QAMSA

WHO Surveys of medicines quality

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Quality and Safety: Medicines
WHO
Quality of Antimalarial Medicines in Sub-Saharan Africa (QAMSA)

• Objectives
  – To evaluate the quality of selected antimalarials in a defined number of African countries
  – Specific objectives:
    • To estimate the proportion of Artemisinin-based combination therapy products (ACT) and Sulfadoxine pyrimethamine (SP) products meeting specific quality standards in the selected countries at different points of the regulated and informal distribution system
    • To estimate the proportion of counterfeit ACT and SP products in the selected countries at different points of the regulated and informal distribution system
    • To identify possible causes of the above findings
    • To propose possible strategies and implementation plans to address the problems identified by the study

2  HANMAT/PIAM-NET meeting, 25-26 Sep 2010, Marrakech, Morocco
Overview

- ACTs (most sold and recommended by national guidelines), sulfadoxine-pyrimethamine, oral dosage forms
- In 6 African countries (Cameroon, Ethiopia, Ghana, Kenya, Nigeria, Tanzania)

- Collection of samples
  - At all levels of distribution chain (private and public) and informal market, throughout the countries
  - In cooperation of NDRAs with WHO country offices

- Testing
  - Screening by GPHF-Minilab
  - One third of samples tested in RIIP, South Africa and USP laboratory (Ph.Int., USP, laboratory in-house method)
Collected samples by products

935 samples

- Artemether/Lumefantrine: 327 samples
- Artesunate/Amodiaquine: 362 samples
- Dihydroartemisinin/Piperaquine Ph: 185 samples
- Artemisinin/Piperaquine Ph: 16 samples
- Artemisinin/Naphthoquine Ph: 5 samples
- Artesunate/Mefloquine: 1 sample
- Artesunate+SPP: 1 sample
- SP: 1 sample
- SPP: 1 sample
Collected samples by countries

- Cameroon: 160 Domestic, 112 Imported
- Ethiopia: 73 Domestic, 29 Imported
- Ghana: 99 Domestic, 76 Imported
- Kenya: 123 Domestic, 31 Imported
- Nigeria: 138 Domestic, 62 Imported
- Tanzania: 112 Domestic, 32 Imported

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Registration status of collected samples

- **Cameroon**: 144 (100% registered)
- **Ethiopia**: 60 (80% registered)
- **Ghana**: 112 (40% registered)
- **Kenya**: 151 (60% registered)
- **Nigeria**: 197 (20% registered)
- **Tanzania**: 144 (0% registered)

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Total failure rate – 28.5%
306 samples tested in QC laboratory

Failure rates by product

- **AL**: 80 non-compliant samples, 14 compliant samples
- **A&A co-p**: 19 non-compliant samples, 18 compliant samples
- **AA FDC**: 9 non-compliant samples, 33 compliant samples
- **SP**: 86 non-compliant samples, 6 compliant samples
- **SPP**: 2 non-compliant samples, 6 compliant samples
Failure rates by country

<table>
<thead>
<tr>
<th>Country</th>
<th>ACTs (%)</th>
<th>SPs (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cameroon</td>
<td>32</td>
<td>0</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>43.7</td>
<td>0</td>
</tr>
<tr>
<td>Ghana</td>
<td>27.3</td>
<td>0</td>
</tr>
<tr>
<td>Kenya</td>
<td>56.2</td>
<td>62.5</td>
</tr>
<tr>
<td>Nigeria</td>
<td>8.3</td>
<td>66.6</td>
</tr>
<tr>
<td>Tanzania</td>
<td>16.7</td>
<td>0</td>
</tr>
</tbody>
</table>
Numbers of manufacturers of tested products

- AL
- A&A co-p
- AA FDC
- SP
- SPP

Cameroon, Ethiopia, Ghana, Kenya, Nigeria, Tanzania

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QUALITY MEDICINES FOR EVERYONE
Failure rates at individual distribution levels

- Level 1
- Level 2
- Informal market

Cameroon
Ethiopia
Ghana
Kenya
Nigeria
Tanzania
Failure rates by QC test - ACTs

- **Artemether/Lumefantrine**
  - Assay
    - 3 samples < 80% (in 1 no artemether)
    - 6 samples within 80-90%

- **Artesunate/Amodiaquine co-packed**
  - Related substances (sum ≤ 2.0%)
    - 1 sample - sum of impurities 33%
    - 16 samples - sum of impurities 2.1-3.5%
  - Assay
    - 5 samples within 76-89%
Comparison of failure rates of prequalified and not prequalified products

83 samples of PQ products
- **AL** (Novartis, Ajanta, Ipca)
- **A&A co-pack** (Cipla, Guilin, Ipca)

<table>
<thead>
<tr>
<th></th>
<th>Non-compliant</th>
<th>Compliant</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PQ total</strong></td>
<td>3</td>
<td>80</td>
</tr>
<tr>
<td><strong>Non-PQ total</strong></td>
<td>73</td>
<td>111</td>
</tr>
<tr>
<td><strong>AL PQ</strong></td>
<td>2</td>
<td>68</td>
</tr>
<tr>
<td><strong>AL non-PQ</strong></td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td><strong>A&amp;A co-p PQ</strong></td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td><strong>A&amp;A co-p non-PQ</strong></td>
<td>17</td>
<td>7</td>
</tr>
</tbody>
</table>

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Failure rates for registered and non-registered products

<table>
<thead>
<tr>
<th>Country</th>
<th>Registered</th>
<th>Not registered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cameroon</td>
<td>27.8%</td>
<td>100%</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Ghana</td>
<td>52.2%</td>
<td>20.0%</td>
</tr>
<tr>
<td>Total</td>
<td>30.0%</td>
<td>20.0%</td>
</tr>
</tbody>
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Failure rates of domestic and imported products according to registration status

<table>
<thead>
<tr>
<th></th>
<th>Registered</th>
<th>Not registered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>50.8%</td>
<td>7.7%</td>
</tr>
<tr>
<td>Imported</td>
<td>22.6%</td>
<td>25.9%</td>
</tr>
</tbody>
</table>

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Failure of domestic and imported products

![Bar graph showing the number of non-compliant and compliant samples from different countries.

Country | Domestic Non-compliant | Domestic Compliant | Imported Non-compliant | Imported Compliant
--- | --- | --- | --- | ---
Cameroon | 13 | 26 | 0 | 15
Ethiopia | 26 | 13 | 4 | 7
Ghana | 4 | 19 | 8 | 11
Kenya | 11 | 30 | 6 | 16
Nigeria | 18 | 21 | 7 | 5
Tanzania | 7 | 33 | 5 | 15

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QUALITY MEDICINES FOR EVERYONE
Observations from QAMSA study

- Situation is substantially different among countries
- Domestic products at higher risk of low quality
- Impact of registration is limited
- Prequalification has positive impact on quality
- Quality of 'international' brands is assured
- Deterioration of quality during distribution is not dramatic
- Minilab testing has low sensitivity
- To correlate outcomes of quality testing and treatment effectiveness is difficult
- Detailed planning and size of samples are critical
Thanks for your attention

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www.who.int/prequal