The 31st International Conference of the Egyptian Society of Medical Microbiology (ESMM) in Association with International Society of Antimicrobial Chemotherapy (ISAC) and Microbiology Department, Faculty of Medicine Fayoum, University

"One Health in Action" Opportunities, Collaboration and Challenges

26th, 27th September, 2024 Cairo, Egypt

https://drive.google.com/drive/folders/1pic7zrouQOR6TxyAnxcqrQqzeAUrdt5X?usp=sharing

ABSTRACTS

A. Oral Presentation

1. History of ONE HEALTH in Egypt

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Healthcare Combined Units

In the late fifties and early sixties of last century, Egypt developed a system to present health services to rural areas. That was the Combined Unites. In the start those combined units composed of:

Primary Healthcare service Unit, that presented the following services**: A primary school, An Agriculture, Irrigation, and Veterinary services Unit and A Social Service Unit.**

The aim of those units was to FIGHT the important three enemies of Egyptians in countryside areas i.e. Ignorance, Poverty and Illness. The golden era for those Combined Units was from 1954-1967. The LEADER of this era was Prof. Elnabawy El Mohandes, Previous Minister of Health in Egypt (1961-1968). **Rule of Combined Units**. How did those combined units work to fight the three enemies? First enemy was **Illness**: Medical services were provided by the Primary Healthcare Unit. The PHU provided: FREE medical examination, FREE investigations and FREE medications. Second enemy was **Ignorance**. Basic education was started to children who completed six years for free. Third enemy was **Poverty**: All services provided either medical, educational, services concerning agriculture/irrigation/veterinarian or social were provided for free. There were some financial aids through the social services. **What were the Major Health Problems at that time?** The rural area faced these major problems:1. Bilharziasis, 2. TB and 3. Malaria. The primitive one health basics were implemented by the Combined Units helped Government and the population to overcome the mentioned problems. Rule of Combined Units in fighting:

1. Bilharziasis: The **First step** to solve that major problem was presented by The Healthcare Unit, through: Free medical examination for all the infested people. Make the required investigations required. Pickup all complicated cases to be sent to central hospitals of the Governorates. Treat the infested patients with the available treatment for free. The second step involved the Agriculture, Irrigation and Veterinary divisions implement the other part to overcome bilharziasis through: The Agriculture and Irrigation divisions: carry out the process of cleaning the canals and drains from the plants and snails on sides to destroy them. They contain schistosomiasis eggs from which the infective stage cercariae emerges. They also use a special chemical to destroy them. The school has started to make the children aware about the disease and how it is transmitted and complications and ask the not to go swimming in the canals.

2. TB: The most important rule was caried out by the Healthcare Unit: As we declared before those units could examine and diagnose cases of TB. Proper vaccine and drug treatment were provided to cases and contacts. Server cases were sent to specialized hospitals in near Governorates. All for free. Then the Veterinary unit started their rule by examining the farmers animals and provided the proper veterinary solution. Schools start awareness campaigns about TB. Social unit start to share by giving affected families some financial help to overcome the poverty state of those patients and families.

3. Malaria: The healthcare unit presented free blood tests to diagnose cases. It also presented the free available treatment for Malaria cases. The Agriculture, Irrigation and Veterinary units altogether shared in fitting the mosquitos through: Cleaning the sides of the canals of dirt and harmful plants that harbor mosquitoes. Fighting mosquitoes with proper insecticides. Destroying the nests of mosquitoes' eggs with special materials.

Conclusion and Future

Those three examples proves that Egypt implemented basic the principals of ONE HEALTH since last century. The future is the duty of you as Doctors and Scientists to cooperate and help to solve the new health problems facing mankind.

2. One Health Approach on Nontyphoidal Salmonellosis: Sri Lankan Experience

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Nontyphoidal Salmonella (NTS) serovars are prevalent among many types of livestock. NTS can cause self-limiting gastroenteritis to life threatening bacteraemic infection especially in extremes of age and in immunocompromised population. In Sri Lanka, NTS are reported 11.6% in broiler chicken meat, 25.5% in shrimp, 17.7% in meat and 5.6% in fish. Chicken is the most popular meat among Sri Lankans and eggs are also a popular source of proteins. *S. enteritidis* and *S. typhimurium* were the commonest isolates from human infections. Both serovars are prevalent in the poultry. *S. typhimurium* ST36 and *S. enteritidis* ST11 and ST1541 were the dominant serotypes. There are other serovars reported in eggs. Large farms have Salmonella control programs and Salmonella surveillance is monitored by Department of Animal Production and Health. Sri Lanka phased out the use of growth promotors by the time first National Action Plan (NAP) for combatting antimicrobial resistance was launched in 2016. This 5-year plan which used One Health approach was succeeded by second NAP which was launched this year. Recent publication points to decrease in 3rd generation cephalosporin resistance in human NTS isolates. Future One Health activities will include joint surveillance for zoonoses, antimicrobial resistance and food safety.

3. Concept of One Health

Prof. Sanaa Haroon
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A new concept has emerged entitled (One Health), which briefly means health of humans, animals, and the environment are closely interconnected.
This modern approach will support the agroecology in our lives (which is a comprehensive and integrated approach that applies the same time of environmental and social concepts, and principles to design and manage sustainable agricultural and food systems) to improve interactions between plants, animals, humans and the environment.
Therefore, agroecology and health are considered two complementary approaches to achieving a world in which everyone has access to safe and nutritious food while protecting the environment, also multidimensional positive impacts of agroecology, including human health, and advance the agroecology agenda among policymakers.
It has recently been noted that three interrelated challenges faced by current agricultural practices are being highlighted: the transmission of pathogens in microbial ecosystems of soil and humans, the dissemination of antibiotic resistance genes in agroecosystems, and the effects of chemical pesticides on humans and environmental health.
Therefore, obvious solutions rely on interactions between plants, animals, diseases and pests, as well as developing innovative methods to combat existing pests while taking into account the interactions between plants, livestock health and natural ecosystems, as sustainable integrated approaches in line with greener agriculture through improved resource efficiency, reduced production losses and avoid the geographical spread of diseases by help and support of multidisciplinary team from experts academic, government, public and private institutions to achieve tangible change in public awareness and policies
The most well-known factor concerning insects related to public health is their role as vectors of pathogens. Arthropods can transmit several infectious pathogens (e.g., bacteria, parasites, protozoa and viruses) resulting in more than 700,000 deaths per year from vector-borne diseases worldwide. In the last decades, vector-borne diseases are still emerging, and they remain among the major public health concerns worldwide.
So, the benefit of applying the one health approach is recognition of the interdependence of humans, animals and the environment which links to the health of our ecosystems.

4. Strengthening Zoonotic Disease Surveillance: The Animal Health Research Institute's Contribution to One Health in Egypt

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The "One Health" concept emphasizes the interconnectedness of human, animal, and environmental health, recognizing that these domains are deeply intertwined. Key zoonotic diseases such as avian influenza, rabies, monkeypox, brucellosis, avian tuberculosis, and COVID-19 illustrate the importance of this integrated health perspective.
Avian influenza, primarily caused by influenza viruses in birds, these viruses can cross species barriers and infect humans, leading to severe respiratory illnesses. The risk is heightened by the frequent interaction between humans and poultry, particularly in agricultural settings. Recent developments include the infection of cows with avian influenza, which could have broader implications for public health. The Animal Health Research Institute (AHRI) has been conducting continuous surveillance in collaboration with the Food and Agriculture Organization (FAO) since the disease outbreak in Egypt in 2006.
Rabies, a fatal viral infection transmitted through the bites of infected animals such as dogs and bats, remains a major public health concern despite the availability of

vaccines. AHRI plays a critical role in the rapid detection and management of rabies cases in Egypt.
Monkeypox, similar to smallpox, has emerged as a significant zoonotic threat, especially in regions with close human contact with wild animals, including rodents and primates. The recent increase in monkeypox cases underscores the need for enhanced surveillance and control measures. AHRI is preparing for effective diagnosis and management of this disease.
Brucellosis, caused by bacteria of the genus *Brucella*, is transmitted through direct contact with infected animals or the consumption of contaminated animal products. AHRI is well prepared by accredited biosafety level (3) laboratories for diagnosis
The COVID-19 pandemic, caused by the SARS-CoV-2 virus, is a prominent example of a zoonotic disease that has profoundly impacted global health. Originally transmitted from an animal source, likely bats, to humans, COVID-19 has caused widespread morbidity and mortality. The pandemic highlights the critical need for robust surveillance systems and a better understanding of the animal origins of such viruses to prevent future outbreaks. (AHRI) plays a central role in implementing One Health strategies throughout Egypt. As a leading research institution within AHRI conducts extensive research on animal diseases, and zoonotic transmission, with a network spanning all Egyptian governorates, AHRI is crucial in protecting the country from recurring, emerging pandemics, and zoonotic diseases. AHRI is considered as an Office International des Epizooties (OIE) of World Organization for Animal Health (WOAH), reference laboratories for *Brucella* and Avian Influenza, enhancing its ability to monitor and control these significant zoonotic threats. These reference laboratories provide expert diagnostics, conduct research, and develop control strategies critical for managing these diseases at national and international levels.
By monitoring disease outbreaks in animal populations and investigating potential zoonotic threats, AHRI provides essential data that informs public health decisions. The institute's extensive network ensures rapid detection and response to zoonotic threats, minimizing the risk of disease transmission to humans. AHRI also collaborates with other health and environmental sectors to implement integrated surveillance systems, improve diagnostic capabilities, and develop effective prevention and control measures. AHRI is well prepared by accredited biosafety level (3) laboratories for diagnosis and Experimental research center for animals and poultry trials (BSL3)
This interdisciplinary approach allows AHRI to effectively implement One Health strategies, safeguarding both animal and public health across Egypt. Through its proactive measures, AHRI is vital in preventing the spread of zoonotic diseases and mitigating the impact of potential pandemics, thus enhancing the health security of both animals and humans.

5. Allergic Diseases– A One Health Perspective

Manar Gouda
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Allergic diseases, including asthma, allergic rhinitis, food allergies, and atopic dermatitis, are increasing globally, affecting millions of people and posing significant public health challenges. Traditionally, the focus has been on treating symptoms rather than addressing the complex interplay of factors contributing to these conditions. The One Health approach, which recognizes the interconnectedness of human, animal, and environmental health, offers a comprehensive framework for understanding and managing allergic diseases.
This presentation explores how environmental factors such as pollution, climate change, and biodiversity loss contribute to the prevalence and severity of allergic diseases. It also examines the role of animals as sources of allergens and potential vectors for zoonotic allergic diseases. Additionally, it highlights human health determinants, including genetic predisposition and socio-economic status, that intersect with environmental and animal health factors.
By applying a One Health perspective, we can develop integrated strategies that address the root causes of allergic diseases across sectors. This presentation will discuss regulatory challenges, opportunities for cross-sector collaboration, and innovative approaches to allergy prevention and management. Emphasizing a holistic view, it aims to promote a multi-disciplinary response to allergic diseases, enhancing health outcomes for humans, animals, and the environment.

6. Successful One Health Strategies in Treating Allergic Diseases

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Allergic diseases, including asthma, rhinitis, and eczema, are rising globally, driven by factors such as pollution, climate change, and urbanization. Addressing these complex health challenges requires a comprehensive, integrative approach. This presentation explores successful One Health strategies that unite human, animal, and environmental health sectors to effectively manage and reduce the burden of allergic diseases.
We highlight innovative urban planning methods, such as planting low-allergen vegetation and implementing

green transportation policies, to reduce airborne allergens. Integrated animal and human health programs, including the promotion of hypoallergenic pets and improved livestock management, are showcased to minimize allergen exposure. We discuss environmental interventions, like improving indoor air quality and public awareness campaigns, as critical elements of allergy prevention.
The presentation also covers climate adaptation strategies, community education initiatives, and cross-sector research collaborations that support the identification of novel allergens and the development of comprehensive management guidelines. Case studies from various countries, including Egypt, demonstrate the effectiveness of these strategies in diverse contexts, emphasizing sustainable farming practices, climate adaptation measures, and integrated pest management.
By leveraging a multisectoral One Health approach, we can create more resilient communities and promote sustainable health outcomes in the face of rising allergic diseases worldwide.

7. Evolving from Traditional to AI-Powered Article Critique in Microbiology; An Expert Insights

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The approach of article critique is fundamental to ensure the quality and integrity of scientific research. Traditionally, this process has relied on manual review techniques, including thorough reading, annotation, and peer evaluation. While these methods have been instrumental in maintaining academic rigor, they are often time-consuming and subject to variability and bias.
This presentation will explore the evolution of article critique from traditional methodologies to the integration of advanced Artificial Intelligence (AI) tools. The presentation begins with an overview of traditional critique methods, highlighting their significance and inherent limitations.
Subsequently, highlights the transformative role of AI in enhancing the article critique process. Key AI tools and technologies will be clarified, including automated text mining, summarization, and plagiarism detection.
By bridging the gap between established practices and innovative AI applications, this presentation will highlight the benefits and challenges of incorporating AI, offering a comprehensive view of how these innovations can improve efficiency, accuracy, and objectivity in scientific evaluation.

8. COVID pandemic, what we expect from One Health strategies

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The COVID-19 pandemic has underscored the critical need for a One Health approach, highlighting the interconnectedness of human, animal, and environmental health. As we move forward, we expect One Health strategies to play a pivotal role in preventing and mitigating future pandemics.
One Health strategies should focus on enhancing surveillance systems that integrate data from human, animal, and environmental sources. This includes monitoring zoonotic diseases, which can spill over from animals to humans, and tracking environmental factors that may influence disease emergence.
Collaboration across sectors will be crucial. Strengthening partnerships between public health officials, veterinarians, and environmental scientists will enable a more comprehensive understanding of disease dynamics and improve response efforts.
Risk mitigation and preparedness will also be emphasized. This involves developing early warning systems, improving infection control practices in both healthcare settings and animal populations, and investing in research to better understand pathogen behavior and transmission.
Furthermore, public health infrastructure will need to be fortified to handle cross-sectoral challenges effectively. This includes enhancing communication strategies and ensuring that responses are adaptable to evolving threats.
Overall, the One Health approach promises a more holistic and integrated response to emerging health threats, ultimately leading to better prevention and control of future pandemics.

9. Infection Control and One Health: Integrating Strategies for Global Health Security

Moustafa Abdelnasser
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The interconnectedness of human, animal, and environmental health is increasingly recognized as critical to preventing and controlling infectious diseases. The One Health approach emphasizes this link, advocating for integrated efforts across multiple sectors to address health threats. In parallel, infection control measures traditionally focus on reducing the spread of pathogens within healthcare settings. However, a comprehensive strategy for global health security

requires the integration of infection control practices with broader One Health initiatives. This presentation explores how harmonizing infection control principles with the One Health approach can strengthen global responses to emerging and re-emerging infectious diseases. It delves into the shared drivers of zoonotic infections, antimicrobial resistance, and healthcare-associated infections, highlighting the need for cross-sectoral collaboration. The presentation illustrates the benefits of coordinated surveillance, improved biosecurity measures, and joint training programs by examining case studies and best practices. The presentation will also cover challenges, including gaps in policy, resource allocation, and interagency coordination while proposing solutions for more effective implementation. In conclusion, integrating infection control with One Health principles enhances our ability to prevent, detect, and respond to health threats, safeguarding both human and animal populations while promoting environmental sustainability.

10. One Health and HIV: Integrating Human, Animal, and Environmental Approaches for Holistic Disease Management

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The global challenge of HIV/AIDS necessitates a multifaceted approach to effectively manage and control the disease, particularly in regions where it intersects with zoonotic infections, environmental factors, and socio-ecological conditions. The One Health approach, which recognizes the interconnectedness of human, animal, and environmental health, provides a comprehensive framework for enhancing our understanding and management of HIV/AIDS.
This presentation explores the role of the One Health framework in HIV prevention and control, highlighting the impact of wildlife and domestic animals on HIV transmission dynamics, the influence of environmental changes on disease spread, and the advantages of cross-sectoral surveillance and interventions. It includes case studies illustrating the interactions between HIV and zoonotic diseases such as Simian Immunodeficiency Virus (SIV), Trypanosomiasis, Bovine Tuberculosis, and Ebola Virus, underscoring the importance of integrated health strategies.
By integrating human, animal, and environmental perspectives, the One Health approach offers a holistic and sustainable pathway to enhance HIV interventions, improve outcomes for affected communities, and reduce the risk of future pandemics. This presentation calls for multidisciplinary collaboration and innovative strategies to tackle HIV/AIDS in a globally interconnected world.

11. Towards the Elimination of Rabies by 2030: a One Health Approach

Prof. Gehan Elshenawy
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Head of the Medical Microbiology and Immunology, Zagazig Faculty of Medicine, Zagazig

Rabies remains a critical public health challenge, causing nearly 59,000 deaths annually, predominantly in Africa and Asia. The global target to eliminate dog-mediated human rabies by 2030 aligns closely with the One Health concept, which recognizes the interconnectedness of human, animal, and environmental health. This approach involves a multi-sectoral strategy focusing on vaccination, awareness, surveillance, and improved healthcare systems.
The core of this initiative is the mass vaccination of dogs, which are responsible for over 99% of rabies transmissions to humans. Integrating veterinary, public health, and environmental sectors ensures efficient resource utilization and broader coverage. Community engagement and education are essential in promoting responsible pet ownership and understanding the disease risks.
Further, improved diagnostic capacity, timely post-exposure prophylaxis (PEP), and enhanced surveillance systems are crucial components. The One Health framework also addresses the socio-economic barriers that hinder rabies control, emphasizing collaboration across government, NGOs, and local communities.
This presentation highlights the importance of sustained political commitment, funding, and cross-sector collaboration in realizing the goal of zero human deaths from rabies by 2030, demonstrating how the One Health approach is a powerful tool in the global fight against this neglected disease.

12. Resurgence of Monkeypox and the One Health Approach

Prof. Laila Elkadi
Microbiology and Immunology Department, Zagazig Faculty of medicine

The resurgence of monkeypox has emerged as a critical concern in global health, highlighting the interconnectedness of human, animal, and environmental health. Traditionally endemic to Central and West Africa, monkeypox has seen an unprecedented spread beyond its historical boundaries, underscoring the need for a comprehensive One Health approach to

address the crisis. This special issue delves into the recent epidemiological trends of monkeypox, exploring the factors contributing to its resurgence, including changes in wildlife reservoirs, human behavior, and global travel patterns. By integrating insights from microbiology, epidemiology, and veterinary sciences, the issue emphasizes the importance of a holistic strategy to mitigate the impact of the outbreak. The One Health approach advocates for collaboration across disciplines to enhance surveillance, improve diagnostic capabilities, and develop effective prevention and control measures. This issue also examines the role of public health interventions, community engagement, and policy frameworks in managing the spread of monkeypox. Through a multidisciplinary lens, it aims to provide actionable recommendations for future preparedness and response efforts, reinforcing the need for coordinated global action to address emerging zoonotic diseases effectively.

13. Diseases caused by natural disasters and human displacement

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Globally, several natural disasters have led to several communicable and non-communicable diseases particularly where there is marked population displacement. After natural disasters depending on the type like earthquakes, tsunamis, floods and hurricanes, there may be loss of livelihoods, housing, health infrastructure and housing in makeshift shelters and tents. Topluoglu (2023), Kuoadio (2012) and Watson (2007) have described several epidemics after natural disasters of both emerging and re-emerging diseases. Some of these diseases include diarrhoeal diseases including gastroenteritis, cholera etc. Other diseases include leptospirosis, malaria and other vector borne diseases. Some of these diseases like malaria may be due to increased breeding sites due to flooding as well as loss of housing leading to increased exposure to insect bites. Acute Respiratory Tract infections are also common due to overcrowded conditions. Acute Respiratory Tract Infections are common in children under five years and have been described by Leggiadro et al (2007). Cazabat (2022) has also described NCDs resulting from natural disasters and human displacement like depression, anxiety and malnutrition. The focus of aid in natural disasters is to save life from the immediate danger or injury, apart from this intervention, there needs to be an additional focus on the health needs of the surviving affected population to reduce morbidity and mortality from both communicable and non-communicable diseases.

14. Bacteriophage Therapy: a One Health prospective

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As the current antimicrobial agents become increasingly inadequate, and the condition has worsened during the COVID-19 pandemic, there is an intense need to establish novel drugs for treatment under One Health Framework. Bacteriophages could be used as antimicrobial agents to treat multidrug-resistant bacteria (MDR) in animal, human and even environment. Studies have reported phage applications were successful in treating resistant zoonotic pathogens as *E. coli, Campylobacter, P. aeruginosa, Salmonella, K. pneumoniae, S. aureus, St.* and *L. monocytogenes*. Bacteriophages could be also used in prophylaxis during outbreaks. Bacteriophages could offer a tool for controlling emerging and re-emerging pathogens. There is also a great potential for phage preparations to significantly reduce antibiotic use in aquaculture, agriculture, animal husbandry, and veterinary medicine. This mini review will discuss the application of bacteriophage in human, animal and environment as a therapeutic or prophylactic agent, also will discuss the advantages and limitation of phage therapy.

15. Artificial Intelligence in Infection Control

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Artificial intelligence (Al) is used in many fields in medicine to promote disease diagnosis and treatment, optimize meticulous care delivery and also in prevention of healthcare-associated infection (HAIs) as one of the popular proceedings of healthcare in hospitals. In prevention and control of infection, Al surveillance is more powerful and better than traditional surveillance as it is more accurate than the manual

methods and it prevents the errors of the human methods to control the infection and it can be used in many applications under the definition of infection control like hand hygiene, waste management, surveillance of healthcare-associated infection and many other applications It is also used in training of healthcare workers to improve their practice. Using service robots in environmental cleaning decreases the risk to develop infection and reduces traditional cleaning/disinfection costs. Also, artificial intelligence (Al) is considered one of the developments in digital technologies data intelligence, and analytics. This minireview will highlight the application of artificial intelligence (Al) in infection control.

16. Climate Change and Antimicrobial Resistance: Unveiling the Hidden Connections

Prof. Fatma Amer
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Climate change is emerging as a critical driver of antimicrobial resistance (AMR), amplifying its global threat to human, animal, and environmental health. Rising temperatures, changing precipitation patterns, and extreme weather events are altering ecosystems, facilitating the spread of resistant bacteria and antimicrobial agents across different environments. Warmer conditions enhance bacterial growth, increase horizontal gene transfer, and support the persistence of resistant strains, particularly in water bodies. Climate-driven shifts in agriculture, such as increased antibiotic use in livestock due to disease outbreaks, further contribute to AMR. Extreme weather events like floods overwhelm sanitation systems, dispersing resistant bacteria through contaminated water sources. Additionally, climate-induced human migration can strain healthcare systems and lead to antibiotic misuse, accelerating the spread of resistance. Environmental reservoirs of AMR, including soil and water, are particularly vulnerable to climate change, highlighting the need for AMR to be included in climate adaptation strategies.

A comprehensive response requires a One Health approach, integrating human, animal, and environmental health to tackle the interconnected challenges of climate change and AMR. Cross-sector collaboration is essential to mitigate these growing threats and safeguard global health.

17. Antibiotic Stewardship, One Health perspectives

Prof. Pierre Tattevin
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The escalating global threat of antimicrobial resistance (AMR) represents a critical challenge to public health, as bacteria, viruses, and other pathogens become resistant to commonly used antibiotics and treatments. Effective antibiotic stewardship is crucial in this context. Antibiotic stewardship refers to the coordinated efforts to optimize the use of antibiotics, ensuring their effectiveness while minimizing the risk of resistance. This involves prescribing antibiotics only when necessary, selecting the appropriate antibiotic, and using the correct dosage and duration. The rationale behind stewardship is to preserve the efficacy of existing antibiotics and reduce the development of resistance. Addressing AMR requires a One Health approach, recognizing the interconnectedness of human, animal, and environmental health. Pathogens can spread between humans and animals, and environmental factors like pollution can influence resistance patterns. Thus, integrating efforts across these domains is essential for effective AMR management. Key drivers of AMR include overuse and misuse of antibiotics, inadequate infection control practices, and environmental contamination. Targeting these tortuous drivers involves enhancing surveillance, improving infection prevention and control, regulating antibiotic use in agriculture, and promoting research into new treatments and alternatives. Coordinated global action and adherence to the One Health framework are crucial to combatting the growing threat of AMR.

B. Poster Presentation

1. Detection of Resistance Integrons among Biofilm and Non-Biofilm Producing Clinical Isolates of *Pseudomonas aeruginosa*

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Introduction: Integrons are genetic systems that may confer antibiotic resistance to *Pseudomonas aeruginosa (P. aeruginosa)*. Besides, biofilms formation can facilitate genes exchange and accelerate the development of antibiotic resistance. The aim of this work was to find out the distribution of resistance integrons including class 1, 2 and 3 among biofilm and non-biofilm producing clinical strains of *P. aeruginosa.* Also, we aimed to investigate the relationship between the existence of these integrons and the isolates resistance patterns. **Methods**: Specimens were obtained from patients showing evidence of infection. *P. aeruginosa* isolates were identified using conventional techniques, while disk diffusion test was executed to detect their antimicrobial susceptibilities. Biofilm formation was detected by tissue culture plate technique, while classes of integrons were detected by polymerase chain reaction. **Results:** Out of 106 *P. aeruginosa* isolates, 55.7% were class 1 integron-positive while 19.8% were class 2 integron-positive. Nevertheless, class 3 integrons were not detected. Significant associations were found between class 1 integrons and resistance toward amikacin, gentamicin, cefepime, ceftazidime and ciprofloxacin. Class 2 integrons were associated with amikacin, ceftazidime and cefepime resistance. Of pseudomonal isolates, 61.3% were biofilm producing. Biofilm production was associated significantly with the existence of class 1 integrons (P <0.001) and class 2 integrons (P =0.039). **Conclusions:** About two thirds of isolated strains harbored resistance integrons which emphasized their significance in our locality. The frequencies of integrons class 1 and 2 were significantly higher among biofilm forming isolates. Ongoing surveillance and infection control strategies are necessary to limit spread of integrons.

2. Genotyping of Staphylococcal Species on the Skin of Patients with Atopic Dermatitis

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Background: Atopic dermatitis (AD) is a prevalent illness that impacts a diverse range of individuals worldwide. The skin microbiome of AD patients is characterized by increased colonization by Staphylococci and decreased bacterial diversity, which could worsen disease symptoms. **Objectives:** To recognize staphylococcal species on skin of AD patients and to assess the association of these species with disease severity. **Methodology:** The study comprised 45 AD patients and 45 healthy controls. Full history, general and dermatological examination were performed to all the participants. Disease severity was calculated using Severity Scoring of Atopic Dermatitis (SCORAD). Microbiological examination was conducted for all skin specimens collected. Molecular identification of the detected staphylococcal species using multiplex Polymerase Chain Reaction (PCR). **Results:** There was a statistically significant higher growth of Staphylococci among cases than control group (97.8% versus 46.7%, respectively, P value<0.001). Following Genotyping, a statistically significant higher growth of Staphylococcus aureus (S. aureus) and S. hominis were detected among AD cases than control group (P value =0.0005 and 0.05, respectively). There was significant association (p value < 0.001) between severity of AD and genotypic distribution of staphylococcus species. All Patients with Severe AD were colonized with S. aureus. **Conclusion:** Staphylococcal species were relatively exclusive to AD. Increased frequency of S. aureus and S. hominis were observed in AD skin. These findings may be significant for understanding pathophysiology and severity of AD to outline new treatment options.

3. The efficacy of diode laser and subgingival air polishing with erythritol in treatment of periodontitis (clinical and microbiological study)

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Background: There is insufficient clinical and microbiological evidence to support the use of diode laser and air-polishing with erythritol as supplements to scaling and root planing. The aim of the study is to evaluate the clinical and microbiologic efficacy of erythritol subgingival air polishing and diode laser in

treatment of periodontitis. **Methods:** The study encompassed twenty-four individuals seeking periodontal therapy. Eight patients underwent scaling and root planning (SRP). Eight more patients had SRP followed by erythritol subgingival air polishing, and the final eight patients had SRP followed by diode laser application. At baseline and six weeks, clinical periodontal parameters were measured, including Plaque Index (PI), Gingival Index (GI), Periodontal Probing Depth (PD), and Clinical Attachment Level (CAL). The bacterial count of *Aggregatibacter actinomycetemcomitans*(A.A), *Porphyromonas gingivalis* (P.G) was evaluated at different points of time. **Results**: The microbiological assessment revealed significant differences in the count of A.A. between the laser and erythritol groups immediately after treatment, indicating a potential impact on microbial levels. However, the microbial levels showed fluctuations over the subsequent weeks, without statistically significant differences. Plaque indices significantly decreased post-treatment in all groups, with no significant inter-group differences. Gingival indices decreased, and the laser group showed lower values than erythritol and control groups. PD and CAL decreased significantly across all groups, with the laser group exhibiting the lowest values. **Conclusion:** The supplementary use of diode laser and erythritol air polishing, alongside SRP, represents an expedited periodontal treatment modality. This approach leads to a reduction in bacteria and improvement in periodontal health.

4. Human Cytomegalovirus and COX2 Expression among Women with Breast Tumors

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The human cytomegalovirus (HCMV) has been linked to all cancer characteristics, leading to increasing speculation that it plays a role in oncomodulation and human carcinogenesis. An increasing body of research demonstrates a connection between HCMV infection and a number of cancers, including breast cancer. Inflammatory cells produce chemokines, cytokines, and growth factors into the microenvironment of the tumor that encourage tumor growth and malignancy. Biopsies of breast cancer often showed COX-2 expression, which HCMV might be the cause of. Our study aimed to through a beam of light on HCMV as a viral etiology of breast tumors and investigate the association between HCMV infection and simultaneous expression of COX2 in women with breast tumors. We assessed HCMV DNA presence by nested type PCR and COX-2 by ELISA in breast tissues obtained from 33 breast cancer (BC) patients, 24 benign breast lesions, and 33 normal breast tissues. We found that there was a statistically significant weak association between HCMV DNA in malignant, benign breast lesions and normal breast tissue groups (p=0.036) and (V =0.283). Also, there was a statistically significant difference between the studied malignant, benign breast lesions and normal breast tissue groups as regard median COX-2 (p =0.0088). In addition, presence of HCMV proteins (E/IE) was identified in 4 breast cancer tissue samples (25%), there was a weak positive correlation between HCMV viral proteins (E/IE) and COX-2 in group IA with statistically insignificant difference r= 0.26 and (p= 0.15). we concluded that the existence of CMV DNA and proteins in breast cancer (BC) tissues points to the virus's involvement. Inaddition, COX-2 may contribute to the development of BC.

Published at: Egyptian Journal of Medical Microbiology
https://ejmm.journals.ekb.eg/article_327382.html

5. High-risk human papillomavirus infection and cervical cytopathology: relationship with cervical nitric oxide levels

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Background Nitric oxide (NO) may contribute to the persistence of high-risk human papillomavirus (hrHPV) infection, which has been linked to the development of premalignant lesions and cervical cancer. Our study aimed to examine the relationship between cervical NO metabolite (NOx) levels, hrHPV infection, and cytopathological findings. Additionally, we assessed cervical NOx levels as a biomarker for predicting hrHPV infection and epithelial atypia.

Methods The study involved 74 women who attended the Gynecology and Obstetrics outpatient clinics at Cairo University Hospitals between November 2021 and August 2022. Cervical samples were subjected to Pap testing, assessment of NOx levels by the Griess method, and detection of hrHPV DNA by real-time polymerase chain reaction.

Results High-risk HPV was detected in 37.8% of women. EA was found in 17.1% of cases, with a higher

percentage among hrHPV-positive than negative cases (35.7% vs. 4.3%, $p = 0.001$). The most prevalent hrHPV genotype was HPV 16 (89.3%). The cervical NOx level in hrHPV-positive cases was significantly higher (37.4 µmol/mL, IQR: 34.5–45.8) compared to negative cases (2.3 µmol/mL, IQR: 1.2–9.8) ($p = < 0.001$). Patients with high-grade atypia showed significantly higher NOx levels (38.0 µmol/mL, IQR: 24.6–94.7) in comparison to NILM and low-grade atypia cases (5.0 µmol/mL, IQR: 1.6–33.3 and 34.5 µmol/mL, IQR: 11.7–61.7, respectively) ($p = 0.006$). Although the NOx levels among hrHPV-positive cases with low-grade atypia (40.4 µmol/mL, IQR: 33.3−61.8) were higher than those with NILM (36.2 µmol/mL, IQR: 35.7−44.0) and high-grade atypia (38.0 µmol/mL, IQR: 24.6−94.7), the difference was not significant ($p = 0.771$). ROC curve analysis indicated that the cervical NOx cut-off values of > 23.61 µmol/mL and > 11.35 µmol/mL exhibited good diagnostic accuracy for the prediction of hrHPV infection and EA, respectively.

Conclusions The high prevalence of hrHPV infection, particularly HPV 16, in our hospital warrants targeted treatment and comprehensive screening. Elevated cervical NOx levels are associated with hrHPV infection and high-grade atypia, suggesting their potential use as biomarkers for predicting the presence of hrHPV and abnormal cytological changes.

6. Helicobacter pylori-Toxoplasma Gondii Interplay with a Possible Role of IL-10

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Parasites are known for their modulatory effects on the immune response. The impact of toxoplasmosis on the immune response towards *H. pylori* is being studied in terms of IL-10 levels. This study included 110 patients suffering from persistent dyspepsia and 50 apparently healthy controls. Stool samples were collected and tested for *H. pylori* using colloidal gold one step test. Sera were examined for anti-Toxoplasma IgM and IgG using ELISA. IL-10 was also tested in the sera using ELISA. We found that Toxoplasma IgM and IgG tested positive in 1.8 % and 40 % of *H. pylori* positive patients, respectively. *H. pylori*-infected patients displayed higher IL-10 levels than the healthy controls (84 versus 0.59 pg/ml, respectively, $P < 0.001$). Classification of *H. pylori* positive patients according to Toxoplasma IgG titers yielded three groups: negative (58, 52.7 %), equivocal (8, 7.3 %), and positive (44, 40 %) groups, with the highest IL-10 levels detected in the double positive than the negative and the equivocal group (215 pg/ml versus 43 and 112.5 pg/ml, respectively, $P < 0.001$). There was strong positive correlation between Toxoplasma IgG titers and IL-10 levels ($rs = 0.82$, $P < 0.001$). Toxoplasma enhances IL-10 production in response to *H. pylori* infection. This could ameliorate the inflammatory response in the gastric mucosa, and subsequently more colonization with the *H. pylori* is achieved, resulting in persistent infection.

7. IL-24 AND IL-29 IN T2DM with and without Diabetic Foot Ulcers

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Type 2 Diabetes Mellitus (T2DM) is a common chronic metabolic disease that spread worldwide. Uncontrolled T2DM cause many complications such as neurological diseases and lower limb amputations, in addition to other health problems. Insulin resistance and low-grade chronic inflammation in adipose tissue is a characteristic of people with obesity and diabetes. In fact, T2DM is inflammatory cytokines are involved in the pathophysiology of this disease. About 1.4 million Iraqis suffer from diabetes. In this study, some clinical characteristics and parameters level sixty patients with T2DM (32 male and 28 female) and thirty as controls were quantified. There are no significant differences between patients and controls in both age and BMI. There are expected significant increase in FBG, HbA1c and HOMA-IR in T2DM patients than healthy groups. There is a significant decline ($p = 0.003$) in serum IL-24 level in T2DM patients as compared with the controls. The low level of interleukin-24 in patients with T2DM has serious consequences. Despite the neuropathies in patients and the disease-causing nerve damage and non-healing of wounds, the decrease of this interleukin leads to may decrease in the patients' immunity. The skin acts as a barrier against harmful microbes on several levels: colonization, pH, mechanical/physical and immunological IL-24 significant decrease ($p < 0.001$) in

patients with type 2 diabetes and those who suffer from diabetic foot (DF) ulcers in particular affects the healing of ulcers and poorly in wound healing. There is a significant decline (p = 0.03) in serum IL-29 level in T2DM patients as compared with controls. The decreased IL-29 levels in patients may be defect in immune system particularly patients with T2DM, where IL-29 is secreted from T-helper that affects keratinocytes and activated against viruses. In contrast, an IL-29 level decrease in patients with DF ulcers induce an inflammatory response.

8. Resistance Pattern and Virulence Factors of CoNS Isolates from Sepsis Associated Acute Kidney Injury

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Background: Acute kidney injury (AKI) is among the most frequent complications of sepsis. Objectives: This study evaluated the antibiotic resistance pattern and virulence factors; slime production and staphylococcal enterotoxins genes of CoNS isolates recovered from blood of sepsis patients with AKI. **Methodology**: Blood samples were collected from patients diagnosed as sepsis and AKI from October 2018 to September 2020 in Mansoura University Main and New Generalized Hospitals. Blood cultures were done and the isolates were identified by MALDI-TOF Biotyper™. Antibiotic testing was done by the disc diffusion test for CoNS isolates. Slime production and staphylococcal enterotoxins, toxic shock syndrome toxin *(tsst)* and *mec A* genes were evaluated. **Results**: A total of 73 patients diagnosed as sepsis with AKI were enrolled in this research; 21 had positive blood cultures, with 66.7% Gram positive bacteria. All cases with Gram-negative bacterial blood culture were significantly complicated with chronic kidney disease compared to 42.9% of Gram-positive bacterial blood cultures (p = 0.01). Eleven out of 14 Gram-positive bacterial blood cultures were CoNS strains; seven *S. haemolyticus*, three *S. epidermidis* and one *S. hominis* strains. All CoNS isolates were sensitive to vancomycin and linezolid. Eight (72.7%) CoNS isolates had *mecA* gene. About 63.6% of CoNS strains were slime producers. Enterotoxin gene *sec* was the predominant among the isolates of CoNS (36.4%). **Conclusion:** *S. haemolyticus* was the most frequent isolated species from blood of patients with sepsis associated AKI. Majority of CoNS strains had *mecA* gene and were slime producers. *Sec* gene was the most often detected enterotoxin gene.

9. Status of *Mycobacterium tuberculosis* Infection in the Maghreb Region: a Systematic Review

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Background: Tuberculosis (TB) is a communicable disease caused by *Mycobacterium tuberculosis* that is transmitted through the air. While its primary target is the lungs, it has the ability to infect various organs throughout the body. TB is a major health problem and continues to be among the top ten reasons for morbidity and death globally. According to the World Health Organization, an estimated 10.6 million people worldwide fell ill with TB in 2022, and about 1.5 million people die from TB each year. In the Maghreb region of North Africa, TB is a health issue. The region consists of Algeria, Libya, Mauritania, Morocco, and Tunisia in geographical terms. The epidemiology of *M. tuberculosis* is not well described in the Maghreb region. The aim of this study was to perform a comprehensive review of the epidemiology of *M. tuberculosis* infection in the Maghreb region.

Methods: A comprehensive literature search was performed on studies related to the prevalence of *M. tuberculosis* infection published in the English language using electronic databases, such as PubMed, ScienceDirect, and Google Scholar. The terms, "*Mycobacterium tuberculosis*", "TB" and "prevalence" or "country name" were used as key words in titles.

Results: The total number of overall *M. tuberculosis* studies identified was 2107, of which 14 studies from four countries within the Maghreb region were included that represented 27195 subjects. The overall prevalence of *M. tuberculosis* ranged from 0.6% to 92.4%, while the prevalence of *M. tuberculosis* causing pulmonary TB (PTB) ranged from 35.1% to 76.1%.

Conclusions: The prevalence of *M. tuberculosis* in Maghreb region countries is still high.

Enhanced TB surveillance and rapid infection prevention steps are urgently needed to combat TB effectively in the Maghreb region.

10. Antibiotic Resistance Profiles and Melatonin's Role in Biofilm Inhibition: A Study on Uropathogens from Cancer Patients

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Background: Multidrug-resistant (MDR) bacterial infections, particularly urinary tract infections (UTIs), present a significant challenge in cancer patients due to prolonged immunosuppression. Uropathogenic bacteria, including *Escherichia coli*, *Klebsiella pneumoniae*, and *Pseudomonas aeruginosa*, frequently exhibit biofilm formation, complicating treatment. Emerging studies suggest that beyond its antioxidant properties, melatonin may inhibit biofilm formation. **Objectives:** This study aims to analyze the antibiotic resistance profiles of uropathogenic bacteria isolated from cancer patients and assess the efficacy of melatonin in inhibiting biofilm formation in these MDR pathogens. **Methodology:** Sixty-five urine samples were collected from cancer patients at Sabha Oncology Center. Bacterial isolates were identified using biochemical assays and the API 20E system. Antibiotic susceptibility testing was performed via the Kirby-Bauer disk diffusion method, following CLSI guidelines. Crystal violet staining assessed biofilm formation, and melatonin's antibiofilm activity was evaluated at concentrations ranging from 10 µg/mL to 1000 µg/mL. **Results:** *E. coli* (32.69%) was the most prevalent pathogen, followed by *K. pneumoniae* (17.30%) and *P. aeruginosa* (15.38%). All isolates showed High resistance to amoxicillin/clavulanic acid and cefotaxime. Biofilm formation was strong in *E. coli*, *K. pneumoniae*, and *P. aeruginosa*. Melatonin demonstrated significant inhibition of *E. coli* biofilms at higher concentrations, with more moderate effects on *K. pneumoniae* and *P. aeruginosa*. **Conclusion:** The high prevalence of MDR uropathogens and their biofilm-forming capabilities highlight the need for alternative treatments in cancer patients. Melatonin shows promise as an adjunctive therapy for biofilm inhibition, particularly in *E. coli*. Further studies are needed to explore its broader application in combating biofilm-associated infections.

11. One Health antimicrobial stewardship: Egypt experience

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Although antibiotics are critical tools for health, however, widespread use of antibiotics has ended in an alarming increased rate of antibiotic-resistant infections. Improper management of antibiotic use, inadequate control of infections, pollutants in the environment, agricultural debris, and migration of people and animals infected with resistant bacteria facilitate the spread of resistance organisms. Antimicrobial stewardship is a One Health issue, which affects the health of humans, animals, as well as the environment. Antimicrobial stewardship in One Health needs cooperation between many Boards including Human Health, and Health Services, Agriculture, Animal Health and Pollution Control Agencies. In 2015, WHO developed a Global action plan (GAP) on antimicrobial resistance and asked all countries to develop their action plan guided by the GAP. By 2017, Egypt has developed the national action plan which focused on improve the public awareness of antimicrobial resistance, optimize the use of antibiotics and decrease the emergence of new resistant strains, strengthen the national one-health surveillance to combat resistance in humans, animals, and environment, and implement good infection control practices which is evidence based. Many organization and agencies are working together to implement this action plan including Ministry of health and population, Ministry of agriculture, Ministry of higher education, Ministry of environment, Ministry of education, Ministry of interior, Drug industry, National authority for drug control, privet sectors and WHO. The action plan started with basal evaluation of the problem of antimicrobial resistance. The target to be achieved after 5 years of implementation of the national action plan are: decrease 10% in mortality rate associated with drug resistant organisms, decrease 20% in the incidence of infections caused by drug resistant organisms, decrease 10% in antibiotic consumption used for growth promotion or prophylaxis in livestock, fishes, poultry, and plant, and finally decrease 10% in antibiotic consumption in the country. This review will discuss the challenges faced during the application of the national action plan.