Antimicrobial Resistance Benchmark 2018

Guiding pharmaceutical companies to strengthen wastewater management

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HCWH Webinar | Multisectoral approaches to tackle Antimicrobial Resistance | 29 Nov 2018
The Access to Medicine Foundation

- Research on, and incentives for, pharmaceutical companies and access to medicine
- Independent, non-profit organisation
- Multi-stakeholder approach
What we do
The Antimicrobial Resistance Benchmark

• A new tool that assesses and compares what pharmaceutical companies are doing to limit AMR

• Fully independent from pharmaceutical companies

• Funded by the UK and Dutch governments
Launch of AMR Benchmark at WEF Davos 2018
AMR Benchmark publication: 2-year cycle

- Early 2019: Methodology Release
- Year 1: Benchmark Development
- Year 2: Verification & Analysis
- Early 2020: Benchmark Release
The AMR Benchmark guides and incentivises companies by

...building consensus and clarifying responsibilities
...triggering positive competition
...enabling private sector accountability
...empowering internal decision-makers
...diffusing good practices
...unleashing pressure from investors
...supporting private sector participation in global health initiatives
The full report

Access to Medicine Foundation

1. Portfolio Analysis
2. Pipeline Analysis
3. Case Studies
4. Key Findings
30 Company Report Cards
30 companies across three sub-sectors analysed

Large research-based pharmaceutical companies
- GlaxoSmithKline plc
- Johnson & Johnson
- Merck & Co., Inc.
- Novartis AG
- Pfizer Inc.
- Roche Holding AG
- Sanofi
- Shionogi & Co., Ltd.

Generic medicine manufacturers
- Aspen Pharmacare Holdings Limited
- Aurobindo Pharma Ltd.
- Cipla Inc.
- Dr. Reddy’s Laboratories Ltd.
- Fresenius Kabi AG
- Lupin Limited
- Macleods Pharmaceuticals Ltd.
- Mylan NV
- Sun Pharmaceutical Industries Ltd.
- Teva Pharmaceutical Industries Ltd.

Biopharmaceutical companies with priority R&D projects
- Achaogen Inc.
- Cempra Inc.
- Entasis Therapeutics Inc.
- Melinta Therapeutics Inc.
- MGB Biopharma
- Motif Bio plc
- Nabriva Therapeutics plc
- Polyphor Ltd.
- Summit Therapeutics
- Tetraphase Pharmaceuticals Inc.
- The Medicines Company
- Wockhardt Ltd.

Source: Access to Medicine Foundation
Analytical framework:
3 Research Areas, 17 metrics

A RESEARCH & DEVELOPMENT
A.1 R&D Investments
A.2.1 Pipeline size
A.2.2 Novelty of pipeline
A.2.3 Vaccines in pipeline
A.3 R&D Collaborations
A.4 Facilitating access and stewardship

B MANUFACTURING & PRODUCTION
B.1 Environmental risk-management strategy
B.2 Disclosure on environmental risk management
B.3 Manufacturing high-quality antibiotics

C ACCESS & STEWARDSHIP
C.1 Registration of antibiotics
C.2 Pricing of antimicrobials
C.3 Ensuring continuous supply
C.4 Supporting educational stewardship activities
C.5 Ethical promotional activities
C.6 Brochure and packaging
C.7 AMR surveillance
C.8 Reducing uncontrolled use
Industry commitments:
The Davos Declaration, 2016 (+100)

“Commitments by signatory companies ... 

Work to reduce the development of antimicrobial resistance ...

We support measures to reduce environmental pollution from antibiotics, along with a ‘one health’ approach towards prudent and responsible use, including a global reduction of unnecessary antibiotic use in livestock, and we applaud moves from major food groups to work towards this goal.”
Industry commitments: The Industry Roadmap (13)

i. Review our own manufacturing and supply chains to assess good practice in controlling releases of antibiotics into the environment.

ii. Establish a common framework for managing antibiotic discharge, building on existing work such as PSCI, and start to apply it across our own manufacturing and supply chain by 2018.

iii. Work with stakeholders to develop a practical mechanism to transparently demonstrate that our supply chains meet the standards in the framework.

iv. Work with independent technical experts to establish science-driven, risk-based targets for discharge concentrations for antibiotics and good practice methods to reduce environmental impact of manufacturing discharges, by 2020.
Manufacturing & Production Company performance

B. MANUFACTURING & PRODUCTION

B.1 Environmental risk-management strategy
B.2 Disclosure on environmental risk management
B.3 Manufacturing high-quality antibiotics

Company performance

Large research-based pharmaceutical companies

- GSK 11
- Johnson & Johnson 10
- Merck & Co., Inc. 9
- Novartis 10
- Pfizer 10
- Roche 10
- Sanofi 10
- Shionogi 9

Generic medicine manufacturers

- Aspen 5.5
- Aurobindo 9
- Cipla 2.5
- Dr. Reddy’s 1
- Fresenius Kabi 8
- Lupin 5
- Macleods 2
- Mylan 8
- Sun Pharma 1
- Teva 9

Legend:
- Manufacturing & Production
- Remaining potential score
# Environmental AMR Risk-Management Strategies

## Large Research-Based Pharmaceutical Companies
- **GSK**:
  - Own manufacturing sites: Strategy, Audits, Limits
  - Third party manufacturing sites of API and Drug Products: Strategy, Audits, Limits
  - External waste treatment plants: Strategy, Audits, Limits
- **Johnson & Johnson**:
  - Own manufacturing sites: Strategy, Audits
  - Third party manufacturing sites of API and Drug Products: Strategy, Audits, Limits
  - External waste treatment plants: Strategy, Audits
- **Merck & Co., Inc.**:
  - Own manufacturing sites: Strategy
  - External waste treatment plants: Strategy, Audits
- **Novartis**:
  - Own manufacturing sites: Strategy, Audits, Limits
  - External waste treatment plants: Strategy, Audits
- **Pfizer**:
  - Own manufacturing sites: Strategy
  - Third party manufacturing sites of API and Drug Products: Strategy, Audits
  - External waste treatment plants: Strategy
- **Roche**:
  - Own manufacturing sites: Strategy, Audits, Limits
  - Third party manufacturing sites of API and Drug Products: Strategy, Audits
  - External waste treatment plants: Strategy, Audits
- **Sanofi**:
  - Own manufacturing sites: Strategy, Audits, Limits
  - External waste treatment plants: Strategy, Audits
- **Shionogi**:
  - Own manufacturing sites: Strategy

## Generic Medicine Manufacturers
- **Aspen**:
  - Own manufacturing sites: Strategy
- **Aurobindo**:
  - Own manufacturing sites: Strategy
- **Cipla**:
  - Own manufacturing sites: Strategy
- **Dr. Reddy's**:
  - Own manufacturing sites: Strategy
- **Fresenius Kabi**:
  - Own manufacturing sites: Strategy
- **Lupin**:
  - Own manufacturing sites: Strategy
- **Macleods**:
  - Own manufacturing sites: Strategy
- **Mylan**:
  - Own manufacturing sites: Strategy
- **Sun Pharma**:
  - Own manufacturing sites: Strategy
- **Teva**:
  - Own manufacturing sites: Strategy
Disclosure on environmental risk-management

- 15/18 companies assessed have ERMS - 12 disclose strategies publicly
- 8 companies in scope report to have set limits for antibiotic discharge
- 4/8 require upstream suppliers of antibiotic APIs and drug products to adhere to same limits.
- Yet, no company discloses publicly its limits and/or the levels of antibiotic discharge.
Recent developments

January 2018 | Common Antibiotic Manufacturing Framework

September 2018 | Recommended discharge limits

“No untreated discharge of manufacturing waste containing antibiotic.”

“Audit reports will remain confidential.”

AMR Alliance Recommended PNECs for Risk Assessments

<table>
<thead>
<tr>
<th>Active Pharmaceutical Ingredient</th>
<th>PNEC-ENV (µg/L)</th>
<th>PNEC-MIC (µg/L)</th>
<th>Lowest Value (µg/L)</th>
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</thead>
<tbody>
<tr>
<td>Amikacin</td>
<td>N/A</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>Testing On-Going</td>
<td>0.25</td>
<td>0.25</td>
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<tr>
<td>Amphotericin B</td>
<td>N/A</td>
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<td>Ampicillin</td>
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<td>Anidulafungin</td>
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<tr>
<td>Aminocillin</td>
<td>8.0</td>
<td>8.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Azithromycin</td>
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<tr>
<td>Aztreonam</td>
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<tr>
<td>Bacitracin</td>
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<td>Bedaquiline</td>
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<td>0.25</td>
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<tr>
<td>Capreomycin</td>
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<tr>
<td>Cefaclor</td>
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<td>0.50</td>
<td>0.50</td>
</tr>
<tr>
<td>Cefadroxil</td>
<td>Testing On-Going</td>
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<td>2.0</td>
</tr>
<tr>
<td>Cefalonium</td>
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<td>N/A</td>
<td>21</td>
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<tr>
<td>Cefaloridine</td>
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<tr>
<td>Cefalothin</td>
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<td>Cefoperazone</td>
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<tr>
<td>Cefotaxime</td>
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</tbody>
</table>
Key takeaways

Companies should:
- Implement recommended “PNEC-MIC” (or lower) limits for antibiotic discharge across their supply chain
- Move forward with practical ways to disclose more information about suppliers and levels of antibiotic discharge

Governments should:
- Consider explicit inclusion of environmental standards in GMP assessments
- Include “green criteria” into procurement of antibiotics

Academia should:
- Collaborate with governments to further refine evidence base for antibiotic discharge limits
- Collaborate with companies & governments in environmental surveillance and assessment of the human health impact of antibiotic discharges
Thank you

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