

INTRODUCTION

- Scabies and pediculosis are infestations of the skin caused by ectoparasites. Scabies is caused by the parasitic mite *Sarcoptes scabiei* and often results in an intense pruritic eruption and itching. Pediculi or lice can cause infestations either on the head (*Pediculus humanus capitis*), body (*Pediculus humanus corporis*), or the pubic region (*Pthirus pubis*). These skin conditions are common causes of skin rash and pruritus (Roos et al 2001, Wendel et al 2002). Head lice infestation crosses all social and geographic boundaries and generally affects children, primarily females, aged 3 to 12 years (Feldmeier 2012). Scabies occur in both sexes, at all ages, and in all ethnic and socioeconomic groups; however, one epidemiologic study reported a higher prevalence in urban areas among women and children (Chosidow 2006, Downs et al 1999).
- The topical agents indicated for the management of scabies and lice are listed in Table 1. All of the agents included in this review are Food and Drug Administration (FDA)-approved for the treatment of head lice with the exception of Croctan (crotamiton), which is only indicated to treat scabies. Lindane lotion indicated to treat scabies has been discontinued; the shampoo is still available for the treatment of lice. Ulesfia (benzyl alcohol) was FDA-approved in 2009; however, in September 2019, it was announced that this product would be discontinued due to a business decision and as of April 2020, the product was discontinued in Medi-Span (FDA drug shortages 2019, Medi-Span Price Rx 2021). Thus, content related to Ulesfia is not included in this review.
- The ideal agent for the treatment of head lice is one with high pediculicidal (capable of killing lice) and ovicidal (capable of killing eggs) activity with minimal toxicity (Villegas et al 2012). With some products that are not ovicidal, retreatment may be recommended in order to kill any newly hatched lice before they can produce new eggs (Devore et al 2015, Centers for Disease Control and Prevention [CDC] 2019[b]).
 - Piperonyl butoxide/pyrethrins and permethrin are pediculicidal, but not ovicidal; retreatment in 9 to 10 days may be recommended (CDC 2019[b]).
 - Malathion is pediculicidal and partially ovicidal, but it is malodorous, requires 8 to 12 hours of application, and is highly flammable. Retreatment is recommended in 7 to 9 days if live lice are still present (CDC 2019[b]).
 - Spinosad kills live lice and unhatched eggs, retreatment is usually not necessary unless live lice are seen after 7 days (CDC 2019[b]).
 - Ivermectin lotion is not ovicidal but appears to prevent nymphs from surviving; retreatment is generally not needed (CDC 2019[b]).
 - Lindane is neurotoxic and is not recommended as an initial treatment option. If used, retreatment should be avoided (CDC 2019[b]). The American Academy of Pediatrics (AAP) no longer recommends use of lindane (AAP Red Book 2018).
 - Abametapir is a metalloproteinase inhibitor which inhibits processes critical to egg development and the survival of lice. It is approved as a single-application product (Xeglyze prescribing information 2020).
- Some data suggest a growing resistance to permethrin in the United States for the treatment of head lice, with recent studies stating that the effectiveness of permethrin has declined to 25% and resistance to pyrethrins is widespread (Koch et al 2016, The Medical Letter 2016). However, the AAP states that 1% permethrin or pyrethrins are reasonable first choices for primary treatment unless resistance to these products has been proven in the community (Devore et al 2015). The CDC notes that resistance to 1% permethrin and piperonyl butoxide/pyrethrins has been reported but its prevalence is unknown (CDC 2019[b]).
 - For head lice, malathion lotion (in patients who are 6 years of age or older), spinosad suspension, and ivermectin lotion are available as additional options (AAP Red Book 2018, CDC 2019[b], Devore et al 2015).
- For scabies, 5% permethrin cream is effective and recommended as a first-line agent (AAP Red Book 2018). Croctamiton is an alternative, but frequent treatment failures have been reported. Oral ivermectin may be considered for patients who fail treatment or for those who cannot tolerate topical therapies, but is not indicated for this use (CDC 2019[d]).
- Medispan class: Scabicides and pediculicides and scabicide combinations.

Table 1. Medications Included Within Class Review

Drug	Generic Availability
Crotan (crotamiton) 10% lotion	✓ *
Lindane 1% shampoo	✓
Natroba (spinosad) 0.9% external suspension	✓
Ovide (malathion) 0.5% lotion	✓
Elimite (permethrin) 5% cream	✓
Permethrin†	✓
Piperonyl butoxide and pyrethrins†	✓
Sklice (ivermectin) 0.5% lotion ‡§	✓
Xeglyze (abametapir) 0.74% lotion	-

*Originator brand, Eurax lotion, has been discontinued. Crotan was approved through the abbreviated new drug application (ANDA) pathway and is now a single-source product.

†Over-the-counter (OTC) product; available formulations vary.

‡The FDA has approved Sklice for OTC use, and the prescription product will be phased out. The specific timing of the switch to OTC availability is pending.

§Additional ivermectin products include a 1% cream (Soolantra) indicated for rosacea and an oral tablet (Stromectol) indicated for strongyloidiasis and onchocerciasis.

|| Launch plans are pending.

(Drugs@FDA 2021, Orange Book: Approved Drug Products with Therapeutic Equivalence Evaluations 2021)

INDICATIONS

Table 2. Food and Drug Administration Approved Indications

Indication	Crotan (crotamiton)	Lindane	Natroba (spinosad)	Ovide (malathion)	Permethrin	Piperonyl butoxide and pyrethrins	Sklice (ivermectin)	Xeglyze (abametapir)
Scabies	✓ **				✓ §#			
Head lice		✓ *	✓ ‡	✓ †	✓ #	✓ ¶	✓ ‡	✓ ‡
Pubic (crab) lice		✓ *				✓ ¶		
Body lice						✓ ¶		

*Lindane shampoo is indicated only for patients who cannot tolerate or have failed treatment with other approved therapies.

† In patients ≥ 6 years of age

‡ In patients ≥ 6 months of age

§ Permethrin 5% cream is indicated for the treatment of scabies.

|| Permethrin 1% lotion/cream rinse is indicated for the treatment of head lice.

In patients ≥ 2 months of age

¶ In patients ≥ 2 years of age

**Safety and effectiveness in children have not been established.

(Clinical Pharmacology 2021; Prescribing information: Crotan 2020, Elimite 2016, Lindane 2019, Natroba 2014, Ovide 2018, Sklice 2017, Xeglyze 2020)

- Information on indications, mechanism of action, pharmacokinetics, dosing, and safety has been obtained from the prescribing information for the individual products, except where noted otherwise.

CLINICAL EFFICACY SUMMARY

Scabies

- In studies comparing various topical agents for the treatment of scabies, a higher cure rate has been reported with permethrin compared to crotamiton and lindane (*Amer et al 1992, Haustein et al 1989, Rao et al 2019, Schultz et al 1990, Taplin et al 1986[b], Taplin et al 1990, Zargari et al 2006*). In the largest study (N = 467), Schultz et al reported that there was a trend toward a higher cure rate with permethrin compared to lindane; however, the difference was not statistically significant (*Schultz et al 1990*). In a single-blind, randomized controlled trial comparing ivermectin to crotamiton (N = 340), 2 applications of ivermectin were as effective as a single application of crotamiton cream for the treatment of scabies at 2 weeks. After repeating therapy, ivermectin was superior to crotamiton cream at 4 weeks follow-up (*Goldust et al 2014*).
- Both lindane and permethrin have also been compared to oral ivermectin for the treatment of scabies. Numerous studies have demonstrated a significantly lower cure rate after 4 weeks with lindane compared to oral ivermectin (*Goldust et al 2013, Madan et al 2001, Mohebbipour et al 2013*). However, another study found similar efficacy between the 2 agents at days 15 and 29 after treatment (*Chouela et al 1999*). Results from another study found that after a single application, permethrin was associated with a higher cure rate compared to ivermectin (*Usha et al 2000*).
- A Cochrane review evaluated 15 studies comparing topical permethrin, topical ivermectin, and oral ivermectin for scabies (*Rosumeck et al 2018*). The meta-analysis found no clear differences in rate of complete clearance of scabies between products, with the exception of the rate of complete clearance after 1 week when comparing topical permethrin to oral ivermectin (relative risk 0.65, 95% confidence interval [CI] 0.54 to 0.78). However, at weeks 2 and 4, there was no difference in the rate of complete clearance for that comparison. Rates of adverse events were similar between all evaluated therapies.
- A meta-analysis evaluated 52 studies comparing treatments for scabies to each other or placebo. These treatments included sulfur, benzyl benzoate, lindane, malathion, crotamiton, permethrin, oral or topical ivermectin, synergized pyrethrins, or herbal treatments. The primary outcome was either clinical or microscopic cure. Secondary outcomes included persistent itching and adverse events. Results of the direct meta-analysis demonstrated permethrin to be significantly better at achieving cure than oral ivermectin, lindane and crotamiton at 1 to 2 weeks and 3 to 6 weeks. Oral ivermectin demonstrated better cure rates than lindane. For persistent itching, oral ivermectin was significantly better than benzyl benzoate and lindane; permethrin was significantly better than lindane. No significant differences between treatments were observed in adverse events. According to the network meta-analysis, the highest probability of cure at 3 to 6 weeks was associated with permethrin + oral ivermectin followed by permethrin alone and topical ivermectin. Topical ivermectin followed by permethrin were the highest ranked for reducing persistent itching. The agents with the lowest probability for adverse events were synthetic pyrethrins, malathion, and oral ivermectin. Sulfur ranked highest in the probability for adverse events followed by permethrin + oral ivermectin (*Thadanipon 2019*).

Lice

- Permethrin has demonstrated a higher rate of treatment success compared to lindane in the treatment of lice following a single application (*Bowerman et al 1987, Brandenburg et al 1986, Kalter et al 1987, Taplin et al 1986[a]*). Compared to the combination of pyrethrins and piperonyl butoxide, permethrin has been shown to be significantly more efficacious (*Carson et al 1988, DiNapoli et al 1988*). Carson et al reported a cure rate of 96.3% for permethrin and a cure rate of 45.2% for the combination of pyrethrins and piperonyl butoxide at 7 days following treatment ($p < 0.005$) (*Carson et al 1988*). In 2 studies, malathion has been reported to have higher rates of cure when compared to permethrin (*Meinking et al 2004, Meinking et al 2007*).
- Two identical, vehicle-controlled studies demonstrating the safety and efficacy of ivermectin lotion in the treatment of head lice were completed in 289 index patients (6 months of age and older). The 2 studies showed that a higher percentage of patients treated with ivermectin lotion, without nit combing, were treatment responders (free of live lice at day 2, which was sustained through days 8 and 15) following a single application compared to vehicle application (study A: 76.1 vs 16.2% at day 15, respectively; study B: 71.4 vs. 18.9% at day 15, respectively; $p < 0.001$ for each comparison). In an extended study population with 781 patients, higher treatment response was seen with ivermectin when compared to vehicle application (combined study results for day 15: 73.8 vs 17.6%, respectively; $p < 0.001$ for each comparison) (*Pariser et al 2012*).
- Spinosad has been evaluated in 2 randomized, active-controlled trials of 1038 patients aged 6 months or older with an active head lice infestation. Patients received spinosad without nit combing or permethrin 1% topical solution with nit combing. Fourteen days following treatment, the spinosad without nit combing treatment arm had a greater proportion of

lice-free patients compared to permethrin with nit combing (study A: 84.6 vs 44.9%, respectively; study B: 86.7 vs 42.9%, respectively; $p < 0.001$ for both trials). Moreover, the majority of patients treated with spinosad required only 1 course of treatment, compared to the majority of permethrin-treated patients who required 2 courses of treatment (p values not reported) (*Stough et al 2009*).

- Abametapir without nit combing was evaluated in 2 double-blind, vehicle-controlled studies in 704 patients aged ≥ 6 months with head lice. All patients received a single application of either abametapir or vehicle control and were evaluated through 14 days. For the evaluation of efficacy, the youngest patient from each household was considered to be the index patient of the household ($n = 216$). Other enrolled infested household members received the same treatment as the youngest subject and were evaluated for all efficacy and safety parameters. Efficacy was assessed as the proportion of index patients who were free of live lice at all follow-up visits on days 1, 7, and 14. In study 1, the proportion of index patients free of live lice at all visits was 81.1% with abametapir vs 50.9% with vehicle ($p = 0.001$). In study 2, the proportion of index patients free of live lice at all visits was 81.8% with abametapir vs 47.2% with vehicle ($p < 0.001$). The most frequently reported adverse events were erythema (4%), rash (3.2%), and skin burning sensation (2.6%) (*Bowles et al 2018*).

CLINICAL GUIDELINES

Scabies

- Treatment guidelines from the CDC and the AAP state that permethrin 5% cream is the drug of choice for children 2 months of age and older with scabies. Crotamiton is available as another option for adult patients, but frequent treatment failures have been reported with this agent. Oral ivermectin may be considered for patients who fail treatment or for those who cannot tolerate topical therapies. Lindane is not recommended due to safety concerns, and the lotion formulation that was FDA-approved for scabies has been discontinued (*AAP Red Book 2018, CDC 2015, CDC 2019[d], Clinical Pharmacology 2021*).
- Crusted scabies should be treated using oral ivermectin in combination with a topical agent (*CDC 2019[d]*).
- Household members and sexual contacts of the affected individual should be treated even if they do not have any signs of an infestation, as it can take **4 to 8 weeks** for symptoms to develop. To prevent re-infestation, all patients should be treated at the same time (*CDC 2019[d]*).
- All clothing, bedding, and towels require decontamination by laundering in hot water and drying in a hot dryer, dry-cleaning, or sealing in a plastic bag for 72 hours. The use of a fumigant or insecticide spray is not recommended (*CDC 2019[d]*).

Lice

- The CDC and the AAP recommend over-the-counter permethrin 1% or piperonyl butoxide/pyrethrin as antiparasitic therapy for the treatment of head lice. However, resistance to these compounds has been documented and clinicians should be aware of regional patterns of clinical resistance. According to the AAP, 1% permethrin or pyrethrins are a reasonable first choice for treatment of head lice unless resistance to these products has been proven in the community (*Devore et al 2015*). Malathion (in patients 6 years of age or older), benzyl alcohol (no longer marketed), spinosad suspension, or ivermectin lotion may be used for the treatment of head lice when treatment with permethrin 1% or piperonyl butoxide/pyrethrin fails despite correct use (*AAP Red Book 2018*). The CDC lists each of these over-the-counter and prescription products as appropriate options without stating a treatment preference (*CDC 2019[b]*).
 - The AAP no longer recommends lindane for use as treatment for head lice. Similarly, lindane is not recommended by the CDC as a first-line treatment. According to the CDC, overuse, misuse, or accidentally swallowing lindane can be toxic to the nervous system; its use should be restricted to patients for whom prior treatments have failed or who cannot tolerate other medications that pose less risk. Lindane should not be used to treat premature infants, persons with human immunodeficiency virus, a seizure disorder, persons who have very irritated skin or sores where the lindane will be applied, women who are pregnant or breastfeeding, infants, children, the elderly, and persons who weigh less than 110 pounds. Retreatment with lindane should be avoided.
- All clothing, bedding, and towels should be laundered in hot water and dried in a hot dryer to avoid another infestation. Items that cannot be washed can be dry-cleaned or sealed in a plastic bag for 2 weeks; combs and brushes should be soaked in hot water (at least 130 degrees Fahrenheit) for 5 to 10 minutes. The use of fumigants is not recommended (*CDC 2019[a], CDC 2019[b], CDC 2019[c]*).

- Non-pharmacological tactics should be used to treat body lice, such as laundering clothing and bedding in hot water as well as regular bathing. If the prescriber determines that pharmacological treatment is necessary, the choice of pediculicide should follow the same guidelines as used for head lice (CDC 2019[a]).
- The CDC recommends permethrin 1% or the combination of piperonyl butoxide and pyrethrins as safe and effective therapies for pubic lice. Lindane shampoo is not recommended as a first-line therapy due to toxicities (CDC 2019[c]).

SAFETY SUMMARY

- Lindane carries a boxed warning for neurologic toxicity, contraindications, and proper use.
 - Lindane should only be used in patients who cannot tolerate or have failed first-line treatment with safer medications.
 - Neurologic toxicity has been reported with lindane use, including seizures and deaths; use with caution in infants, children, the elderly, individuals with other skin conditions, and individuals who weigh less than 110 pounds (50 kg).
 - Lindane is contraindicated in premature infants and individuals with known uncontrolled seizure disorders.
 - Patients should be instructed on the proper use of lindane including amount to apply, how long to leave on, and avoiding retreatment.
- Lindane is contraindicated in patients with crusted (Norwegian) scabies and other skin conditions such as atopic dermatitis or psoriasis that may increase systemic absorption of the drug.
- Malathion lotion is contraindicated in neonates and infants because their scalps are more permeable and may have increased absorption of malathion. Malathion lotion is flammable; patients should be instructed to allow hair to dry naturally after application and avoid use of any electric heat source.
- All topical scabicide and pediculicide products are contraindicated in patients with a sensitivity or allergy to any active or inactive ingredient in the product.
- For the class, adverse events are mostly dermatological in nature.
- Lindane should be used with caution with any drug that is known to lower the seizure threshold. Drug interactions for the remaining products in this class are minimal due to the topical application.
- Natroba and Xeglyze contain benzyl alcohol, which has been associated with serious and fatal adverse reactions including “gasping syndrome” in neonates and low birth weight infants. In order to prevent accidental ingestion in pediatric patients, these agents should only be administered under direct supervision of an adult.
- Products have not been evaluated in the elderly; caution should be exercised when used in this population.

Table 3. Specific Populations

Drug	Pregnancy	Nursing Mothers	Pediatrics
Crotan (crotamiton)	Category C*	Lactation information is not available from the manufacturer so it is unknown whether excreted in breast milk; use with caution.	Safety and effectiveness in pediatric patients have not been established.
Lindane	Category C*	Enters breast milk; use is contraindicated. Discard milk for at least 24 hours after application.	Avoid use in infants and young children due to a higher incidence of adverse reactions and risk of toxicity in this age group.
Natroba (spinosad)	Category B*	Spinosad is not present in breast milk. However, Natroba also contains benzyl alcohol which may be systemically absorbed through the skin. Use only if benefits outweigh the risks and discard breast milk for at least 8 hours after use.	Should not be used in children younger than 6 months old due to risk of benzyl alcohol toxicity.
Ovide (malathion)	Category B*	Unknown whether excreted in breast milk; use with caution.	Should not be used in children younger than 6 years old.

Drug	Pregnancy	Nursing Mothers	Pediatrics
Permethrin	Category B*	Unknown whether excreted in breast milk; due to tumorigenic potential in animal studies, consider discontinuing nursing temporarily or withholding the drug while nursing	Should not be used in children younger than 2 months old.
Piperonyl butoxide and pyrethrins	Category C*	Unknown whether excreted in breast milk; use with caution.	Should not be used in children younger than 2 years old.
Sklice (ivermectin)	Unclassified†: No studies evaluating use in pregnant women. Observational studies have not revealed adverse effects, but these studies cannot definitively rule out any drug-associated risk.	Following oral administration, it is excreted in human milk in low amounts; this has not been evaluated following topical administration.	Should not be used in children younger than 6 months old.
Xeglyze (abametapir)	Unclassified†: No studies evaluating use in pregnant women. Animal model studies have not revealed adverse effects in all studies. These studies cannot definitively rule out any drug-associated risk.	Unknown whether excreted in breast milk; use with caution.	Should not be used in children younger than 6 months old.

*Pregnancy Category B = No evidence of risk in humans, but there remains a remote possibility. Animal reproduction studies have failed to demonstrate a risk to the fetus, and there are no adequate and well-controlled studies in pregnant women. Pregnancy Category C = Risk cannot be ruled out. Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

†In accordance with the FDA's Pregnancy and Lactation Labeling Rule (PLLR), this product is not currently assigned a Pregnancy Category. Consult product prescribing information for details.

DOSING AND ADMINISTRATION

Table 4. Dosing and Administration

Drug	Available Formulations	Route	Usual Recommended Frequency	Comments
Crotan (crotamiton)	lotion	Topical	Apply thoroughly from chin to toes, including skin folds and under fingernails; a second application is recommended 24 hours later. A cleansing bath should be taken 48 hours after the last application.	
Lindane	Shampoo	Topical	Apply to dry hair and leave in place for 4 minutes. Then add a small amount of water until a good lather forms and immediately rinse. Retreatment is not recommended.	

Drug	Available Formulations	Route	Usual Recommended Frequency	Comments
Natroba (spinosad)	Suspension	Topical	Apply to dry scalp and hair; wash off after 10 minutes. A second treatment may be applied after 7 days if live lice are still seen.	
Ovide (malathion)	Lotion	Topical	Apply to dry hair. Leave on 8 to 12 hours then shampoo and rinse. May repeat with a second application after 7 to 9 days if lice are still present.	Product is flammable; avoid smoking, open flame, and hair dryers. Allow hair to dry naturally and uncovered.
Permethrin	Aerosol, cream, crème rinse, lotion	Topical	Scabies: Apply 5% cream from head to soles of feet. Wash off after 8 to 14 hours. Application may be repeated after 14 days if live mites are still present. Lice: Apply 1% crème rinse/lotion on the scalp and damp hair. Leave on for 10 minutes then rinse with water. May repeat after 7 days if live lice are still present.	The 5% cream formulation is approved for scabies and is available by prescription only; the 1% crème rinse and lotion are approved for head lice and are available OTC.
Piperonyl butoxide and pyrethrins	Shampoo, crème rinse	Topical	Apply to hair and scalp. Leave on for no more than 10 minutes then rinse. Treatment should be repeated after 7 to 10 days on dry hair.	If first application is applied on wet hair, reapply after 24 hours.
Sklice (ivermectin)	Lotion	Topical	Apply to dry hair and scalp. Leave on for 10 minutes then rinse with water. Wait 24 hours before using shampoo. For single use only; do not re-treat.	
Xeglyze (abametapir)*	Lotion	Topical	Apply to dry hair and scalp. Leave on for 10 minutes then rinse.	

See the current prescribing information for full details

*Launch plans are pending.

CONCLUSION

- There are a number of effective topical scabicide and pediculicide agents available including Crotan (crotamiton), lindane, Ovide (malathion), Natroba (spinosad), permethrin, piperonyl butoxide with pyrethrins, Sklice (ivermectin), and Xeglyze (abametapir). Permethrin may be used as a first-line therapy for treatment of scabies and lice, despite increasing resistance in the United States (*Downs et al 1999, CDC 2019[b], CDC 2019[d], Devore et al 2015*).
- Permethrin 1% and the combination of pyrethrins and piperonyl butoxide are available OTC; the remaining agents are available by prescription (*CDC 2019[b]*). **The FDA has approved Sklice for OTC use, and the prescription product will be phased out; the specific timing of the switch to OTC availability is pending.**
- According to the AAP, 1% permethrin or pyrethrins are reasonable first choices for treatment of head lice unless resistance to these products has been proven in the community (*Devore et al 2015*). Malathion (in patients 6 years of age or older), benzyl alcohol (no longer marketed), spinosad suspension, or ivermectin lotion may also be used (*CDC 2019[b]*). Lindane, a well-known older agent, is reserved as second-line therapy and carries a boxed warning describing

risk of neurotoxicity associated with its use (CDC 2019[b]). The AAP no longer recommends the use of lindane (AAP Red Book 2018, Devore et al 2015).

- Limited direct comparisons have been completed with agents in this class. Permethrin has demonstrated a higher rate of treatment success compared to lindane in the treatment of lice following a single application (Brandenburg et al 1986, Bowerman et al 1987, Taplin et al 1986[a]). Compared to the combination of pyrethrins and piperonyl butoxide, permethrin was more efficacious several days following treatment; however, one study found the agents to be equally effective after 14 days (Carson et al 1988, DiNapoli et al 1988). Numerous studies have demonstrated a significantly lower cure rate after 4 weeks with lindane compared to oral ivermectin (Goldust et al 2013, Madan et al 2001, Mohebbipour et al 2013); however, one study found no difference at days 15 and 29 following treatments (Chouela et al 1999). In 2 studies, malathion has been reported to have higher cure rates when compared to permethrin (Meinking et al 2004, Meinking et al 2007).
- The newer agents, which include ivermectin, spinosad, and abametapir, have shown cure rates (lice-free at day 14 or 15) of 71 to 76%, 84.6 to 86.7%, and 81.1 to 81.8%, respectively, although there is limited published literature confirming these results.
- Retreatment may be necessary for permethrin and piperonyl butoxide/pyrethrins due to lack of ovicidal efficacy. Retreatment may not be necessary for the prescription products, unless live lice are seen after 7 to 9 days. Retreatment with lindane should be avoided (CDC 2019[b]).
- A comparison of the overall success rates for the topical scabicide products shows 89 to 100% success with permethrin, 65 to 92% with lindane, and 60 to 88% with crotamiton. A meta-analysis demonstrated permethrin to be significantly better at achieving cure than oral ivermectin, lindane, and crotamiton at 1 to 2 weeks and 3 to 6 weeks (Thadanipon 2019). Current clinical guidelines recommend permethrin 5% as the drug of choice for the treatment of scabies. Crotamiton is an alternative, but frequent treatment failures have been reported. Lindane is not recommended due to its toxicity, and the lotion formulation that was approved for scabies has been discontinued. For crusted scabies, oral ivermectin should be co-administered with a topical agent (AAP Red Book 2018, CDC 2015, CDC 2019[d], Clinical Pharmacology 2021).
- Body lice can be managed with nonpharmacological tactics such as laundering clothes and bedding in hot water and regular bathing. Should pharmacological treatment be necessary, the choice of pediculicide should follow the same guidelines as used for head lice (CDC 2019[a]).
- The CDC recommends permethrin or the combination of piperonyl butoxide and pyrethrins as safe and effective for pediculosis pubis (CDC 2019[c]).

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