGETHER WITH AN ANTIBIOTIC THAT KILLS THEM. The combination is often less effective than one alone. (Once the bacteria are captured or slowed, they stay hidden where the other antibiotics cannot kill them.) For example, never use tetracycline in combination with chloramphenicol.

8. WHENEVER POSSIBLE, AVOID USING A TOXIC MEDICINE FOR A PERSON WITH DIARRHEA OR DEHYDRATION. A dehydrated person's body cannot get rid of poisons as quickly in the urine. Even normal doses of a toxic medicine may build up and poison the person. (Sulfas are especially risky for treating diarrhea. Unless the person is making a lot of urine, sulfa can form crystals in the kidneys and cause damage.)

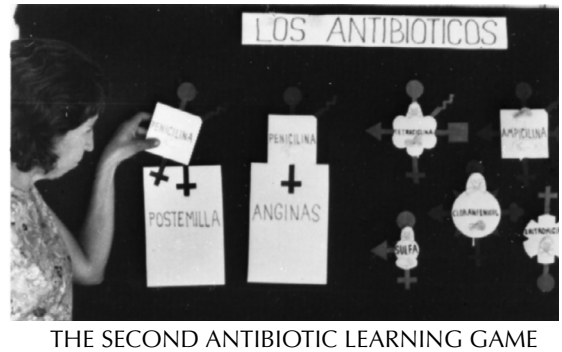
9. DO NOT USE TOXIC MEDICINES DURING PREGNANCY—ESPECIALLY DURING THE FIRST 3 MONTHS. Some medicines can cause severe birth defects.

10. USE A MEDICINE THE FAMILY CAN AFFORD. When choosing between medicines, always consider the relative cost, and weigh this with other advantages and disadvantages.

THE SECOND LEARNING GAME

This game helps students use the guidelines from the first learning game to practice choosing antibiotics for specific infections.

This game was last updated in 1995. Some of the antibiotics shown no longer work against the injections they used to treat. But we hope that the idea for the game will still be useful. It is discussed in detail on the pages to follow.

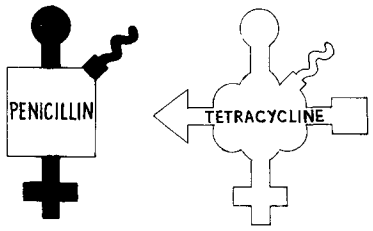


THE SECOND ANTIBIOTIC LEARNING GAME

1. THE ANTIBIOTICS: First make a series of cardboard figures representing the different antibiotics. Each figure has a number of strange shapes that stick out from it. These represent 'weapons' for attacking specific kinds of bacteria. (The shapes of these projecting 'weapons' have no special meaning. However, they must match appropriately with the cut-out parts of the disease cards shown below.)

If there are few weapons sticking out, it is a narrow-range antibiotic that attacks few kinds of bacteria.

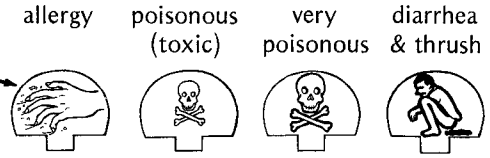
Black weapons mean the antibiotic kills the bacteria.



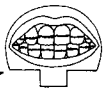
If there are many weapons, it is a broad-range antibiotic that attacks many kinds of bacteria.

White (or yellow) weapons mean the antibiotic only slows down the bacteria.

Make small tabs like these to represent the various side effects and reactions. These tabs fit into small cuts in the antibiotic figures.

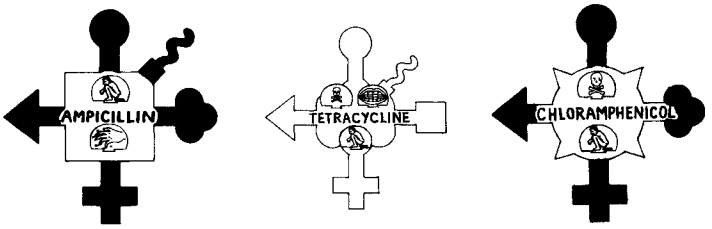


Another tab can be used for tetracycline, to show that it can stain the teeth of young (or unborn) children.

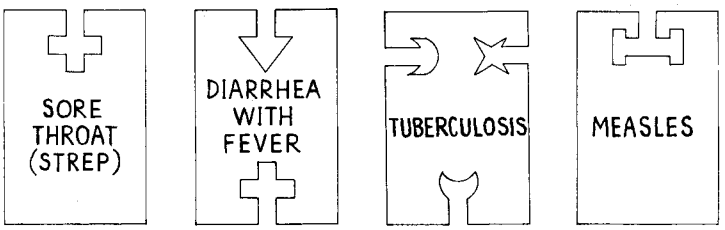


Students put together the side effect tabs and antibiotic figures, using what they learned in the first game.

For example, ampicillin, a broad-range antibiotic, can cause allergic reactions or diarrhea.



2. THE INFECTIONS: After preparing the antibiotic figures, make cards to represent infections found in your area. For each card, cut out shapes to match the 'weapons' of the antibiotics that can fight that infection.



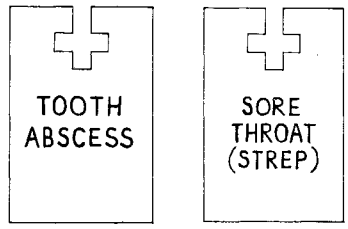
In this way, the 'weapons' of antibiotics that attack certain diseases will fit into them like pieces of a jigsaw puzzle.

A wide selection of figures and cards for this learning game are shown on page **19**-11. Use the ones that are appropriate for your area, or make up new ones as needed.

Choosing the most appropriate antibiotic

Students can now play a 'game of choice', deciding which antibiotics are the best choices for specific infections. Here are several examples.

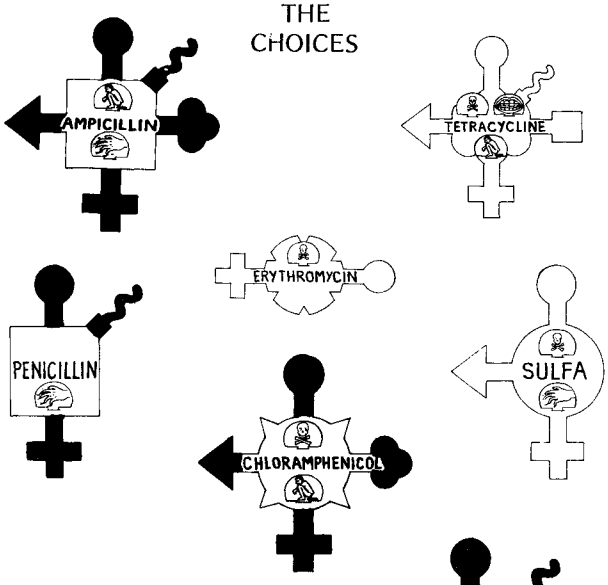
THE PROBLEMS



EXAMPLE 1: Suppose someone has a tooth abscess or 'strep' throat.

The students can see that any of the antibiotics below will fight these problems. (They all have the weapon shape that fits the cut-out part of the disease cards.)

THE CHOICES

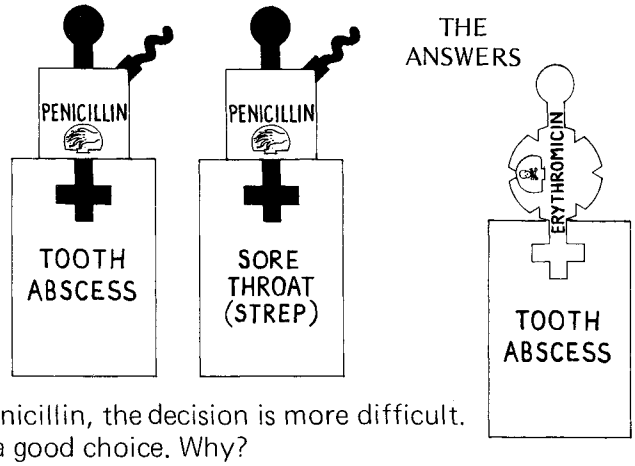


Which antibiotic should be used? Following the guidelines they developed, students will look for:

- one that kills rather than captures
- a narrow-range one, if possible
- one with less dangerous side effects
- one that is low cost

If the person is not allergic to penicillin, this is clearly the best choice. Why?

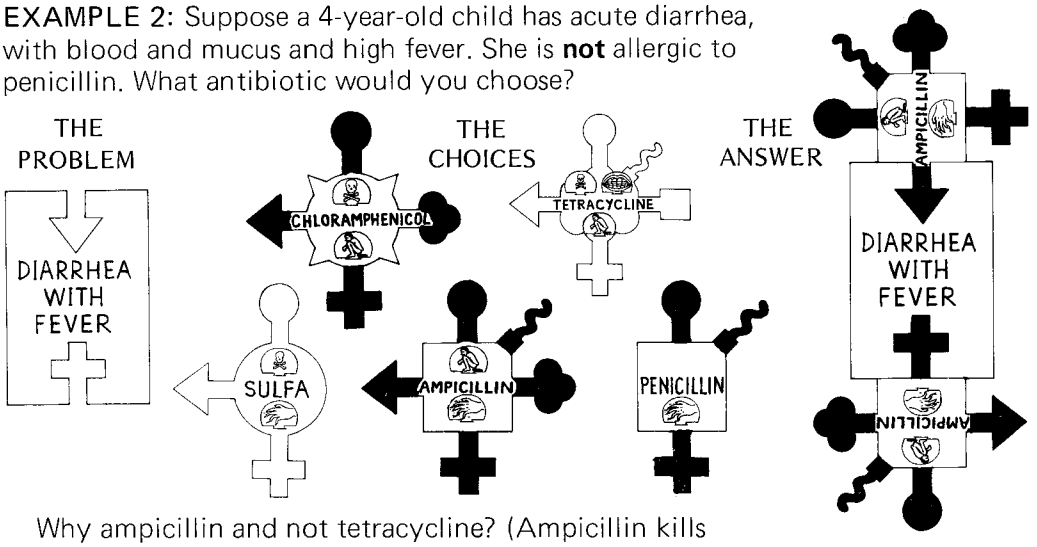
THE ANSWERS



If the person is allergic to penicillin, the decision is more difficult. But erythromycin is probably a good choice. Why?

Why not ampicillin? (Because persons allergic to penicillin are also allergic to ampicillin.) Why not chloramphenicol? (Because it is broad-range and because it is too poisonous. The treatment could be worse than the illness!) If the person is allergic to penicillin and you do not have erythromycin (or it is too expensive), what is the next best choice? Why?

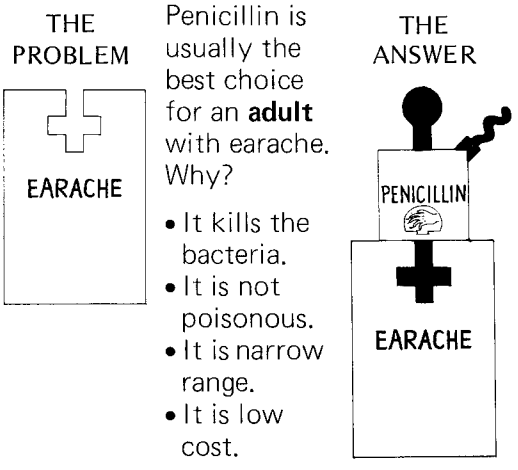
EXAMPLE 2: Suppose a 4-year-old child has acute diarrhea, with blood and mucus and high fever. She is **not** allergic to penicillin. What antibiotic would you choose?



Why ampicillin and not tetracycline? (Ampicillin kills bacteria, is not poisonous, and does not stain children's teeth.)

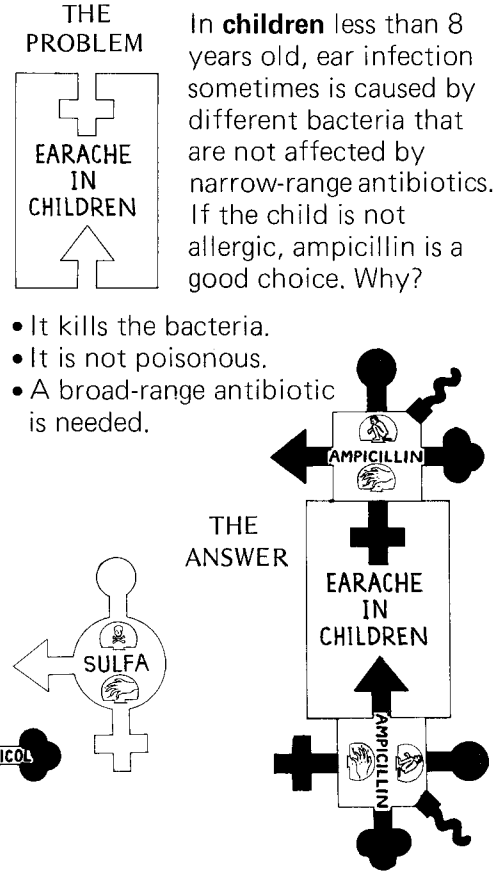
Why not penicillin instead of ampicillin? (Penicillin does not 'fit' both cut-out spaces; it does not attack this kind of infection adequately.)

EXAMPLE 3: Earache



Penicillin is usually the best choice for an **adult** with earache. Why?

- It kills the bacteria.
- It is not poisonous.
- It is narrow range.
- It is low cost.



In **children** less than 8 years old, ear infection sometimes is caused by different bacteria that are not affected by narrow-range antibiotics. If the child is not allergic, ampicillin is a good choice. Why?

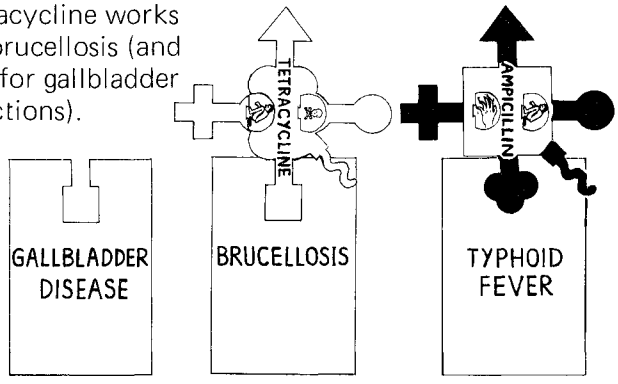
- It kills the bacteria.
- It is not poisonous.
- A broad-range antibiotic is needed.

If the child is allergic to penicillin, what would you give him instead? Why?

Antibiotics with special uses

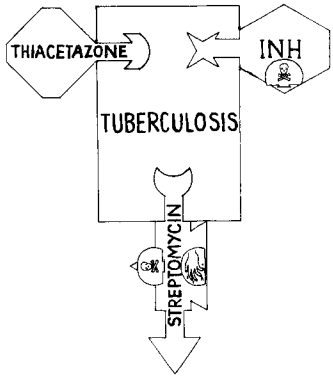
Some antibiotics are especially effective for particular illnesses:

Tetracycline works for brucellosis (and also for gallbladder infections).



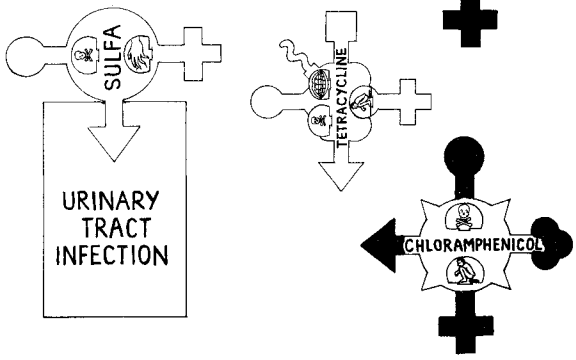
Ampicillin is best for typhoid fever. (Use chloramphenicol if ampicillin does not work or is not available.)

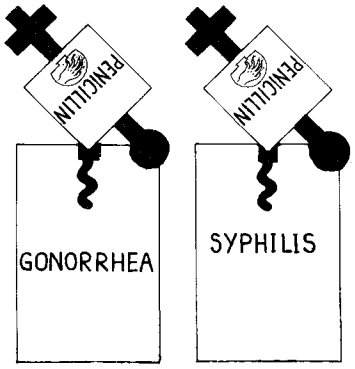
Three medicines together are needed to fight tuberculosis.



(Include whichever TB medicines are commonly used in your area.)

A sulfa drug is best for most minor bladder and urinary tract infections. It is low cost and has a narrower range than other choices. However, if the infection is severe or has gone into the kidneys, ampicillin may be a better choice. Why?





If the person is not allergic, penicillin is often best for gonorrhea and syphilis because:

- It kills the bacteria.
- It is not poisonous.
- It has a narrow range.

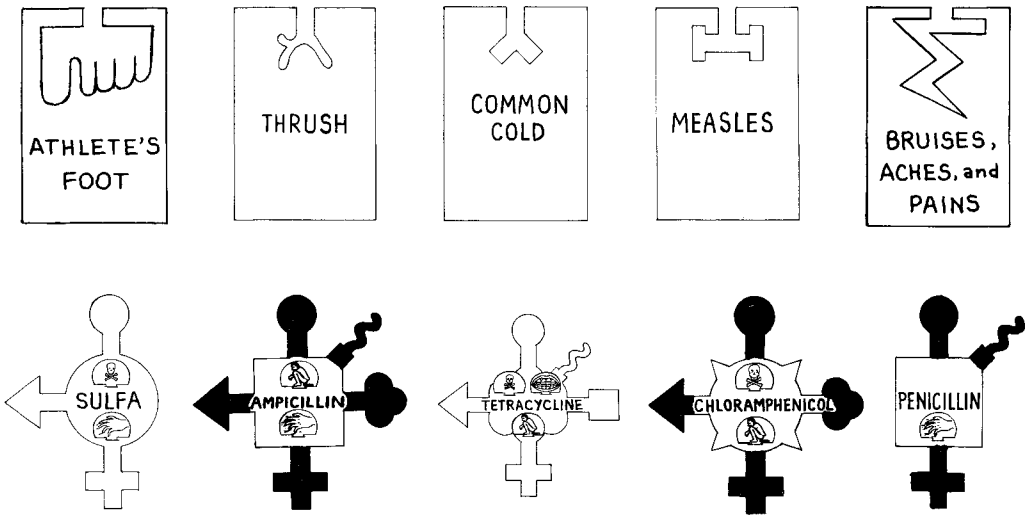
Note: In some areas, ampicillin may work better for gonorrhea and syphilis. In other areas, gonorrhea has become resistant to penicillin, ampicillin, and some other antibiotics. Tetracycline is not usually recommended to treat syphilis, unless the person is allergic to penicillin.

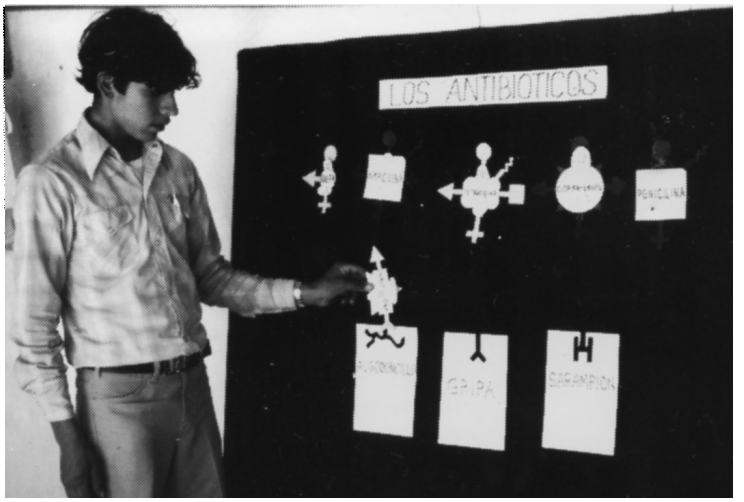
When not to use antibiotics

No antibiotic helps the common cold or measles, as these infections are caused by viruses.

Nor do antibiotics work for fungus infections (thrush or moniliasis). In fact, the opposite is true. Using a broad-range antibiotic for several days can actually cause a fungus infection. If this happens, the person should usually stop using the antibiotic.

To help students realize the limitations of antibiotics, include cards for viruses, fungus infections, and other problems in the game. Students will search for antibiotics to fit them—and find none. That way, they will discover which diseases are not helped by antibiotics. This is an important lesson!

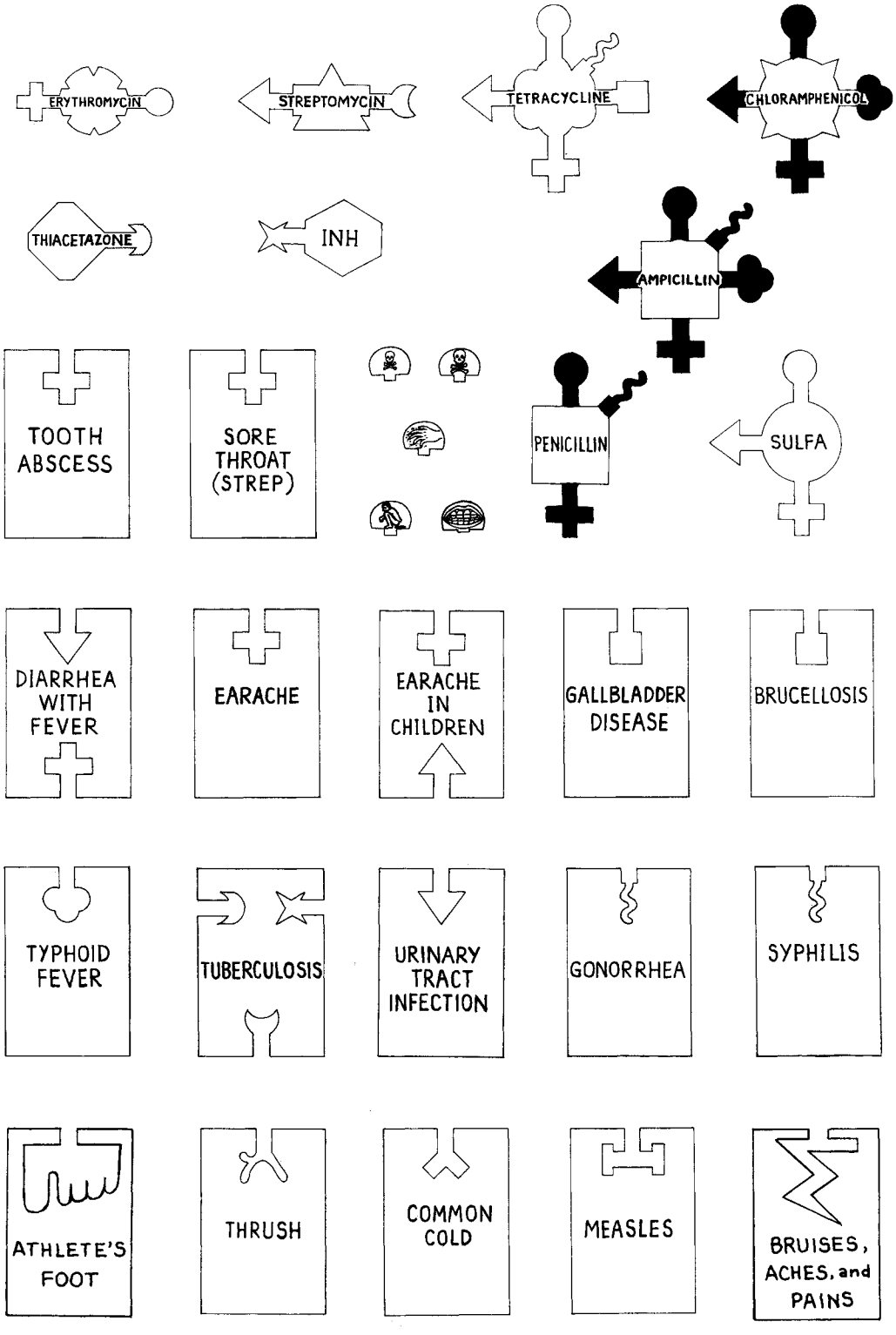




A student tries to find an antibiotic that will work for 'thrush'. At last he gives up—because there is none.

PIECES NEEDED FOR THE SECOND ANTIBIOTIC LEARNING GAME

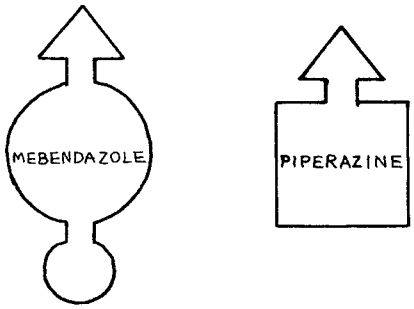
Use the pieces appropriate for your area and program. Add new pieces as needed for other antibiotics or diseases.



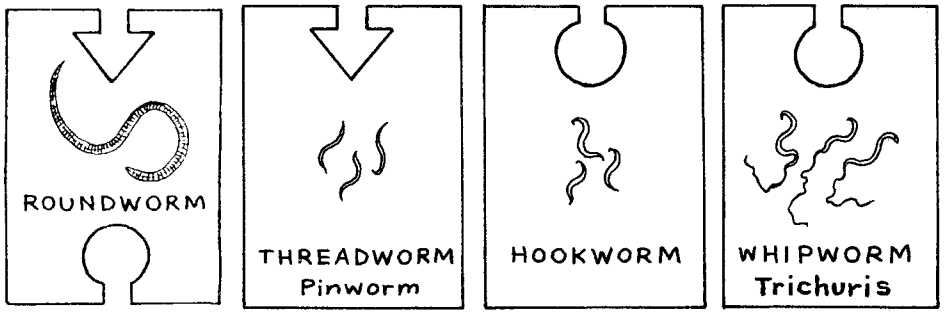
THE USE OF MEDICINES FOR WORMS AND PARASITES

Teaching aids like the second antibiotic game can also be used for learning about the medicines that fight different parasites and worms in the gut. Again, students can make a set of cards to use on a flannel-board.

Each medicine is represented by a figure with projecting 'weapons' that indicate the worms or parasites it can fight. For example:

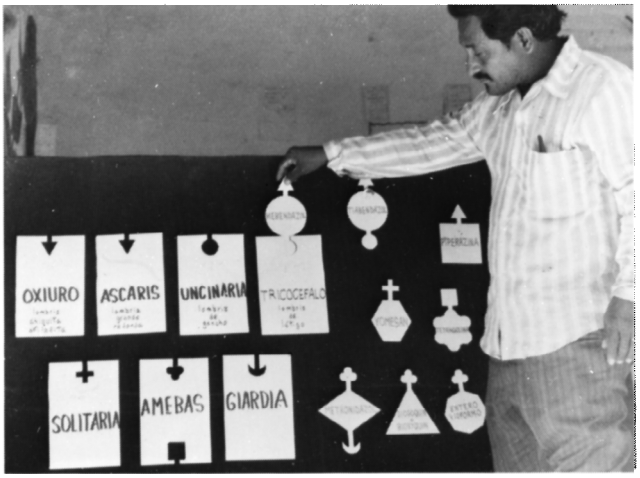


Cards representing the different parasites and worms have cut-out shapes to match with the projecting 'weapons' of the appropriate medicines. For example:



To be sure things are clear, use the common names of worms along with drawings.

By making up games and testing each other with these cards, students have fun and at the same time learn the correct use of worm and parasite medicines.



LEARNING TO MEASURE BLOOD PRESSURE

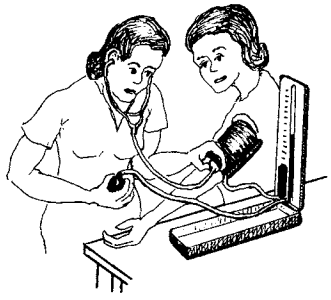
Some health programs choose not to teach health workers how to measure blood pressure. Others cannot afford the necessary equipment. But blood pressure measurement can be an important skill—especially in communities where high blood pressure and related diseases are common. It is also a valuable skill for midwives and others who regularly check women's health during pregnancy—because high blood pressure increases the risk for the mother during childbirth. Also, a marked increase in blood pressure late in pregnancy may be a sign of pre-eclampsia (see ***WTND***, p. 249).

Anyone who knows how to count can learn to measure blood pressure.

Health workers learn more easily how to take blood pressure when they **understand the principles behind it.**

For this reason, it helps if they learn with the older type of mercury *sphygmomanometer,* or at least see one demonstrated.

With this older kind of blood pressure instrument, learners can actually see the pressure lift the mercury in the tube. Blood pressure is measured in millimeters (mm.) of mercury.



mercury sphygmomanometer

Newer blood pressure cuffs are all electric. They do everything for you except wrap themselves onto the person's arm. But if you have an older cuff, follow these instructions:

To measure blood pressure:

- **Explain what you are going to do,** so the person will not be alarmed.
- **Fasten the pressure cuff** around the person's bare upper arm.
- **Close the valve** on the rubber bulb by turning the screw clockwise.
- **Pump the pressure up** to more than 200 millimeters of mercury.
- **Place the stethoscope over the artery** on the inner side of the person's elbow
- **Very slowly, release the pressure** in the cuff by loosening the screw on the rubber bulb.
- **With the stethoscope, listen carefully for the pulse** as you continue letting the air out of the cuff. As the needle of the gauge (or the level of mercury) slowly drops, **take two readings:**

  1. **Take the first reading the moment you begin to hear the soft thumping of the pulse.** This happens when the pressure in the cuff drops to the highest pressure in the artery (*systolic* or 'top' pressure). This top pressure is reached each time the heart contracts and forces the blood through the arteries. In a healthy person, this top pressure reading is usually around 110-120 mm.

2. Continue to slowly release the pressure while listening carefully. **Take the second reading when the sound of the pulse begins to fade or disappear.** This happens when the pressure in the cuff drops to the lowest pressure in the artery (*diastolic* or 'bottom' pressure). This bottom pressure occurs when the heart relaxes between pulses. It is normally around 60 to 80 mm.

When you record a person's blood pressure, always write both the top and bottom arterial pressure readings. We say that an adult's normal blood pressure (BP) is "120 over 80," and write it like this:

BP $\frac{120}{80}$ or BP 120/80

120 is the top (systolic) reading.
80 is the bottom (diastolic) reading.

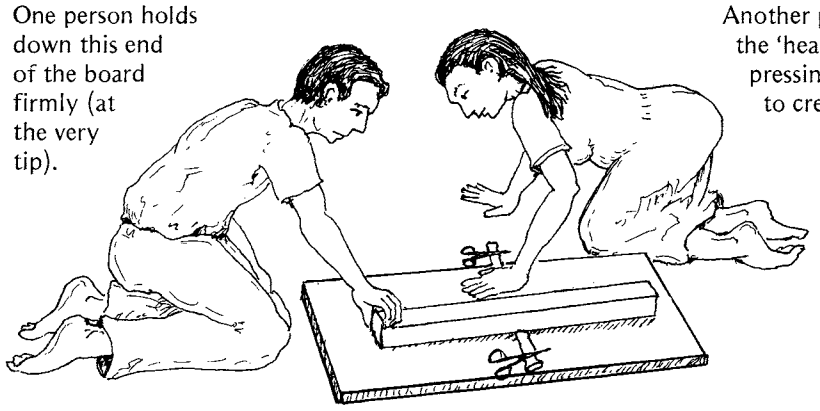
For health workers, it may be better to speak of the "top" and "bottom" numbers (TN and BN), rather than use confusing words like *systolic* and *diastolic.*

A SIMPLE AID FOR LEARNING ABOUT BLOOD PRESSURE

The above explanation of the top and bottom blood pressure numbers is difficult to understand when explained with words alone. However, a simple teaching aid that the health workers themselves can make, clearly shows what the two different blood pressure readings mean and how the pressure cuff works.

Materials needed:
1 thick, narrow board about ½ meter long
1 thin-walled rubber tube (surgical tubing 2 to 3 cm. wide, or a piece of an old bicycle inner tube)
2 surgical clamps or equivalent (string will work)

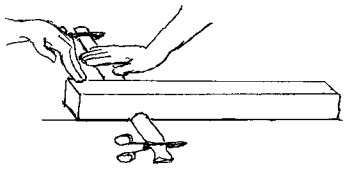
Method: Fill the tube with water and clamp both ends. Put the tube under the board.



This should be done on a hard, smooth floor or on a flat board.

Each 'pulse' or 'heartbeat' will lift the piece of wood off the floor. Between pulses it will drop back with a loud thump. (You may have to add more water or let some out for the thumping to occur.)

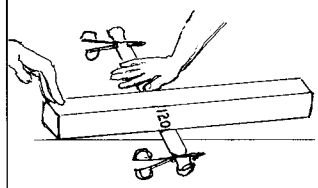
To understand how a pressure cuff works, start with the tube near the end of the board that is being held down.



DOES NOT LIFT

There the weight, or pressure, will be so great that the 'pulse' will not lift the board and no thump will occur.

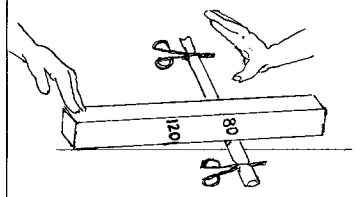
Slowly move the board backward until it begins to lift and thump.



LIFTS WHEN TUBE IS PRESSED

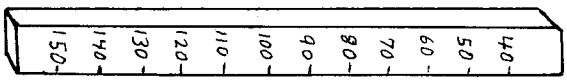
This is the top pressure reading. Mark the board "120" at this spot.

Keep sliding the board back until it stops thumping the floor and stays lifted between pulses.



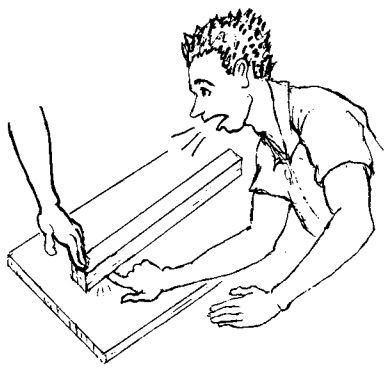
STAYS LIFTED

This is the bottom pressure reading. Mark the board "80" at this spot.



After marking the positions of 80 and 120 on the stick, students can add other numbers to form a scale.

By taking water out of the tube or adding more water (or by changing the positions of the clamps) they can make the pressure higher and lower, and practice measuring it. This provides a good opportunity to discuss some of the causes of **low blood pressure** that relate to lowering the volume of blood (shock, severe blood loss, etc.).

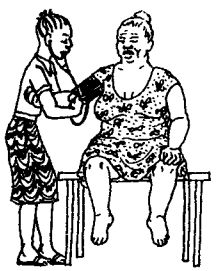
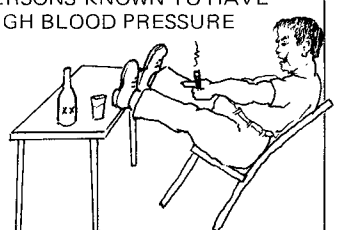
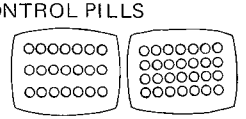


If someone doubts that the pressure is greater near the end of the board that is held down, have him put his finger under it instead of the tube!

Note: In another part of this book, we discuss reasons for not starting a course by teaching 'anatomy and physiology' (see p. **5**-13). Instead, we suggest including information on the body and how it works whenever needed to help explain specific problems or practical activities. This demonstration for learning about blood pressure and its measurement is a good example. Here, students learn about the heart and blood vessels in an active way that relates to and helps explain a basic skill (measuring blood pressure).

WHEN TO TAKE BLOOD PRESSURE AND WHAT TO DO ABOUT YOUR FINDINGS
(This list can be expanded or shortened, according to the local situation.)

WHO	WHEN	WHAT TO LOOK FOR	WHAT TO DO
PREGNANT WOMEN 	early in pregancy	• Possible high blood pressure (BP) • What is normal BP for the woman	• If high-bottom number (BN) over 100—watch carefully. Advise her not to eat too much fatty food and energy foods—especially if she is fat. Consider referring her to a doctor. Childbirth will be safer in a hospital. • If normal (60 to 95 BN), record BP to use for comparison later.
	regularly during pregnancy (every 2 months or so)	Changed or high blood pressure.	Same as above.
	more often late in pregnancy (last 2 to 3 months—especially during ninth month or if there are problems)	Increase in blood pressure.	If BP increases by 10 mm. or more, suspect pre-clampsia (see ***WTND***, p. 249). Check for other signs. Follow advice in book and get medical help if possible. Childbirth should be in hospital.
MOTHERS AT CHILDBIRTH 	during childbirth (or abortion), and in hours or days following—especially when there is blood loss (but even when there is little visible bleeding, as lost blood may be trapped in the womb)	Sudden drop in BP with signs of shock (see ***WTND***, p. 77) If bottom number (BN) drops more than 20 mm. or falls below 50 mm., she is in danger. (Some drop in BP is normal as the woman relaxes after childbirth.)	• Treat for shock (lots of liquid if conscious, intravenous solution if possible, etc.). • Try to control bleeding (see ***WTND***, p. 264). • Get medical help if possible, or rush to hospital.
 ANYONE	if the person may be losing blood from any part of the body, inside or out	Sudden or marked drop in BP (see above). Look for other signs of shock (***WTND***, p. 77).	• Control bleeding if possible. • Treat for shock (***WTND***, p. 77) • Rush to hospital if possible.

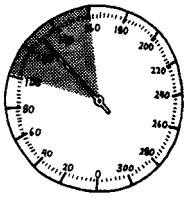
ANYONE 	if the person might be in shock (***WTND,*** p. 77), including allergic shock (***WTND,*** p. 70). If the person is not yet in shock, but there is danger of it, take blood pressure often and watch for drop.	Same as above.	• Control bleeding, if any. • Treat for shock (***WTND,*** p. 77). • Rush to hospital if possible.
PEOPLE OVER 40 FAT PEOPLE PEOPLE WITH SIGNS OF: • heart trouble • stroke • difficulty breathing • frequent headaches • swelling • diabetes • chronic urinary problems • swollen or painful veins	each time you see them, as they are especially likely to have high BP 	• High blood pressure (bottom number over 100). • Signs of related disease. • Wide difference (over 80 mm.) between top and bottom numbers (possible sign of hardening of the arteries), and other abnormalties in BP. • Little difference between top and bottom numbers may mean a kidney problem. Get medical help.	• If BN over 100 mm. but under 110, give advice on diet (***WTND,*** p. 126). Encourage fat person to lose weight. • If BN over 110 mm., give same advice on diet and, if possible, have the person get medicine for lowering BP. • If the underlying problem is known and can be treated, see that the person gets treatment if she wants it.
PERSONS KNOWN TO HAVE HIGH BLOOD PRESSURE 	at regular intervals (once a month or every few months), but more often . . . • at first • when beginning to use blood pressure medicine or changing dosage • if BP is very high or changes often	• How BP compares with the last reading you took. • Related problems such as heart trouble, stroke, diabetes, chronic urinary problems, or painful veins.	• Follow the advice in the square above and in ***WTND,*** p. 126. • If BN drops below 100 mm. with diet alone, congratulate the person and tell him to continue the diet. • If BN does not drop below 100 or gets higher (over 110), try to see that the person gets medicine to lower his blood pressure. • Continue to check BP regularly.
WOMEN TAKING BIRTH CONTROL PILLS 	before beginning, and then every six months	High or rising BP.	If BN is over 100 mm., it is safer not to use the pill. Recommend another method to avoid pregnancy.

Points to cover when teaching about blood pressure:

- Before health workers begin to measure blood pressure, be sure they know how to use a stethoscope. Have them listen to each other's heartbeats to become familiar with the sound of the pulse.
- Caution each health worker against using either the stethoscope or pressure cuff as 'magic medicine' to make people think he has special powers or knowledge. Use these instruments as tools, and only when necessary—never for show or prestige.
- Measure blood pressure when the person is 'at rest'. Recent exercise (running, walking, or working), anger, worry, fear, or nervousness can make pressure rise and give a falsely high reading. In a doctor's office the most common problem is nervousness, especially if the patient is a woman and the doctor is a man. Ask the health workers why they think this is so. Discuss with them what can be done to make the person as comfortable and relaxed as possible before taking their blood pressure.
- Always take a person's blood pressure 2 or 3 times to be sure your readings are about the same.
- Normal blood pressure for an adult at rest is usually around 120/80, but this varies a lot. Anything from 100/60 to 140/90 can be considered normal. Older people usually have somewhat higher blood pressure than young people.

- Of the two readings, top (systolic) and bottom (diastolic), it is usually the bottom number that tells us more about a person's health. For example, if a person's blood pressure is 140/85, there is not much need for concern. But if it is 135/110, he has seriously high blood pressure and should lose weight (if fat) or get treatment. It is generally agreed that a bottom number (BN) of over 100 or a top number of over 160 means the blood pressure is high enough to require attention (diet and perhaps medicine).

TOO HIGH



- Advise health workers that they usually do not have to worry when a person regularly has low blood pressure. In fact, blood pressure on the low side of normal, 90/60 to 110/70, means a person is likely to live long and is less likely to suffer from heart trouble or stroke. Many normal, healthy village people, especially in Latin America, have blood pressure as low as 90/60.
- A sudden or marked drop in blood pressure is a danger sign (blood loss, shock), especially if it falls below 60/40. Health workers should watch for any sudden drop in the blood pressure of persons who are losing blood or at risk of shock. However, some drop in pressure may happen normally when a woman relaxes after giving birth or a person calms down after an accident. Always look for other signs of shock besides a drop in blood pressure. (See the test for shock on p. **16**-9.)

TOO LOW

Note: References to blood pressure in ***Where There Is No Doctor*** are: Shock, p. 70 and 77 (also see Index); Fat People, p. 126; Heart Trouble, p. 325; High Blood Pressure, p. 125 and 326; Stroke, p. 327; Pregnancy, p. 249, 251, and 253; Pre-eclampsia, p. 249; Childbirth (blood loss), p. 265; and Birth Control Pills, p. 289.