



Our time with
ANTIBIOTICS
is running out.

Antibiotics are in danger of losing their effectiveness due to misuse and overuse, and in many cases they aren't even needed.

Always seek the advice of
a healthcare professional
before taking antibiotics.

R&D priority setting to combat antimicrobial resistance & impact of COVID-19 on use

Dr Peter Beyer
Unit Lead
AMR Division
World Health Organization

Current trends in antibacterial R&D

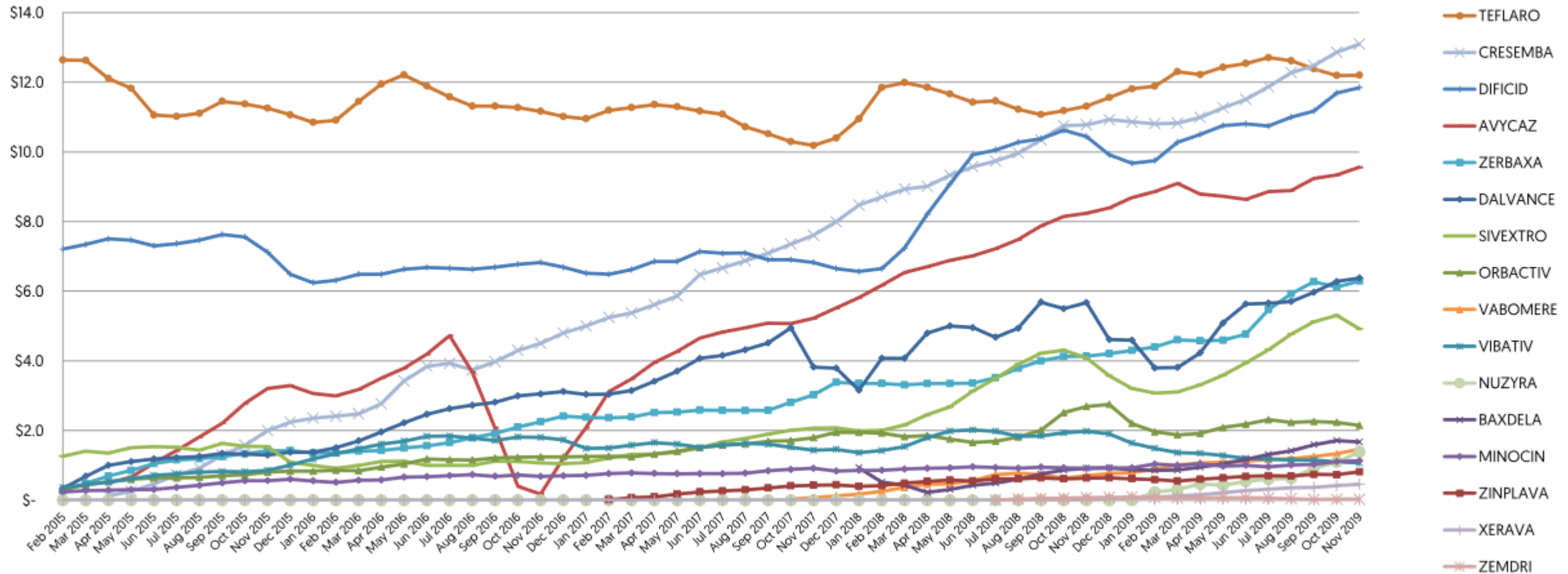


>70% pre-clinical pipeline
driven by SMEs



Branded U.S. Antibiotics and Antifungal Drugs Approved Since 2009

3-Month Moving Average



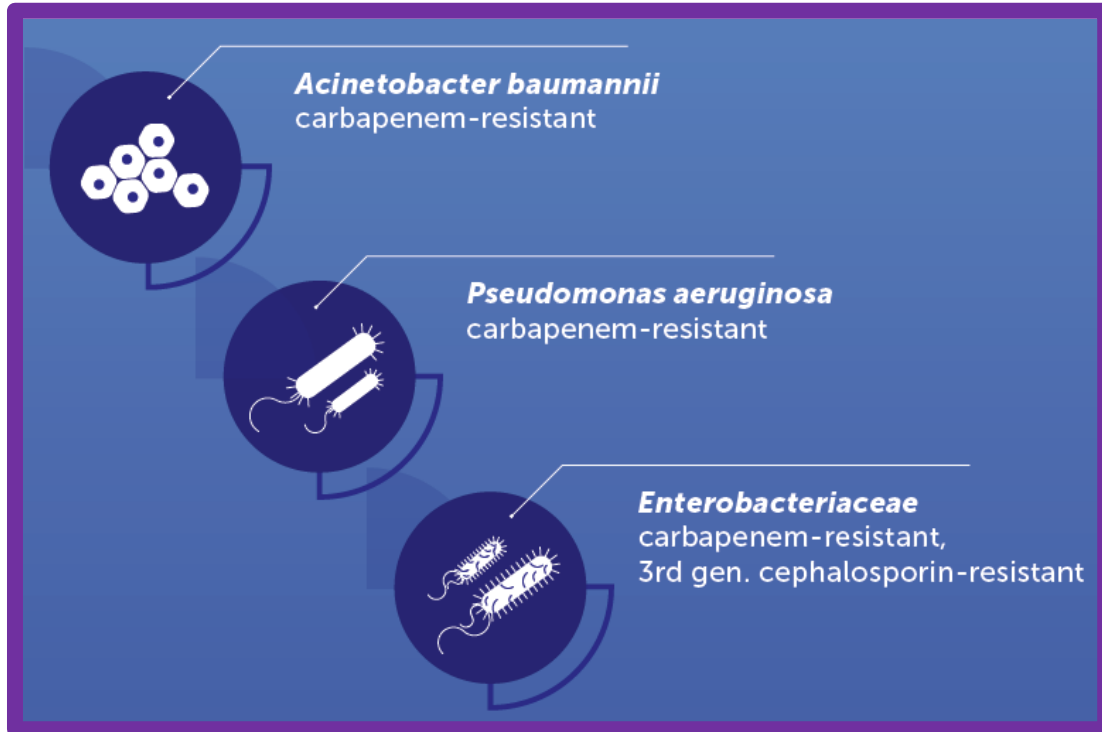
Source: Needham & Company, Antibiotic and Antifungal Update: January 2020

Identification of Priorities (2017)

Global Priority Pathogens List: 13 pathogens prioritized to guide R&D

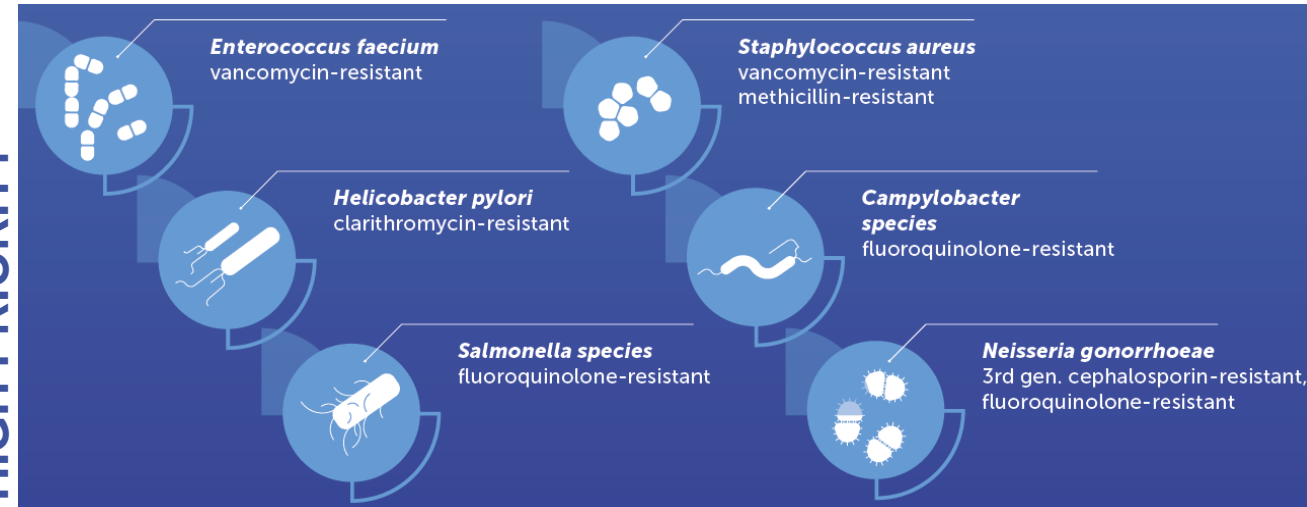
TUBERCULOSIS: A GLOBAL PRIORITY FOR RESEARCH AND DEVELOPMENT

CRITICAL PRIORITY

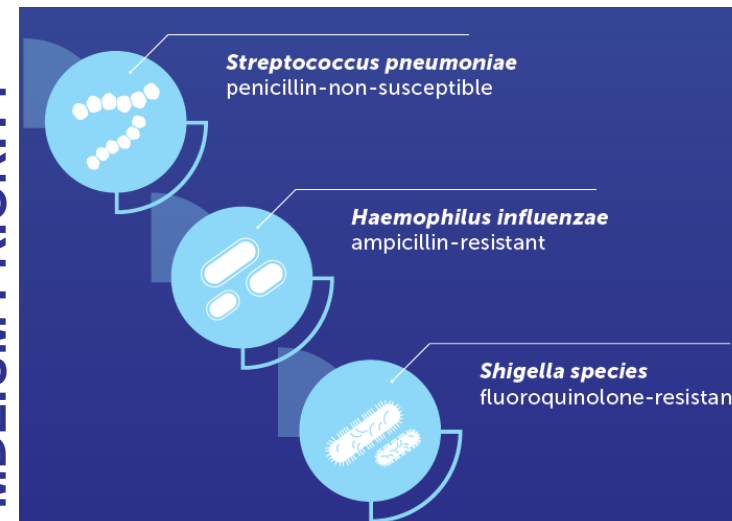


Tacconelli E et al. *Lancet Infect Dis.* 2018; 18(3):318-327

HIGH PRIORITY



MEDIUM PRIORITY



2022
update

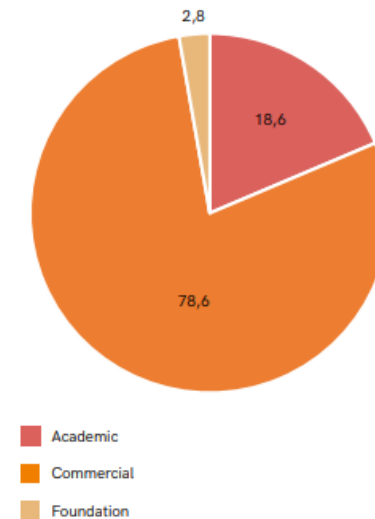
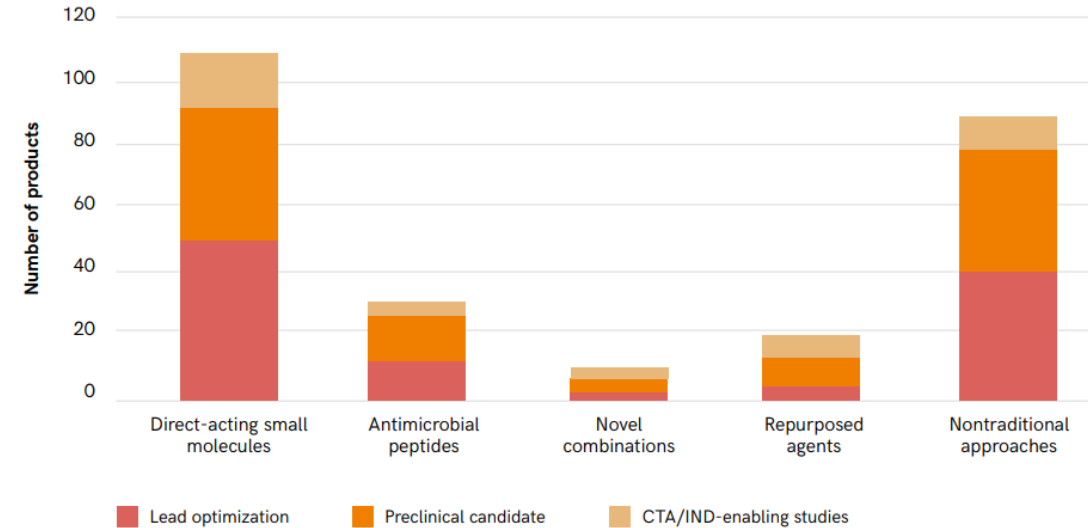
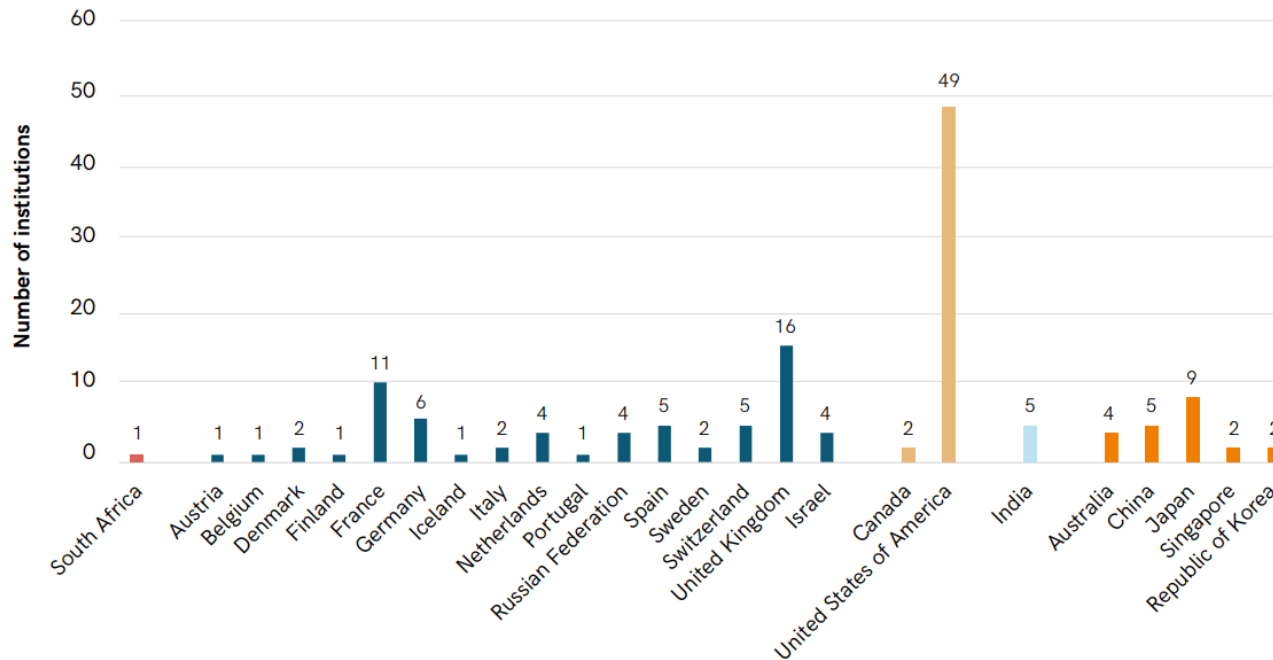
1st pre-clinical antibacterial pipeline review

An open access database

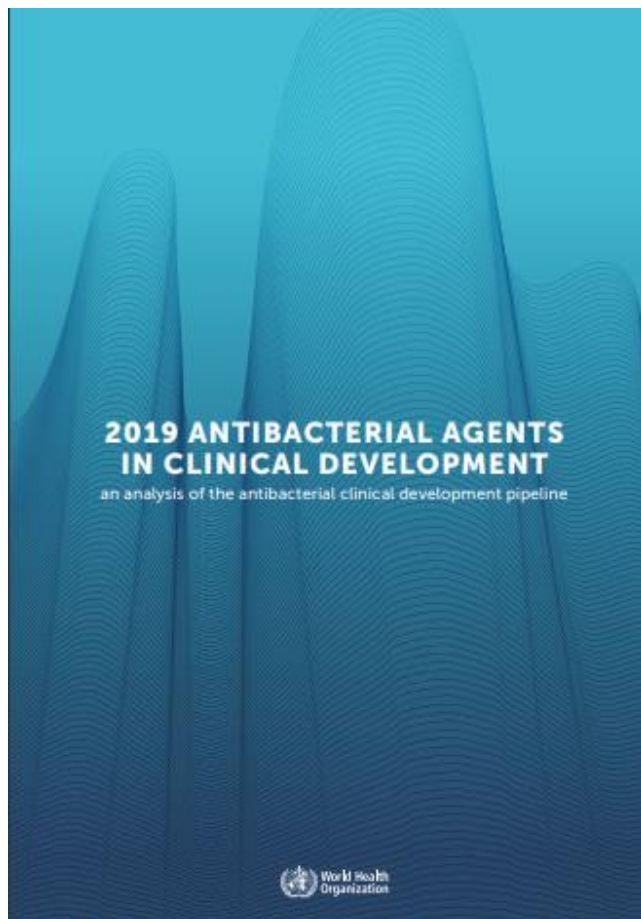


2019: 145 individual entities & 252 products:

- **108** direct acting small molecules
 - 21 targets at least 1 critical Gram-negative bacteria
- **90** non-traditional approaches - diverse



Annual clinical antibacterial pipeline review



- 1st published in 2017
- Data storage: WHO Global Observatory on Health R&D
- 2019 update: [who.int/iris/restricted/handle/10665/330420](https://apps.who.int/iris/restricted/handle/10665/330420)
- Scope: new therapeutic entities in clinical phases I–III
 - Antibiotics and combinations
 - Scope expansion in 2020 to include non-trationals
- **Assessment:**
 - Activity against bacterial priority pathogens, TB and *C. difficile*
 - **Innovation:** absence of cross-resistance to existing antibiotics; new chemical class; new target; or new mechanism of action

Source: <https://apps.who.int/iris/handle/10665/330420>

Data collection in collaboration with: EMA, Access to Medicines Foundation, BEAM Alliance, BIO, CARB-X, GARDP, IFPMA, JPIAMR, NIAID/NIH, Norwegian Public Health Institute, ReAct, REPAIR, TB Union, PEW, TAG and others

Global Antibiotic R&D Partnership (GARDP)

Initiative by WHO and Drugs for Neglected Diseases *initiative* (DNDi)



**Vision: all infections
are treatable for
everyone,
everywhere**



5 new treatments to address antibiotic resistant infections by 2025

What treatments does the world need?

WHO Priority Pathogen List:

- CRAB: carbapenem-resistant *A. baumannii*
- CRE: carbapenem-resistant Enterobacteriaceae
- Sexually-transmitted infections
- Children (paediatric antibiotics)
- Neonatal sepsis

How will GARDP accomplish its ambition?

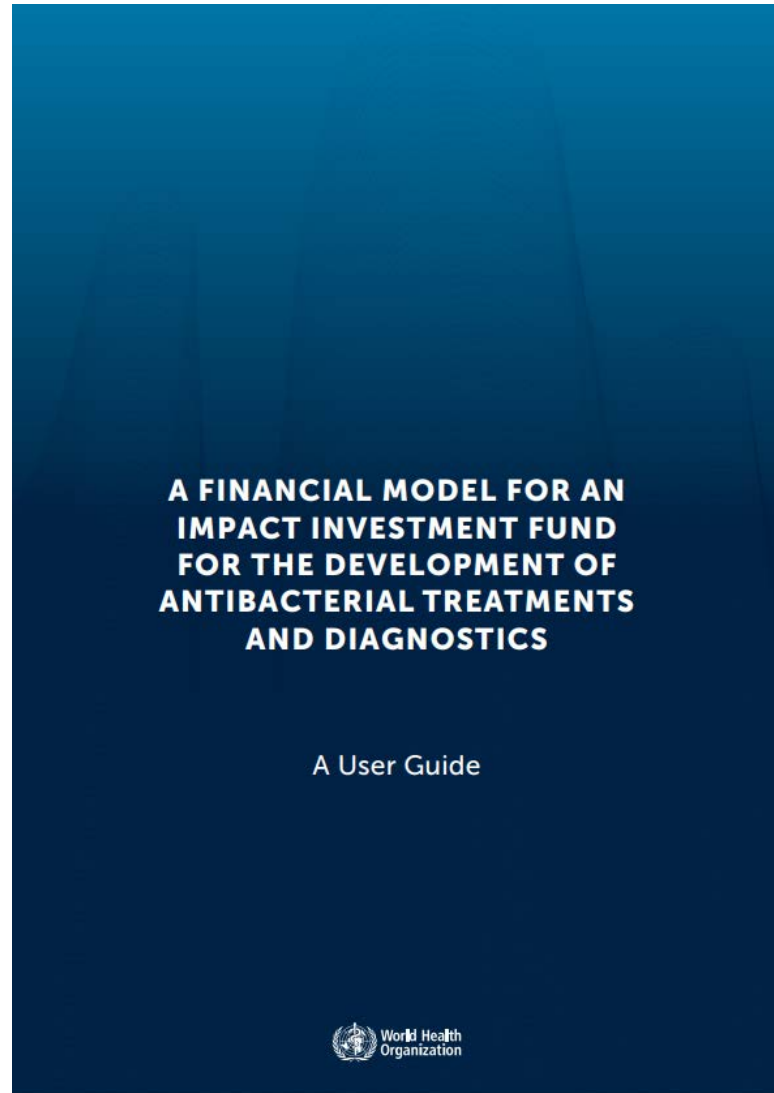
The focus on developing assets in late stage clinical development and ensuring access

AMR Action Fund launched in July 2020



AMR Action Fund driven by pharmaceutical industry:

- USD1BN investment by pharmaceutical companies and EIB
- Invests into innovative antibacterial agents that target public health priorities
- Focus on clinical phases II and III
- WHO involved in the set up and to guide public health priorities and access and appropriate use strategies
- WHO developed financial model that estimates the potential returns on investments into the fund given the information available on R&D costs and progression rate through development phases
- <https://www.who.int/publications/i/item/a-financial-model-for-an-impact-investment-fund-for-the-development-of-antibacterial-treatments-and-diagnostics-a-user-guide>
- <https://amractionfund.com/>



France: Ensuring the availability of antibiotics



Objective: ensuring availability of off-patent antibiotics in France (in humans and animals, while taking into account the environment) and identifying effective countermeasures

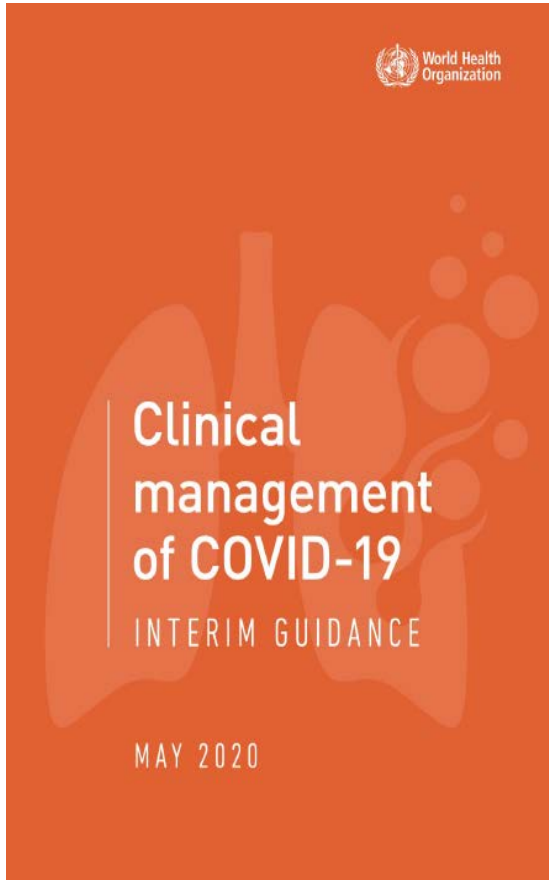


Technical support provided by the World Health Organization (WHO) in close collaboration with all French stakeholders in the human, veterinary and environmental sectors (**One Health approach**), as well as the Directorate-General for Structural Reform Support (DG REFORM) of the European Commission

Three-year project at the request of the **French Government**, co-funded by the European Commission and WHO, starting in **November 2020**



WHO clinical management of COVID-19 interim guidance



Source:
<https://www.who.int/publications/i/item/clinical-management-of-covid-19>

- ✘ For suspected or confirmed mild COVID-19 – recommend against antibiotic therapy or prophylaxis
- ✘ For suspected or confirmed moderate COVID-19 – recommend that antibiotics should not be prescribed unless there is clinical suspicion of a bacterial infection
- ✔ For suspected or confirmed severe COVID-19 – recommend the use of empiric antimicrobials to treat all likely pathogens, based on clinical judgement, patient host factors and local epidemiology and this be done as soon as possible (within 1 hour of initial assessment if possible), ideally with blood cultures obtained first. Antimicrobial therapy should be assessed daily for de-escalation



AMR and COVID-19



Literature

Bacterial and Fungal Coinfection in Individuals With Coronavirus: A Rapid Review To Support COVID-19 Antimicrobial Prescribing FREE

Timothy M Rawson, Luke S P Moore, Nina Zhu, Nishanth Ranganathan, Keira Skolimowska, Mark Gilchrist, Giovanni Satta, Graham Cooke, Alison Holmes ✉

Clinical Infectious Diseases, ciaa530, <https://doi.org/10.1093/cid/ciaa530>

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Journal of Infection

journal homepage: www.elsevier.com/locate/jinf

Co-infections in people with COVID-19: a systematic review and meta-analysis

Louise Lansbury^{a,*}, Benjamin Lim^b, Vadsala Baskaran^{a,c}, Wei Shen Lim^c

7-8% hospitalized COVID-19 patients had secondary co-infections:

- higher proportion of ICU patients
- most common: *Mycoplasma pneumonia*, *Pseudomonas aeruginosa*, *Haemophilus influenzae*

72% received antibiotic therapy - broad-spectrum antibiotics

COVID-19: Antibiotic Use in the Community



High income countries preliminary data/studies:

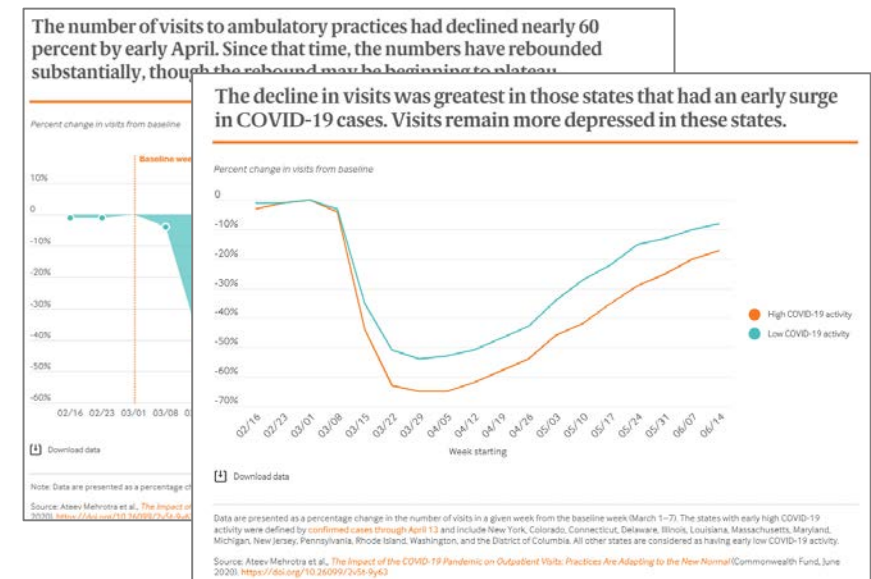
Antibiotic use in the community **lower**

- **Example:** the USA HSS preliminary reports indicate significant drops in antibiotics use from previous years in outpatient, and in nursing homes

Likely reason: drop in non-COVID19 related medical visits

- **US Emergency department:** visits declined 41%-64% during January-April 2020 and 42% year over year
- **Outpatient providers (50,000+ sample):** visits down 60% on the last week of March compared to the first week

1. Jeffery, M. M., et al. (2020). "Trends in Emergency Department Visits and Hospital Admissions in Health Care Systems in 5 States in the First Months of the COVID-19 Pandemic in the US." JAMA Intern Med
2. Hartnett KP, Kite-Powell A, DeVies J, et al. Impact of the COVID-19 Pandemic on Emergency Department Visits — United States, January 1, 2019–May 30, 2020. MMWR Morb Mortal Wkly Rep 2020;69:699–704. DOI: <http://dx.doi.org/10.15585/mmwr.mm6923e1external icon>
3. Mehrotra, A., et al. (2020, June 2020). "The Impact of the COVID-19 Pandemic on Outpatient Visits: Practices Are Adapting to the New Normal." from <https://www.commonwealthfund.org/publications/2020/jun/impact-covid-19-pandemic-outpatient-visits-practices-adapting-new-normal>



Covid-19: Antibiotic Use in the Community



Low Income Countries: preliminary data/studies:

Increased antibiotic use in the community, **but more data is needed**

Likely reason:

- Increased antibiotic use as a preventive measure or to treat COVID-19 or symptoms
- Easy access: OTC, lax or unenforced regulations

Example: Bangladesh: 100 COVID-19 RT-PCR positive patients

96% mild symptoms:

- 45% patients did not consult with physicians and reported self medicating with antibiotics, and
- 36% with multiple antibiotics and antivirals at a time

Bangladesh Journal of Infectious Diseases

Antimicrobial Resistance, Evidences on Irrational Anti-microbial Prescribing and Consumption during COVID-19 Pandemic and Possible Mitigation Strategies: A Bangladesh Perspective

Monira Parveen¹, Mahmuda Yeasmin², Md. Maruf Ahmed Molla²

¹Lecturer, Department of Pharmacology, Dhaka Dental College, Dhaka, Bangladesh; ²Medical Officer, Department of Virology, National Institute of Laboratory Medicine and Referral Center, Dhaka, Bangladesh



Am J Trop Med Hyg. 2020 Oct; 103(4): 1360–1363.
Published online 2020 Aug 18. doi: [10.4269/ajtmh.20-0903](https://doi.org/10.4269/ajtmh.20-0903)

PMCID: PMC7543841
PMID: [32815510](https://pubmed.ncbi.nlm.nih.gov/32815510/)

How Do We Combat Bogus Medicines in the Age of the COVID-19 Pandemic?

Wubshet Tesfaye,¹ Solomon Abriha,^{2,3} Mahipal Sinnollareddy,⁴ Bruce Arnold,⁵ Andrew Brown,⁶ Cynthia Matthew,² Victor M. Oguoma,¹ Gregory M. Peterson,^{2,7} and Jackson Thomas^{2,*}

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Am J Trop Med Hyg. 2020 Jun;102(6):1184–1188. doi: [10.4269/ajtmh.20-0290](https://doi.org/10.4269/ajtmh.20-0290).

Chloroquine and Hydroxychloroquine for the Prevention or Treatment of COVID-19 in Africa: Caution for Inappropriate Off-label Use in Healthcare Settings

Pascale M Abena¹, Eric H Decloedt², Emmanuel Bottieau³, Fatima Suleman⁴, Prisca Adejumo⁵, Nadia A Sam-Agudu^{6,7,8}, Jean-Jacques Muyembe Tamfum⁹, Moussa Seydi¹⁰, Serge P Eholie¹¹, Edward J Mills¹², Oscar Kallay¹⁴, Alimuddin Zumla^{15,16}, Jean B Nachega^{17,18,19}

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