

## UTILIZATION AND TREATMENT PATTERNS FOR PEDICULICIDES IN MISSISSIPPI MEDICAID

### BACKGROUND

Recent literature has documented the spread of drug-resistant lice in the United States and other countries.<sup>1, 2</sup> OTC pediculicides such as permethrin 1% lotion, benzyl alcohol 5% lotion and pyrethrin lotion are the most commonly used pharmacological treatments for lice. Effective treatment and avoidance of reinfestation is difficult. Recommendations for effective treatment include children not sharing personal items such as combs, brushes, and hats; applying active contact tracing to identify other infested individuals in the household, play group, kindergarten, and school; using wet combing, because only this technique has a sufficiently high sensitivity to detect few head lice; using a non-toxic drug with an efficacy >90% against nymph, adults, and eggs; applying a second treatment 7-9 days after the first one; and synchronizing treatment, i.e. all infested individual have to be treated at the same time.<sup>3</sup> A summary of current lice treatments is included as an attachment at the end of this report.

In January 2016, the Mississippi Division of Medicaid (DOM) switched Ulesfia (benzyl alcohol) to non-preferred status and added a step edit for Natroba (spinosad) to the Mississippi Medicaid Universal Preferred Drug List (UPDL). The current UPDL for this class is shown below.

THERAPEUTIC DRUG CLASS	PREFERRED AGENTS	NON-PREFERRED AGENTS	PA CRITERIA
ANTIPARASITICS (Topical)	PEDICULICIDES		
	permethrin 1% NATROBA (spinosad) <small>Step Edit</small>	lindane malathion OVIDE (malathion) SKLICE (ivermectin) ULESFIA (benzyl alcohol)	<p><b>Minimum Age/Weight Limit for Pediculicides</b></p> <ul style="list-style-type: none"> <li>• 50 kg - lindane shampoo</li> <li>• 2 months - permethrin 1%(OTC)</li> <li>• 6 months - Natroba, SKLICE, Ulesfia</li> <li>• 2 years - piperonyl/pyrethrins (OTC)</li> <li>• 6 years - Ovide</li> </ul> <p><b>Natroba - Step Edit</b></p> <ul style="list-style-type: none"> <li>• History of permethrin 1% topical lotion OR piperonyl/pyrethrin in the past 90 days</li> </ul> <p><b>Non Preferred Criteria</b></p> <ul style="list-style-type: none"> <li>• History of permethrin 1% topical lotion OR piperonyl/pyrethrin in the past 90 days AND</li> <li>• History of Natroba in the past 90 days</li> </ul> <p><b>Ulesfia</b> Ulesfia is no longer covered due to no longer being rebated.</p>

<sup>1</sup> McNair CM. Ectoparasites of medical and veterinary importance: drug resistance and the need for alternative control methods. *Journal of Pharmacy And Pharmacology* 2015: 67:351–63. doi: 10.1111/jphp.12368

<sup>2</sup> Van der Wouden JC, Klootwijk T, Le Cleach L, Do G, Vander Stichele R, Knustingh Neven A, Eekhof JAH. Interventions for treating head lice. *Cochrane Database of Systematic Reviews* 2011, Issue 10. Art. No.: CD009321. DOI: 10.1002/14651858.CD009321.

<sup>3</sup> Feldmeier H. Treatment of Pediculosis Capitis: A Critical Appraisal of the Current Literature. *Am J Clin Dermatol.* 2014;15:401–12. DOI 10.1007/s40257-014-0094-4

Recently DOM has received feedback from providers about concerns regarding resistance to the most frequently used preferred products and the limited number of preferred agents. MS-DUR was asked to conduct an analysis to assess the utilization and treatment patterns for pediculicides in Mississippi Medicaid and to evaluate the potential need for changes in the UPDL.

## METHODS

A retrospective analysis was conducted using Mississippi Medicaid fee-for-service (FFS) and coordinated care organizations [CCOS: United Healthcare (UHC) and Magnolia (Mag)] pharmacy claims for the period January 1, 2015 through December 31, 2015. All prescriptions for pediculicides in the UPDL were extracted for analysis. Prior authorization information was available for the FFS claims only.

For each beneficiary, treatment patterns (regimens) were identified using the following criteria:

- A prescription fill was considered to be a new start of treatment if it was the first prescription for a pediculicides in 90 days.
- All subsequent prescriptions for pediculicides filled without a 90-day gap were considered to be retreatments and were linked to identify the sequence of treatments.
- Prescription claims with greater than a 90 day gap were considered to be new treatment starts, thus beneficiaries could have multiple regimens reported.

## RESULTS

The data shows that permethrin 1% lotion was the most commonly used pediculicide in Mississippi Medicaid in 2015. Table 1 shows the number of beneficiaries from each pharmacy plan and the number of times they filled a pediculicide prescription.

Table 1: Utilization of Anti-lice Agents (January - December 2015)						
Drug	FFS		UHC		Mag	
	Number of Benes	Number of Fills	Number of Benes	Number of Fills	Number of Benes	Number of Fills
Permethrin 1% lotion	1296	1627	1048	1359	977	1247
Benzyl Alcohol 5% lotion (Ulesfia)	506	622	416	544	303	363
Piperonyl butoxide-Pyrethrins topical	47	53	26	29	0	0
Spinosad 0.9% suspension (Natroba)	19	20	21	21	14	14
Malathion 0.5% lotion	18	24	70	78	5	7
Ivermectin 0.5% lotion (SKLICE)	17	19	26	26	6	6

*Note: Prescription encounter data for Magnolia is incomplete for November and December 2015.*

Table 2 shows the number of pediculicide prescriptions filled by each beneficiary in 2015 by each pharmacy plan. Although the majority (71.5% overall) had a single prescription filled for a pediculicide, more than a fourth (28.5%) of beneficiaries had more than one treatment during 2015 indicating the failure of successful treatment and/or re-infestation. The high number of retreated patients could signify development of resistance or simply incomplete treatment of the home environment.

Table 2: Number of Anti-lice Agent Prescription Fills in 2015 (January - December 2015)								
Number of Rx Fills	FFS		UHC		Magnolia		Total	
	#	%	#	%	#	%	#	%
1	1120	78.7%	1008	66.4%	869	69.5%	2997	71.5%
2	222	15.6%	336	22.1%	247	19.8%	805	19.2%
3	69	4.8%	107	7.0%	79	6.3%	255	6.1%
4	10	0.7%	36	2.4%	24	1.9%	70	1.7%
5	3	0.2%	18	1.2%	17	1.4%	38	0.9%
6	0	0.0%	5	0.3%	3	0.2%	8	0.2%
7	0	0.0%	3	0.2%	4	0.3%	7	0.2%
8	0	0.0%	3	0.2%	1	0.1%	4	0.1%
9	0	0.0%	2	0.1%	4	0.3%	6	0.1%
10	0	0.0%	0	0.0%	2	0.2%	2	0.0%
14	0	0.0%	1	0.1%	0	0.0%	1	0.0%
Total	1424		1519		1250		4193	

*Note: Prescription encounter data for Magnolia is incomplete for November and December 2015.*

A 90-day washout period for a pediculicide was used to identify the first complete drug regimen occurring in 2015 for each beneficiary. Table 3 shows the agents used in 2015 following the 90-day washout period. Compliance with the UPDL appears to be very good in all three plans but does vary by plan. Magnolia had the highest rate of compliance with only 0.7% of first drugs in regimens being non-preferred products compared to 2.4% for FFS and 5.4% for United Healthcare.

<b>Table 3: Drugs Used for First Regimen in 2015 Following 90-day Washout Period (FFS and CCO January - December 2015)</b>					
<b>Drug</b>	<b>FFS</b>			<b>UHC</b>	<b>Mag</b>
	<b>Prior Authorization</b>				
	<b>Manual</b>	<b>Smart</b>	<b>Total</b>		
Permethrin 1% lotion	5	419	424	854	777
Benzyl Alcohol 5% lotion (Ulesfia)	1	194	195	309	206
Piperonyl butoxide-Pyrethrins topical	0	12	12	20	0
Malathion 0.5% lotion	6	0	6	44	0
Ivermectin 0.5% lotion (SKLICE)	4	1	5	12	1
Spinosad 0.9% suspension (Natroba)	5	0	5	11	6
<b>Total</b>	<b>21</b>	<b>626</b>	<b>647</b>	<b>1250</b>	<b>990</b>

*Note: Prescription encounter data for Magnolia is incomplete for November - December 2015. Should have little, if any impact on this table.*

Table 4 shows the frequency of each treatment regimen identified after the initial 90-day washout period. As expected, one-time treatment with permethrin and Ulesfia lotion were the most common treatment options (54.8% and 20.2%, respectively). Overall, 78.7% of the regimens identified included a single treatment. Although the number of cases are not very high, it is concerning that beneficiaries are sometimes retreated with the same agent which could indicate inadequate treatment technique or could contribute significantly to the development of resistance in the household.

<b>Table 4: Regimen Combinations Occurring After 90-day Washout Period (FFS and CCOs January - December 2015)</b>								
<b>Regimen</b>	<b>FFS</b>		<b>UHC</b>		<b>MAG</b>		<b>TOTAL</b>	
	<b>Number of Benes</b>	<b>%</b>	<b>Number of Benes</b>	<b>%</b>	<b>Number of Benes</b>	<b>%</b>	<b>Number of Benes</b>	<b>%</b>
Permethrin	362	48.5%	711	53.1%	629	61.7%	1702	54.8%
Ulesfia	176	23.6%	270	20.2%	182	17.8%	628	20.2%
Permethrin; Permethrin	62	8.3%	142	10.6%	113	11.1%	317	10.2%
Ulesfia; Ulesfia	20	2.7%	46	3.4%	28	2.7%	94	3.0%
Permethrin; Permethrin; Permethrin	15	2.0%	19	1.4%	26	2.5%	60	1.9%
Malathion	5	0.7%	44	3.3%	0	0.0%	49	1.6%
Permethrin; Ulesfia	25	3.4%	12	0.9%	9	0.9%	46	1.5%
Pip butox/Pyr	10	1.3%	18	1.3%	0	0.0%	28	0.9%
Natroba	6	0.8%	9	0.7%	5	0.5%	20	0.6%
Ulesfia; Ulesfia; Ulesfia	9	1.2%	10	0.7%	1	0.1%	20	0.6%
SKLICE	4	0.5%	11	0.8%	1	0.1%	16	0.5%

Ulesfia; Permethrin	4	0.5%	7	0.5%	2	0.2%	13	0.4%
Permethrin; Permethrin; Permethrin; Permethrin	4	0.5%	4	0.3%	3	0.3%	11	0.4%
Permethrin; Permethrin; Ulesfia	5	0.7%	1	0.1%	5	0.5%	11	0.4%
Permethrin; Ulesfia; Ulesfia	2	0.3%	4	0.3%	3	0.3%	9	0.3%
Permethrin; Permethrin; Permethrin; Permethrin; Permethrin	4	0.5%	1	0.1%	1	0.1%	6	0.2%
Permethrin; Permethrin; Ulesfia; Ulesfia	2	0.3%	3	0.2%	0	0.0%	5	0.2%
Permethrin; SKLICE	0	0.0%	3	0.2%	2	0.2%	5	0.2%
Pip butox/Pyr; Pip butox/Pyr	2	0.3%	3	0.2%	0	0.0%	5	0.2%
Permethrin; Natroba	2	0.3%	1	0.1%	1	0.1%	4	0.1%
Malathion; Malathion	1	0.1%	2	0.1%	0	0.0%	3	0.1%
Permethrin; Ulesfia; Permethrin	1	0.1%	2	0.1%	0	0.0%	3	0.1%
Ulesfia; Malathion	0	0.0%	1	0.1%	2	0.2%	3	0.1%
Ulesfia; Permethrin; Permethrin	2	0.3%	1	0.1%	0	0.0%	3	0.1%
Natroba; Ulesfia	0	0.0%	1	0.1%	1	0.1%	2	0.1%
Permethrin; Malathion	0	0.0%	2	0.1%	0	0.0%	2	0.1%
Permethrin; Permethrin; Permethrin; Pip butox/Pyr	2	0.3%	0	0.0%	0	0.0%	2	0.1%
Ulesfia; Ulesfia; Ulesfia; SKLICE	2	0.3%	0	0.0%	0	0.0%	2	0.1%
Ulesfia; Ulesfia; Ulesfia; Ulesfia	1	0.1%	1	0.1%	0	0.0%	2	0.1%
Malathion; Malathion; Malathion	1	0.1%	0	0.0%	0	0.0%	1	0.0%
Natroba; Permethrin	0	0.0%	1	0.1%	0	0.0%	1	0.0%
Permethrin; Permethrin; Malathion	0	0.0%	1	0.1%	0	0.0%	1	0.0%
Permethrin; Permethrin; Malathion; Permethrin; Ulesfia	1	0.1%	0	0.0%	0	0.0%	1	0.0%
Permethrin; Permethrin; Permethrin; Permethrin; Malathion	1	0.1%	0	0.0%	0	0.0%	1	0.0%
Permethrin; Permethrin; Permethrin; Permethrin; Permethrin; Permethrin	1	0.1%	0	0.0%	0	0.0%	1	0.0%

Permethrin; Permethrin; Permethrin; Permethrin; Ulesfia	0	0.0%	0	0.0%	1	0.1%	1	0.0%
Permethrin; Permethrin; Permethrin; Ulesfia	0	0.0%	0	0.0%	1	0.1%	1	0.0%
Permethrin; Permethrin; Pip butox/Pyr	0	0.0%	1	0.1%	0	0.0%	1	0.0%
Permethrin; Permethrin; Ulesfia; Natroba	0	0.0%	0	0.0%	1	0.1%	1	0.0%
Permethrin; Permethrin; Ulesfia; Permethrin; SKLICE	0	0.0%	0	0.0%	1	0.1%	1	0.0%
Permethrin; Pip butox/Pyr	0	0.0%	1	0.1%	0	0.0%	1	0.0%
Permethrin; Pip butox/Pyr; Permethrin	1	0.1%	0	0.0%	0	0.0%	1	0.0%
Permethrin; SKLICE; Permethrin; Permethrin; Ulesfia	1	0.1%	0	0.0%	0	0.0%	1	0.0%
Permethrin; SKLICE; Permethrin; Permethrin; Ulesfia; Ulesfia	1	0.1%	0	0.0%	0	0.0%	1	0.0%
Permethrin; SKLICE; Permethrin; Ulesfia	0	0.0%	1	0.1%	0	0.0%	1	0.0%
Permethrin; Ulesfia; Malathion	1	0.1%	0	0.0%	0	0.0%	1	0.0%
Permethrin; Ulesfia; Ulesfia; Ulesfia	0	0.0%	1	0.1%	0	0.0%	1	0.0%
Pip butox/Pyr; Permethrin	1	0.1%	0	0.0%	0	0.0%	1	0.0%
Pip butox/Pyr; Ulesfia	1	0.1%	0	0.0%	0	0.0%	1	0.0%
SKLICE; Permethrin	1	0.1%	0	0.0%	0	0.0%	1	0.0%
SKLICE; SKLICE	1	0.1%	0	0.0%	0	0.0%	1	0.0%
SKLICE; Ulesfia	0	0.0%	1	0.1%	0	0.0%	1	0.0%
Ulesfia; Malathion; Malathion	0	0.0%	0	0.0%	1	0.1%	1	0.0%
Ulesfia; Natroba	0	0.0%	1	0.1%	0	0.0%	1	0.0%
Ulesfia; Permethrin; Malathion; Malathion	1	0.1%	0	0.0%	0	0.0%	1	0.0%
Ulesfia; Permethrin; Natroba	1	0.1%	0	0.0%	0	0.0%	1	0.0%
Ulesfia; Permethrin; Ulesfia	1	0.1%	0	0.0%	0	0.0%	1	0.0%
Ulesfia; Permethrin; Ulesfia; SKLICE	0	0.0%	1	0.1%	0	0.0%	1	0.0%
Ulesfia; Ulesfia; Permethrin; Permethrin; Natroba	0	0.0%	0	0.0%	1	0.1%	1	0.0%

Ulesfia; Ulesfia; Permethrin; Ulesfia; Ulesfia	1	0.1%	0	0.0%	0	0.0%	1	0.0%
Ulesfia; Ulesfia; SKLICE	0	0.0%	1	0.1%	0	0.0%	1	0.0%
Ulesfia; Ulesfia; Ulesfia; Permethrin	1	0.1%	0	0.0%	0	0.0%	1	0.0%
Ulesfia; Ulesfia; Ulesfia; Ulesfia; Ulesfia; Permethrin	1	0.1%	0	0.0%	0	0.0%	1	0.0%
Total	746		1339		1020		3105	

*Note: Prescription encounter data for Magnolia is incomplete for November and December 2015.*




## **CONCLUSIONS**

Treatment patterns for pediculicides seem to follow expected patterns with respect to utilization of preferred products. However, some beneficiaries appear to be undergoing extended therapies using the same or similar products several times, which could suggest inappropriate treatment or an increase in drug-resistant lice.




## **DUR BOARD ACTION REQUESTED**

- a. Feedback regarding the increased prevalence of lice and the possibility of drug-resistance.

# SUMMARY OF LICE TREATMENTS

Brand/Generic Name	Route	Cidal Activity	MOA	FDA-approved ages	Summary of Application
<b>Nix</b> <ul style="list-style-type: none"> <li>permethrin 1%</li> <li>OTC</li> </ul>	Topical cream rinse 	Pediculicidal – kills live lice	<ul style="list-style-type: none"> <li>Synthetic pyrethroid that delay repolarization of neuron by affecting voltage-gated Na<sup>+</sup> channels → leads to nervous system hyperstimulation which results in paralysis</li> </ul>	Individuals ≥ 2 moa	<ul style="list-style-type: none"> <li>Apply to damp hair</li> <li>Leave on hair for 10 minutes then rinse with warm water</li> <li>Towel dry hair and comb out tangles</li> <li><b>Retreat</b> 7 days after initial treatment (9 days per CDC)</li> <li>1 bottle: 2 oz (59 mL)</li> </ul>
<b>Rid, A-200, Pronto, R&amp;C, Triple X, Licide</b> <ul style="list-style-type: none"> <li>pyrethrins + piperonyl butoxide</li> <li>OTC</li> <li>Contraindicated if chrysanthemum/ragweed allergy</li> </ul>	Topical shampoo or mouse formulation 	Pediculicidal – kills live lice	<ul style="list-style-type: none"> <li><b>Naturally</b> occurring pyrethroid extract from <b>chrysanthemum</b></li> <li>Delay repolarization of neuron by affecting voltage-gated Na<sup>+</sup> channels → leads to nervous system hyperstimulation which results in paralysis</li> </ul>	Individuals ≥ 2 yoa	<ul style="list-style-type: none"> <li>Apply to dry hair</li> <li>Leave on hair for 10 minutes then rinse with warm water</li> <li>Comb out damp hair with regular wide-tooth comb</li> <li><b>Retreat</b> 9-10 days after initial treatment</li> <li>1 bottle: 2 oz (59 mL)</li> </ul>
<b>Sklice</b> <ul style="list-style-type: none"> <li>ivermectin 0.5%</li> <li>Prescription</li> </ul>	Topical lotion 	<b>Not</b> ovicidal - does not kills unhatched eggs) but prevents nymphs (newly hatched lice) from surviving	<ul style="list-style-type: none"> <li>Increases the Cl<sup>-</sup> permeability of muscle cells, resulting in hyperpolarization, paralysis, and death</li> </ul>	Individuals ≥ 6moa	<ul style="list-style-type: none"> <li>Apply to dry hair and dry scalp</li> <li>Leave on hair for 10 minutes and rinse with water</li> <li><b>Do NOT retreat</b></li> <li>1 bottle: 4 oz (120 mL)</li> </ul>



<p><b>Ulesfia</b></p> <ul style="list-style-type: none"> <li>benzyl alcohol 5%</li> <li>Prescription</li> </ul>	<p>Topical lotion</p> 	<p>Pediculicidal—kills live lice</p>	<ul style="list-style-type: none"> <li>Kills by asphyxiation; inhibits lice from closing their respiratory spiracles, allows the vehicle to obstruct the spiracles and causes the lice to asphyxiate</li> </ul>	<p>Individuals <math>\geq</math> 6 moa and <math>\leq</math> 60 yoa</p>	<ul style="list-style-type: none"> <li>Apply to <b>dry</b> scalp and <b>dry</b> hair</li> <li>Leave on hair for 10 minutes and rinse with water</li> <li><b>Retreat</b> 7 days after initial treatment (PI) although 9 days may be more effective (CDC)</li> <li>1 bottle: 8 oz (240 mL)</li> </ul>
<p><b>Ovide</b></p> <ul style="list-style-type: none"> <li>malathion 0.5%</li> <li>Prescription</li> </ul>	<p>Topical lotion</p> 	<p>Pediculicidal—kills live lice and ovicidal - kills unhatched eggs</p>	<ul style="list-style-type: none"> <li>Organophosphate that inhibits cholinesterase activity, resulting in increased acetylcholine concentrations <math>\rightarrow</math> excess cholinergic activity causes nervous system hyperstimulation and prevents feeding</li> </ul>	<p>Individuals <math>\geq</math> 6yoa</p>	<ul style="list-style-type: none"> <li>Apply to dry hair and dry scalp</li> <li>Allow hair to <b>air dry</b> (malathion is <u>flammable</u>)</li> <li>Shampoo hair after 8-12 hours</li> <li>Rinse and use fine-toothed (nit) comb to remove dead lice and eggs</li> <li><b>Retreat</b> if live lice are seen 7-9 days</li> <li>1 bottle: 2 oz (59 mL)</li> </ul>
<p><b>Natroba</b></p> <ul style="list-style-type: none"> <li>spinosad 0.9%</li> <li>Prescription</li> </ul>	<p>Topical suspension</p> 	<p>Pediculicidal—kills live lice and ovicidal- kills unhatched eggs</p>	<ul style="list-style-type: none"> <li>Causes hyperexcitability of nervous system that results in paralysis and death</li> </ul>	<p>Individuals <math>\geq</math> 4yoa</p>	<ul style="list-style-type: none"> <li>Apply first to dry scalp, then to dry hair in amount sufficient to cover entirely</li> <li>Apply up to 120 mL (depends on hair length)- only the amount needed to cover the scalp and hair is used</li> <li>Leave on for 10 minutes and rinse with warm water</li> <li><b>Retreat</b> if live lice are seen after 7 days</li> <li><b>Does NOT require nit combing</b></li> <li>1 bottle: 4 oz (120 mL)</li> </ul>