

Antimicrobial Resistance and COVID-19, what do we know so far?

Caline S. Mattar, M.D

Assistant Professor of Medicine and Global Health

Department of Internal Medicine

Division of Infectious Diseases



Learning Objectives

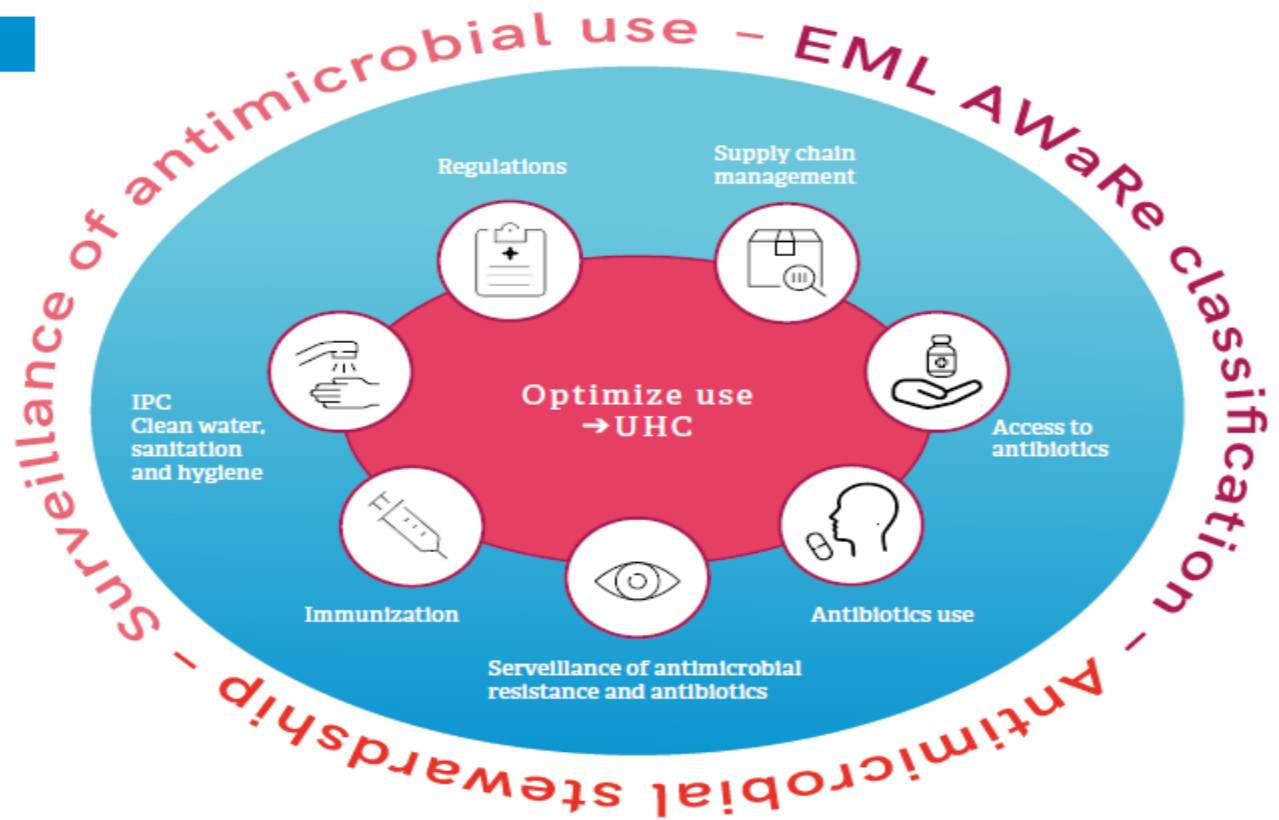


- Review of optimization of antibiotic use
- Describe processes affected by COVID-19
- Review the available evidence on bacterial infections and COVID-19

A brief review

FIGURE 1

Integrated approach to optimizing use of antimicrobials towards universal health coverage



What is happening during this pandemic?

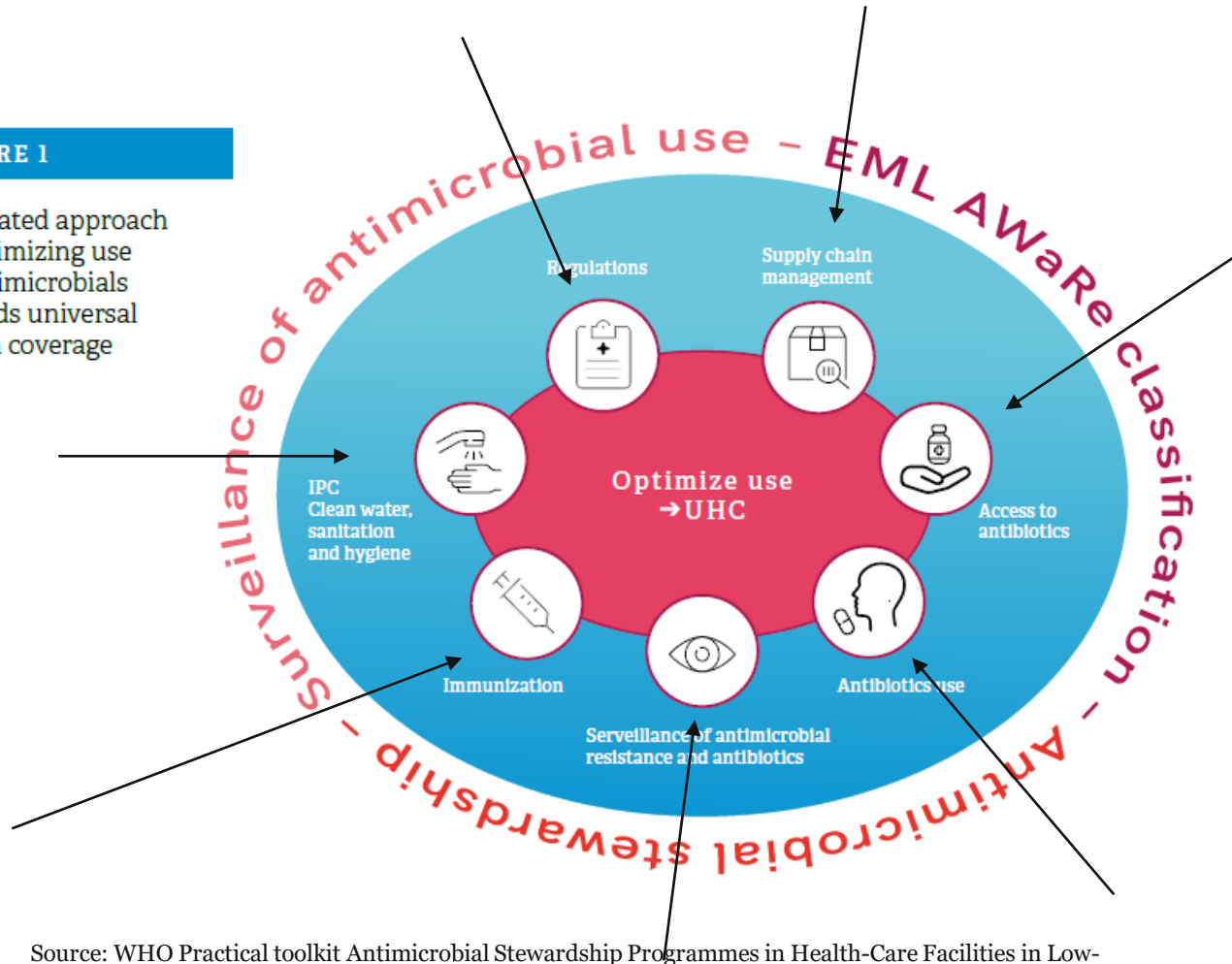


- Many changes in healthcare systems
- Fear, anxiety from patients' side
- Possible delays in presentation for care
- Changes in supply chains and regulations on export of medical products
- Availability of testing and surveillance
- Decreased access to personal protective equipment

In Summary

FIGURE 1

Integrated approach to optimizing use of antimicrobials towards universal health coverage



Source: WHO Practical toolkit Antimicrobial Stewardship Programmes in Health-Care Facilities in Low- and Middle-Income Countries

During the COVID-19 pandemic

- Supply Chain disruptions
 - Quarantined workers- Closed factories
 - Hardest hit areas- contributions to the antibiotic production
- Regulations
 - Travel restrictions/stay at home orders/curfews etc
 - Restrictions of movement of medical supplies/medicines

During the COVID-19 pandemic

- Access
 - Further restricted → out-of-pocket expenses, economic hardships, job losses
 - Public health facilities-overwhelmed → purchasing ability decreases → funds
- Immunizations
 - Expanded immunizations programs halted
 - Redeployment of staff
 - Vaccine availability drops

During the COVID-19 pandemic

- Surveillance
 - Surveillance Programs → stop
 - Testing facilities and labs → repurposed for COVID-19
 - Some molecular testing → same reagents
 - Shortages in reagents, necessary tools etc
 - Human Resources
- Infection Control and Prevention
 - Isolation for MDRO stops
 - Lack of isolation supplies → PPE
 - Infection control practitioners → focus shifts towards pandemic

Understanding COVID-19 presentations



- CXR with multifocal opacities
- High fever
- Oxygen requirement
- Shock
- Progressive multi-organ failure

CXR images from twitter Radiology RSNA

Understanding COVID-19 presentations

- Increase in inflammatory markers: CRP, D-Dimer, LDH
- Increase in WBC count (lymphopenia common)
- The longer the hospital stay → increase risk of secondary bacterial infection

A quick review of the literature

- Lancet:
 - 191 patients from Wuhan
 - Hospitalized
 - Looking at risk factors and mortality
 - SOFA score, D-dimer, lymphocyte count etc
 - Secondary infection in 15% of patients but 95% received antibiotics

	Total (n=191)	Non-survivor (n=54)	Survivor (n=137)	p value
Treatments*				
Antibiotics	181 (95%)	53 (98%)	128 (93%)	0.15
Antiviral treatment	41 (21%)	12 (22%)	29 (21%)	0.87
Secondary infection	28 (15%)	27 (50%)	1 (1%)	<0.0001

A quick review of the literature

- NEJM
 - 1099 patients from 3 provinces in China
 - 154 patients with severe disease
 - 58% received antibiotics
 - Culture data missing-hospitals overwhelmed

Treatments

Intravenous antibiotics — no. (%)	637 (58.0)	498 (53.8)	139 (80.3)
Oseltamivir — no. (%)	393 (35.8)	313 (33.8)	80 (46.2)

Issues with the current COVID-19 literature

- Pandemic situation: no rigorous study designs
- Push for rapid publication- sometimes without proper peer-review
- Many articles- retrospective and very small sample sizes
 - Others with the same patients included in more than one study

Proposed way forward

- Concomitant Bacterial infections in COVID-19 patients → exception not the norm
- Critically-ill patients → cautious management
- Some of the proposed therapies for COVID-19 may predispose to secondary bacterial infections
- In patients presenting with shock → diagnostics to prove Bacterial infection + use pro-calcitonin if available
- → Discontinue antibacterials within 48 hours

References and additional readings

- Fei Zhou, Ting Yu, Ronghui Du, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study, *The Lancet*, Volume 395, Issue 10229, 2020, Pages 1054-1062.
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Caline S. Mattar, M.D
Assistant Professor of Medicine and
Global Health
Campus Box 8051
4523 Clayton Ave
St. Louis, MO 63110
Twitter: @CalineMattar

cmattar@wustl.edu

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