Antimicrobial Stewardship In An African Context and Its Challenges

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A sixty eight year old gentleman was admitted to a large private hospital in Kerala state of India. The admission was for an elective laparoscopic cholecystectomy (surgical removal of gall bladder) for calculous cholecystitis (gall bladder stones causing recurrent infection and inflammation). The surgery was uneventful and patient was apparently recuperating well. Signs of chest infection from second day onwards. He was started on antibiotics and nebulization, but the chest infection was worsening and he started feeling breathless.
• He was shifted to the Intensive Care Unit and started on oxygen. A chest X-ray showed signs of pneumonia.

• He was put on ventilatory support (a machine supporting breathing) on the second day of ICU admission.

• His sputum culture meanwhile grew Klebsiella, an organism usually found in human intestines.

• The antibiotic sensitivity testing showed that it was a resistant form of Klebsiella, which may not respond to routine antibiotics.

• He was given Meropenam (a very expensive antibiotic) and Colistin (a very toxic antibiotic which can damage the kidneys) in view of his worsening condition and the resistant bug.

• Despite all efforts, he died on the 4th day of ICU admission.
What happened?

• A healthy person admitted for a relatively minor surgical procedure
• Developing a systemically unrelated illness during hospital stay
• Dying of the unrelated illness
• Why did it happen?
• And more importantly, what could have prevented it?
Outline

1. Global & regional Impact of AMR
2. What we know about AMR
3. AMR and SDGs
4. AMR and UHC
5. Connecting AMR, SDGs, UHC to Antimicrobial Stewardship
6. Conclusion
Alexander Fleming was right ......

‘The time may come when penicillin can be bought by anyone in the shops. Then there is the danger that the ignorant man can easily underdose himself and by exposing his microbes to non lethal quantities of the drug make them resistant’
The need for AMS

• Antibiotic Resistance has emerged as a global health problem, particularly with the advent of Healthcare Associated Infections.

• Antibiotic resistant organisms are capable of causing life threatening infections. The gravity of the problem has increased since research and development of newer antimicrobial agents has significantly diminished.

• Hospitals and health centres prescribe and dispense a lot of antibiotics, thereby increasing the selection pressure on bacteria to develop mechanisms of resistance.

• This factor significantly contributes to healthcare facilities becoming hubs for development of multi-drug resistant organisms.

AMR Global action Plan

1. Improve awareness and understanding
2. Strengthen knowledge through surveillance & research
3. Reduce incidence of infection
4. **Optimize use of antimicrobial medicines**
5. ... increase investment in new medicines, diagnostic tools, vaccines and other interventions
What we know
Antibiotics are the cornerstone of modern medicine.
• African countries have not been spared from AMR

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>No. Studies</th>
<th>HAI N (%)</th>
<th>BSI N (%)</th>
<th>UTI N (%)</th>
<th>AGE N (%)</th>
<th>WI N (%)</th>
<th>Carriage N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. aureus</td>
<td>79</td>
<td>17 (21.5)</td>
<td>17 (21.5)</td>
<td>NS</td>
<td>NS</td>
<td>22 (27.8)</td>
<td>10 (12.7)</td>
</tr>
<tr>
<td>S. pneumoniae</td>
<td>24</td>
<td>NA</td>
<td>8 (33.3)</td>
<td>1 (4.2)</td>
<td>NS</td>
<td>NS</td>
<td>4 (16.7)</td>
</tr>
<tr>
<td>E. coli</td>
<td>87</td>
<td>15 (17.2)</td>
<td>17 (19.5)</td>
<td>17 (19.5)</td>
<td>7 (8)</td>
<td>NS</td>
<td>2 (2.3)</td>
</tr>
<tr>
<td>Enterobacter spp.</td>
<td>36</td>
<td>3 (8.3)</td>
<td>8 (22.2)</td>
<td>8 (22.2)</td>
<td>1 (2.8)</td>
<td>NS</td>
<td>NA</td>
</tr>
<tr>
<td>Haemophilus influenzae</td>
<td>7</td>
<td>NA</td>
<td>NA</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NA</td>
</tr>
<tr>
<td>CoNS*</td>
<td>27</td>
<td>9 (33.3)</td>
<td>6 (22.2)</td>
<td>5 (18.5)</td>
<td>NS</td>
<td>9 (33.3)</td>
<td>NA</td>
</tr>
<tr>
<td>Citrobacter spp.</td>
<td>19</td>
<td>2 (10.5)</td>
<td>5 (26.3)</td>
<td>7 (36.8)</td>
<td>NS</td>
<td>NS</td>
<td>NA</td>
</tr>
<tr>
<td>S. Typhi</td>
<td>28</td>
<td>2 (7.1)</td>
<td>1 (3.6)</td>
<td>1 (3.6)</td>
<td>6 (21.4)</td>
<td>NS</td>
<td>1 (3.6)</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>60</td>
<td>17 (28.3)</td>
<td>11 (18.3)</td>
<td>8 (13.3)</td>
<td>NS</td>
<td>20 (33.3)</td>
<td>2 (3.3)</td>
</tr>
<tr>
<td>Seratia spp.</td>
<td>7</td>
<td>7 (14.1)</td>
<td>2 (28.6)</td>
<td>NA</td>
<td>NS</td>
<td>NS</td>
<td>1 (14.3)</td>
</tr>
<tr>
<td>Klebsiella pneumoniae</td>
<td>75</td>
<td>15 (20)</td>
<td>21 (28)</td>
<td>15 (20)</td>
<td>NS</td>
<td>16 (21.3)</td>
<td>2 (2.7)</td>
</tr>
<tr>
<td>Proteus spp.</td>
<td>46</td>
<td>10 (21.7)</td>
<td>8 (17.4)</td>
<td>10 (21.7)</td>
<td>NS</td>
<td>NS</td>
<td>1 (2.2)</td>
</tr>
<tr>
<td>Acinetobacter spp.</td>
<td>17</td>
<td>5 (29.4)</td>
<td>7 (41.2)</td>
<td>1 (5.9)</td>
<td>NS</td>
<td>4 (23.5)</td>
<td>NA</td>
</tr>
<tr>
<td>Neisseria meningitidis</td>
<td>1</td>
<td>NA</td>
<td>NA</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NA</td>
</tr>
<tr>
<td>Shigella spp.</td>
<td>8</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>6 (75)</td>
<td>NS</td>
<td>NA</td>
</tr>
<tr>
<td>Campylobacter spp.</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
<td>1 (33.3)</td>
<td>3 (100)</td>
<td>NS</td>
<td>NA</td>
</tr>
<tr>
<td>Group A Streptococcus</td>
<td>18</td>
<td>1 (5.6)</td>
<td>6 (33.3)</td>
<td>NS</td>
<td>NS</td>
<td>3 (16.7)</td>
<td>2 (11.1)</td>
</tr>
<tr>
<td>Group B Streptococcus</td>
<td>2</td>
<td>NA</td>
<td>NA</td>
<td>NS</td>
<td>NS</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Listeria monocytogenes</td>
<td>2</td>
<td>NA</td>
<td>1 (50)</td>
<td>1 (50)</td>
<td>NS</td>
<td>NS</td>
<td>NA</td>
</tr>
<tr>
<td>Non-Typhoidal Salmonella spp.</td>
<td>11</td>
<td>NA</td>
<td>9 (81.8)</td>
<td>NS</td>
<td>NA</td>
<td>NS</td>
<td>NA</td>
</tr>
<tr>
<td>Neisseria gonorhoeae</td>
<td>11</td>
<td>NS</td>
<td>NA</td>
<td>2 (18.2)</td>
<td>NS</td>
<td>NS</td>
<td>NA</td>
</tr>
<tr>
<td>Moraxella spp.</td>
<td>2</td>
<td>NS</td>
<td>NA</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NA</td>
</tr>
<tr>
<td>Streptococcus spp.</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
<td>1 (33.3)</td>
<td>NS</td>
<td>1 (33.3)</td>
<td>1 (33.3)</td>
</tr>
</tbody>
</table>

HAI = Hospital Acquired Infection, UTI = Urinary Tract Infection, AGE = Acute Gastroenteritis, WI = Wound Infection, BSI = Bloodstream Infections, NS = Not Significant since the bacterium is a unlikely cause of the infection etiology. NA = Not applicable because data were not available for the specific combination.

*CoNS: Coagulase Negative Staphylococcus spp.
We are losing antibiotics faster than we can produce them.
Pharmaceutical companies exiting antibiotic production business

- Novartis (2018)
- AstraZeneca (2016)
- Sanofi (2018)
- Allergan (2018)
- The Medicines Co (2017)

Because of lack of profit

Companies remaining include

- Merck,
- Roche,
- GlaxoSmithKline
- Pfizer
We know the drivers of AMR

Holmes at al., 2016
<table>
<thead>
<tr>
<th><strong>Burden of Deaths and Costs due to AMR</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>700,000</strong></td>
</tr>
<tr>
<td>Current estimated number of deaths from AMR each year</td>
</tr>
</tbody>
</table>

Hoffman SJ et al. 2015. An international legal framework to address antimicrobial resistance. *Bull World Health Organ* 93:66 | doi: [http://dx.doi.org/10.2471/BLT.15.152710](http://dx.doi.org/10.2471/BLT.15.152710)

The Triple Burden in LMICs

- Higher incidence of infectious diseases
- Poor access and regulatory structures
- Poor IPC and AMS efforts in healthcare
AMR and SDGs

- SDG1: End poverty in all its forms
- SDG2: End hunger and ensure food security
- SDG3: Healthy lives & promote wellbeing
- SDG4: Quality education
- SDG5: Gender equality and empowerment of all women and girls
- SDG6: Clean water and sanitation
- SDG7: Affordable and clean energy
- SDG8: Sustainable economic growth
- SDG9: Industry, innovation and infrastructure
- SDG10: Reduced inequalities
- SDG11: Sustainable cities and communities
- SDG12: Sustainable consumption and production
- SDG13: Climate action
- SDG14: Life below water
- SDG15: Life on land
- SDG16: Peaceful and inclusive societies
- SDG17: Partnerships for the goals

The Impact of AMR on SDGs

<table>
<thead>
<tr>
<th>SDGs</th>
<th>Impact of Antimicrobial Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No poverty</td>
<td>Antimicrobial resistance significantly increases cost of treatment driving people into poverty or making treatment inaccessible. The World Bank projects that <strong>24.1 million people could fall into extreme poverty by 2030</strong> because of antimicrobial resistance.</td>
</tr>
<tr>
<td>3. Good health and wellbeing</td>
<td><strong>Common infections</strong> – many of which childhood and maternal infections – will increasingly be associated with severe complications and increased risk of death. <strong>Non-vital surgeries</strong>, would become difficult to justify due to the risk of infection. <strong>Most cancer therapies</strong> and other therapies that require immune suppression, such as organ transplants would become substantially more risky. <strong>Antimicrobials could become unavailable or if new, unaffordable</strong> for many countries.</td>
</tr>
<tr>
<td>10. Reduced inequalities</td>
<td>Antimicrobial resistance risks <strong>increasing inequalities</strong> within societies. Groups that are extra vulnerable to antimicrobial resistance include <strong>women and children, migrants and refugees</strong>. Antimicrobial resistance can increase <strong>stigmatisation</strong> of people with infectious diseases that already drives inequality.</td>
</tr>
<tr>
<td>12. Peace and justice</td>
<td>The cost of inaction has been calculated to be a <strong>1.1% to 3.8% decrease of global GDP by 2050</strong>. By comparison, the consequences of climate change are predicted to cause a drop of 1.0% to 3.3% global GDP by 2060.</td>
</tr>
</tbody>
</table>
The Goal of UHC

• The goal of universal health coverage is to ensure that all people obtain the health services they need [ACCESS] without suffering financial hardship when paying for them [AFFORDABILITY]

• The full spectrum of essential, quality health services should be covered including health promotion, prevention and treatment, rehabilitation and palliative care

Source: WHO.
http://www.who.int/mediacentre/factsheets/fs395/en/
SDG Goal 3 on Communicable Diseases and UHC

- By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases

- Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all

Source: UN
http://www.un.org/sustainabledevelopment/health/
Medicines – Critical for UHC & AMS

• Global spending on medicines – more than a trillion dollars a year

• Projected to go up to 1.4 trillion dollars a year by 2020

• Some countries spend up to 67% of their health budgets on medicines, mostly paid out-of-pocket by consumers

• Antimicrobials constitute a major class of medicines

• UHC implementers thus need to pay careful attention to the access, affordability and use of antimicrobials

Sources: IMS Institute – Global medicine use in 2020; Wagner et al. BMC Health Services Research 2014, 14: 357
Medicines – 3 of the Top 10 Leading Sources of Inefficiency and Waste

<table>
<thead>
<tr>
<th>1. Medicines: underuse of generics and higher than necessary prices for medicines</th>
<th>6. Health-care services: inappropriate hospital admissions and length of stay</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Health-care products and services: overuse or supply of equipment, investigations and procedures</td>
<td>9. Health system leakages: waste, corruption and fraud</td>
</tr>
<tr>
<td>5. Health workers: inappropriate or costly staff mix, unmotivated workers</td>
<td>10. Health interventions: inefficient mix/inappropriate level of strategies</td>
</tr>
</tbody>
</table>


[http://apps.who.int/iris/bitstream/10665/44371/1/9789241564021_eng.pdf](http://apps.who.int/iris/bitstream/10665/44371/1/9789241564021_eng.pdf)
Inappropriate Use, Inefficiency, and Waste – Very Common with Antimicrobials

• Up to 50% of all antibiotic prescriptions are unnecessary

• Two thirds of antibiotics sold without prescription, mostly via unregulated private sector

• Only half of malaria cases receive recommended first-line agents

• Only 50%-70% of pneumonia cases treated with appropriate antibiotics

Overuse/misuse of antimicrobials is a major driver of AMR


Source: Littmann and Viens. Public Health Ethics 2015: 1–16
We cannot attain the 2030 Agenda
We also know ...we can do something
Antimicrobial Stewardship (AMS)

- Antimicrobial Stewardship (AMS) is a set of coherent activities that results in responsible use of antibiotics, with the definition of responsible use being context-specific and updated periodically.

- AMS is often cited as a major strategy to rationalize the use of antibiotics and prevent emergence of resistance in various settings.

- The role of AMS in a healthcare facility has been demonstrated through various studies which show significant reduction in use of antimicrobials, expenditure associated with antimicrobial use and levels of resistance among various indicator pathogens.

- Any AMS programme should be seen as complementary to the Infection Prevention and Control (IPC) initiatives as they have a shared objective and are synergistic.
Benefits of AMS

- Improve patient outcomes
- Optimize selection, dose and duration of Rx
- Reduce adverse drug events including secondary infections (e.g., *C. difficile* infection)
- Reduce morbidity and mortality
- Limit emergence of antimicrobial resistance
- Reduce length of stay
- Reduce health care expenditures
- Promote equitable access

https://www.cdc.gov/antibiotic-use/healthcare/evidence.html
Why should we invest in AMS?

• Among all the objectives of the Global Action Plan on AMR, Objective 4 (Optimize the use of antimicrobial medicines in human and animal health) can be considered as a **low-hanging fruit**

• The solutions are not as complex and multi-sectoral as the other objectives of GAP-AMR

• Can be achieved by a mix of regulatory measures and resource allocation

• **Behavior change models** are already available from several other domains like TB/HIV etc
Factors which can increase antibiotic use in hospital settings

<table>
<thead>
<tr>
<th>Patient factors</th>
<th>Prescriber factors</th>
<th>Commercial factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Antibiotics seen as standard of care</td>
<td>• Empiric judgement</td>
<td>• Significant source of income for smaller hospitals</td>
</tr>
<tr>
<td>• Poor access to medical facilities</td>
<td>• Outbreak of infectious diseases</td>
<td>• Promotional activities by pharmaceutical companies</td>
</tr>
<tr>
<td>• Advancing age</td>
<td>• Poor prescribing competence</td>
<td>• Incentives for prescribing more</td>
</tr>
<tr>
<td>• Drug resistant infections</td>
<td>• Lack of access to information</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Fear of litigation</td>
<td></td>
</tr>
</tbody>
</table>

ReAct
AMS situation in Africa

- It is reported that only 14% of the healthcare facilities have functional AMS programs (effectiveness of those programs have not been assessed yet)
- Operationalization of NAPs has been patchy due to lack of political commitment and resource-constraints
- Competing priorities like HIV/TB/Malaria have always received precedence
- Surveillance efforts has also suffered due to poor lab capacity and lack of trained personnel across the country
- Only 23 African countries are reporting to GLASS- many are using non-representative data from a small number of centers

**Is this data being used at country level to inform and drive intervention?**
Challenges in implementing AMS in LMICs

- Minimal supporting facilities
- Lack of or weak regulatory mechanisms
- Doubtful utility value of an antibiogram
- Large patient load and time constraints
- Absence of micro/ID experts
- Competition among prescribers
- Perceived patient pressures
- Poor inter-departmental cooperation
- Lack of champions
More challenges

• Diagnostic
  ✓ Limited microbiology labs
  ✓ Lack of availability of consumables
  ✓ Lack of human resources
  ✓ Infrastructure challenges: no running water, electricity, waste disposal
  ✓ Lack of competencies, SOPs, quality assurance

• Access to quality-assured antimicrobials
  ✓ High cost of antibiotics
  ✓ Lack of reliable supply chain systems
  ✓ Weak regulatory structures
  ✓ Perverse financial incentives for prescribers

• Lack of policies and framework on AMS

• Economic and political
  ✓ Lack of uniformity in implementation across sectors and regions
One-third of hospitals in developing world lack running water
Make shift ICU
Prescription autonomy of doctors

• Non prescription use of antibiotics is high in most LMICs and measures have not been successful in containing it
• In a review, it was reported that non-prescription use of antibiotics can be between 19% to 100% in some contexts
• This affects the prescription autonomy of physicians significantly as antibiotics are available without any technical oversight
• The knowledge that patients can obtain antibiotics even if they don’t prescribe it, can possibly make the physicians go for antibiotics
• This can significantly affect AMS in LMIC settings

Cost and human resources are often the most important barriers in implementing a successful AMS programme in the smaller hospitals in LMICs.

The traditional reasoning about ‘return on investment’ does not really apply to the smaller healthcare facilities and community health centres.

This is because most of such centres are standalone facilities and cater to only ambulatory patients.

Also, it is difficult to obtain validated local data on antibiotic use and resistance patterns; and this makes the case even more complex to convince administrators.

Cultural and structural challenges

- Traditional messages using the ‘war-metaphor’ and the misconceived notion that antibiotics are a ‘magic bullet’ for all kinds of infections
- Poor oversight and inability to separate prescribing and dispensing—something which can incentivise prescribers to write for more antibiotics
- Lack of access to healthcare forcing people to depend on cheaper and more physically convenient options like grey market/unqualified prescribers
- Dysfunctional primary healthcare and referral system, which forces patients to access higher levels of healthcare delivery even for trivial medical illnesses

Despite all these challenges...
Does AMS really work in LMICs?

- Multiple studies showing significant reduction in costs incurred for antibiotics and DDDs for reserve antibiotics
- A study from India shows that mean monthly cost for restricted drugs dropped by 14.4% in the post-implementation phase of ASP ($P = .03$)

Core elements of Performance

Leadership Commitment
Accountability
Drug Expertise
Action
Tracking
Reporting
Education

CDC Core Elements of Antibiotic Stewardship for Nursing Homes.
The Joint Commission. Proposed Standard for Antimicrobial Stewardship in AHC, CAH, HAP, NCC, and OBS.
Antimicrobial Management Team
Multidisciplinary Team Approach to Optimizing Clinical Outcomes*

ASP Directors
- Clinical Pharmacist
- Physician Champion

*based on local resources

Key Antimicrobial Stewardship Interventions
Broad interventions

• Most antibiotic treatment is started empirically as diagnosis is done
• CDC recommends all clinicians should perform a review of antibiotics 48 hours after antibiotics are initiated to answer these key questions:
  ✓ Does this patient have an infection that will respond to antibiotics?
  ✓ If so, is the patient on the right antibiotic(s), dose, and route of administration?
  ✓ Can a more targeted antibiotic be used to treat the infection (de-escalate)?
  ✓ How long should the patient receive the antibiotic(s)?
• Develop and implement algorithms for assessment of patients suspected of having an infection
• Reduce prolonged antibiotic treatment courses for common infections
Pharmacy led Interventions

• Automatic changes from intravenous to oral antibiotic therapy in appropriate situations and for antibiotics with good absorption (e.g., fluoroquinolones, trimethoprim-sulfamethoxazole, linezolid, etc.) which improves patient safety by reducing the need for intravenous access.

• Dose adjustments in cases of organ dysfunction (e.g. renal adjustment).

• Dose optimization including dose adjustments based on therapeutic drug monitoring, optimizing therapy for highly drug-resistant bacteria, achieving central nervous system penetration, extended-infusion administration of beta-lactams, etc.

• Automatic alerts in situations where therapy might be unnecessarily duplicative including simultaneous use of multiple agents with overlapping spectra e.g. anaerobic activity, atypical activity, Gram-negative activity and resistant Gram-positive activity.

• Time-sensitive automatic stop orders for specified antibiotic prescriptions, especially antibiotics administered for surgical prophylaxis.

• Detection and prevention of antibiotic-related drug-drug interactions—e.g. interactions between some orally administered fluoroquinolones and certain vitamins.
Antibiotic Time Out

- Trigger tool to stop and reassess antibiotic therapy
- Targeted at all providers for Med/Surg patients
- Guided assessment at 72 hr
- Treatment duration recommendations included for key infections
Infection and Syndromic Specific

Intended to improve prescribing for certain syndromes

• Community acquired pneumonia
• Urinary tract infections
• Soft tissue infections
• Empiric coverage of MRSA

*Use of algorithms would be an important strategy in LMICs*
# Empiric antibiotic Guidelines

## Adult Empiric Antibiotic Therapy Recommendations
(Adjust antibiotics following culture and sensitivity)

<table>
<thead>
<tr>
<th>Infection Site</th>
<th>Suspected Pathogens</th>
<th>Recommended Intravenous Drugs</th>
<th>Recommended Oral Drugs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urine (hospital-acquired or risk factors, e.g. nursing home patient)</td>
<td><em>Enterobacteriaceae</em></td>
<td>Early onset (Hosp &lt; 5 days)</td>
<td>Early onset (Hosp &lt; 5 days) nitrofurantoin (CrCl &gt; 50) Alternative: Amoxicillin/clavulanate</td>
</tr>
<tr>
<td></td>
<td><em>Pseudomonas aeruginosa</em></td>
<td>ceftriaxone</td>
<td>Late onset (Hosp &gt; 5 days)</td>
</tr>
<tr>
<td></td>
<td><em>Enterococcus</em></td>
<td><em>PCN-Cephalosporin allergy aztreonam</em></td>
<td>PCN-Cephalosporin allergy aztreonam +/- tobramycin (see comment above)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ceftazidime +/- tobramycin (consider adding tobramycin if <em>Pseudomonas</em> highly suspected however limit tobramycin duration to 3-5 days if micro negative)</td>
<td></td>
</tr>
<tr>
<td>Urine (community-acquired)</td>
<td><em>Enterobacteriaceae S. saprophyticus</em></td>
<td>ceftriaxone</td>
<td>nitrofurantoin (CrCl &gt; 50) OR cefuroxime</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>PCN-Cephalosporin allergy aztreonam</em></td>
<td>Alternatives (age stratified) agents: ≤ 30 yo ciprofloxacin (avoid in pregnancy)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>41-64 yo amoxicillin/clavulanate</td>
</tr>
</tbody>
</table>
Strategies to overcome challenges at the facility level

Tailor the ASP guidelines according to the resource limitations of the facility

Better communication with patients on the nature of illness and use of medicines

Build sufficient Microbiology/ID expertise by training existing personnel
Improving ACCESS to Antimicrobials

- Access lies in the heart of SDGs and UHC
- Global consumption of antibiotics by humans increased 30% between 2000 and 2010 *
- But this increase was not uniform and lack of access is still a huge problem in many LMIC settings
- Lack of access to treatment for pneumonia and sepsis kills more than a million children every year *
- Universal access to antibiotics can avert 75% of deaths due to community-acquired pneumonia in children under 5 *
- At the same time, unregulated OTC availability of antimicrobials is another dimension of the problem
- So the key is to **improve access, but in a regulated manner**

Both lack of access and unregulated access lead to irrational antimicrobial use and contribute to AMR

OTC – Over-the-counter

* Laxminarayan et al. Lancet, November 18, 2015
Improving ACCESS to Vaccines

- Vaccines prevent infections, reduce the need to use antimicrobials and decrease selection pressure

- Universal global coverage with pneumococcal conjugate vaccine (PCV) could prevent 11.4 million days of antibiotic use in children under 5 *

- But vaccination coverage in LMICs still inadequate

- System-based efforts needed to scale up coverage with already available vaccines such as PCV, HiB vaccine, and rotavirus vaccine

- Vaccines also have a potential to greatly decrease antibiotic use in agriculture **

Besides preventing infections, multivalent pneumococcal conjugate vaccine reduces drug resistance in Strep. pneumoniae in infants and children

HiB – Haemophilus influenzae type b

* Laxminarayan et al. Lancet, November 18, 2015;
** Review on AMR. Vaccines and alternative approaches, 2016

Improving ACCESS to Diagnostics

• Diagnostic tests, especially RDTs, can help make decisions about the need and type of antimicrobial use

• RDT examples:
  • Malaria RDT
  • Xpert MTB/RIF to detect TB and rifampicin resistance

• In rural Zambia, access to malaria RDT substantially reduced inappropriate antimalarial prescribing by CHWs in children under 5 and increased early appropriate use of antibiotics for pneumonia *

• System-based efforts are needed to integrate current and future RDTs into clinical algorithms and improve their access and affordability

RDTs – Rapid diagnostic tests; CHWs – Community health workers

Need for multiple entry points in expanding AMS

1. Convincing narratives on patient safety and cost advantages
2. Resource mobilization for AMS
3. Facility level AMS programs
4. National Level AMS strategy
5. Incorporating AMS into accreditation standards and quality measurements
6. Creating Champions, building competence and increasing allied facilities
Addressing AMR for achieving UHC/SDGs

- Good IPC norms and practices
- Diagnostic Stewardship and building lab capacity
- Antimicrobial Stewardship and good prescribing competencies
- Access to Quality Healthcare and better regulatory structures
- Health-for-all and Universal Health Coverage

SDG 3- Ensuring Healthy Lives and promote wellbeing for all ages
Conclusion

• We need to think of AMS more broadly and have an integrated approach in addressing it
• Practice AMS at all stages of health care
• Take lessons from HIV and AIDS on involvement of community health workers
• AMS must be complemented with strong infection prevention and control (IPC) practices
• AMS should be a core component of training for health care workers
• AMS should be context specific
Thank you

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