



## Stockholm Convention on Persistent Organic Pollutants

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**Conference of the Parties to the Stockholm  
Convention on Persistent Organic Pollutants  
Sixth meeting**

Geneva, 28 April–10 May 2013

Item 5 (a) (ii) of the provisional agenda\*

**Matters related to the implementation of the Convention:  
measures to reduce or eliminate releases from intentional  
production and use: exemptions**

### **Report on a study of health sector information sources on the availability of lindane as a pharmaceutical and its alternatives as a treatment for head lice and scabies**

#### **Note by the Secretariat**

As referred to in document UNEP/POPS/COP.6/5 on the register of specific exemptions and the register of acceptable purposes, the annex to the present note sets out the report of a study, undertaken by the Secretariat, in cooperation with the World Health Organization, of health sector information sources on the availability of lindane as a pharmaceutical and its alternatives as a treatment for head lice and scabies. The annex has not been formally edited.

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\* UNEP/POPS/COP.6/1.

**Annex**

SECRETARIAT OF THE STOCKHOLM CONVENTION

# Pharmaceutical uses of lindane

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as a treatment for scabies and head lice

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## Acknowledgements

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This is a report based on a study of health sector information sources on lindane as a pharmaceutical and its alternatives for head lice and scabies to further the understanding of prevailing situation for the implementation activities of the work programme on developing reporting and reviewing requirements for continued need for lindane endorsed by decision SC-4/15. The study gathered information from World Health Organization databases, public information sources and, a survey of the pharmaceutical market in limited countries. The Secretariat acknowledges the information provided by IMS HEALTH Institute for Healthcare Informatics in compiling the report. The contributions by Ms. Eun Byul Ko, in database searching and compiling preliminary information, and Mr. Ricky Dunn, in the editing of the report, as part of their assignments as interns at the Secretariat of the Stockholm Convention are gratefully acknowledged.

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## I. INTRODUCTION

1. At the fourth meeting of the Conference of the Parties held in 2009, in its decision SC- 4/15, lindane was listed in the Convention under Annex A with specific exemptions for use as a human health pharmaceutical only for the control of head lice and scabies as second line treatment. For the Parties that may wish to use lindane for the control of head lice and scabies, the specific exemptions are available for that purpose until August 26, 2015.
2. In the same decision the Secretariat was requested to develop a work plan in collaboration with the World Health Organization (WHO) for reporting and reviewing requirements on the use of lindane for the specific exemptions allowed by the Convention.
3. The Conference of the Parties, at its fifth meeting, took note of the Secretariat's report on the development of reporting and reviewing requirements for the use of lindane and in its decision SC- 5/8, requested the Secretariat, subject to the availability of resources, to take the lead in implementing the proposed activities, in cooperation with the WHO. As part of the work plan, the Secretariat in collaboration with the WHO undertook a limited study of the health sector to enhance the understanding of current status of lindane as pharmaceutical and accessibility to alternatives for the control of head lice and scabies.
4. This report summarizes the information gathered from WHO database archives, pharmaceutical industry and several developing countries.
5. It is worth noting that this report contains only limited information on the availability of lindane in selected countries. Therefore, the issue of scheduling of lindane in countries is not discussed here.

## II. METHODOLOGY

6. Data on the use of lindane and other alternatives for head lice and scabies were collected from the following sources:
  - The WHO Model List of Essential Medicines;
  - The WHO database on National Essential Medicines Lists;
  - A limited local market survey at pharmacies in selected countries on the availability of lindane and/or its alternatives;
  - Pharmaceutical industry information accessible to the public.
7. The review of the editions of the WHO Model List of Essential Medicines, which is updated every two years, focused on the status evolution of lindane as a pharmaceutical. The WHO model list serves as guidance for countries to develop their own national essential medicines lists. The national essential medicines lists were viewed to understand the geographical distribution of use of lindane and availability of alternative pharmaceuticals for the control of head lice and scabies.
8. For the market survey, the Stockholm Convention regional centres and some national research institutions in Brazil, India, Kenya, Mexico, Nepal, Sri Lanka, South Africa, Senegal and Thailand were invited to take part on voluntary basis. A short questionnaire was provided by the Secretariat (Annex I) to facilitate collecting the information. Responses to the above request were received from India, Mexico, Nepal, Senegal and Sri Lanka.
9. An internet based survey was conducted to search trade names of lindane and its chemical alternatives and relevant marketing information. The primary sources for the internet search were product lists in pharmaceutical companies' websites, online drug stores for pharmaceutical professionals and national medicines list.

## III. RESULTS

### A. Listing of lindane on the WHO Model List and National Essential Medicines List

10. The WHO Model List of Essential Medicines (WHO Model List) has been regularly published since 1977. Essential medicines, according to the WHO, are medicines that satisfy the priority health care needs of a population. The list provides as a guide for countries to develop their own National

Essential Medicines List (NEML)<sup>1</sup>. Lindane (gamma benzene hexachloride) has been listed from 1977 and 1990 in the WHO Model List with benzyl benzoate and permethrin as a cost-effective alternative to lindane for head lice and scabies. Lindane has been removed from the WHO Model List in 1992 on the basis that “it is toxic to the environment and humans, and safer alternatives are available”. In 1998, an age-restriction had been introduced to one of the lindane alternatives, benzyl benzoate inviting countries to select other alternatives within the equivalent pharmacological class depending on local availability, costs and local resistance patterns. At present, benzyl benzoate (lotion 25%) is included in the WHO Model List with age restriction of more than 2 years old along with permethrin (cream 5%, lotion 1%) as pharmaceuticals for head lice and scabies. According to sources of the Department of Essential Medicines and Health Care Products at WHO, malathion and croamiton could be considered as common alternatives to benzyl benzoate though they are not listed as such. A summary of the information related to lindane and its alternatives found in WHO Model List is presented in Annex II to this report.

11. Of all 99 NEMLs examined, 24 countries listed lindane as essential medicine for treatment of scabies and pediculosis. Table.1 summarizes information available in NEMLs of countries where use lindane has been cited. Among the countries reported in the WHO database, Asia and Pacific States are the majority that appears to include lindane for scabicides and pediculicides control. The NEMLs only provide information on lindane considered as an essential medicine. However, it may be possible that lindane is available in the country; although it is not on the NEML, it can be registered and imported into the country. The National Essential Medicines List is not a comprehensive list of all the medicines that are available in the country. Therefore the above account does not take into account those countries where lindane is not considered as an essential medicine but still used as a pharmaceutical. Further, an update on the published year of the NEMLs may provide a clearer guidance on the current status of lindane in respective countries.

**Table.1** Lindane listed under National Essential Medicines Lists

Region	Country	Published year	Amount of lindane ( $\gamma$ -HCH)
Asian and Pacific States	Afghanistan	2007	1% topical lotion
	Bhutan	2009	100ml
	Cook Islands	2007	1% ointment
	Iran (Islamic Republic)	2009	1% lotion 1% shampoo
	Malaysia	2008	0.1%
	Maldives	2009	1%
	Marshall Islands	2007	1% lotion
	Nauru	2010	1% cream
	Nepal	2009	1% cream or lotion
	Palau	2006	Unknown
	Papua New Guinea	2002	Unknown
	Thailand	2008	Unknown (cream)
	Yemen	2006	1%
Latin American and Caribbean States	Belize	2009-2011	1% cream (50g) 1% shampoo (200ml) 1% lotion
	Chile	2005	1% emulsion
	Guyana	2009-2010	1% lotion as complementary drug
	Jamaica	2008	1% cream
	Trinidad and Tobago	2010	Unknown
	Uruguay	2008	Unknown
African States	Cameroon	2003	1% cream
	Ghana	2010	1% lotion
	Senegal	2008	400 mg
	Tunisia	Not available	Unknown
	Zimbabwe	2006	1% lotion (not used during pregnancy and lactation)

<sup>1</sup> Medicines: essential medicines; cited in September 2012 in WHO website <http://www.who.int/mediacentre/factsheets/fs325/en/>

## B. Accessibility to lindane as a pharmaceutical

12. Information on the prevalence of lindane as a pharmaceutical for head lice and scabies in the marketing network were gathered at global and local level. The industry information accessible to the public and limited local market survey of pharmacies in some countries in Asia, Africa and Latin America were included in this study. It also focused on the availability of alternatives to lindane as a pharmaceutical and information from national health systems in relation to regulation of lindane.

### *Global Supply Network*

13. According to a global supplier of generic medicine to developing countries, there have been no recent marketing activities of lindane containing pharmaceutical products. In 2009 the company has supplied 31,000 of 100ml bottles of lindane preparation manufactured in India. However, there seems to be regional and sub-regional marketing activities mainly in developing countries. Several pharmaceutical suppliers have listed lindane and its alternatives in their respective websites and number of different countries where the products have been offered to, as recently as in January 2012. The surveys conducted at local pharmacies have also reported lindane products from several different suppliers. Trade names of lindane and its alternative pharmaceutical products found in the study are reproduced in Annex III and IV, respectively.

### *Local supply*

14. In 2012, nearly 20 countries were still using lindane as a pharmaceutical while a total of 32 countries reported to have been using lindane sometime in the past<sup>2</sup>. The countries include Argentina, Austria, Brazil, Canada, Costa Rica, Dominican Republic, Ecuador, Egypt, El Salvador, Guatemala, Honduras, Hong Kong, India, Indonesia, Korea, Lebanon, Malaysia, Mexico, New Zealand, Nicaragua, Pakistan, Panama, Paraguay, Puerto Rico, South Africa, Slovakia, Sri Lanka, Taiwan, Thailand, Tunisia, Uruguay, United States of America.

15. From 2002, the use of lindane has been increased by 6% per annum in middle income countries till 2009<sup>2</sup>, the year in which lindane was listed under the Stockholm Convention as a POPs. During the same period, usage has decreased in high income countries by 9% per annum. In both middle and high income countries, usage has declined since 2009 by 2% and 5% per annum, respectively (Table 2).

**Table 2:** Usage of lindane as a pharmaceutical in middle and high income countries<sup>2</sup>

	Annual usage (kg)		
	2002	2009	2012
<b>Middle income countries</b>	9789	15015	13571
<b>High income countries</b>	1410	393	316
<b>Total</b>	11199	15408	13887

16. Results of the study on domestic markets of lindane and its alternatives in participated countries are summarized below. The sources of information include pharmaceutical industry of respective countries and surveys conducted at local pharmacies by the Stockholm Convention regional centres and some national research institutions.

### **India**

17. The survey on availability of lindane in the market was carried out at local pharmacies in Nagpur, India. Pharmaceutical products containing 1% of lindane are available in both lotion and cream. Further it was reported that both the final products and the active pharmaceutical ingredient of lindane were manufactured in India.

18. Several alternatives to lindane are also available at pharmacies in Nagpur, India including benzyl benzoate, permethrin and crotamiton.

<sup>2</sup> IMS HEALTH Institute for Healthcare Informatics; Data Sources for Pharmaceutical Policy Analysis In Low- and Middle-Income Countries; [http://www.imshealth.com/deployedfiles/ims/Global/Content/Insights/IMS%20Institute%20for%20Healthcare%20Informatics/Global%20Health%20Research%20Program/Data\\_Sources\\_Global\\_Research.pdf](http://www.imshealth.com/deployedfiles/ims/Global/Content/Insights/IMS%20Institute%20for%20Healthcare%20Informatics/Global%20Health%20Research%20Program/Data_Sources_Global_Research.pdf), accessed 18 April 2013

19. In India, lindane has been removed from the NEML in 2011 and has replaced with permethrin (cream and lotion) has as its alternative.

### **Nepal**

20. Lindane pharmaceutical products are reported to be commonly available at hospitals in Nepal. However, a declining trend has been seen in the use of these products because permethrin has slowly replaced the market of lindane.

21. Cream or lotion forms of lindane for the treatment of head lice and scabies are listed in the NEML of Nepal published in 2009.

### **Senegal**

22. In Senegal, it was reported through the local survey that there is no active production, import and export of lindane through registered channels. Also, there is no regulation of use of lindane for head lice or scabies treatments. Public outreach programmes on the use of lindane or initiatives to promote methods or strategies to substitute lindane products are not in place.

23. In terms of pharmaceutical purposes, lindane has been included in the national list of essential drugs and materials in 2008 by order of the Ministry of Health. Lindane has been used as a dermatological medicine for treatment of scabies and head lice. It is sold in powder form containing 400 mg of lindane.

24. According to the survey undertaken in local pharmacies, benzyl benzoate is used as an alternative to lindane in Senegal and sold in the form of lotion.

25. The NEML published by Senegal in 2008 include lindane for the treatment of head lice and scabies.

### **Sri Lanka**

26. The study conducted in Sri Lanka included 18 pharmacies from the capital city and its suburbs, Wellawatte, Bambalapitiya, Town Hall, Borella, Pannipitiya and Ja-ela. It was found that lindane was available in 17 out of 18 pharmacies examined. However, benzyl benzoate, permethrin, sulphur, malathion and natural products were also available in the pharmacies as possible alternative medicines for head lice and scabies.

27. No records of lindane found in NEMLs of Sri Lanka examined but has registered for specific exemptions of lindane under the Stockholm Convention for the treatment of head lice and scabies.

### **Mexico**

28. The pharmacies surveyed during the study were those located in the north, east and south of Mexico. In general, head lice and scabies are commonly treated by over-the-counter medicines with consultations from pharmacists. Based on this survey, lindane pharmaceutical products are not available at pharmacies in Mexico.

29. As part of the North American Agreement on Environmental Cooperation the Mexican government has banned all lindane products in 2006 and undertaken the implementation of the North American Regional Action Plan on lindane and other HCH isomers<sup>3</sup>. These initiatives have facilitated Mexico to effectively reduce the reliance on lindane and introduce alternatives for the treatment of head lice and scabies including permethrin, sulphur soap, pyrethrin soap, ivermectin (oral) benzyl benzoate and crotamiton.

## **C. Alternatives to lindane as pharmaceuticals**

30. The sources of WHO and national EMLs show many countries primarily use alternative measures for the treatment of scabicides and pediculicides. The most common alternative is benzyl benzoate (25% lotion) and permethrin at 1-5% as seen in Table.3, which are listed as national essential medicines. However, other alternatives such as ivermectin is also used as reported in some countries (Table 4).

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<sup>3</sup> [http://www.cec.org/Storage/36/2797\\_NARAP\\_on\\_Lindane\\_and\\_Other\\_Hexachlorocyclohexane\\_Isomers.pdf](http://www.cec.org/Storage/36/2797_NARAP_on_Lindane_and_Other_Hexachlorocyclohexane_Isomers.pdf)



**Table.3:** Benzyl benzoate and/or permethrin based alternatives to lindane listed under National Essential Medicines Lists

Benzyl benzoate and/or permethrin			
Asian and Pacific States	Latin American and Caribbean States	African States	Central Eastern, Western European and Other States
Cambodia	Argentina	Algeria	Armenia
Democratic People's Republic of Korea	Brazil	Burundi	Republic of Moldova
Fiji	Colombia	Cameroon	Slovakia
India	Dominican Republic	Central African Republic	Slovenia
Indonesia	Ecuador	Congo	Ukraine
Iran (Islamic Republic)	Guyana	Democratic Republic of Congo	
Iraq	Honduras	Congo	
Kiribati	Jamaica	Djibouti	
Kyrgyzstan	Mexico	Egypt	
Malaysia	Nicaragua	Eritrea	
Maldives	Paraguay	Ghana	
Marshall Islands	Peru	Lesotho	
Myanmar	Trinidad and Tobago	Mali	
Nauru	Uruguay	Mauritania	
Nepal		Namibia	
Palau		Nigeria	
Oman		Rwanda	
Pakistan		Senegal	
Solomon Islands		Somalia	
Sri Lanka		Sudan	
Syrian Arab Republic		Tunisia	
Thailand		Uganda	
Tajikistan		United Republic of Tanzania	
Timor-Leste			
Tonga			
Tuvalu			
Vanuatu			

**Table 4:** Chemicals other than benzyl benzoate and permethrin listed under National Essential Medicines Lists as alternatives to lindane

Other Chemical Alternatives: Benzoic acid and Salicylic acid <sup>¥</sup> , Sulphur <sup>α</sup> , Malation <sup>β</sup> , Pyrethrin <sup>‡</sup> , Piperonyl butoxide <sup>π</sup> , Crotamiton <sup>Σ</sup> , Esdepallethrin <sup>Ω</sup> , Ivermectin <sup>δ</sup> , Acetylsalicylic acid <sup>‡</sup>			
Asian and Pacific States	Latin American and Caribbean States	African States	Central Eastern, Western European and Other States
Afghanistan <sup>¥</sup>	Argentina <sup>‡, π</sup>	Lesotho <sup>Δ, ≈</sup>	Ukraine <sup>π, β</sup>
Indonesia <sup>¥, α</sup>	Colombia <sup>Σ</sup>	Mali <sup>Σ</sup>	
Iraq <sup>α</sup>	Chile <sup>Σ, π, α</sup>	Mauritania <sup>¥</sup>	
Oman <sup>β, ‡, π</sup>	Uruguay <sup>‡, β</sup>	Somalia <sup>‡, ?</sup>	
Palau <sup>Σ</sup>		South Africa <sup>δ</sup>	
Philippines <sup>Σ</sup>		Sudan <sup>β, ¥</sup>	
Sri Lanka <sup>α</sup>		Tunisia <sup>Ω, π</sup>	
Syrian Arab Republic <sup>Ω, ‡, π</sup>			
Thailand <sup>α</sup>			
Vanuatu <sup>δ</sup>			

31. In addition to the chemical alternatives to lindane for the treatment of head lice and scabies listed in the WHO Model List and NEMs the surveys conducted in countries participated in the study have reported several other alternative options including esdepallethrin and natural products such as neem tree oil and tea tree oil. Chemical and natural product based alternatives reported in the study are summarized in Table.5.

**Table 5:** Alternatives to lindane for reported as treatment for head lice and scabies

WHO Model List of Essential Medicines	National Essential Medicines Lists	Retail Market
<ul style="list-style-type: none"> <li>• Benzyl benzoate</li> <li>• Permethrin</li> </ul>	<ul style="list-style-type: none"> <li>• Benzyl benzoate</li> <li>• Permethrin</li> <li>• Benzoic acid</li> <li>• Salicylic acid</li> <li>• Pyrethrin</li> <li>• Piperonyl butoxide</li> <li>• Crotamiton</li> <li>• Deltamethrin</li> <li>• Sulphur</li> <li>• Esdepallethrin</li> </ul>	<ul style="list-style-type: none"> <li>• Permethrin</li> <li>• Deltamethrin</li> <li>• Benzyl benzoate</li> <li>• Crotamiton</li> <li>• Phenothrin</li> <li>• Ethylbutylacetyl amino propionate</li> <li>• Esdepallethrin</li> <li>• Piperonyl butoxide</li> <li>• Sulphur</li> <li>• Natural products</li> </ul>

(E.g. neem tree oil, rosemary oil, tea tree oil, melissa oil, castor oil, eucalyptus oil, lavender oil)

#### IV. Discussion

32. The present study has shown that lindane is still prevalent in several developing countries as a treatment for head lice and scabies with a continued market potential. There are several chemical as well as natural product based options are also available to replace the use of lindane as a pharmaceutical. The study has found such alternatives are readily available even in some of those countries where lindane is still being used. Measures to promote alternatives and regulate lindane as a pharmaceutical appear to be not effectively in place in countries where lindane is available. However, the status of reliance on the chemical has been changed in some countries where lindane is still accessible, as it has been removed lindane from respective National Essential Medicines Lists.

33. Of the countries included in this study, Mexico has successfully introduced measures to transit from lindane as a pharmaceutical by implementing comprehensive elimination programmes. Evaluation and communication of alternatives to lindane and associated benefits of controlling the use of lindane, policy and legal framework for enhanced regulatory and control measures, and effective monitoring system are some of the key components included in the approach by Mexico. Involvement of stakeholders such as academia, industry, NGOs and government may have contributed to the sustainability of this programme. Such elements may provide some of the bases for reporting and reviewing requirements for the continued need for lindane under the Convention.

34. Update on the current status of National Essential Medicines lists and further information on the pharmaceutical market of lindane may provide more accurate understanding on the accessibility and cost effectiveness of control measure under local conditions. An important information gap of this study is the capacity of countries relying on lindane to evaluate alternatives to lindane and available regulatory and control mechanisms to facilitate efficient management of lindane as a pharmaceutical towards its elimination.

## Annex I

### Template of the questionnaire used for the surveys in local pharmacies in selected countries

**Survey directions:** The surveys may be conducted using the format provided at central drug procurement or supply agency for government hospitals and/or randomly selected pharmacies preferably representing urban and rural settings.

	Lindane	Alternatives to lindane				
		Benzyl benzoate	Permethrin	Sulphur	Malathion	Other products for head lice
Brand name						
Dosage form						
Strength (Content of active ingredient in %)						
Packaging						
Manufacturer						
Country of manufacturer						
Fast moving product? (Y/N)						
Prescriptions per month						
Availability (Number of pharmacies)						
Location of pharmacies (Town)						

## Annex II

### Extracts of the records of scabicides and pediculicides from WHO Model Essential Medicines List (1977-2011)

Year	No	Scabicides and pediculicides
1977 <sup>4</sup>	1	<ul style="list-style-type: none"> <li>• Benzyl Benzoate;</li> <li>• Gamma Benzene Hexachloride</li> </ul>
1979 <sup>5</sup>	2	<ul style="list-style-type: none"> <li>• Benzyl Benzoate lotion, 25%;</li> <li>• Gamma Benzene Hexachloride cream or lotion, 1%</li> </ul>
1983 <sup>6</sup>	3	<ul style="list-style-type: none"> <li>• Benzyl Benzoate lotion, 25%;</li> <li>• Lindane cream or lotion, 1%</li> </ul>
1985 <sup>7</sup>	4	<ul style="list-style-type: none"> <li>• Benzyl Benzoate lotion, 25%;</li> <li>• Lindane cream or lotion, 1%</li> </ul>
1988, 1990 <sup>8</sup>	5	<ul style="list-style-type: none"> <li>• Benzyl Benzoate lotion, 25%; Lindane (7) cream, lotion, or powder, 1%.</li> <li>• Lindane was qualified by (7) and a powder formulation is added.</li> <li>• Guideline (7): efficient mgt of stocks is necessary to eliminate waste and to ensure continuity of supplies. Procurement policy should be based upon detailed records of turnover. In some instances, drug utilization studies may contribute to a better understanding of true requirements.</li> </ul>
1992 <sup>9,10</sup>	6	<ul style="list-style-type: none"> <li>• Benzyl Benzoate lotion, 25%; Lindane (7) cream, lotion, or powder, 1%; Permethrin lotion, 1%.</li> <li>• Permethrin is added for the treatment of parasitic infestations as a cheaper alternative to lindene.</li> </ul>
	7	<ul style="list-style-type: none"> <li>• Benzyl Benzoate lotion, 25%; Permethrin lotion, 1%.</li> <li>• Lindane is deleted since it is toxic to the environment and humans, and safer alternatives are available.</li> </ul>
1995 <sup>11</sup>	8	<ul style="list-style-type: none"> <li>• Benzyl Benzoate lotion, 25%; Permethrin lotion 1%, cream 5%.</li> <li>• For Permethrin, cream 5% is added, since this is widely used in the treatment of scabies.</li> </ul>
1997 <sup>12</sup>	9	<ul style="list-style-type: none"> <li>• Benzyl Benzoate lotion, 25%; Permethrin lotion 1%, cream 5%.</li> </ul>
1998 <sup>13</sup>	10	<ul style="list-style-type: none"> <li>• Benzyl Benzoate lotion, 25%; Permethrin lotion 1%, cream 5%.</li> <li>• A square symbol is added to benzyl benzoate to accommodate precipitated sulfur.</li> </ul>

<sup>4</sup> [http://whqlibdoc.who.int/trs/WHO\\_TRS\\_615.pdf](http://whqlibdoc.who.int/trs/WHO_TRS_615.pdf)

<sup>5</sup> [http://whqlibdoc.who.int/trs/WHO\\_TRS\\_641.pdf](http://whqlibdoc.who.int/trs/WHO_TRS_641.pdf)

<sup>6</sup> [http://whqlibdoc.who.int/trs/WHO\\_TRS\\_685.pdf](http://whqlibdoc.who.int/trs/WHO_TRS_685.pdf)

<sup>7</sup> [http://whqlibdoc.who.int/trs/WHO\\_TRS\\_722.pdf](http://whqlibdoc.who.int/trs/WHO_TRS_722.pdf)

<sup>8</sup> [http://whqlibdoc.who.int/trs/WHO\\_TRS\\_770.pdf](http://whqlibdoc.who.int/trs/WHO_TRS_770.pdf)

<sup>9</sup> [http://whqlibdoc.who.int/trs/WHO\\_TRS\\_796.pdf](http://whqlibdoc.who.int/trs/WHO_TRS_796.pdf)

<sup>10</sup> [http://whqlibdoc.who.int/trs/WHO\\_TRS\\_825.pdf](http://whqlibdoc.who.int/trs/WHO_TRS_825.pdf)

<sup>11</sup> [http://whqlibdoc.who.int/trs/WHO\\_TRS\\_850.pdf](http://whqlibdoc.who.int/trs/WHO_TRS_850.pdf)

<sup>12</sup> [http://whqlibdoc.who.int/trs/WHO\\_TRS\\_867.pdf](http://whqlibdoc.who.int/trs/WHO_TRS_867.pdf)

<sup>13</sup> [http://whqlibdoc.who.int/trs/WHO\\_TRS\\_882.pdf](http://whqlibdoc.who.int/trs/WHO_TRS_882.pdf)

Year	No	Scabicides and pediculicides
2000 <sup>14</sup>	11	• Benzyl Benzoate lotion, 25%; Permethrin lotion 1%, cream 5%.
2003 <sup>15</sup>	12	• Benzyl Benzoate lotion, 25%; Permethrin lotion 1%, cream 5%.
2004 <sup>16</sup>	13	• Benzyl Benzoate lotion, 25%; Permethrin lotion 1%, cream 5%.
2005 <sup>17</sup>	14	• Benzyl Benzoate lotion, 25%; Permethrin lotion 1%, cream 5%.
2007 <sup>18</sup>	15	• Benzyl Benzoate lotion, 25%, review of alternatives to benzyl benzoate for use in younger children (possible role for sulphur-based preparations in younger children; Permethrin lotion 1%, cream 5%.
		• Benzyl Benzoate lotion, 25%, >2 years; Permethrin lotion 1%, cream 5%.
2009 <sup>19</sup>	16	• Benzyl Benzoate lotion, 25%, >2 years; Permethrin lotion 1%, cream 5%.
2011 <sup>20</sup>		• Benzyl Benzoate lotion, 25%, >2 years; Permethrin lotion 1%, cream 5%.

<sup>14</sup> [http://whqlibdoc.who.int/trs/WHO\\_TRS\\_895.pdf](http://whqlibdoc.who.int/trs/WHO_TRS_895.pdf)

<sup>15</sup> <http://whqlibdoc.who.int/hq/2002/a76618.pdf>

<sup>16</sup> <http://whqlibdoc.who.int/hq/2003/a80290.pdf>

<sup>17</sup> [http://whqlibdoc.who.int/hq/2005/a87017\\_eng.pdf](http://whqlibdoc.who.int/hq/2005/a87017_eng.pdf)

<sup>18</sup> [http://whqlibdoc.who.int/hq/2007/a95075\\_eng.pdf](http://whqlibdoc.who.int/hq/2007/a95075_eng.pdf)

<sup>19</sup> [http://whqlibdoc.who.int/hq/2010/a95060\\_eng.pdf](http://whqlibdoc.who.int/hq/2010/a95060_eng.pdf);

<sup>20</sup> [http://whqlibdoc.who.int/hq/2011/a95053\\_eng.pdf](http://whqlibdoc.who.int/hq/2011/a95053_eng.pdf)

## Annex III

### Trade names of lindane

*A compilation of trade names of lindane as a pharmaceutical based on the information from surveys conducted in local pharmacies in participated countries and found in internet search (where applicable, relevant weblinks are provided in footnotes)*

Trade name*	Active compound	Country
Liceoma lotion <sup>21</sup>	1% of lindane	Kenya
Ascabiol (emulsion 50ml; 100ml) <sup>22</sup>	Lindane 1%, centrimide 0.1%	India
Gamaderm (lotion 100ml) <sup>23</sup>	Lindane 1%	India
Scabex-S (oint 20g)	Lindane 1%, cetrimide 0.1% Lindane 1%, cetrimide 0.1%	India
Scabex (lotion 50ml, 100ml; cream 20g) <sup>24</sup>	Lindane 1%, cetrimide 0.1% Lindane 1%, cetrimide 0.1%	India
Scaboma (lotion 50ml, 100ml) <sup>25</sup>	Lindane 1%	India
Scaboma (cream 25g)	Lindane 1%, benyocaine 2%	India
Scarab (lotion 100ml; cream 25g)	Lindane 1%, cetrimide 0.1%	India
Welscab (lotion 100ml) <sup>26</sup>	Lindane 1%	India
Swiscab (lotion)	Lindane 1%	India
Ascabiol (lotion)	Lindane 1%	India
Scarab (lotion)	Lindane 1%	India
Gamascab (lotion)	Lindane 1%	India
Aphiria (powder)	Lindane 400mg	Senegal
Scaboma	Lindane 1%	Nepal
Ascapoudre Powder <sup>33</sup>	Lindane	Tunisia
Scaboma,	Lindane 1% (lotion, cream)	Sri Lanka
Scaboma cream <sup>27</sup>	Gamma benzene hexachloride 1%	Maldives
Scaboma lotion <sup>27</sup>	Gamma benzene hexachloride 1%	Maldives
Scabcur lotion <sup>27</sup>	Gamma benzene hexachloride 1%	Maldives
Ascabiol <sup>27</sup>	Gamma benzene hexachloride 1%	Maldives
Kellis <sup>27</sup>	Gamma benzene hexachloride 0.25 % (Topical solution)	Maldives

<sup>21</sup> <http://glenmarkpharma.com/Common/pdf/ProductListAfricaKenya.pdf>; accessed in February 2012.

<sup>22</sup> <http://mohfw.nic.in/WriteReadData/1892s/Annx%20-%20B-96841230.pdf>; accessed in March 2012.

<sup>23</sup> <http://vilcolabs.com/products05.htm#gamaderm>; accessed in February 2012.

<sup>24</sup> <http://vilcolabs.com/products05.htm#gamaderm>; accessed in February 2012.

<sup>25</sup> <http://www.indoco.com/products/formulation/spera-prdts.htm>; accessed in February 2012.

<sup>26</sup> <http://www.mptgoa.com/tenders/medical/Listofmedicine.pdf>; accessed in February 2012.

<sup>27</sup> Approved drug lists (March 2011)—<http://apps.who.int/medicinedocs/documents/s18044en/s18044en.pdf>

## Annex IV

## Trade names of alternatives to lindane

A compilation of trade names of alternatives to lindane as a pharmaceutical based on the information from surveys conducted in local pharmacies in participated countries and found in internet search (where applicable, relevant weblinks are provided in footnotes)

Trade name	Active compound	Country
Nedax (Shampoo) <sup>28</sup>	Permethrin 1%	Brazil
Kwell (Creamy lotion) <sup>29</sup>	Permethrin 1%	Brazil
Clean Hair (Lotion) <sup>29</sup>	Permethrin 1%	Brazil
Keltrina (Lotion) <sup>29</sup>	Permethrin 1%	Brazil
Keltrina Plus <sup>29</sup>	Permethrin 5%, hydrogenated ethoxylated ricinus oil	Brazil
Deltacid (Lotion) <sup>29</sup>	Deltamethrin 0.02%	Brazil
Pediderm (Shampoo) <sup>29</sup>	Deltamethrin 0.02%	Brazil
Piolho e Lendea (Solution) <sup>29</sup>	Simaruba amara 10%	Brazil
Pilogenio (Solution) <sup>29</sup>	Pilocarpus pinnatifolius 10%	Brazil
Gamaderm-P (lotion 60ml) <sup>30</sup>	Permethrin 5%	India
Dermin (lotion)	Benzyl benzoate 25%	India
Clearkin (gel)	Permethrin 5%	India
Mityscab (cream)	Permethrin 5%	India
Perin 1% (cream)	Permethrin 1%	India
Perin 5% (cream)	Permethrin 5%	India
Perlice (cream)	Permethrin 1%	India
Permerid (lotion & cream)	Permethrin 5%	India
Permite (cream)	Permethrin 5%	India
Crotorax (lotion & cream)	Crotamiton 10%	India
Crotorax-HC (cream)	Crotamiton 10%	India
Ascabiol (lotion)	Benzyl benzoate 25%	Senegal
Novo Herklin 2000	Permethrin 5% (Cream)	Mexico
Novo Herklin 2000	Permethrin 5% (Shampoo)	Mexico
Acomexol	Crotamiton 10% (Cream)	Mexico
Herklin	Phenothrin 0.20% (Shampoo)	Mexico
Herklin	Ethyl butylacetylaminopropionate 20% (Solution repellent)	Mexico
Scabisan	Permethrin 1% (Cream)	Mexico
Scabisan	Permethrin 5% (Shampoo)	Mexico
SISCAR	Permethrin 1% (Shampoo)	Mexico
Novoscar	Permethrin 1% (Solution)	Mexico
Testaclean	Neem tree oil, rosemary oil, tea tree oil, melisa oil	Mexico
SAFE liceguard	N/A, however, no pesticides (Shampoo)	Mexico

<sup>28</sup> Asenov A, Oliveira FA, Speare R, Liesenfeld O, Hengge UR, Heukelbach J. Efficacy of chemical and botanical over-the-counter pediculicides available in Brazil, and off-label treatments, against head lice ex vivo. Int J Dermatol 2009; 49: 324-30. International Journal of Dermatology (2010) volume: 49, Issue: 3, Pages: 324-330

<sup>29</sup> <http://glenmarkpharma.com/Common/pdf/ProductListAfricaKenya.pdf>

<sup>30</sup> <http://vilcolabs.com/products06.htm#gamaderm1>

Trade name	Active compound	Country
Nobichin	Castor oil, Eucalyptus oil, lavender oil, rosemary oil, tea tree oil (shampoo, ointment)	Mexico
Bioasis	Vegetable oil extract of fetid goosefoot (epazote de zorrillo herb)	Mexico
Kilicel	Quassia Vinegar (Shampoo)	Mexico
Sinpiojos10	Dimeticone 96.9 g/100ml (gel)	Mexico
Rosemary Repel	Rosemary oil, lavender oil and citronella oil (Conditioner, shampoo)	Mexico
Adiós a los piojos	Yeast enzymes	Mexico
Eurax <sup>31</sup>	Crotamiton 10% lotion 60ml, 120ml; cream 10g tube	Philippines
Infectoscab 5% krém <sup>32</sup>	Permethrin	Slovakia
Ascalol lotion <sup>33</sup>	Benzyl benzoate	Tunisia
Lotion Ascabiol <sup>33</sup>	Benzyl benzoate + Sulfirame	Tunisia
Spregal spray solution <sup>33</sup>	Esdepallethrine +Piperonyl butoxide	Tunisia
Charlieu anti-poux lotion <sup>33</sup>	Permethrin	Tunisia
Para plus spray solution <sup>33</sup>	Permethrine + piperonyl butoxide	Tunisia
Benzyl benzoate Application BP	Benzyl benzoate 25% (emulsion)	Sri Lanka
Benzyl benzoate Application BP	Benzyl benzoate 25% (cream)	Sri Lanka
Lycine	Permethrin 0.5% (lotion)	Sri Lanka
Permite	Permethrin 5% (cream)	Sri Lanka
Perlice	Permethrin 1% (cream)	Sri Lanka
Lice-ex	Permethrin 1% (lotion)	Sri Lanka
Scabion	Sulphur + crotamiton 2g in 30mL (lotion)	Sri Lanka
Mediker	Shampoo (natural product)	Sri Lanka

<sup>31</sup> Essential Drug List (2007)—[http://www.who.int/selection\\_medicines/country\\_lists/phl\\_edl\\_2007.pdf](http://www.who.int/selection_medicines/country_lists/phl_edl_2007.pdf)

<sup>32</sup> Slovakia EDL (2010)—[http://www.who.int/selection\\_medicines/country\\_lists/Slovakia\\_EML\\_2010.pdf](http://www.who.int/selection_medicines/country_lists/Slovakia_EML_2010.pdf)

<sup>33</sup> 2e Formulaire thérapeutique tunisien— [http://www.who.int/selection\\_medicines/country\\_lists/TUN\\_2e\\_FORMULAIRE.pdf](http://www.who.int/selection_medicines/country_lists/TUN_2e_FORMULAIRE.pdf)