

## WHICH ARE THE PRIMARY SKIN MANIFESTATIONS?

Primary lesions may be flat, elevated, or depressed. Flat lesions include macules and patches.

A macule is a small, circumscribed area of color change without elevation or depression.

An example is a cafe au lait macule



macule

. Although specific criteria for size are lacking, a patch is a large macule



patch

. Elevated lesions may be solid or fluid filled. Solid lesions include papules (<0.5 cm in diameter), nodules ( $\geq 0.5$  cm in diameter),



papule



nodule

wheals (pink, rounded, or flat-topped elevations caused by edema in the skin), and plaques (plateau shaped structures often formed by the coalescence of papules) (Figure 63-3, Figure 63-4, Figure 63-5, and Figure 63-6).



urticaria



plaque

Elevated fluid-filled lesions are vesicles ( $<0.5$  cm in diameter and filled with serous fluid), bullae ( $\geq 0.5$  cm in diameter and filled with serous fluid), pustules ( $<0.5$  cm in diameter and filled with purulent material), and cysts ( $\geq 0.5$  cm in diameter



vesicle



bullae

**How long have you had the rash? Has it gotten better or worse? Has it occurred in the past?**

Conditions such as atopic dermatitis are chronic and recurrent, whereas others such as viral exanthems (eg, erythema infectiosum) are acute and self-limited.

**Are there associated symptoms?**

A generalized erythematous macular eruption associated with fever, nasal congestion, and cough suggests the presence of a viral exanthem. Fever, petechiae, and purpura in an ill-appearing child may indicate a serious bacterial infection such as meningococemia. Atopic or contact dermatitis and scabies characteristically produce pruritus.

**Are any medications being taken?**

The onset of wheals in a child receiving an oral antibiotic might represent urticaria as a manifestation of drug allergy. Lithium can worsen acne, and minocycline may cause hyperpigmentation. Topical therapies also may be relevant to the patient's problem. Neomycin (used in certain topical antibiotic preparations), diphenhydramine (used to reduce pruritus), and certain anesthetics (used to reduce pain or pruritus), when applied topically, may induce a contact dermatitis.

**Are there factors that worsen or precipitate the rash?**

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The malar rash of systemic lupus erythematosus is worsened by sun exposure. For many children who have atopic dermatitis, reduced humidity during colder months is associated with an exacerbation of disease.

**What treatment has been tried, and what was its effect?**

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Knowing which therapies have been employed, if they were used appropriately, and if they were effective is helpful. Treatment for head lice infestation, for example, may fail if the product is applied incorrectly or if it is left on the scalp for an insufficient period. In addition, repeating a therapy is unwise if it was used correctly but proved ineffective.

### **Family History**

**Is there a family history of skin disease or other health problems?**

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Children who have atopic dermatitis often have a family history of atopic disease, including atopic dermatitis, allergic rhinitis, or asthma. If a child is found to have multiple café au lait macules and a diagnosis of neurofibromatosis type 1 is being considered, determining whether the patient has any

affected first-degree relatives is vital. Whether other family members are similarly affected is relevant when cutaneous infections or infestations are suspected. Impetigo, tinea capitis, scabies, and head lice are frequently transmitted within families

**What are common causes of fever with rash?**

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<i>Viral</i>	<i>Collagen vascular disorders</i>
Measles	Systemic onset JIA
Rubella	SLE
Chicken pox	Dermatomyositis
Dengue	Kawasaki disease
Chikungunya	Henoch Schonlein purpura
HSV and HHV infections	Polyarteritis nodosa
Influenza	
Coxsackie virus	
Other viral hemorrhagic fevers (Hanta, Ebola, etc.)	
<i>Bacterial</i>	<i>Drugs and hypersensitivity</i>
<i>S. aureus</i>	Steven Johnson syndrome
Group A Streptococcus	Toxic epidermal necrolysis
<i>N. meningitidis</i>	Vasculitic syndromes
Listeria	Drug reactions
Leptospira	Type 1 hypersensitivity reactions
Borellia	Graft vs Host reactions
Rickettsial fevers and Q fever	

## What are the causes of maculopapular rash?

Diseases	Common recognizing features
Measles	<ul style="list-style-type: none"> <li>Respiratory prodrome</li> <li>Koplik's spot in buccal mucosa which gradually wane after onset of rash</li> <li>Maculopapular rash starting from hairline and behind the ears, spread down the trunk and limbs. Rash fades in the order in which it appeared with brownish discoloration and desquamation</li> </ul>
Rubella	<ul style="list-style-type: none"> <li>Prodrome of fever and malaise</li> <li>Followed by posterior auricular, cervical and suboccipital lymphadenopathy</li> <li>Fever and rash. Rash is maculopapular, begins on face and spreads downward</li> </ul>
Erythema infectiosum (Fifth disease)	<ul style="list-style-type: none"> <li>Common in children between 3 and 12 years of age</li> <li>Bright-red "slapped cheek" appearance following a minor febrile prodrome</li> </ul>
Exanthema subitum (Roseola)	<ul style="list-style-type: none"> <li>Common in children below 3 years of age</li> <li>Diffuse maculopapular rash sparing face following resolution of fever</li> </ul>
Infectious mononucleosis	<ul style="list-style-type: none"> <li>Common in older children and adolescents</li> <li>Fever, sore throat and lymphadenopathy is most common</li> <li>Morbiliform or papular rash develops usually on trunk and arms</li> </ul>
Dengue	<ul style="list-style-type: none"> <li>Initially diffuse red flushing with pruritus followed by maculopapular rash on trunk which spreads centrifugally to extremities and face</li> <li>Petechiae may be seen in some cases on extremities</li> </ul>
Drug rash	<ul style="list-style-type: none"> <li>Usually maculopapular common in trunk and symmetrical</li> <li>Intensely pruritic, absence of respiratory catarrh and enanthems helps to distinguish from a viral eruption</li> </ul>
SLE	<ul style="list-style-type: none"> <li>Photosensitive butterfly rash on cheek and nose</li> <li>Discoid, urticarial or bullous lesion may also be seen</li> <li>Periungual telangiectasia</li> <li>Livedo reticularis and Raynaud's phenomenon</li> </ul>
JIA	<ul style="list-style-type: none"> <li>Evanescant erythematous papules on trunk appearing at the height of fever</li> <li>Koebner phenomenon</li> </ul>

## What are the causes of peripheral rashes?

Diseases	Common recognizing features
Erythema multiforme	<ul style="list-style-type: none"> <li>Target lesions symmetrical on palms, soles, knee and elbow</li> <li>The center of the lesion dusky violet color or petechiae</li> <li>In erythema multiforme major there is usually involvement of ocular, nasal, oral or genital mucous membrane</li> </ul>
Hand, foot and mouth disease (coxsackie and enteroviruses)	<ul style="list-style-type: none"> <li>Tender maculopapular lesion on hand, fingers, feet, buttocks and groin</li> <li>Vesicular lesions are also seen</li> <li>Associated involvement of buccal mucosa, pharynx, gingiva and palate</li> </ul>
Secondary syphilis	<ul style="list-style-type: none"> <li>Maculopapular rash frequently involving palms and soles</li> <li>They are dark colored, nonpruritic and discrete</li> <li>Constitutional symptoms other than fever include malaise, sore throat, weight loss and headache</li> <li>There is also involvement of mucous membrane</li> </ul>
Infective endocarditis	<ul style="list-style-type: none"> <li>Erythematous or hemorrhagic macules on palms and soles which are painless (Janeway lesions)</li> <li>Petechiae on skin and mucosa</li> <li>Tender red nodules on finger and toe pads (Osler's node)</li> <li>Associated heart murmur</li> </ul>
Juvenile dermatomyositis	<ul style="list-style-type: none"> <li>Periorbital violaceous heliotrope edema</li> <li>Gotttron papules</li> </ul>

## What are the desquamative rash?

Diseases	Common recognizing features
Scarlet fever	<ul style="list-style-type: none"> <li>Blanchable erythema over face and upper trunk to start</li> <li>Minute papules which gives the skin a sand paper feel</li> <li>Associated feature include strawberry tongue</li> <li>Subsidence of rash is followed by desquamation</li> </ul>
Streptococcal toxic shock syndrome	<ul style="list-style-type: none"> <li>Generalized erythematous macular rash which desquamate</li> <li>May develop other features which usually include hypotension, renal impairment, respiratory distress syndrome, coagulopathy or soft tissue infection</li> </ul>

Staphylococcal scalded skin syndrome	<ul style="list-style-type: none"> <li>Seen in infants and children below 5 years of age</li> <li>Scarlatiniform scalded skin erythema develops followed by sterile flaccid blisters</li> <li>Nikolsky sign is positive with skin peeling off leaving moist, glistening denuded areas</li> <li>Patient may appear well despite marked skin tenderness</li> </ul>
Staphylococcus toxic shock syndrome	<ul style="list-style-type: none"> <li>Acute onset with high fever, erythematous macular rash which desquamates later and associated with hypotension</li> <li>Multisystem involvement with thrombocytopenia, renal failure, liver and central nervous system abnormality are seen</li> </ul>
Kawasaki disease	<ul style="list-style-type: none"> <li>Maculopapular, scarlatiniform or erythema multiforme with accentuation in the groin area</li> <li>Associated feature includes fissuring of the lips, conjunctivitis, strawberry tongue, edema of hands and feet with periungual desquamation of finger and toes</li> <li>Illness predominantly in young children with majority under 5 years of age</li> </ul>
Steven Johnson syndrome (SJS) and Toxic epidermal necrolysis (TEN)	<ul style="list-style-type: none"> <li>SJS start as erythematous macules which develop central necrosis to form vesicles, bullae and skin denudation</li> <li>Extent of involvement is less than 10% of body surface area in SJS</li> <li>Skin lesions are accompanied by two or more mucous membrane involvement like conjunctivitis, oral ulceration or anogenital inflammation</li> <li>TEN has involvement more than 30% of body surface area with more systemic symptoms like pulmonary or gastrointestinal involvement</li> <li>In SJS/TEN involvement is between 10% and 30%</li> </ul>

### What are the vesiculobullous rash and features?

Diseases	Common recognizing features
Varicella zoster	<ul style="list-style-type: none"> <li>Macules appears on trunk and face that rapidly spreads to other areas of the body</li> <li>Lesions have a erythematous base which quickly evolves to vesicles, pustules and then crust formation</li> <li>Lesions appear in crops with different stages of development</li> <li>In healthy children it is usually associated with mild fever and malaise</li> </ul>
Herpes simplex virus infection	<ul style="list-style-type: none"> <li>Cutaneous lesions usually involve face, lips, gingiva, tongue and palate</li> <li>Erythema followed by grouped vesicles, which progress to pustules and crust formation</li> <li>There is regional lymphadenopathy, but systemic symptoms are usually absent</li> </ul>
Herpes zoster	<ul style="list-style-type: none"> <li>Clustered vesicular lesions confined to one or two dermatomes</li> <li>Pain, hyperesthesia and fever are mild as compared to adults</li> <li>Lesions completely resolve within 1 or 2 weeks</li> </ul>

### What are the purpuric rashes?

Diseases	Common recognizing features
Acute meningococemia	<ul style="list-style-type: none"> <li>Initial maculopapular lesion involving trunk and lower extremities</li> <li>Lesions quickly evolving to petechiae and purpura may spread to involve upper extremities and face</li> <li>Large ecchymoses with hemorrhagic bullae (purpura fulminans) indicate DIC</li> <li>Associated features of meningitis and shock may be evident</li> </ul>
Dengue hemorrhagic fever	<ul style="list-style-type: none"> <li>After a relatively benign first stage with fever, malaise and headache patient suddenly collapses with cold extremities and irritability</li> <li>Petechiae and purpura may be seen in extremities and face followed by ecchymoses</li> </ul>
Henoch schonlein purpura	<ul style="list-style-type: none"> <li>Initial maculopapular rash</li> <li>Later palpable purpura</li> <li>Rash occurs typically below the waist. Buttocks and lower limbs are classically described. Eyelids, lips, dorsum of hands can also be involved</li> <li>Renal involvement is common</li> <li>Arthritis and abdominal symptoms are also associated in many cases</li> </ul>
Wegners granulomatosis	<ul style="list-style-type: none"> <li>Palpable purpuric nodules are found</li> <li>Renal and pulmonary symptoms are associated</li> </ul>

### What is the dx approach?

- Enquire about medications taken in recent months, history of travel, exposure to insects and animals, immune status and immunization history. It should also include history of any cardiac abnormality including prosthesis, exposure to ill individual and sexually transmitted diseases.

- The age of the child can give a clue to diagnosis. Most of the viral exanthemas occur in younger children. Measles and exanthema subitum occur in children less than 5 years of age.
- Kawasaki disease again is common in younger children especially under 5 years of age. Chicken pox can affect at any age, but again is common at lesser ages. Meningococcal infection is uncommon in India. In countries where it is common there are two peaks at under 5 years of age and the second one during adolescence.
- Rheumatological problems are more common at older ages (e.g. SLE is common in adolescent girls). The present epidemic of dengue can affect at any age, the disease being more severe in infants and younger children.
- The morphology of rash and its associated clinical features are described above and help in arriving at a diagnosis. In most of the situations the associated clinical features can lead a clinician to a reasonable diagnosis, avoiding the need for costly laboratory tests.
- The associated clinical features are also a very useful means of arriving at a diagnosis. Prodrome of upper respiratory infection is seen in most of the viral and bacterial infections like measles, rubella, coxsackie, varicella, adenovirus and scarlet fever to name a few.
- Infectious diseases, Kawasaki disease, toxic shock syndromes and meningococcemia have an acute presentation which differentiates them from fever of insidious onset [e.g. SLE, JIA and polyarteritis nodosa (PAN)].
- Borrelia infections can cause recurrent fevers. Arthritis is an associated feature in most of the rheumatological conditions, HSP, Kawasaki disease, dengue and Chikungunya.
- Organomegaly occurs in brucellosis and Epstein–Barr Virus (EBV) infections. Meningococcemia, dengue, leptospira and toxic shock syndromes can cause wide spread systemic manifestations, multiorgan dysfunction and can be fatal