

CORTISOL REPLACEMENT THERAPY

An Education Booklet for Parents and Children

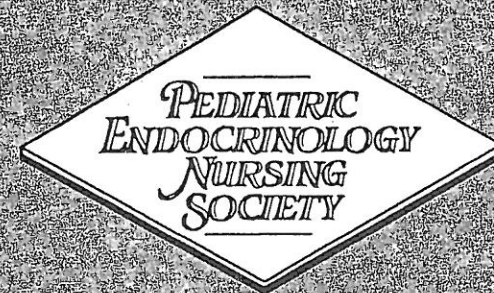
developed by
Judith J. Henry, R. N.

in conjunction with the
Pediatric Endocrinology Nursing Society

Printed with an educational grant by
Eli Lilly and Company

© 1992, Judith J. Henry

CORTISOL REPLACEMENT THERAPY



An Educational Booklet for Parents and Children

Reviewers:

David Allen, M. D.
University of Wisconsin Hospital and Clinics

Dorothy Becker, M.B.B.Ch.
Children's Hospital of Pittsburgh

Stephanie Bordenick, R. N. C., B. S. N.
National Institutes of Health and Science

Sharon Connaughty, B. S. N., M. H. Sc.
British Columbia's Children's Hospital

Robert Couch, M. D.
British Columbia's Children's Hospital

Beverly Giordano, R. N., M. S.
Children's Hospital, Denver

Jack Holland, M. D.
Toronto Sick Children's Hospital

Jan Lehman, R. N., B. S. N.
University of Wisconsin Hospital and Clinics

Sonja Pang, M. D.
University of Illinois Hospital

Patti Rieser, R. N., B. S. N., FNP-C
University of North Carolina

Mary Ann Robnett, R. N., M. S.
Children's Hospital, Los Angeles

Index

Introduction	Page 6
What is cortisol?	Page 7
What is Cortef® (hydrocortisone)?	Page 7
Your child's daily dosage	Page 9
What to do if your forget a dose	Page 10
When your child is ill	Page 13
When to give more hydrocortisone	Page 13
When to give a shot of Solu-Cortef® ..	Page 16
How to prepare Solu-Cortef®	Page 17
How to give a shot	Page 21
Guidelines for hospital care	Page 25
Individual instructions	Page 26
Glossary	Page 27

Introduction

This booklet will help answer questions you may have about your child's need for cortisol replacement medication. Keep it as a reference to use at home.

Many parents of children with cortisol deficiency express concerns and fears after being told their child will need this medication for the rest of his life. Be assured that your child can grow and develop normally if the correct dosage is given, and if doses are not omitted.

Ideally, a teaching session should be scheduled for you with your child's nurse after you've read the booklet. This would be the best time to learn and ask questions about your child's daily cortisol needs, as well as extra cortisol needs during times of illness. Areas in the book particular to your child should be highlighted. Page 26, which has blank spaces, should be filled in with your child's specific doses and instructions.

It's natural for your child to ask questions about the hydrocortisone medicine and the reasons hydrocortisone needs to be taken daily. Have his doctor or nurse help you answer these questions in easily understood terms when you return for checkups.

With time and experience you and your child will find that cortisol replacement therapy can become a part of a normal, healthy life.

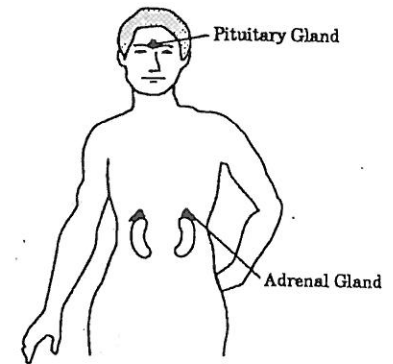
What is Cortisol?

CORTISOL is a hormone* produced by the adrenal glands* under the direction of the pituitary gland's* hormone, ACTH.*

Cortisol is needed by the body to:

- maintain an energy supply
- control the body's reaction to changes or physical stress
- maintain fluid and electrolyte balance
- maintain normal blood sugar levels in young children

Most importantly, it is essential to maintain life.



Hydrocortisone is the generic name of a medication often prescribed for children who are making less cortisol than they need. The name of one commercial brand frequently used is Cortef®. Children who are unable to take oral medication require regular injections of a slightly different medication, cortisone acetate. Either form of cortisol will replace the hormone the body should be making but isn't.

It may help to explain cortisol replacement therapy to you by answering the questions parents frequently ask:

Why does my child need to take hydrocortisone?

Your child has had certain tests that show:

1. the pituitary gland is not making ACTH to stimulate the adrenal gland or

2. the adrenal gland is unable to make cortisol even with adequate stimulation from the pituitary gland.

In either case, hydrocortisone replacement medication will be required for life; your child will not outgrow the need for medication.

Occasionally, but rarely, a child's pituitary gland that has been injured (possibly by surgery) will have partial ACTH secretion, so he may need cortisol replacement therapy for only a short time until completely recovered.

Isn't hydrocortisone a steroid? Is it harmful to give it to a child?

Hydrocortisone and the cortisol it is replacing are one type of steroid.* Steroids are a group of hormones made in everyone's body from cholesterol. In addition to cortisol, the other steroid hormones made by the adrenal glands are aldosterone and androgens (male-type hormones). Each one of these hormones has a different job.

Aldosterone* is used by the kidneys to maintain a normal blood sodium and fluid balance. One form of congenital adrenal hyperplasia* results in less than needed aldosterone and requires salt to be added to the diet or a replacement medication (Florinef®).

Androgens* are used by the body to build muscle mass, promote bone growth, and produce male sexual characteristics. However, the androgens produced in the adrenal glands are less potent and are produced in smaller amounts than the androgens produced in the male testes. In children with congenital adrenal hyperplasia androgens produced in the adrenal glands can cause blood levels to be abnormally elevated unless controlled with medication.

Cortisol,* as described earlier, is used by the body to maintain an energy supply, maintain fluid and electrolyte balance, control the body's reaction to changes or physical stress, and maintain normal blood sugar levels. Also remember that everyone needs cortisol to live.

Much of the negative publicity about steroids is based on individuals who take larger than needed amounts of androgens (male-type steroid hormones). For instance, when athletes take steroids to build muscle mass, they receive much more than their bodies need (an overdose) and this can cause serious side effects over time.

Steroids also are used to reduce inflammation and therefore can be used appropriately to treat many other diseases in larger doses than your child will take.

How much hydrocortisone does my child need?

The proper dose of hydrocortisone is based on a measurement called "surface area," which is calculated from the child's height and weight. You may notice that your child's hydrocortisone dose is increased less than other medications that are based only on weight.

Your doctor may order a blood sample or 24-hour urine collection periodically to ensure that your child is taking the right dose of hydrocortisone.

What are the side effects of hydrocortisone?

The amount of hydrocortisone prescribed for your child will replace what the adrenal glands should make under normal, daily, non-stressful conditions. This daily replacement dose is not to be confused with large doses of steroids given for serious illnesses.

Large doses of steroids may have side effects, including

poor growth, weight gain, thin skin that bruises easily and the tendency to mask signs of infection. Because your child's dose only replaces what the body should be making, no side effects should occur if the medication is used as directed.

When should my child take hydrocortisone?

Some hormones stay at a fairly constant level in the bloodstream throughout the day. This is not true of cortisol; its secretion naturally varies with the time of day and in response to changes in the body, such as illness or physical stress. To mimic this natural pattern, different doses of hydrocortisone may be given at different times throughout the day.

The doctor will decide the number of doses and specific requirements for your child. Space the doses as evenly as possible during waking hours.

Turn to page 26 for your specific instructions.

What should I do if I forget a dose?

Keep in mind the point made earlier - the amount of cortisol made by the body varies throughout the day. For this reason it is very important that your child receives the dose within two to three hours of the prescribed time. If you find yourself forgetting frequently, try to determine why, then work out a system to prevent it. For example, if the afternoon dose is forgotten after school:

- try leaving it on a visible counter that your child must pass on the way into the house
- use one of the pill reminder systems available at pharmacy counters
- make it a habit to ask your child before the evening meal if the pill was taken
- use a calendar with stickers to mark off doses taken

Whether you should make up a forgotten dose is an important point to clarify with your child's doctor. Some doctors argue that a forgotten dose does not help the child if given later than four hours after the usual time. Some doctors want only a double dose given even if three or more doses were omitted.

Clarify what you should do if two or more doses are forgotten with the doctor and write your instructions on page 26.

How does hydrocortisone come from the pharmacy?

Hydrocortisone comes in both oral and injectable forms. Most children take an oral form for their daily doses. Oral hydrocortisone comes in pill and liquid form. The pills are available in several strengths and are marked in the middle, so they can be split evenly for doses of half pills.

Liquid oral hydrocortisone comes with a dropper to be used for measuring. Some brands are orange-flavored. If you use the liquid form, practice measuring the right dose on the dropper. There should not be any air bubbles in the dropper.

Injectable hydrocortisone comes as a white powder that needs to be mixed with sterile water. Once diluted, it appears clear as water. It is absorbed quickly and will last only four to six hours. One commercial name for a frequently used brand is Solu-Cortef®.

You will probably need to keep injectable hydrocortisone (Solu-Cortef®) in your home in case of an emergency. Information on injectable hydrocortisone is provided later in this book (pages 16-23) to prepare you for this.

Can any other medicines be used for treating my child's cortisol deficiency?

Another form of injectable cortisol that can be used for children is cortisone acetate. It is thick and white in the vial. When injected, it is absorbed slowly and will last for two to three days. Some doctors prefer to give an infant this form of cortisol replacement instead of the oral kind if the infant spits up frequently or has intestinal problems.

Injectable hydrocortisone and injectable cortisone acetate are not identical. They differ in appearance, how quickly they begin to work once injected, and how long they last. Also, only injectable hydrocortisone can be given intravenously if necessary (by a nurse or doctor). Your doctor will decide which of these medicines is right for your child.

Your doctor has prescribed the type of cortisol replacement that is recommended for growing children. Oral and injectable hydrocortisone or injectable cortisone acetate are the only medicines your child should receive; do not accept any substitution for your child's prescription. Always check your prescription bottle when you return from the pharmacy to ensure that it is correct.

Other forms of cortisol are more common, but they are usually not recommended for children with cortisol deficiency. Your child should not use medicines such as prednisone, dexamethasone, Decadron®, or Solu-Medrol®.

As your child completes growth during the later teen years the doctor may prescribe prednisone or dexamethasone daily instead of hydrocortisone. This

decision is best made by a pediatric endocrinologist* on an individual basis.

What should I do when my child is ill?

There is a greater need for cortisol during times of illness and physical stress. Therefore, children with hypopituitarism* or adrenal gland disorders need to increase the dose of hydrocortisone when they are ill or physically stressed.

If your child normally takes the oral hydrocortisone and is able to swallow it without vomiting, give two or three times the usual amount of pills or liquid at each daily dose time. Your doctor will decide if your child's usual dose is to be doubled or tripled.

The following examples demonstrate how to double or triple doses (Turn to page 26 to write your instructions.)

Example 1:	Usual	Double	Triple
Morning	1 pill	2 pills	3 pills
Afternoon	1/2 pill	1 pill	1 1/2 pills
Bedtime	1/2 pill	1 pill	1 1/2 pills

Example 2:	Usual	Double	Triple
Morning	2 tsp	4 tsp	6 tsp
Afternoon	1 1/2 tsp	3 tsp	4 1/2 tsp
Bedtime	1 1/2 tsp	3 tsp	4 1/2 tsp

NOTE: If your child receives injections of cortisone acetate on a regular basis instead of oral medication, ask your doctor what adjustments are to be made during times of illness, then turn to page 26 and write your specific instructions.

How do I know if my child is sick enough to need extra hydrocortisone?

Most doctors agree on these general guidelines. Your doctor or nurse will discuss the guidelines you should use.

1. Fever higher than 101 degrees Fahrenheit (38.3 degrees Celsius).
2. Serious trauma, such as broken bones, head injury, concussions, auto or bike accidents resulting in injury.
3. Seizures or other serious medical problems.
4. Viral illnesses that would keep the child home from school.
5. The child must be able to swallow.
6. If the child needs surgery, the surgeon and the anesthesiologist must be told of the child's cortisol dependency. (See page 16 under indications for injections, and pages 25-26 for your pediatric endocrinologist's recommended IV doses.)

Remember, mild viral illnesses such as a runny nose or dry cough do not require increased doses, but:
ANY TIME YOU'RE IN DOUBT, OR YOUR CHILD'S SYMPTOMS AREN'T QUITE AS DESCRIBED ABOVE, CALL YOUR CHILD'S DOCTOR to discuss the symptoms of the illness and decide what to do.

How long should I continue to give my child the extra oral medicine?

You should lower the dosage back down to normal when:

1. Temperature returns to under 101 degrees Fahrenheit (38.3 degrees Celsius) for 12 to 24 hours.
2. The trauma or medical problem has been treated by a doctor and the child's condition is stable.

3. The doctor should advise you when to follow a gradual tapering schedule of large doses back to normal doses, usually after surgery or other long illnesses requiring extended treatment.

With time and experience you may eventually feel comfortable adjusting the oral doses during time of illness by yourself without calling the doctor first. However, keep in mind you should always contact the doctor if your child has been on double or triple oral doses for more than two full days. The doctor may want to assess your child's condition to determine if any extra treatment is required.

What should I do if my child has vomited and can't take the oral medicine?

Wait for a half hour and repeat the dose. If it stays down, you may need to give double or triple doses the remainder of the day. Watch for other signs of acute cortisol deficiency which are listed below. Offer small amounts of clear liquids frequently. Call the doctor if your child appears ill despite keeping oral liquids down.

The signs and symptoms of acute cortisol deficiency include:

- headache
- confusion
- restlessness
- lethargy
- fever
- weakness
- fatigue
- dizziness
- pale skin
- dehydration
- loss of appetite
- nausea
- vomiting
- diarrhea
- reduced urine output

If your child vomits repeatedly (more than once) or is unable to take oral hydrocortisone for any reason, the medicine will have to be given by injection or intravenously (into the bloodstream). Your doctor or nurse should teach you to give an intramuscular injection (a shot) to prepare you for this.

An injectable form of hydrocortisone (Solu-Cortef®) must be kept in your home in case you need it quickly. Your doctor will give you a prescription for this. It can be kept in your medicine cabinet for several years if unmixed. Check the expiration date on the bottle periodically to be sure it's not outdated. An easy way to remember to do this regularly is to check it each time you need to have the oral medicine refilled, or each time you have a doctor's appointment.

Examples of when to give the injection are:

- repeated vomiting (more than once)
- unconsciousness (unable to arouse)
- repeated episodes of diarrhea
- surgery

How much of the injectable hydrocortisone do I give?

The amount of hydrocortisone given in the injection depends on the age or size of the child:

- children newborn to six months old usually require hydrocortisone 25 mg. (equal to 1/2 cc on the syringe)
- children six months to two years old usually require hydrocortisone 50 mg. (equal to 1 cc on the syringe)
- children two years of age or older usually require hydrocortisone 100 mg. (equal to 2 cc on the syringe)

Check with your child's doctor for the exact dose and write it on page 26.

How do I give my child an injection? Do I have to learn how to do this?

Parents usually do not want to give their child an injection; however, it is an important skill for you to learn because you cannot predict when and where your child may get ill and need emergency hydrocortisone. Learning to do this procedure in a calm atmosphere, such as during your child's doctor's appointment, is easiest. An emergency situation is **not** the best time to learn!

Solu-Cortef® comes in a unique bottle called a Mix-O-Vial® or Act-O-Vial®. The sterile water inside the vial sits on top separated from the powdered medicine on the bottom by a rubber disc. Once the powder has been dissolved, the medicine is activated and will be safe to use for 72 hours.

Cortisone acetate comes already mixed and is safe to use until the expiration date on the bottle.

If your child takes oral medication daily, you may not have to use the injectable form of hydrocortisone for long periods of time. To help you remember these important steps when needed, the next pages have instructions for both preparing the injectable medicine and giving the injection to your child.

PREPARING INJECTABLE HYDROCORTISONE USING A MIX-O-VIAL® OR ACT-O-VIAL®

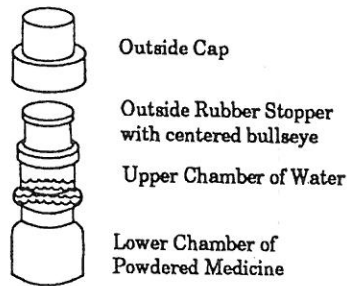
1. Wash hands.

2. Assemble equipment

- 3 cc disposable syringe with attached 23 gauge, 1 inch long needle
- rubbing alcohol
- cotton ball
- medication vial
- Band-Aid® (optional)

3. Check the expiration date on bottle. Do not use if outdated.

4. Remove outside cap of vial and push down firmly on the rubber stopper. The Mix-O-Vial® top must be turned a quarter turn before pressing; the Act-O-Vial® requires only pressure. (This forces the water in the upper chamber to push the middle rubber disc down into the lower chamber with the powder.)



Solu-Cortef® Mix-O-Vial

5. Gently rotate the vial so the water and powder mix completely and appear clear, not cloudy or clumpy.

6. Wash the outside rubber stopper on top of the vial with alcohol.

7. Put air into the syringe by pulling back to ____ cc.

8. Holding the syringe like a pencil, insert the needle through the bullseye of the rubber stopper; push the plunger down to force air into the vial.

9. Turn the vial upside down and pull the plunger back to ____ cc, drawing the medication into the syringe. **KEEP**

THE NEEDLE TIP BELOW THE SURFACE OF THE LIQUID TO PREVENT AIR FROM ENTERING THE SYRINGE.

10. Check for air bubbles in the syringe; tap to help them surface; push plunger up to force air back into the vial.

11. Recheck correct dosage; remove needle from vial.

12. Replace the needle cover until you have the child ready to receive the injection.

PREPARING INJECTABLE HYDROCORTISONE USING TWO BOTTLES

1. Wash hands.

2. Assemble equipment

- 3 cc disposable syringe with attached 23 gauge, 1 inch long needle
- medication vial
- sterile water vial
- rubbing alcohol
- cotton ball
- Band-Aid® (optional)

3. Check expiration date on bottle. Do not use if outdated.

4. Remove outside caps of both vials and wash the tops with alcohol.

5. Put air into the syringe by pulling the plunger back to ____ cc. (See diagram next page)

6. Holding the syringe like a pencil, insert needle through the rubber top bullseye of the water vial; push the plunger down to force air into vial.

7. Turn the vial upside down and pull the plunger back to ___ cc drawing water into the syringe. **KEEP THE NEEDLE TIP BELOW THE SURFACE OF THE LIQUID TO PREVENT AIR FROM REENTERING THE SYRINGE.**

8. Check for air bubbles in the syringe; tap to help them surface; push the plunger up to force air back into vial.

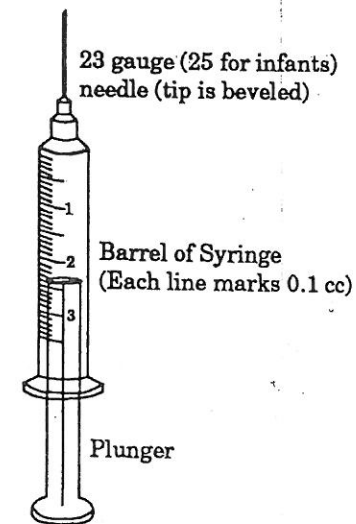
9. Recheck correct volume ___ cc; remove the needle from the water vial.

10. Insert the needle through the rubber bullseye of the powder medication vial; push the plunger down to force water into vial.

11. Gently rotate the vial, so the water and powder mix completely and appear clear, not cloudy or clumpy.

12. Turn the vial upside down and pull the plunger back to ___ cc drawing the medicine into the syringe. **KEEP THE TIP OF THE NEEDLE BELOW THE SURFACE OF THE LIQUID TO PREVENT AIR FROM ENTERING THE SYRINGE.**

13. Check for air bubbles in the syringe; tap to help them



3 cc Syringe and Needle

surface; push the plunger up to force the air back into the vial.

14. Recheck correct dosage ___ cc; remove the needle from the vial.

15. Replace the needle cover until you have the child ready to receive the injection.

HOW TO GIVE AN INTRAMUSCULAR INJECTION

1. Wash hands.

2. Get assistance holding an uncooperative child.

3. Have the child lie down or sit comfortably.

4. Wipe the middle and top portion of the leg (anterior thigh) with alcohol and let dry. (*See diagram, next page*)

5. Hold the syringe like a pencil. With your other hand, hold the muscle on top of the leg by opening your hand fully and squeezing the skin.

6. Quickly pierce the skin at a 90 degree angle (straight down) as if you were throwing a dart. Quick, forceful penetration hurts less than "pushing" the needle through the skin.

7. Check to see that the needle is not in a blood vessel by gently lifting the plunger with your thumb or other hand; this is called aspirating.

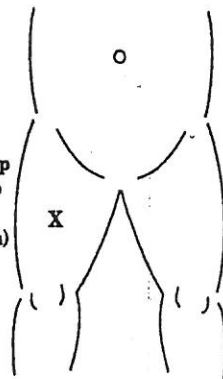
Note: if blood **does** appear inside the syringe, remove the needle without injecting the medicine into the leg and start over.

8. If no blood appears in the syringe, push the plunger down to inject the medicine into the leg.

9. Remove the needle from the leg quickly and release your hand holding the muscle at the same time.

10. Hold dry cotton over the injection site if oozing occurs; Apply a Band-Aid®.

The middle, top portion of the child's leg (anterior thigh)



Just a word about cleanliness, safety, and sterility...

It is very important to **wash your hands before beginning the procedure**. This helps lower the risk of contamination or infection. The importance of this step cannot be overemphasized.

The medication should be stored in a cool, clean, dry place. If you have younger children at home, take special precautions for storing the unused syringes. Keep them inside the sealed sterile wrapper and up out of reach.

The needle and inside of the syringe are sterile, meaning they are completely free of germs. Be careful not to touch the tip of the needle to anything accidentally before the injection is given. If you should drop the syringe or brush the needle against your hand or the table, discard that syringe and start over with a new one. It is helpful to prepare the syringe in a clean, quiet area where you can concentrate without interruptions.

After the injection, put the syringe in an opaque plastic container (old milk carton or plastic detergent bottle) before throwing it away.

What do I do after I give my child an injection when he is ill?

Your child's doctor **must** be notified when a hydrocortisone injection is given when your child is ill. The doctor will help you decide the next step to be taken, which could be any of the following:

- resume oral medicine at double or triple the normal amount
- give a second injection of hydrocortisone four to six hours later
- bring the child to the hospital for examination or IV treatment

What if I give a shot that isn't necessary?

Overtreatment (too much hydrocortisone) is better than undertreatment (not enough hydrocortisone) for a child who appears significantly ill or stressed. You cannot hurt your child by giving a shot of cortisol that might later prove to be unnecessary. On the other hand, a child who needs an injection and does not receive it quickly can go into shock. If severe illness or physical stress occurs without adequate replacement of cortisol, the child's blood pressure may fall and the child may become unconscious. This condition can be life-threatening.

Remember the signs and symptoms of acute cortisol deficiency: fever, dizziness, restlessness, pale skin, lethargy, vomiting, weakness, dehydration, and decreased urine output. Knowing these signs can help you know when quick treatment is necessary. You may feel more comfortable talking with a doctor to help you decide whether to give an injection, but if that's not possible quickly, go ahead and give the injection. You may be able to prevent a trip to the hospital by avoiding any delay in treatment.

What if there's an emergency and I'm not there?

Your child should wear a medical identification bracelet or necklace that states "Needs hydrocortisone." Emergency personnel are trained to look for medical alert emblems, so this emblem could save your child's life. Emblems bought in your local drug store can be engraved for this purpose. Some companies (such as Medic-Alert®) make medical identification emblems and enter your child's specific information, doses or doctor into a national phone file to be used as a reference by the emergency team. Your child's doctor or nurse can give you an order form or mailing address.

Any doctor or school nurse caring for your child should know that he is on cortisol replacement therapy. If the school nurse is not always stationed in your child's school building, then a teacher or the principal should be informed of your child's condition. Emergency instructions should be part of your child's file. You may want to ask your child's doctor to give you a copy of these instructions to keep at the school.

What if my child is taken to another hospital in an emergency?

Tell the emergency room doctor your child's medical diagnosis. Give the doctor the name and phone number of your child's pediatric endocrinologist. Encourage the doctor to call your child's pediatric endocrinologist with any questions. Take the vial of emergency hydrocortisone you keep at home with you to the hospital.

To plan ahead for this situation ask your child's pediatric endocrinologist to give you specific written instructions on recommendations for treatment including IV hydration and medications. Give them to the emergency room doctor as a guideline.

When traveling, take these instructions and the vial of injectable hydrocortisone with you. (*Turn to page 26 and keep these instructions along with your child's other specific dose instructions.*)

Add your pediatric endocrinologist's GUIDELINES FOR HOSPITAL CARE on this page.

Write your pediatric endocrinologist's specific instructions for your child on this page.

1. The number of daily doses your child needs is _____.

2. The times these doses are to be given and the amounts of medicine are (mark the correct times and amounts):

___ upon arising in the morning _____ amount
___ mid-afternoon (after school) _____ amount
___ bedtime _____ amount

3. Your doctor's instructions if two or more doses are forgotten: _____

4. When your child is ill, but not vomiting, you should (check one) ___ double or ___ triple the child's usual doses. These increased amounts would be:

increased morning dose for illness _____
increased afternoon dose for illness _____
increased bedtime dose for illness _____

5. When your child has vomited and can't keep oral medication down, you are to give an injection of hydrocortisone in the amount your doctor prescribes:

_____ mg = _____ cc

6. Children who receive regular injections of cortisone acetate instead of oral medication should follow these instructions when they are ill: _____

ACTH (adrenocorticotrophic hormone) - A pituitary hormone that stimulates the adrenal gland.

Addison's Disease - A rare condition in which the adrenal glands are permanently, functionally impaired, usually caused by an autoimmune disorder.

Adrenal Glands - Two glands that sit on top of the kidneys and produce several hormones including cortisol.

Adrenal Insufficiency - A decrease in the amount of hormones produced by the adrenal glands; may be due to sluggish adrenal glands or insufficient ACTH to stimulate the adrenal glands.

Aldosterone - A hormone produced by the adrenal glands that helps regulate sodium and fluid balance.

Androgens - Male hormones, including testosterone, produced normally in small amounts by the adrenal glands of both sexes and in large amounts by the testes of males; aside from producing male sexual characteristics, these hormones help the body build muscle mass and promote bone growth.

Congenital Adrenal Hyperplasia - An inheritable condition in which enzymes necessary to manufacture cortisol (and occasionally aldosterone) are missing.

Cortisol - A hormone produced by the adrenal glands after stimulation by the pituitary hormone, ACTH; cortisol is necessary to control body changes, physical stress, maintain normal fluid, electrolyte, and blood sugar levels, maintain an energy supply and to maintain life.

Gland - An organ inside the body that manufactures hormones for use elsewhere in the body.

Hormone - A chemical substance produced in glands and transported in the blood to stimulate an organ to work; hormones act as "messengers" to control growth, reproduction, and body metabolism.

Hypopituitarism - A condition in which the pituitary gland does not secrete needed hormones.

Hypothalamus - The portion of the brain that stimulates the pituitary gland.

Pediatric Endocrinologist - A doctor who specializes in treating children's hormone and growth problems.

Pituitary Gland - The "master" gland that sits under the brain and secretes hormones that in turn stimulate other glands to secrete hormones; aside from ACTH, some other hormones it makes are:

- TSH (thyroid stimulating hormone)
 - GH (growth hormone)
 - LH (luteinizing hormone)
 - FSH (follicle stimulating hormone)
 - ADH (antidiuretic hormone)
- ... and others not listed.

Steroids - A group of hormones made naturally in the body from cholesterol, having several different jobs.

EMERGENCY PHONE NUMBERS

Doctor's Name _____

Doctor's Office Phone Number _____

Hospital Paging Number _____

Hospital Emergency Room Number _____

Nurse's Name _____

Nurse's Phone Number _____

Child's Diagnosis _____

DRUG PRESCRIPTION INFORMATION

Hydrocortisone (Cortef®) Liquid, Oral
10 mg./5 cc Suspension (2 mg.=1 cc)

Hydrocortisone (Cortef®) Tablets
5 mg., 10 mg., and 20 mg.

Hydrocortisone Injectable (Solu-Cortef®)
Mix-O-Vial® or Act-O-Vial® preferred
100 mg./2 cc

Cortisone Acetate, Injectable Suspension
50 mg./1 cc