Climate Change and One-Health

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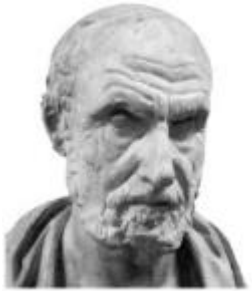
- L’epidemiologia ambientale una disciplina antica.
- One-Health.
- Cambiamenti climatici.
- Guerre nel mondo.
- Riflessi dell’economia della Guerra, sulla sostenibilità e sulla salute.
- La guerra in Ucraina

L'EPIDEMIOLOGIA AMBIENTALE UNA DISCIPLINA ANTICA

MALATTIE INFETTIVE ⇄ **FATTORI AMBIENTALI**

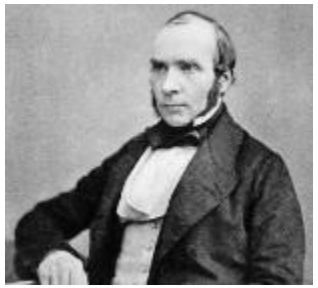
relazione fra virus, fattori etnici, socio economici e ambientali



«PERÌ AERON, UPATON, TOPON»

Ippocrate Coo, 460 a.C. circa – Larissa, 377 a.C.

La **Peste** ad Atene raccontata da Tucidide ne «la guerra del Peloponneso»
430 a.C. supportata con teoria ippocratica nel Medioevo e spiegata solo nel 1800.



- Il **colera** a Londra 1854
- Il **tifo addominale nei teatri di guerra**

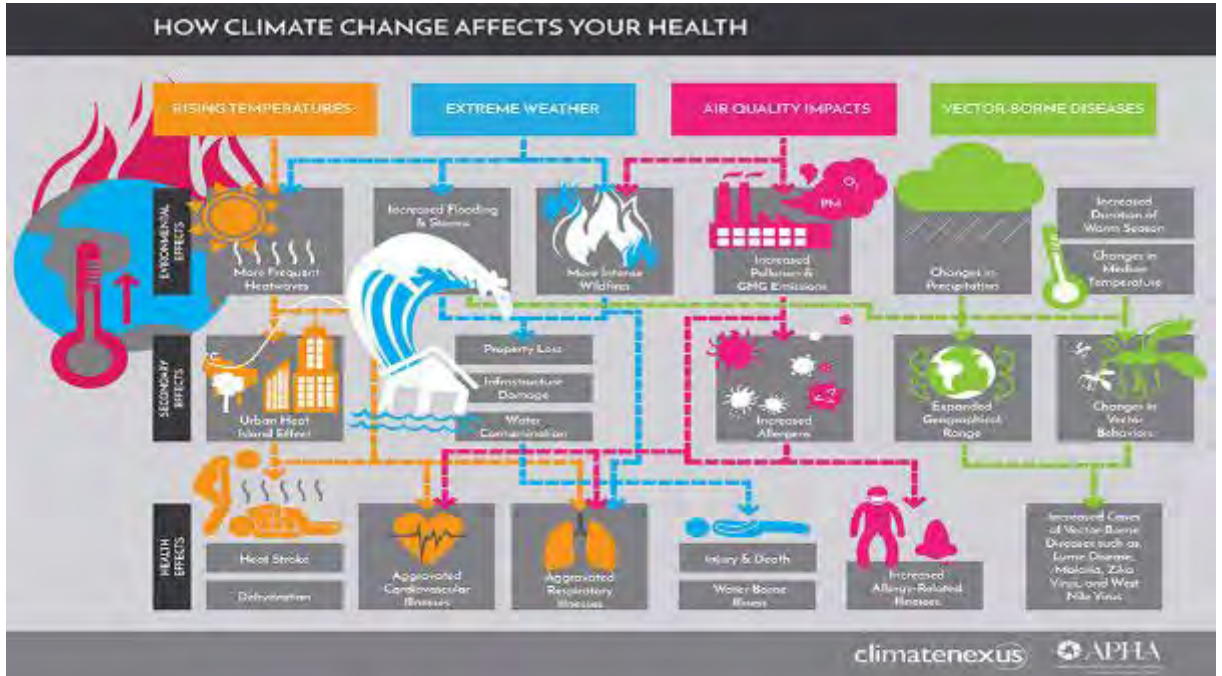
Sempre nel 1800, si scoprì che le acque stagnanti e paludose erano determinanti nella diffusione endemica della **malaria.**
A inizio '900 la nascita degli interventi di "bonifica integrale»

Nobel 2015 **Satoshi Omura William Campbell** x nuovi farmaci antiparassitari


ONE HEALTH
Human health and animal health are interdependent.
At the same time, both depend on the environment.
Diet
Social determinants
Security food
Population movements
Antibiotics and other antimicrobials
Climate change
Intensive livestock
Water pollution
Disease vectors
Air pollution
Biodiversity loss
Deforestation
HUMAN HEALTH
ANIMAL HEALTH
ENVIRONMENT
ONE HEALTH
Note: The associated factors are not exhaustive, they are examples, as there are many elements to consider.
ISGlobal

One Health


INTEGRATIVE HEALTH RISK MANAGEMENT
PREVENTION
INTERVENTION
RECOVERY/REHABILITATION
ONE HEALTH
water sanitation & hygiene (WASH)
food safety & security
agriculture
equity
climate change
resource management
urbanisation
energy
ecosystem services
HUMAN HEALTH
ANIMAL HEALTH
ENVIRONMENTAL HEALTH
SUSTAINABILITY


HOW CLIMATE CHANGE AFFECTS YOUR HEALTH
RISING TEMPERATURES
EXTREME WEATHER
AIR QUALITY IMPACTS
VECTOR-BORNE DISEASES
ENVIRONMENTAL EFFECTS
SECONDARY EFFECTS
HEALTH EFFECTS
More Frequent Heatwaves
Increased Flooding & Storms
More Intense Wildfires
Increased Pollutants & GHG Emissions
Changes in Precipitation
Increased Duration of Warm Season
Changes in Median Temperature
Property Loss
Infrastructure Damage
Water Contamination
Urban Heat Island Effect
Increased Allergens
Expanded Geographical Range
Changes in Vector Behaviors
Heat Stroke
Dehydration
Aggravated Cardiovascular Illnesses
Aggravated Respiratory Illnesses
Injury & Death
Water Borne Illnesses
Increased Allergy-Related Illnesses
climatenexus
APHA

EUROPEAN COMMISSION

Brussels, 14.10.2020
SWD(2020) 251 final

COMMISSION STAFF WORKING DOCUMENT

FITNESS CHECK

on endocrine disruptors

Accompanying the document

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

Chemicals Strategy for Sustainability
Towards a Toxic-Free Environment

{COM(2020) 667 final} - {SWD(2020) 225 final} - {SWD(2020) 247 final} - {SWD(2020) 248 final} - {SWD(2020) 249 final} - {SWD(2020) 250 final}

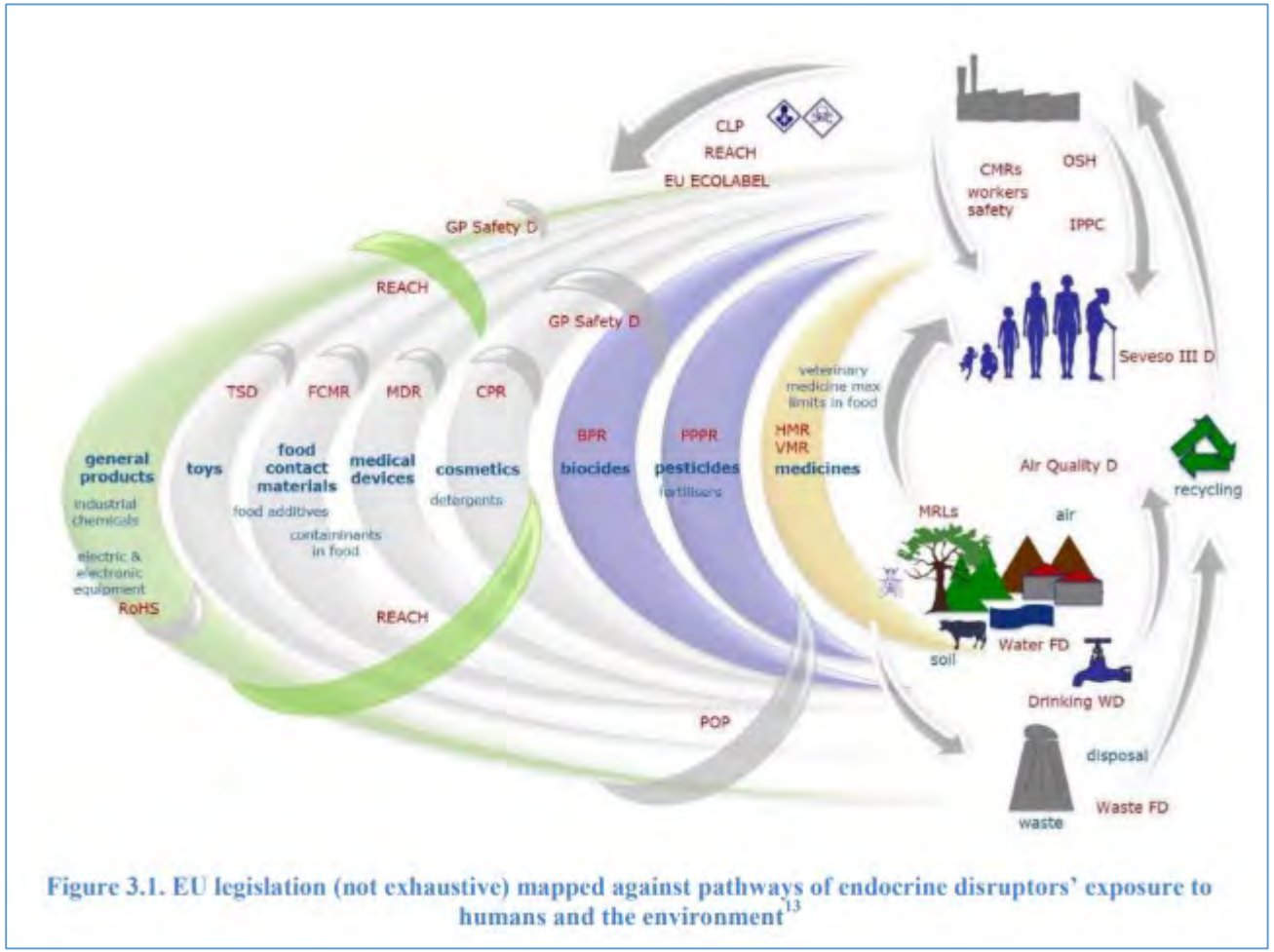


Figure 3.1. EU legislation (not exhaustive) mapped against pathways of endocrine disruptors' exposure to humans and the environment[13]

From book: ***Sicker Fatter Poorer: The Urgent Threat of Hormone-Disrupting Chemicals to Our Health and Future … and What We Can Do About It*** (2019)

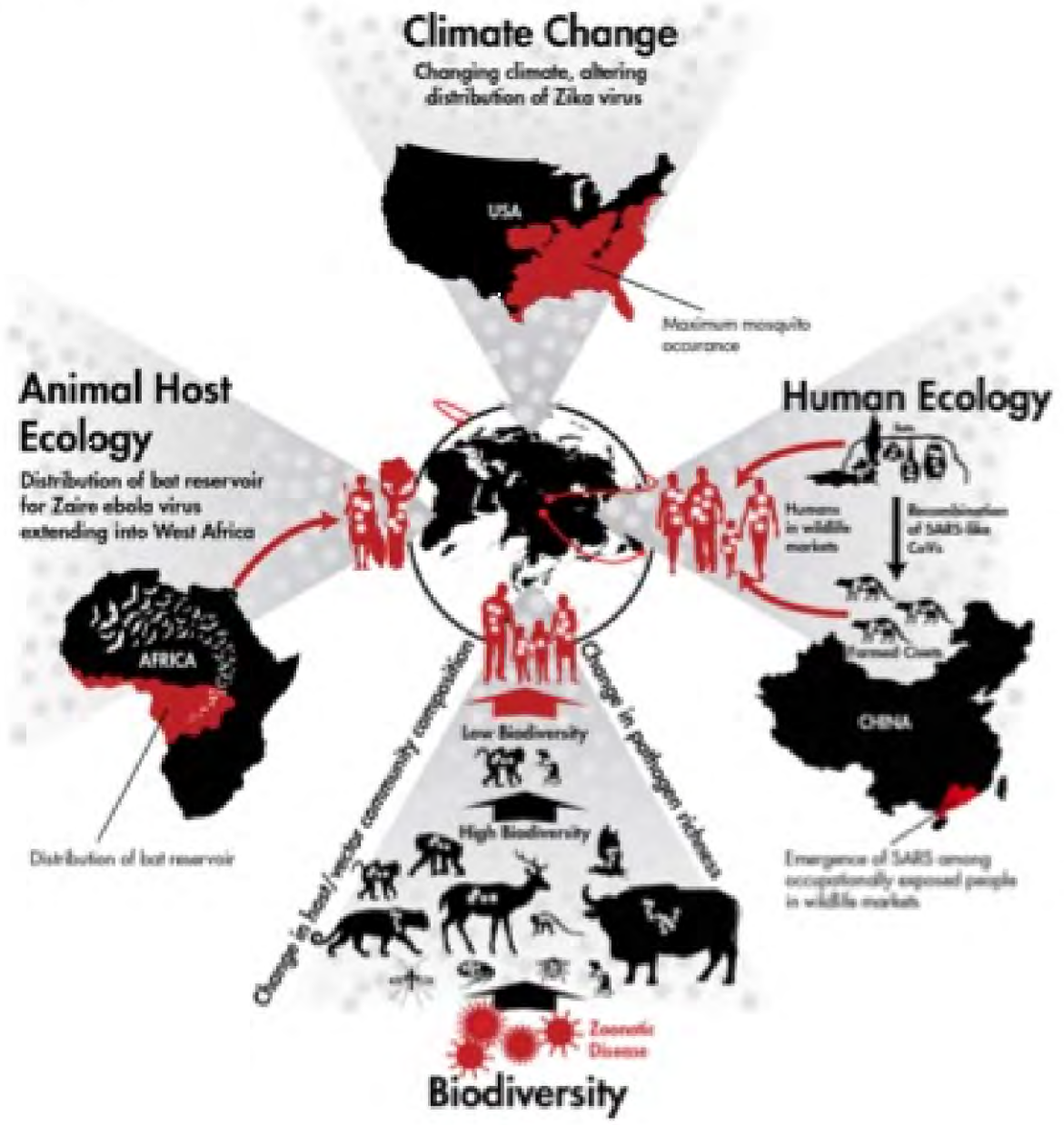
SORVEGLIANZA DELLE MALATTIE INFETTIVE

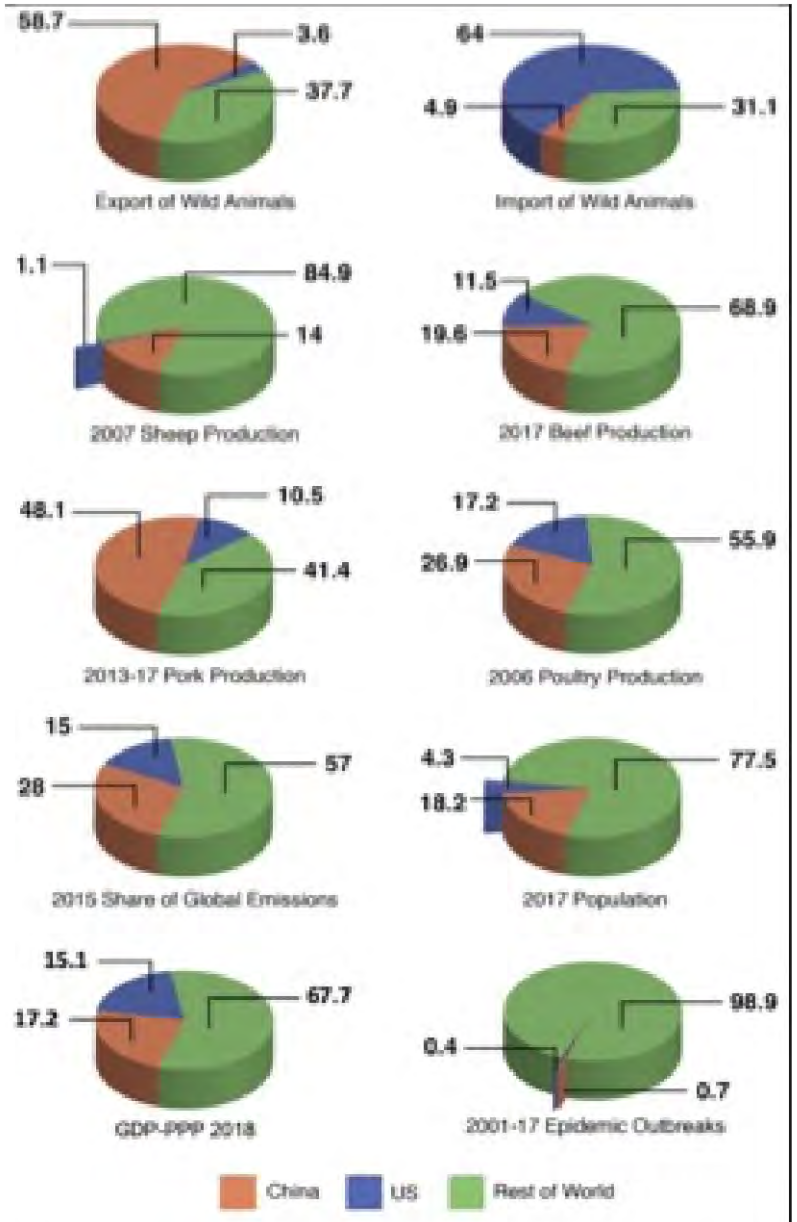
- Prevista dal DPCM 3 marzo 2017, "Identificazione dei sistemi di sorveglianza e dei registri di mortalità, di tumori e di altre patologie"
- Rientra tra i Livelli Essenziali di Assistenza (LEA).
- Gli ambiti di intervento ritenuti prioritari sui quali sono concentrate le attività di prevenzione previste dal PNP 2020-2025 riguardano:

- **Preparedness**
- **Vaccinazioni e piani di eliminazione delle malattie prevenibili**
- **Lotta a inf. Sessualmente trasmesse, HIV, AIDS, epatiti virali, poliomielite e tubercolosi-TBC, zoonosi e tossinfezioni alimentari, malattie trasmesse da vettori, antimicrobico-resistenza e ICA.**

Diagram: EU actors dealing with zoonoses

Smiley Evans, T., Shi, Z., Boots, M. *et al.* Synergistic China–US Ecological Research is Essential for Global Emerging Infectious Disease Preparedness. ***EcoHealth*** **17**, 160–173 (2020). https://doi.org/10.1007/s10393-020-01471-2





Factors contributing to China, USA and rest of the world's stake in emerging infectious disease preparedness.

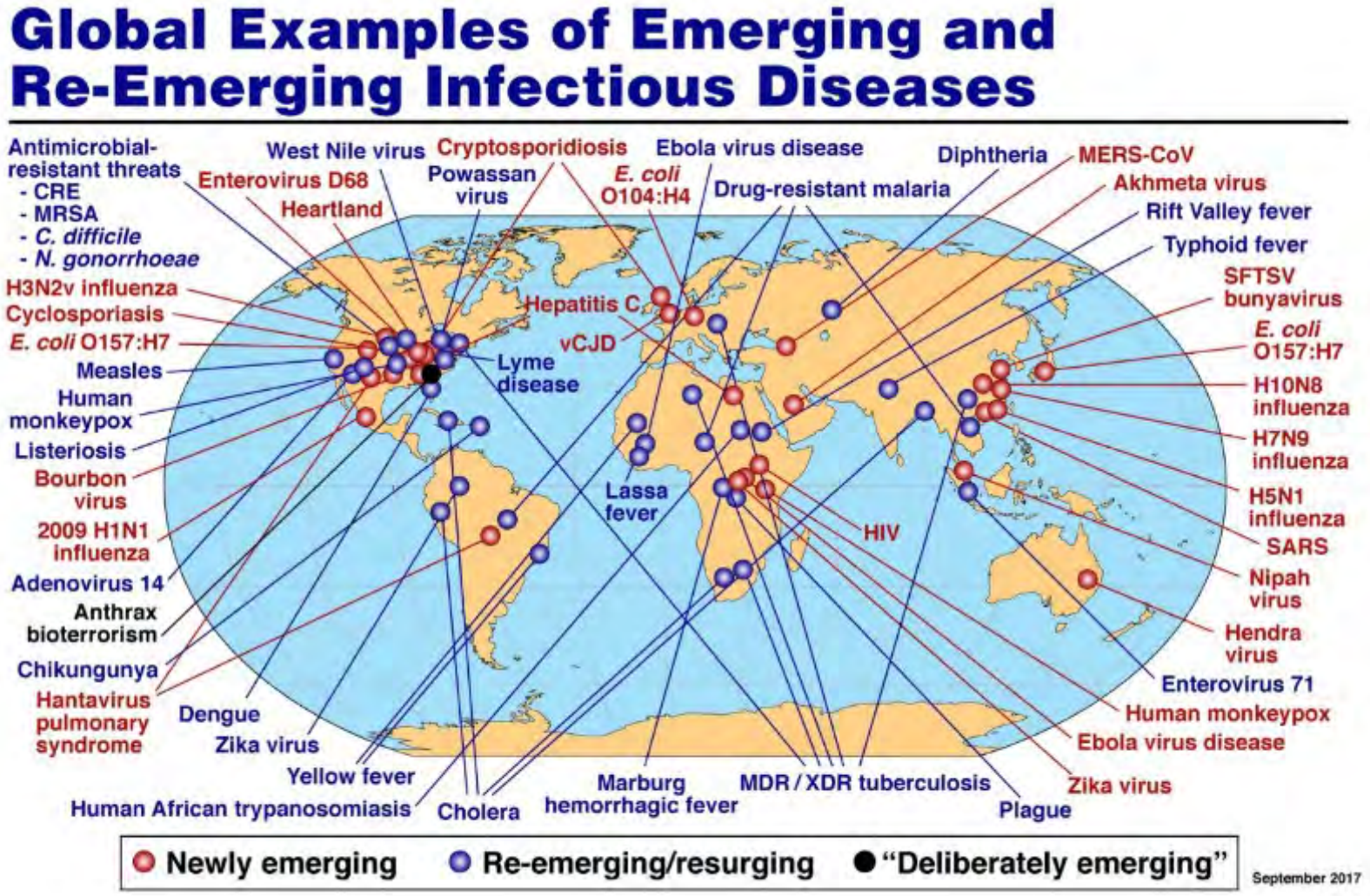
MALATTIE INFETTIVE E ZOONOSI

Alcuni vettori sono in grado di coprire grandi distanze, ampliando il raggio d'azione dei patogeni veicolati, mentre altri penetrano passivamente in nuove aree geografiche tramite gli spostamenti compiuti dalle persone, gli scambi commerciali internazionali, il trasporto di bestiame, la migrazione degli uccelli, le variazioni delle pratiche agricole, il vento. Se il clima è favorevole, i vettori persistono e si diffondono nelle aree d'arrivo.

Es. zanzare, zecche e flebotomi, ecc…

Ma dobbiamo considerare anche i veicoli:

per es. gli alimenti, l'acqua, il suolo ecc…



Mappa delle malattie infettive emergenti al 2017. Crediti: Antoni Fauci/Wikimedia Commons

BMJ Global Health

Tackling antimicrobial resistance in low-income and middle-income countries

Sunil Pokharel,[1] Shristi Raut,[2] Bipin Adhikari [1]

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Antimicrobial resistance (AMR) is a global threat that claims 700 000 lives every year. If no urgent actions are taken, by 2050, AMR will cause an estimated loss of 10 million lives and $US100 trillion.[1] Over the years, commonly identified infectious agents have developed resistance to antimicrobials. Since the discovery of penicillin in 1928, 20 000 potential resistant genes of nearly 400 different types have been identified.[2] Methicillin-resistant *Staphylococcus aureus* alone causes more than 80 000 severe infections and claims more than 11 000 lives each year.[3] The World Bank estimates a reduction in global domestic product per annum of 1.1%–3.8% by 2050 if AMR remains unchecked, and that an investment of US$9 billion per year will be required to counteract the problem.[4]

AMR affects all countries, but the burden is disproportionately higher in low-income and middle-income countries.[1] To halt the spread of AMR, it is important to understand what contributes to its emergence. While the overuse of antimicrobials in both humans and animals is broadly implicated and strategies are developed to counteract such an overuse, the broader factors that contribute to AMR are often overlooked. In addition, national action plans on AMR are often constrained by lack of comprehensive multisectoral and multipronged approaches (eg, too focused on the health sector), and their findings are only relevant for a limited period of time as AMR continues to evolve at a fast pace.[5] A recent assessment of country situational analyses against the political, economic, sociological, technological, ecological, legislative, and industry (PESTELI) framework identified important gaps in addressing AMR.[6]

Indeed, collaborative efforts are necessary to delineate global, regional and local contingency plans for AMR. A multitude of factors contribute to the development of AMR. Many of these factors transcend discipline and sectors. Efforts to counteract AMR through a traditional biomedical approach alone may fail to curb the current challenges. In this editorial, we draw insight from some recent papers in *BMJ Global Health* on AMR, and we use the PESTELI framework to highlight the multifaceted challenges involved in tackling AMR in low-income and middle-income countries, and the need for a holistic and multisectoral approach.

POLITICAL FACTORS

Weak governance often leads to lack of attention to health system functioning and, hence, to weakened regulations for the antimicrobial stewardship. Poor antimicrobial stewardship and inappropriate antimicrobial use often in substandard doses challenge the efforts to contain the emergence and spread of AMR.[7] In addition, budgetary constraints limit the prioritisation for surveillance of AMR.[8] Improved surveillance systems and surveillance data, for example, through establishing computerised data repository, are necessary to inform policies and to respond to both the emerging threats and the long-term trends in resistance.[9] However, existing surveillance systems to monitor antimicrobial consumption in both humans and animals and to identify the rate and trends in development of resistance are often inadequate.[6] Strong political commitment with multistakeholder engagement to strengthen surveillance networks and AMR reporting, and stewardship are essential.

The lack of infrastructure due to poor economy, corruption and low preparedness in many low-income and middle-income countries has led to inadequate attention to preventive measures, such as water, sanitation and hygiene, leading to high burden of infectious diseases. Often in such settings, antimicrobials function as a 'quick-fix' infrastructure, used in place of and to rescue the fractured infrastructures of care, water, sanitation and hygiene.[10]

BMJ Global Health

Antimicrobial resistance and the Iraq wars: armed conflict as an underinvestigated pathway with growing significance

Antoine Abou Fayad ,[1] Anthony Rizk,[2] Samya El Sayed,[3] Malak Kaddoura,[3] Nadine K Jawad,[4] Adel Al-Attar,[5] Omar Dewachi,[6] Vinh Kim Nguyen,[7] Zahy Abdul Sater[3]

To cite: Abou Fayad A, Rizk A, El Sayed S, *et al*. Antimicrobial resistance and the Iraq wars: armed conflict as an underinvestigated pathway with growing significance. *BMJ Global Health* 2023;**7**:e010863. doi:10.1136/bmjgh-2022-010863

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► Additional supplemental material is published online only. To view, please visit the journal online (http://dx.doi.org/10.1136/bmjgh-2022-010863).

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INTRODUCTION

Antimicrobial resistance (AMR) is rising globally at an alarming rate and, if left unaddressed, expected to cause 10 million deaths per year by 2050.[1] This growing threat has widely been attributed to the overuse and misuse of antibiotics and/or the use of substandard antibiotics in humans, livestock and as a byproduct of environmental contamination. While antibiotic use has often been the focus of AMR science and policy, only recently has clinical research in microbiology turned to evaluating other biocides, such as heavy metals and quaternary ammonium compound disinfectants (QACs), as potential drivers that co-select for resistant pathogens.[2] In the Middle East, spiking rates of antibiotic resistance, especially in Gram-negative pathogens such as *Acinetobacter baumannii*, *Pseudomonas aeruginosa* and *Klebsiella pneumoniae*, have also implicated another underinvestigated pathway for AMR: the direct and indirect roles of wars and conflicts, and their associated implications to healthcare (these can include, but are not limited to, the breakdown of healthcare systems, the loss of skills healthcare personnel, deteriorating infection and sanitation controls in healthcare settings, and difficulty of access to effective therapy, therapeutics and diagnostics), in driving the emergence of resistant pathogens.

Investigating the relationship between wars, conflicts and transformations in antimicrobial susceptibility and resistance patterns is not unprecedented. War has been implicated in the emergence of AMR as far back as the 1940s, when widespread industrial-scale mass production and application of arsenicals, sulfonamides and disinfectant QACs, as well

SUMMARY BOX

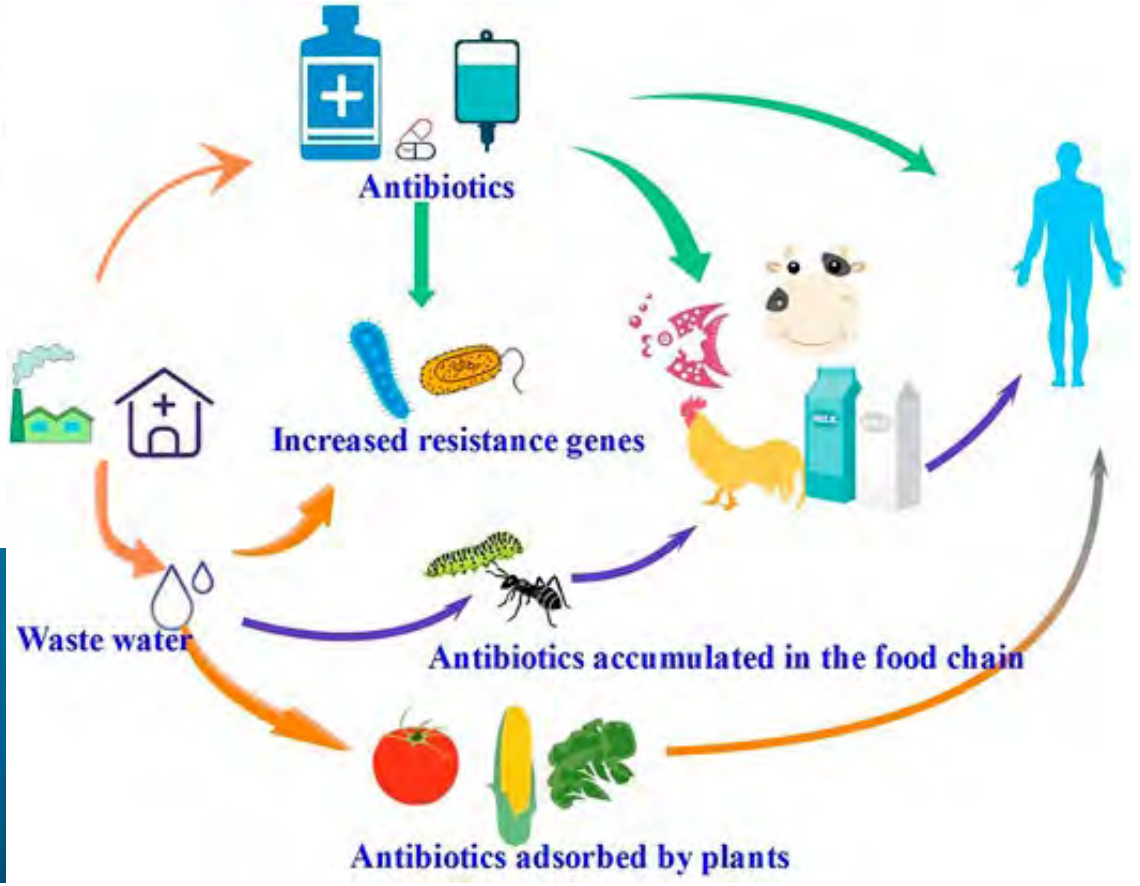
- While antibiotic misuse and overuse has often been the focus of antimicrobial resistance (AMR) science and policy, clinical microbiology in the Middle East is turning to evaluating war and conflict as drivers of antimicrobial resistance.
- War has been implicated in the emergence of antimicrobial resistance as far back as the 1940s and these conditions have since persisted and intensified, with contemporary conflicts pressuring microbes with selective environments that contain unique combinations and concentrations of toxic heavy metals and antibiotics and providing niches and dissemination routes.
- Iraq experienced a sequence of conflicts since the 1980s, and reports point to a progressive deterioration of Iraq's national healthcare system, lack or limitation in trained staff, infection prevention and control, access to antibiotics as well as sanitation control and debridement of highly contaminated wounds from explosives or burns, as well as inappropriate diagnoses and drug regimens, all potential contributors to the rising rates of AMR in Iraq.
- AMR co-selection from heavy metals is becoming more strongly implicated due to conflict-driven environmental contamination, as with lead, mercury, chromium, copper, lead nickel and zinc used to cast bullets, missiles, gun barrels and military vehicles, while antimony, barium and boron are used as weapon-priming compounds.
- The rise of AMR in Iraq, with indications of regional and global spread, remains direly understudied, where clinical, microbiological, historical, ethnographic and environmental research is needed to conclusively establish the roles that war and conflict play in the rise of multidrug-resistant organisms.
- Understanding the link between AMR and conflict is essential for a global response to AMR, especially with little indication that global conflict will abate in years to come.

European Commission

JRC TECHNICAL REPORTS

2018

State of the Art on the Contribution of Water to Antimicrobial Resistance



Environmental Research 204 (2022) 112038

Contents lists available at ScienceDirect

Environmental Research

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

Antibiotic residues in poultry tissues in Iran: A systematic review and meta-analysis

Majid Mohammadzadeh [a], Maryam Montaseri [b], Saeid Hosseinzadeh [b], Majid Majlesi [c], Enayat Berizi [a,*], Morteza Zare [a], Zahra Derakhshan [d,e], Margherita Ferrante [f], Gea Oliveri Conti [f]

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[b] Department of Food Hygiene and Public Health, School of Veterinary Medicine, Shiraz University, Shiraz, Iran
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ARTICLE INFO

ABSTRACT

INTERNATIONAL JOURNAL OF FOOD PROPERTIES
2017, VOL. 20, NO. 2, 402–408
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Taylor & Francis

Antibiotics and malachite green residues in farmed rainbow trout (*Oncorhynchus mykiss*) from the Iranian markets: A risk assessment

Milad Adel[a], Maryam Dadar[b], and Gea Oliveri Conti[c]

[a]Department of Aquatic Animal Health and Diseases, Iranian Fisheries Science Research Institute (IFSRI), Agricultural Research Education and Extension Organization (AREEO), Tehran, Iran; [b]Center of Biotechnology and Biology Research, Shahid Chamran University, Ahvaz, Iran; [c]Department of Medical Sciences, Surgical and Advanced Technologies "G.F. Ingrassia"-Hygiene and Public Health, Laboratory of Environmental and Food Hygiene (LIAA), University of Catania, Catania, Italy

ABSTRACT

Antibiotic and malachite green residues in farmed rainbow trout muscles were determined by high-performance liquid chromatography for a food risk assessment. The surveillance was carried out on total of 120 rainbow trout fillets, all fishes were randomly sampled from 20 fish markets of Iran. All antibiotics were detected in the range of 0.42–1.20 μg/g for Oxytetracycline, 0.02–0.34 μg/g for Enrofloxacin, 0.21–2.61 μg/g for Florfenicol, and finally 0.02–0.89 μg/g for Malachite green. Our results showed that 99 (82.5%), 36 (30%), 56 (46.6%), and 70 (58.4%) samples contained detectable residues of Oxytetracycline, Enrofloxacin, and Florfenicol antibiotics, and Malachite green, respectively. Our results showed that fish farmers use these drugs in large scale. Further investigations are needed to prevent: the foodborne risk to consumers, the possible environmental contamination, and the antimicrobial resistances.

ARTICLE HISTORY
Received 4 October 2015
Accepted 5 March 2016

KEYWORDS
Oxytetracycline; Enrofloxacin; Florfenicol; Malachite green; Rainbow trout; Food hygiene

Studies on Antibiotic Residues in Beef and Effect of Cooking and Freezing on Antibiotic Residues Beef Samples

Fahim A Shaltout[1]*, Mohamed A El shatter[2] and Heba M Fahim[3]

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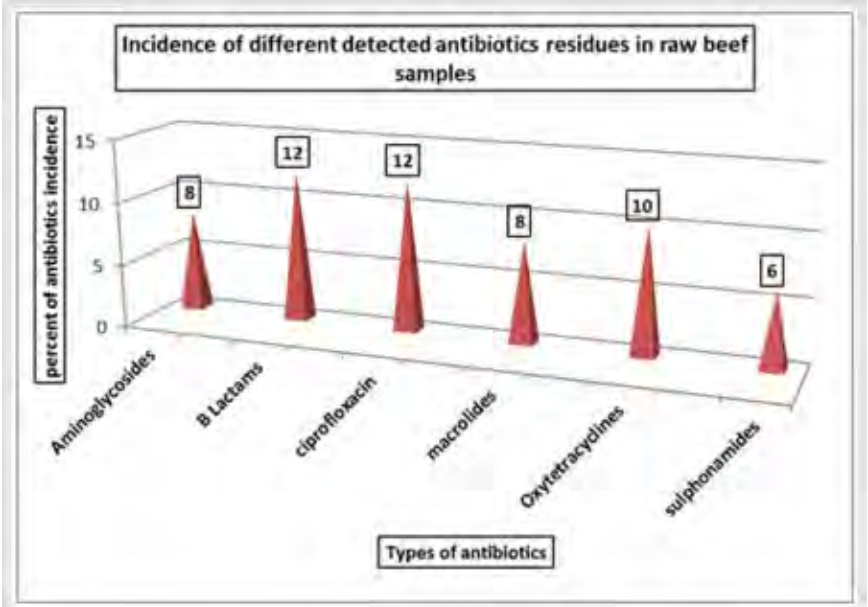
[2]Animal Health Research Institute, Egypt

[3]General organization of veterinary services, Egypt

Received: June 24, 2019; **Published:** July 08, 2019

***Corresponding author:** Fahim A Shaltout, Food Hygiene Department, Faculty of Veterinary Medicine, Benha University, Egypt

doi 10.32474/SJFN.2019.02.000129



Food Control
Volume 50, April 2015, Pages 937-941

Determination of illegal antimicrobials in aquaculture feed and fish: An ELISA study

Gea Oliveri Conti, Chiara Copat, Zhanhui Wang, Placido D'Agati, Antonio Cristaldi, Margherita Ferrante

Show more

Share Cite

https://doi.org/10.1016/j.foodcont.2014.10.050

Highlights

- We assessed antimicrobials in feed and fish from an aquaculture through ELISA.
- The performance characteristic of methods were described.
- Levels exceeding the method's detection capability were found in all samples.
- The 50% of farmed fish is used to make fish meal, thus compounding bio-accumulation.
- Results were important because data on this topic are still today scarce.

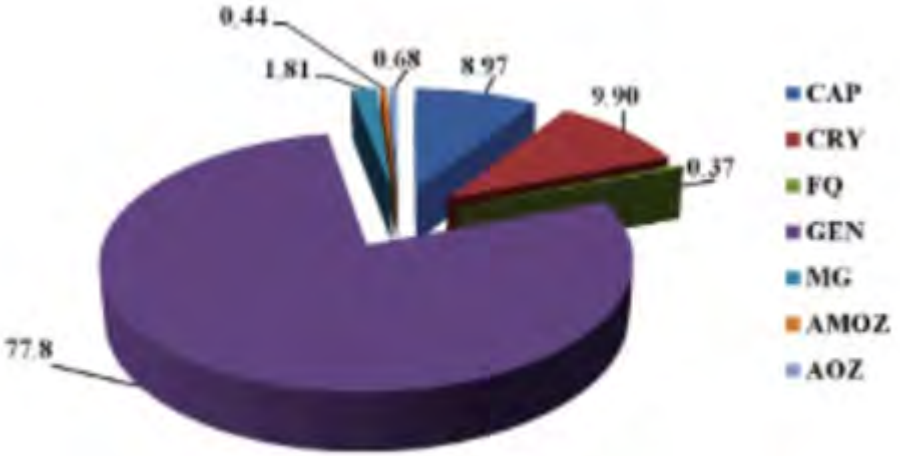


Fig. 2. Percentages content of each antimicrobial in feed.

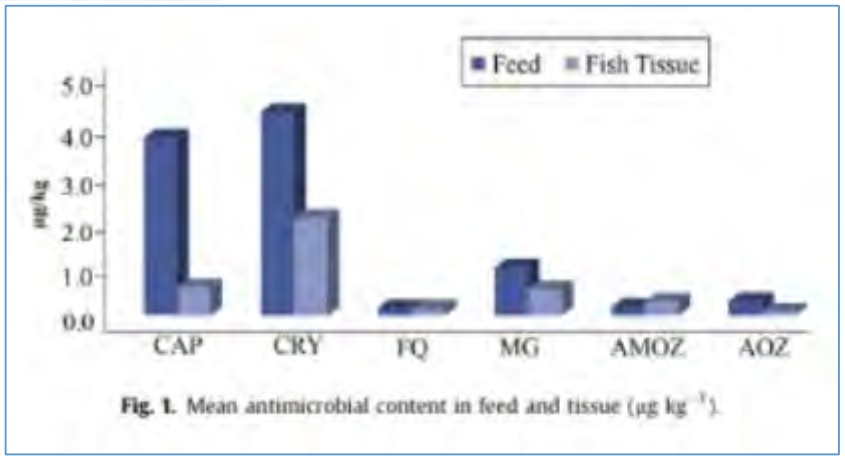


Fig. 1. Mean antimicrobial content in feed and tissue (μg kg^{-1}).

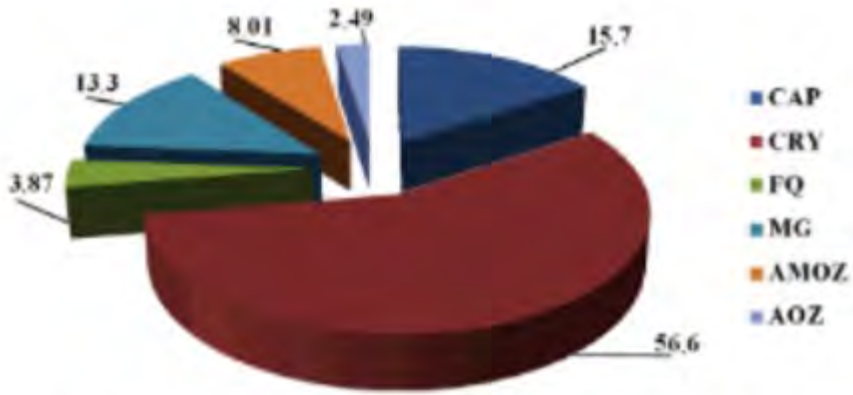
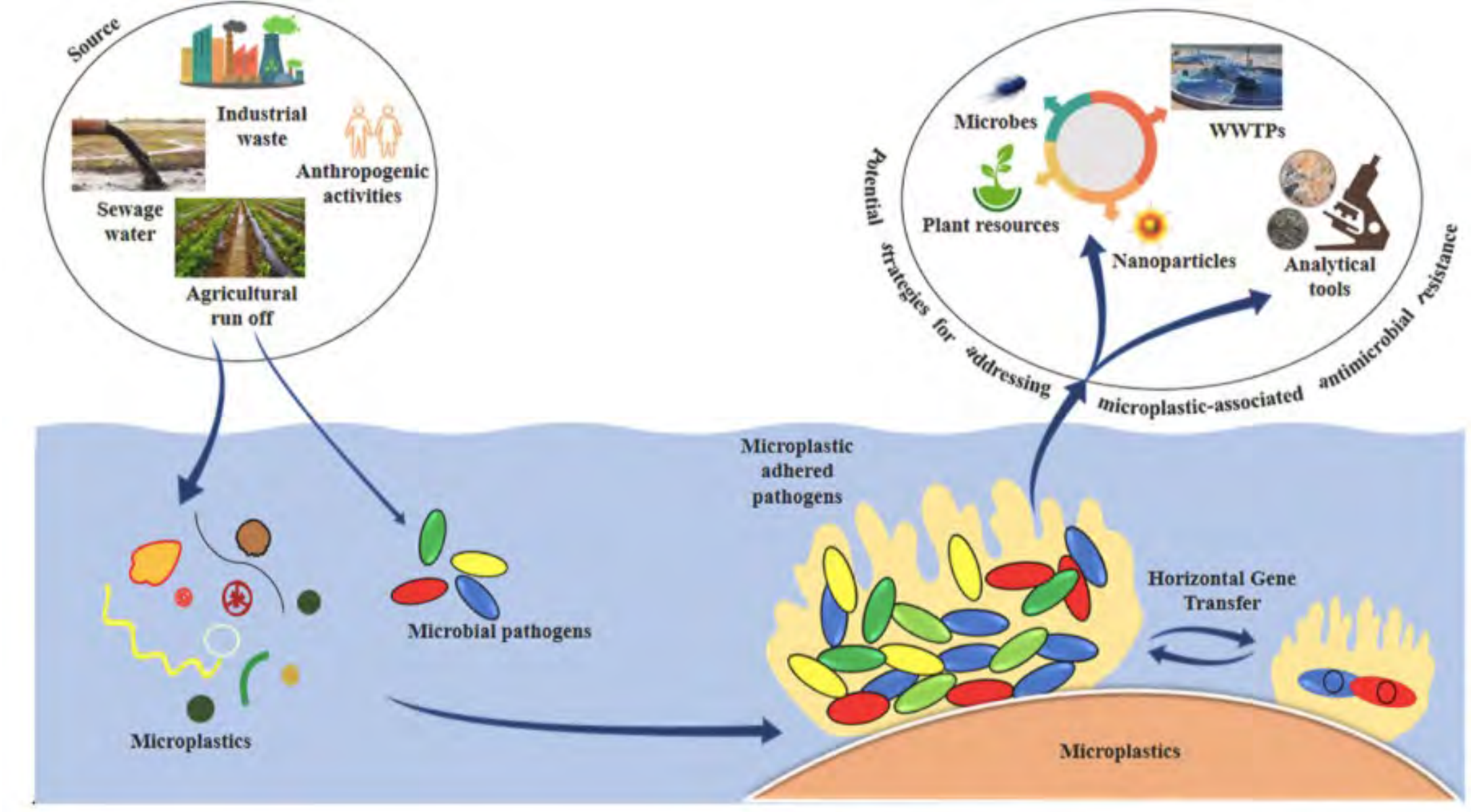


Fig. 3. Percentages content of each antimicrobial in fish tissue.

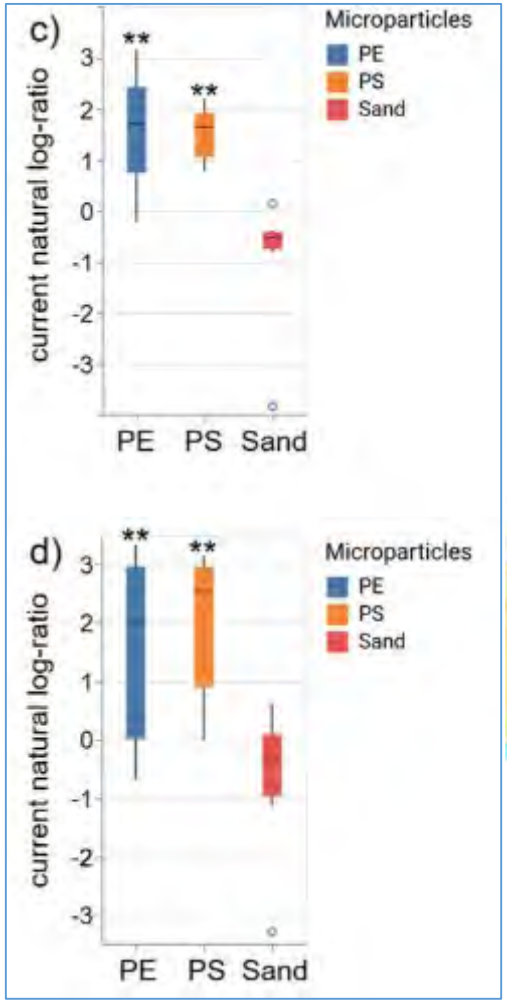


Le Microplastiche sono gli hubs così come i carrier effettivi di questi patogeni microbici .....i loro AMR-genes (ARGs) negli ecosistemi marini, di acque dolci, sewage/acque reflue, e fluviali urbani. L'AMR associata alle microplastiche è un problema emergente per la salute umana e l'assistenza sanitaria costituendo anche una sfida per le comunità dei ricercatori.

Journal of Hazardous Materials Letters
Volume 2, November 2021, 100014

Microplastics as hubs enriching antibiotic-resistant bacteria and pathogens in municipal activated sludge

Dung Ngoc Pham, Lerone Clark, Mengyan Li



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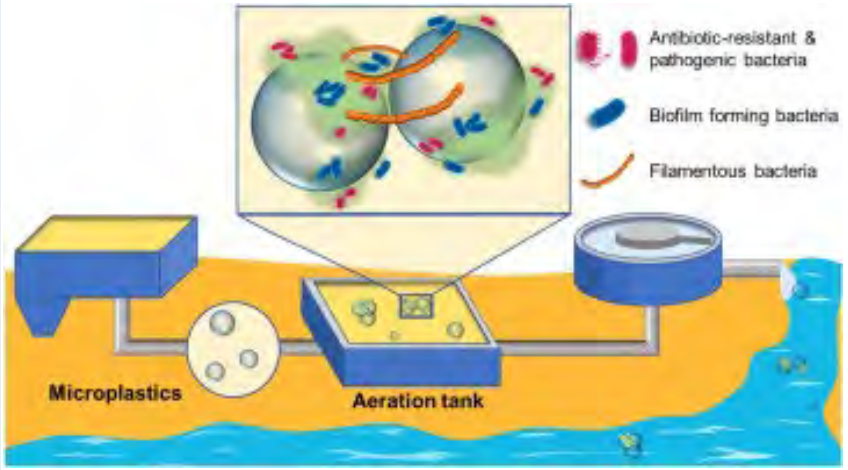
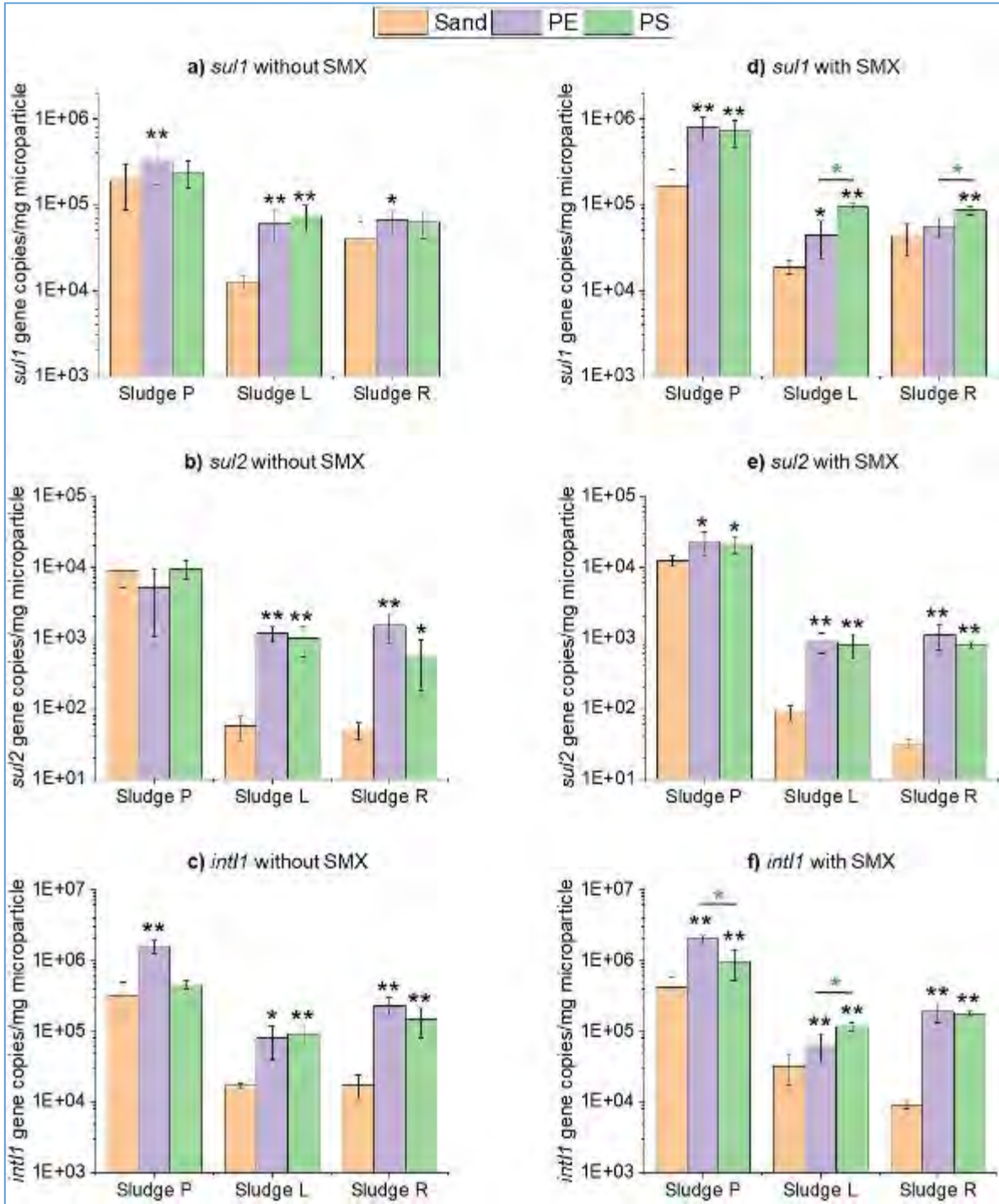


Differential ranking of taxa associated with microparticle components. c-d) Qurro-produced log ratios were significantly different among PE, PS, and sand biofilms based on selected taxon sets determined by the differential ranking analysis. Two-way Student's *t*-test (**, $p < 0.01$).

Absolute abundance of *sul1*, *sul2*, and *intI1* in microparticle biofilms cultivated in different activated sludge samples with or without the presence of SMX (100 µg/L).

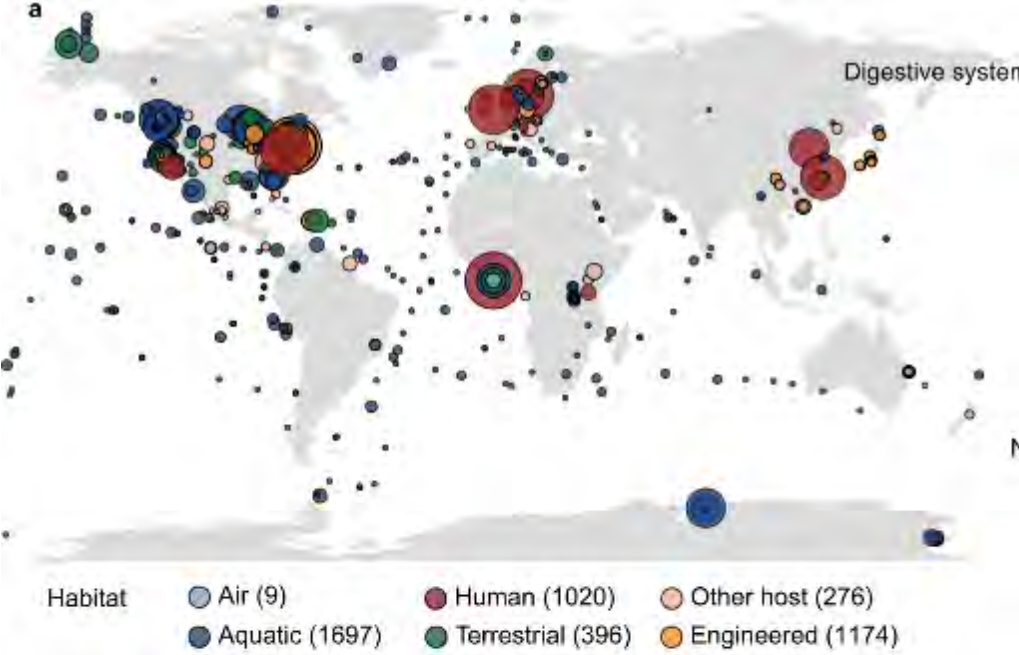


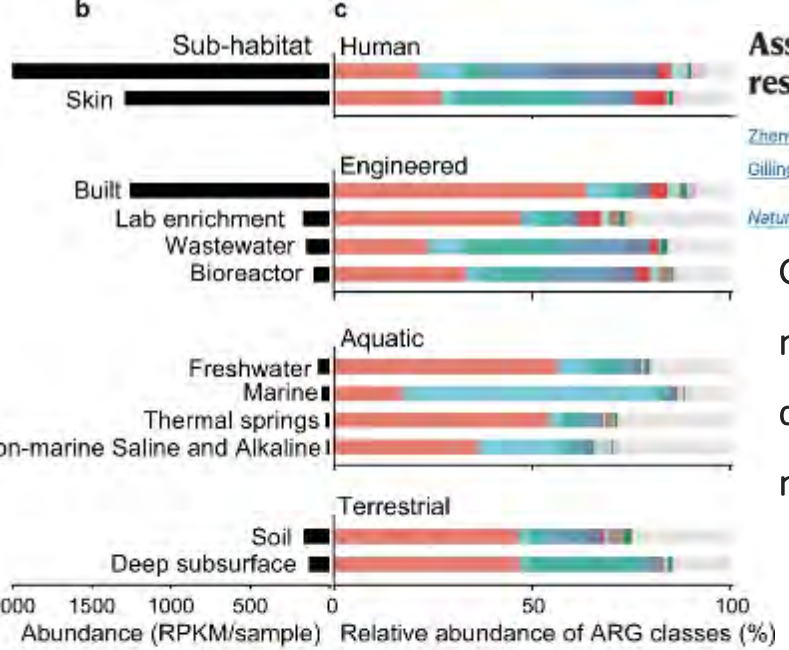
Assessment of global health risk of antibiotic resistance genes

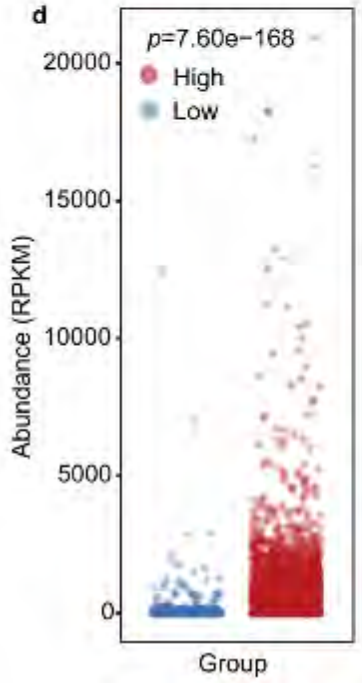
Zhenyan Zhang, Qi Zhang, Tingzhang Wang, Nuohan Xu, Tao Lu, Wenjie Hong, Josep Penuelas, Mich Gillings, Meixia Wang, Wenwen Gao & Haifeng Qian ✉

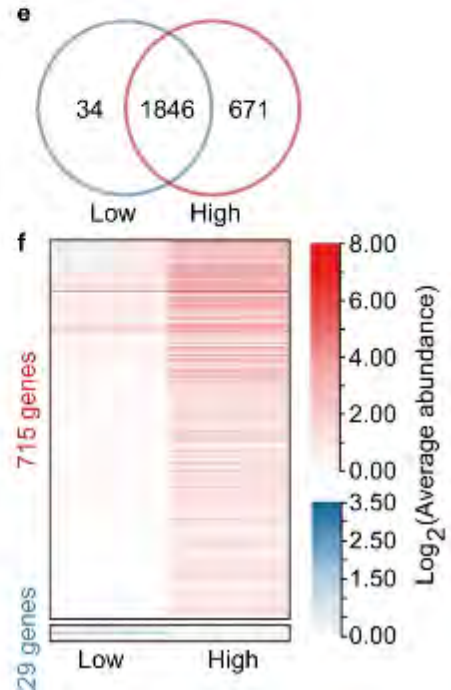
Nature Communications **13**, Article number: 1553 (2022) Cite this article

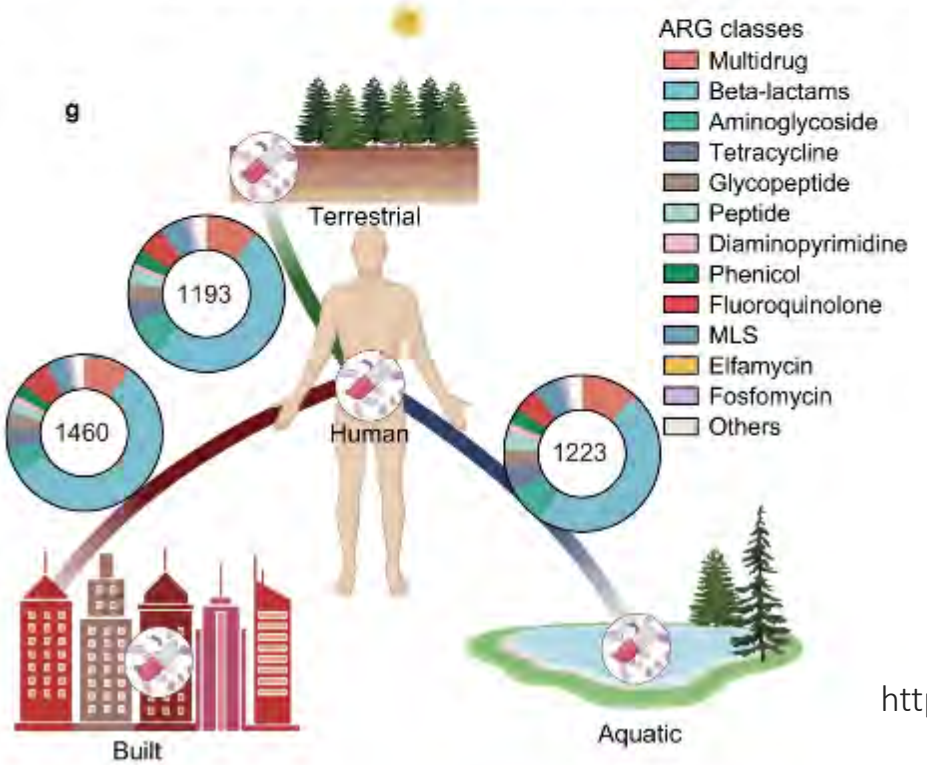
Gli Autori hanno usato 4572 datasets metagenomici per svelare la distribuzione e disseminazione di 2561 ARGs e i loro ospiti nell'habitat globale.











https://doi.org/10.1038/s41467-022-29283-8

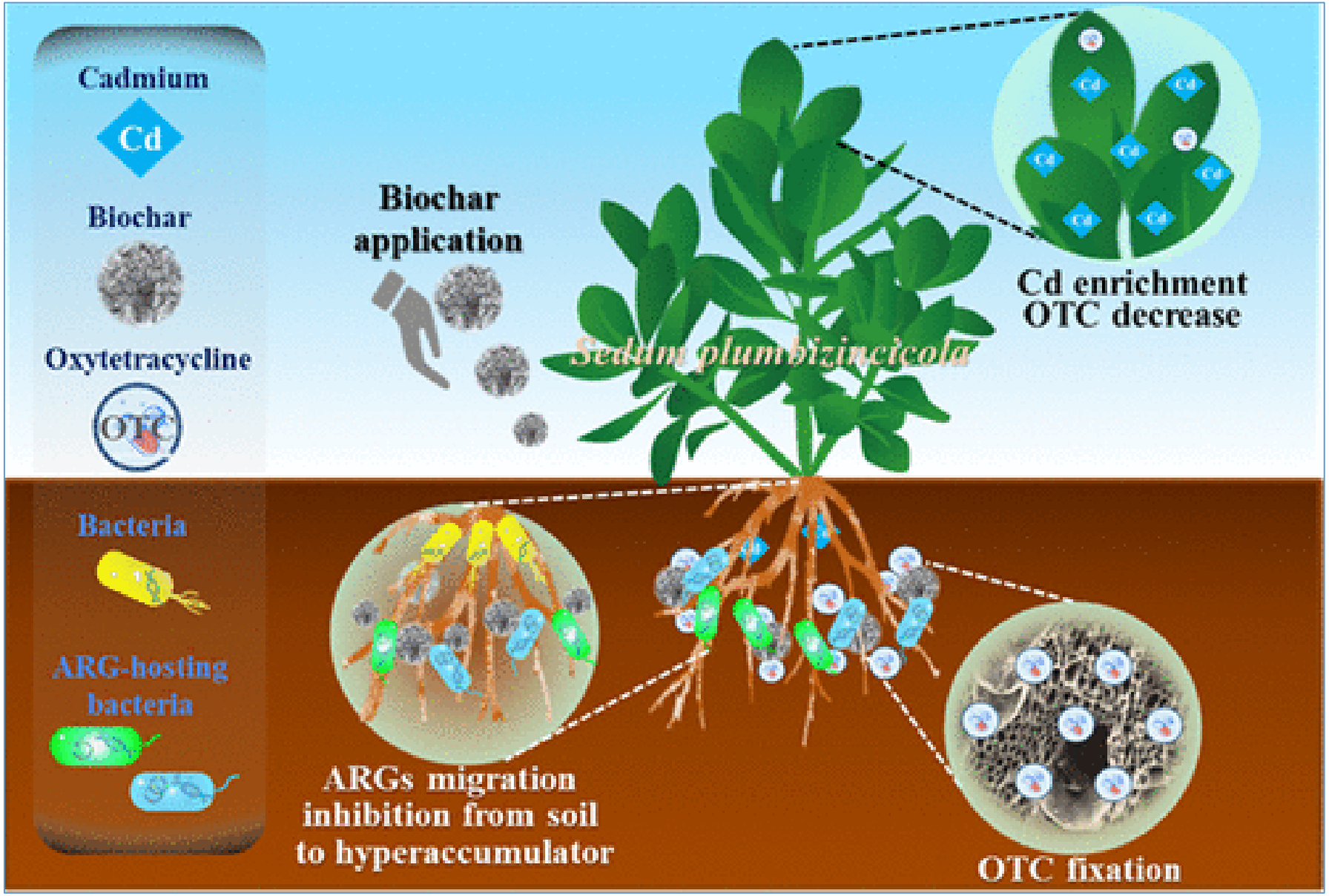
Environmental Science & Technology

Environ. Sci. Technol. 2021, 55, 24, 16369–16378

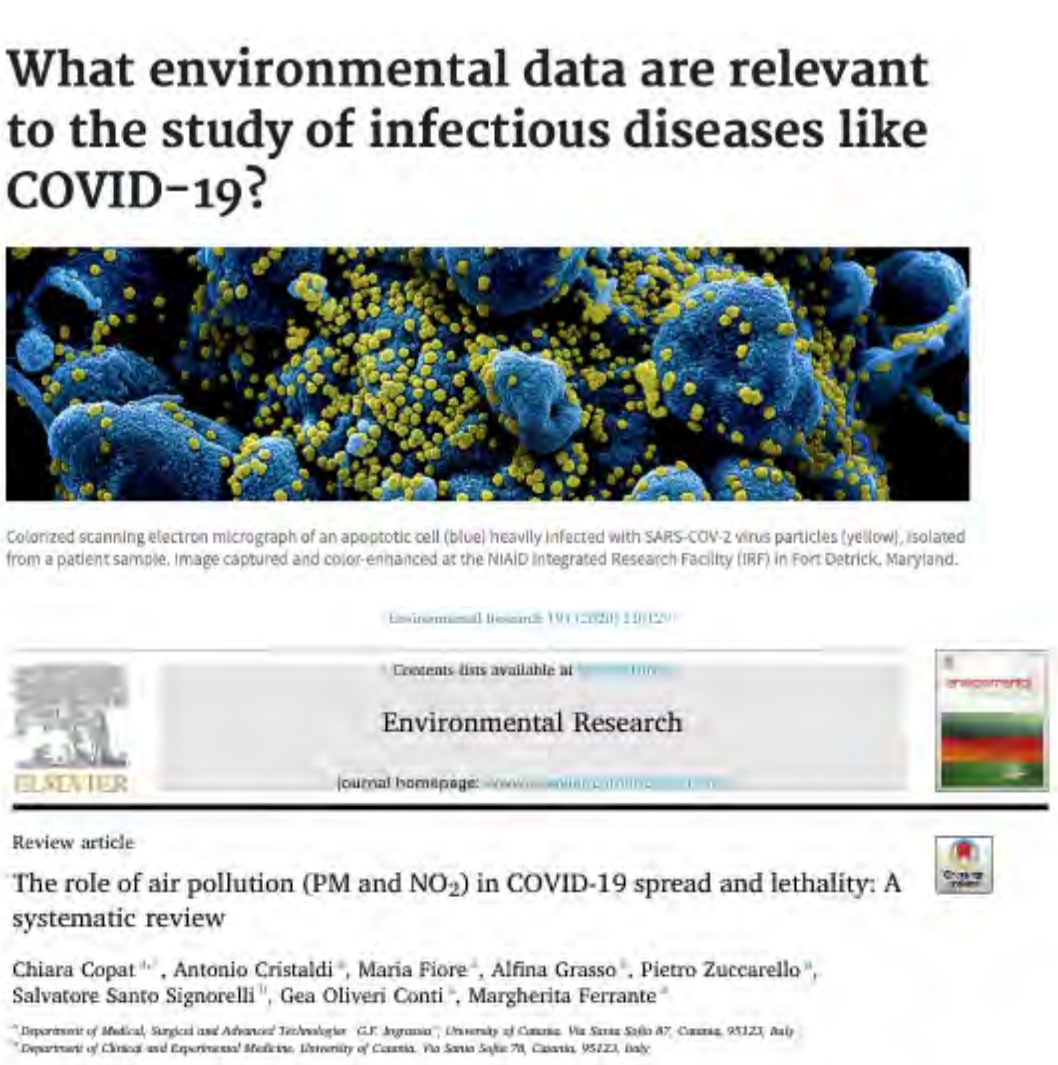
Strategia per mitigare la resistenza agli antibiotici da biochar e iperaccumulatori nel suolo contaminato da cadmio e ossitetraciclina

Sedum plumbizincicola

La fitodepurazione è un approccio eco-friendly e economicamente vantaggioso.



Secondo il rapporto, ogni anno sono più di 13 milioni i decessi per cause ambientali che si potrebbero altrimenti prevenire. Nei Paesi più poveri, quasi una morte su tre è dovuta a fattori ambientali. Più del 40% dei decessi per malaria e circa il 94% di quelle per malattie diarroiche (due dei principali killer nel mondo) potrebbero essere prevenuti con una politica ambientale adeguata.



What environmental data are relevant to the study of infectious diseases like COVID-19?

Colorized scanning electron micrograph of an apoptotic cell (blue) heavily infected with SARS-COV-2 virus particles (yellow), isolated from a patient sample. Image captured and color-enhanced at the NIAID Integrated Research Facility (IRF) in Fort Detrick, Maryland.

Contents lists available at

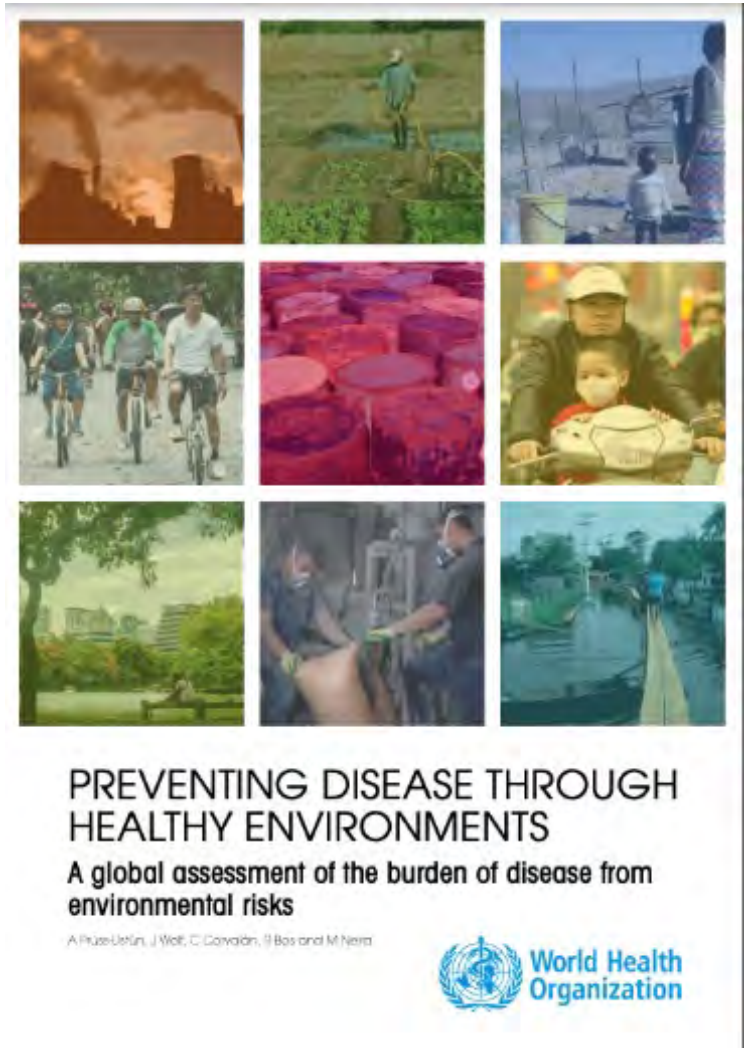
Environmental Research

journal homepage:

Review article

The role of air pollution (PM and NO_2) in COVID-19 spread and lethality: A systematic review

Chiara Copat, Antonio Cristaldi, Maria Fiore, Alfina Grasso, Pietro Zuccarello, Salvatore Santo Signorelli, Gea Oliveri Conti, Margherita Ferrante

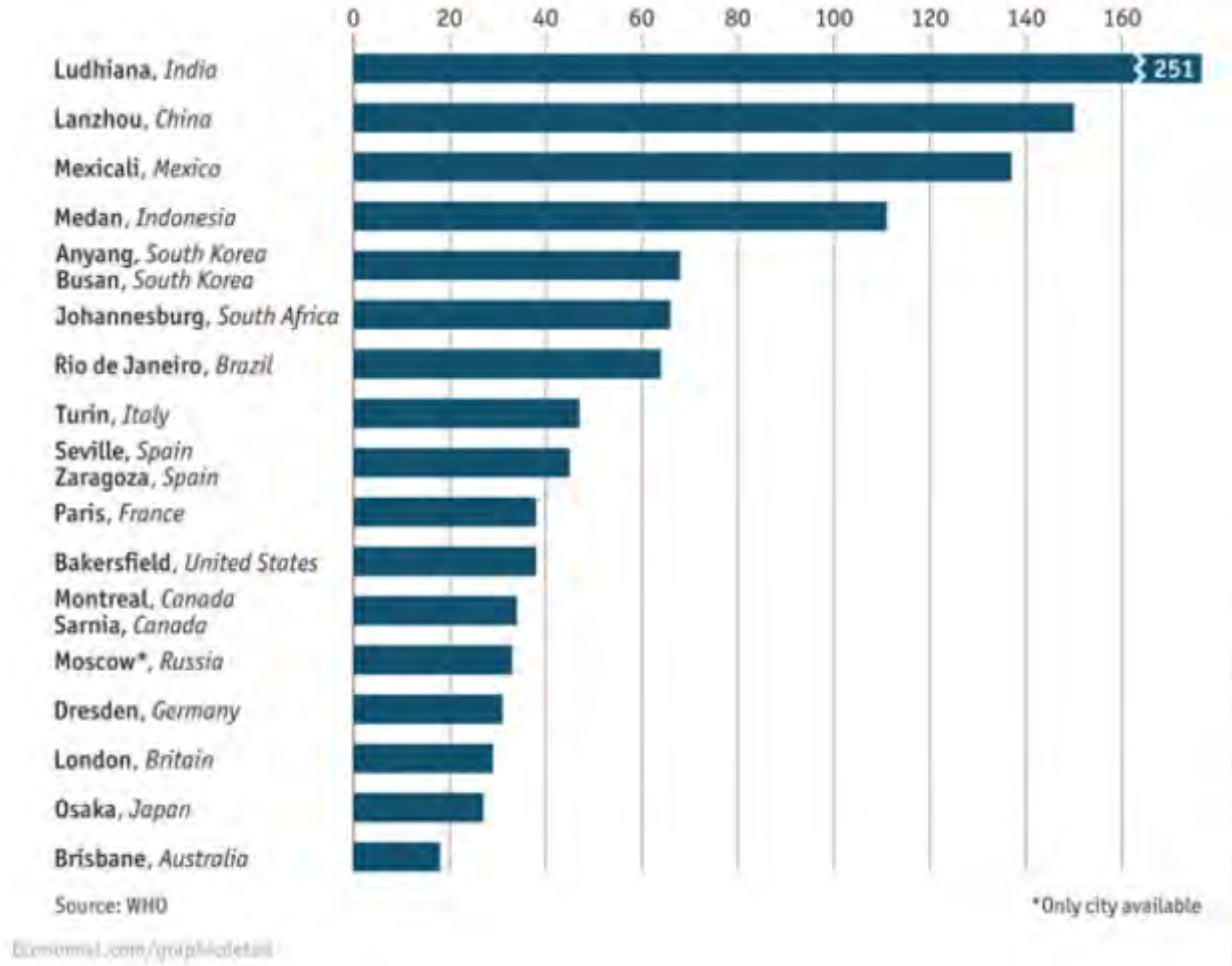


PREVENTING DISEASE THROUGH HEALTHY ENVIRONMENTS

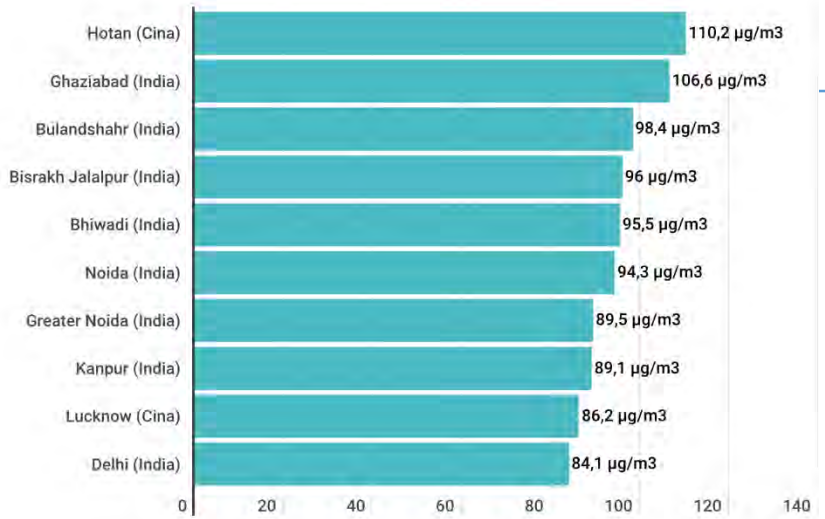
A global assessment of the burden of disease from environmental risks

World Health Organization

Paesi BRICS : cinque **paesi** (Brasile, Russia, India, Cina e Sudafrica)



INQUINAMENTO DA SMOG 2022



TRUENUMB3RS

INQUINAMENTO DA PM 2,5

IL LATO OSCURO DELLA CRESCITA ECONOMICA DEI PAESI EMERGENTI

CarbonBrief

Il tema dell'inquinamento **non è un problema solo dei paesi più poveri**

IMPATTI SULLA SALUTE	
Malattie mentali	Denutrizione
Allergie	Disturbi cardiovascolari
Infezioni	Incidenti
Disturbi respiratori	Intossicazioni