

# THE IMPORTANCE OF CONTACT ECZEMA IN CHILDREN

By Lewis Webb Hill, M.D.

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Dr. Lewis Webb Hill of Boston, Massachusetts, was honored by the Section on Allergy of the American Academy of Pediatrics at a meeting held in Chicago, Illinois, October 19, 1958. Dr. Arthur J. Horesh of Cleveland, Ohio, National Chairman of the Allergy Section, presented Dr. Hill with a scroll which read as follows:

By unanimous vote of the Section on Allergy of the American Academy of Pediatrics assembled in Chicago, Illinois, at the Twenty-Seventh Annual Meeting of the Academy, this Scroll is awarded to

LEWIS WEBB HILL, M.D.

as an expression of gratitude and appreciation for his untiring services as a pioneer investigator in advancing our knowledge of allergy in pediatrics, particularly in the difficult field of allergic skin diseases.

For his brilliant teaching of pediatric allergy at Harvard Medical School and in this Academy for many years.

For the Section:

HARRY L. MUELLER, M.D.

JEROME GLASER, M.D.

ARTHUR J. HORESH, M.D., *Chairman*

This 21st day of October, 1958

**DR. HORESH:** Tonight, on behalf of the Section on Allergy, I am specifically assigned to present a token of appreciation to an old friend of ours.

The man we honor this evening did so much in developing the field of pediatric allergy that it is not possible to link his name with one particular achievement. There is no one in this audience who has not benefited greatly from Dr. Lewis Webb Hill's contributions in this area.

Sixty-nine years ago, Lewis Webb Hill was born in Boston, Massachusetts. His parents were New England Yankees on both sides as far back as there was a New England. He received his education at Roxbury Latin School (the oldest endowed school in America), at Harvard College and Harvard Medical School. He interned at the Boston Floating Hospital, Massachusetts General Hospital and the Children's Hospital.

His honors are many, including the presidency of the American Association of Teachers of Diseases of Children in 1919, the presidency of the Boston Medical Milk Commission and the presidency of the New England Pediatric Society. He served on the Executive Board of the American Academy of Pediatrics before and shortly after World War II. Now he is president of the New England Society of Allergy. During World War II, he served for 3½ years as Chief of Medical Service in a 2,500-bed hospital. He reached the rank of Colonel.

Dr. Hill's publications are many. Sixty-seven papers bear his name, the first ones dealing with nephritis and problems of infant feeding. For the last 25 years, his writings dealt mostly with various aspects of allergy in children. Dr. Hill wrote books. These cover a wide variety of subjects such as diabetes, laboratory procedures, infant feeding and allergy in infants and children. Outstanding above all his writings, is his most recent book published in 1956 titled *The Treatment of Eczema in Infants and Children*. Dr. Hill's profound studies on eczema shall always prove an inspiration and stimulation to all scientists interested in allergic diseases. In the preface of this outstanding publication Dr. Hill writes, "My understanding of this disorder (eczema) is not good, and the older I grow the more acutely I realize my ignorance."

Were Lewis Webb Hill not so famous for his contributions to the literature on allergic diseases, his reputation would still be great for his remarkable ability as a teacher. For 40 years he

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PEDIATRICS, April 1959

taught in Harvard Medical School. He is notable in the Academy for having conducted five seminars and four or five round tables on pediatric allergy. Indeed, it can be said that the knowledge of allergy owes its present advanced position in this Academy largely to the inspiration and stimulation given it by Lewis Webb Hill.

Above all Dr. Lewis Webb Hill is also a man of great culture and learning. He is simple, modest and yet imaginative. His speech is clear, blunt, concise and liberally salted with good common sense. He has no trace of the pomposity which men of his eminence are sometimes apt to display. Reading, gardening, game shooting and a collection of antique shot-guns are his favorite pastimes. Of more far-reaching importance, in his domestic life Dr. Hill has one very superior wife (for 41 years), two female twin children and seven grandchildren.

We in this Section on Allergy are grateful for his presence among us for the past 10 years. We are grateful for his great contributions to our meetings. We are grateful for his generosity in disclosing new ideas and methods with practical application to our clinical problems. We are grateful for the knowledge obtained from his fundamental studies of basic subjects. We are grateful for his wise counsel on matters of policy and organization. These are a few of the measurable reasons that we consider it a fortune and a grace to know him.

SOME forty years ago when the first skin tests were done, and it began to be realized that eczema in the young was often a manifestation of allergy, the idea took firm root in the minds of pediatricians that food was almost always the cause. To some extent this idea has persisted, and while I am still one of those who firmly believe that food frequently causes eczema, I suspect that too much attention has been paid to it, and too little to things which contact the skin from the outside. Too many children are dieted when their skin trouble has nothing to do with food.

Sensitizing substances which contact the skin from the outside are by far the most common causes of eczema in adults. Their number is beyond count. One would expect that contact eczema might be less common in children than in adults, because adults are exposed to so many more potentially sensitizing contacts than are children. In the dermatologic literature of the last 25 years there are dozens of papers on contact dermatitis in adults, with case reports of sensitization to everything under the sun, from tulip bulbs to contraceptive jellies. There is, however, but little in the literature concerning this in the young, although it is well known that children *may* have contact eczema caused by most of the many things that cause it in adults.

Osborne and Walker,<sup>1</sup> and Waldbott<sup>2</sup> have called attention to this. I have seen it over

the years, from neomycin, orlon, nylon, perfumery, primrose, mulberry leaves, dyes, furniture polish, turpentine, tincture of green soap, mercury, tar, sulfur, Sopronol®, patent hair shampoo, hair tonic, and creosote. The question is, however, do such things, which so frequently cause contact eczema in adults, play a *common* rôle in children, or are the things which *ordinarily* cause trouble in children of a somewhat different category? If so, what are they, how common is contact eczema in children, and are there differences between it in the young child and in the adult? How important is it in the over-all picture of eczema in children?

It seemed to me that the best way to answer these questions would be to make an analysis of a series of cases as they actually occurred in routine office practice. In a consecutive series of 200 cases of eczema of all sorts seen in my office mostly in 1955 and 1956, there were 53 in which the diagnosis of contact eczema was made. Most of these children had been previously treated by dietetic measures without benefit.

#### DIAGNOSIS OF CONTACT ECZEMA

It is usually not difficult from the history and inspection, with the child stripped, to make a presumptive diagnosis of contact eczema. The following criteria are suggestive (Tables I-III):

TABLE I  
MOST COMMON PRIMARY CONTACT

Hands, wrists	11
Abdomen, inner thighs	10
Neck	7
Buttocks	6
Buttocks, abdomen	3
Shoulders	3
Various other places	1 each

1) If the dermatitis appears suddenly on a previously healthy skin, on an area of the body that has been exposed to some substance capable of producing eczema, either by sensitization or as a primary irritant.

2) If the eczema is confined to one segment of the body, sometimes with fairly sharp lines of demarcation between the healthy and eczematous skin. For example, if it is on the arms, wrists and neck, but stops rather abruptly at the upper third of the upper arms, and the child is wearing a quarter-sleeved undershirt and a full-sleeved sweater, it is reasonably sure that something to do with the sweater is causing the trouble.

3) It is often not difficult to decide that eczema is due to external contact—it is not so easy to determine the exact cause, for many times it is not possible to get a clear history of contact with things known to be sensitizers or primary irritants. A positive patch test to some suspected contact means a good deal, a negative test means but little, largely, I expect, because often in children the degree of sensitivity to the

TABLE II

<i>Primary Contact</i>	<i>Frequent Causes</i>
Neck	Coat collar
Wrists, hands	Mittens, sleeve edge
Arms	Sweater
Eyelids	Nail polish
Buttocks	Ammonia, toilet seat
Inner thighs	Pants, diapers, plastic diaper covers
Pubes, abdomen	Diapers (maybe ammonia, maybe not)
Shoulders	Shirt, straps of sun suit, sweater
Dorsa of feet and toes	Shoe lining

TABLE III  
CAUSE DETERMINED (53 CASES)

Accurately	31
Probably	18
Not at all	4

things which cause the trouble is not high enough, and the patch test does not reproduce natural conditions of exposure: there must be long-continued contact and rubbing in order to produce eczema when the degree of sensitivity is not high. I have done a good many patch tests. Few have been positive. I do not think that the patch test is, most of the time, a very valuable aid in children for confirming the suspected cause of the eczema—often it cannot be determined with 100% accuracy. It is possible, however, for a child to give a very strongly positive patch test—I have seen bullous patch test reactions to neomycin and to mercury. I was much surprised not long ago to hear a well known dermatologist make the statement that in adults also the patch test could not be relied upon to confirm the cause of the eczema in more than a third of the cases tested. It seems likely that in children, with their tender skins, a high proportion of contact eruptions is due rather to long-continued contact plus rubbing, with primary irritants of relatively low irritant power, than to short-term contact, and resulting allergic sensitization to allergens of high sensitizing power.

4) It is often possible in suspected contact eczema, even if it is rather widely scattered, by close observation, to judge pretty accurately by the intensity and the stage of the dermatitis on what part of the body the primary contact was, and this may give a clue to causation. It must be remembered that parts of the body remote from the original contact may be involved, either hematogeneously from absorption of minute amounts of the allergen, by transmission of the allergen with the fingers, or by spread through the lymphatics. Contact eczema rarely begins in the popliteal or antecubital spaces, but they are often sec-

ondarily involved. Atopic eczema from the inhalation of environmental allergens very often is primary in these locations.

#### Clothes

If the diapers and shoes are included as clothes, 40 out of the 53 cases were probably caused by something to do with the clothes (Table IV). It is interesting to note that 36 were first seen during the winter months (November to April), and only 17 in the summer months (May to October). This is probably due to more contact with wool in the winter. It is also of some interest that of the 53 cases, 39 were between the ages of 1 and 3 years.

**WOOL:** Wool is the commonest cause of contact eczema in children. It is of considerable interest, because it can cause contact dermatitis by external contact as a primary irritant or as a sensitizer, as well as atopic dermatitis by inhalation. Wool sensitivity can be of extraordinarily high degree so that only slight contact with it will cause urticaria. This is, however, unusual, and more often allergic sensitivity, if it exists at all, is of low degree, so that continued contact with rubbing is necessary before eczema is produced. Scratch tests are rarely positive, patch tests occasionally positive. As a matter of fact, it is not unlikely that much of the wool eczema seen in young children is caused by the primary irritating action of wool, particularly if it is wet, rather than by allergic sensitization. Wool eczema is likely to begin in the winter, and usually clears in the summer. It may, however, due to long-continued scratching and rubbing, become very chronic, and last all the year round.

TABLE IV  
CAUSE (53 CASES)

Wool	16	Dye	2
Diapers (not NH <sub>3</sub> )	8	Rubber	2
Diapers (NH <sub>3</sub> )	4	Nail polish	1
Plastic	4	Toilet seat	1
Corduroy pants	4	Shoe lining	1
Underclothes	4		
Ivy	2		

**DIAPERS:** In infants dermatitis on the abdomen and the front and inner sides of the thighs is becoming more common, largely because it is now the fashion for them to sleep on their abdomens. The skin, owing to heat and constant moisture, becomes macerated; the protective horny layer disintegrates and inflammation of one sort or another results. Infection with *Candida albicans* (moniliasis), either primary or secondary, is not uncommon and should always be considered when there is dermatitis in this area, particularly if sharp margins and small satellite lesions are present. The character of the eruption and recovery of *Candida albicans* by culture make the diagnosis. No patient with moniliasis has been included in the series under discussion, for this is not contact eczema. Ammonia dermatitis is easily diagnosed by the smell and also by the appearance of the dermatitis, which may be a simple erythema with sharp margins (corresponding to the diaper area), erythema with extensive peeling (not scaling), scattered, quite characteristic papules, or in the more severe cases, actual bullae, with secondary ulceration.

The most difficult cases to deal with, and I think now the most common, are not due to ammonia or to *Candida albicans* infection. The eruption in these cases usually begins in the pubic area and soon extends up the abdomen and down the inner side of the thighs. It is erythematous and papulovesicular—there is no peeling—satellite lesions are uncommon. The eruption may extend upwards so far that the chest and neck and even the face are involved; there is often intertrigo of the axillae, and almost always extensive cradle cap. The back and the buttocks are free from dermatitis. Some of these infants are allergic and may have atopic dermatitis on other parts of the body added to the picture. Most of them are not allergic, but it is evident that there must be some constitutional predisposition to this sort of dermatitis, on account of the fact that only a small proportion of those infants who sleep on their



abdomen develop it, and because there is almost always accompanying seborrhoea of the scalp, indicating a seborrheic constitution, whatever that may be. It is clear that the trouble is started by long-continued exposure to wetness and warmth, and is aggravated by the wearing of impervious diaper covers. It is also likely that at least a part of the inflammation is due to sweat retention from plugging up of the sweat ducts when the skin is waterlogged and macerated. Most of these babies are big and fat, and have been taking large quantities of (usually undiluted) milk even at an early age, which is at present the fashion. Their urines therefore contain large amounts of salts and of nitrogenous end products, exceeding by many times what would be in the urine of a breast-fed baby. It seems not unlikely that some particular constituent of the urine may be responsible for the dermatitis, once maceration has occurred. With most of them it is not ammonia. What it is I do not know.

**PLASTICS AND SYNTHETIC FIBERS:** Children frequently come into contact with plastics. These are enormously complicated chemically and may contain many sensitizing substances as well as primary irritants. I have seen one case of contact eczema due to a plastic bib, one to a mattress cover, and two to diaper covers. The last, I expect, is fairly common—I just have not happened to see many. I have seen four cases of contact eczema due to orlon—one to nylon.

**UNDERWEAR:** Soft white cotton, provided it has been untreated with chemicals, is never allergenic. However, most cotton garments have been treated with a great variety of chemicals for various purposes during the process of manufacture. Some of these are various starches, alkalies or synthetic resins, which may contain free formaldehyde, lubricants, wetting agents or bleaches. It is possible for some of these chemicals to act either as sensitizers or as primary irritants, and some of them may take up chlorine from bleaching powders used when the garment is laundered. The

soaps and detergents used in laundering should be under suspicion if there is reason to believe that any cotton garment worn next the skin is the cause of dermatitis, and it is best to change to some mild soap. I have never been able to prove, however, that contact eczema is caused by a soap or other detergent. I have seen one case caused by bleaching powder.

#### **Toilet Seats**

Toilet-seat dermatitis is not very common: I have seen only two cases in the last 3 years—I don't know how many before that. These two were caused not by the lacquer on the seat, but by chemicals that had been used to wash it.

#### **SUMMARY AND CONCLUSIONS**

In 200 consecutive cases of eczema in children from the age of 7 weeks to 14 years, 53 were thought to be caused by outside contact with allergenic or irritating material.

The cause was determined in 31 cases, the probable cause in 18, and in 4 it was entirely unknown.

The cause was thought to be due to something connected with the clothes (including diapers and shoes) in 40 cases (74%).

Contact eczema, as seen in young children, differs from contact eczema in adults in that: it is more likely to be due to the clothes than to anything else, a high degree of sensitization with resulting vesiculation (although it can occur) is not so common as in adults, and primary irritants of relatively low irritating power are more likely to be causes than they are in adults.

Too many children are dieted for eczema when the cause is really something which contacts the skin from the outside.

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*Pediatrics* 1959;23;797

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OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

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