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CONFERENCE ABSTRACTS

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Clinical biology

A systematic review of metal-induced neurotoxicity and its association with neurodegenerative diseases

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Background: Metal-induced neurotoxicity represents a growing public health concern due to its association with long-term neurological impairment. Trace metals are essential for normal physiological processes, including enzymatic activity, neurotransmission, cellular signalling, and homeostasis. However, excessive exposure to metals, particularly over prolonged periods, may result in toxic bioaccumulation and irreversible neuronal injury. Neurotoxicity may occur through inhalation, ingestion, or dermal contact, depending on occupational and environmental conditions. Neuronal tissue is especially vulnerable because neurons regenerate slowly and have high metabolic demand. Metal overload has been linked to several neurodegenerative and neurodevelopmental disorders, including Alzheimer's disease (AD), Parkinson's disease (PD), amyotrophic lateral sclerosis (ALS), Huntington's disease (HD), multiple sclerosis, and autism spectrum disorders (ASDs). The present study aimed to provide an overview of scientific evidence on metal-induced neurological diseases over time, focusing on exposure characteristics, mechanistic pathways, and clinical outcomes.

Method: A structured literature review was conducted using large scientific databases containing peer-reviewed articles and review publications. Studies were selected to evaluate the association between heavy metal exposure and neurological disease development. Articles were screened and analysed based on predefined variables, including type of metal exposure, neurological disorder investigated, acute versus chronic neuroinflammation, combined exposure with other chemicals (e.g., pesticides), occupational or environmental setting, and the presence of confounding genetic or medical conditions. Data extraction focused on reported clinical outcomes and mechanistic findings such as oxidative stress, mitochondrial dysfunction, deoxyribonucleic acid (DNA) fragmentation, protein misfolding, and apoptosis. Statistical comparisons were performed using Student's t-test or analysis of variance (ANOVA), as appropriate, to identify significant trends between exposure categories and disease patterns.

Results: The reviewed literature demonstrated consistent evidence that high concentrations of certain metals can cross the blood brain barrier, leading to neuroinflammatory and neurodegenerative changes. Chronic exposure was more frequently associated with progressive neurological disorders, whereas acute exposure was linked to rapid neuronal damage and systemic toxicity. Multiple studies highlighted oxidative stress and mitochondrial impairment as central mechanisms underlying neuronal injury, with downstream effects including protein aggregation, disruption of neurotransmission, and activation of programmed cell death pathways. Several metals were associated with increased risk markers for AD and PD, particularly due to their ability to promote abnormal accumulation of pathological proteins such as beta-amyloid and to contribute to dopaminergic neuron degeneration. Co-exposure to metals and pesticides was reported as an aggravating factor, increasing neurotoxicity and accelerating disease progression. Across the dataset, AD and PD emerged as the most frequently reported neurological diseases linked to heavy metal toxicity.

Conclusion: The findings indicate that heavy metal exposure, especially chronic exposure leading to bioaccumulation, is a major contributor to neurotoxicity and is strongly associated with the development of neurodegenerative disorders. Mechanisms such as oxidative stress, mitochondrial dysfunction, DNA damage, protein misfolding, and apoptosis

appear central to metal-induced neuronal injury. The evidence suggests that AD and PD are the neurological conditions most consistently associated with heavy metal neurotoxicity. Improved regulatory control, occupational safety measures, and public awareness regarding exposure to metals and chemical mixtures, including pesticides, are essential to reduce preventable neurological disease burden.

Validation of a cholinesterase activity assay for monitoring organophosphate exposure

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Background: Organophosphates are irreversible inhibitors of cholinesterases. Although their use is prohibited, they still represent a major risk to human health. Measurement of cholinesterase activity may be prescribed in several situations, particularly when organophosphate pesticide (OPP) poisoning is suspected or following exposure to organophosphate neurotoxic agents (ONA) and other derivative products prohibited under French legislation in the context of terrorist threats. Measurement of this activity constitutes a key biomarker for biological diagnosis and exposure monitoring (1). The reliability of results relies on rigorous validation of the analytical methods used.

Buturylcholinesterase activity can be measured in plasma samples using a colorimetric enzymatic method using Cholinesterase Gen.2 test (Roche®) on cobas pro integrated c503 module. Analytical validation has been performed in accordance with international and national recommendations (Clinical laboratory and standards Institute, Guide technique d'accreditation COFRAC).

Analytical performances were concordant with literature data : within-run precision is inferior to 1%, between run precision to 2%. Bias and uncertainty are excellent, respectively(< 3% and <5%. Accuracy was validated through an interlaboratory comparison with HNIA Begin. A good correlation with previous method was established. Reference intervals were also successful verified using CLSI recommendations. However, genetic polymorphisms of butyrylcholinesterase exists and must be taken into count to interpret the results.

Is Bruce Banner (Hulk) alive?

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Background: A 71-year-old-male was admitted for peritonitis and underwent digestive surgery before being transferred to the ICU. A urine sample was collected, few hours after surgery. The urine sample was surprisingly green-colored.

Method: : To understand this phenonemon, patient follow-up was conducted along with a review of his treatment history and a toxicological screening.

Results: This discoloration resolved spontaneously after approximatively 24 hours. He had normal liver and renal function, and urine was sterile. This patient had been prescribed sufentanyl, ropivacaine, rocuronium, propofol and ketamine for general anesthesia and antibiotics (vancomycin and cefoxitin) to treat peritonitis. Further investigations have been discussed. Green urine can be caused by dyes (indigo blue) or pigments (biliverdin), pathologies (chronic obstructive jaundice, pseudomonas urinary tract infection, indicanemia) and various medicines (amitriptyline, cimetidine, indomethacin, metoclopramide, methocarbamole, methylene blue, promethazine, propofol or triamterene…). Here, propofol was suspected to be the cause of the discoloration, as this side effect has not been reported with the other prescribed drugs. Green, pink or milky pink urine discolorations have been reported, after short or prolonged use of propofol. These side effects are rare (<1% of patients), benign and transient (from two hours to two days) and attributed to phenolic metabolites eliminated in urine following hepatic glucuronidation. Further investigations are, therefore, not necessary. According to the previous patient's urine analyses, the discoloration does not seem to interfere with the biological tests. Green hair discoloration has also been described in the months following propofol administration.

Conclusion: Medications can cause interferences in biological samples, as in the case presented here. the clinical pharmacist-biologist must be able to identify them and assess the impact on the results.

Selective reporting of antibiotic susceptibility testing for urinary tract infections in women: A national antimicrobial stewardship initiative in France

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Background: Antimicrobial resistance (AMR) is a global public health priority, and inappropriate antibiotic prescribing remains a major driver of resistance. Urinary tract infections (UTIs) are among the most frequent indications for antibiotic use in both community and hospital settings, particularly in women.
Clinical biologists and pharmacists play a central role in antimicrobial stewardship (AMS) by promoting guideline-concordant prescribing and optimizing antibiotic selection. Selective reporting of antibiotic susceptibility testing (AST), also referred to as targeted antibiograms, has emerged as a structural stewardship intervention designed to guide prescribers toward first-line, narrow-spectrum antibiotics while limiting unnecessary exposure to broad-spectrum or "critical" agents.

Purpose: To present the rationale, framework, and early national implementation of selective AST reporting for UTIs caused by Enterobacterales in women in France.

Method: In October 2023, French scientific societies — the Société de Pathologie Infectieuse de Langue Française (SPILF) and the Société Française de Microbiologie (SFM) — with endorsement from the High Health Authority (Haute Autorité de santé), issued national recommendations supporting selective AST reporting in positive urine cultures from women aged ≥12 years.

The targeted antibiogram:

- Restricts displayed antibiotics according to bacterial resistance profiles

- Aligns with national treatment guidelines

- Adapts reporting, when possible, to clinical presentation (acute cystitis vs pyelonephritis)

Broad-spectrum and "critical" antibiotics (e.g., fluoroquinolones, third-generation cephalosporins) are intentionally masked when effective narrow-spectrum alternatives are available.

The complete antibiogram remains accessible upon explicit request.
Educational interpretative comments are systematically included to:

- Support appropriate empirical and targeted therapy

- Encourage treatment reassessment

- Reinforce guideline adherence

Results: Multiple observational and interventional studies have demonstrated that selective AST reporting significantly reduces prescriptions of broad-spectrum antibiotics, particularly fluoroquinolones, without adverse clinical outcomes.

Regional French implementation initiatives have reported:

- High acceptance among microbiologists, prescribers, and pharmacists

- Improved adherence to national treatment guidelines

- No increase in UTI-related complications or therapeutic failures

A national survey conducted in 2025 showed:

- 44% of clinical laboratories had implemented selective reporting

- Prescriber acceptance rate of 92% Identified barriers to nationwide deployment included:

- Organizational and technical constraints

- Limited human resources

- Insufficient clinical information provided on laboratory request

Conclusion: Selective AST reporting for UTIs in women is an effective antimicrobial stewardship intervention that supports pharmacists and clinical biologists in promoting rational antibiotic use.

Its nationwide scale-up, integration into laboratory information systems, and potential extension to additional patient populations represent key strategic opportunities to strengthen multidisciplinary stewardship efforts and combat antimicrobial resistance at a national level.

National implementation of a reimbursed toxicological screening protocol for drug-facilitated crimes in France: A three-year pilot program (2026–2029)

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Background: Drug-facilitated crimes (DFC), including drug-facilitated sexual assault (DFSA), constitute a major public health and forensic challenge. In France, delayed toxicological testing, lack of systematic reimbursement, and heterogeneous biological sampling practices have historically hindered timely victim care and compromised judicial

documentation. These structural barriers have limited access to forensic evidence, weakened evidentiary reliability, and contributed to inequities in victim support and medico-legal management.

To address these shortcomings, a nationally coordinated three-year pilot program was launched on 1 January 2026, establishing standardized and fully reimbursed toxicological screening procedures.

Purpose: To implement and evaluate a structured national care pathway ensuring:

- Rapid access to forensic toxicology analyses

- Standardized biological sampling procedures

- Secure evidence preservation

- Coordinated integration with medico-legal and judicial processes

Method: The pilot program is deployed in three French regions: Hauts-de-France, Île-de-France, and Pays de la Loire.

Any patient presenting with a medical prescription labeled "Protocole SC" may access fully reimbursed toxicological analyses without the prior obligation to file a police complaint. This provision aims to reduce procedural and financial barriers to care.

Sampling Strategy

Sampling is adapted according to the delay since the alleged exposure: ≤ 5 days after suspected exposure:

- Whole blood (lithium heparin, EDTA, and fluoride tubes)

- Urine (≥6 mL, without preservative)

- When indicated, one strand of hair

5 days after suspected exposure:

- Four strands of hair collected with root orientation preserved

Analyses are conducted in designated specialized hospital toxicology laboratories.

Turnaround times:

- 28 days for blood and urine analyses

- 6 weeks for hair analysis

Residual biological samples are securely stored for three years to enable potential judicial counter-expertise.

The National Reference Center for Drug-Facilitated Crimes (CRAFS) provides:

- Professional guidance

- Victim support coordination

- Methodological harmonization

- National evaluation and monitoring of the pilot program

Results:
EXPECTED IMPACT: This initiative standardizes forensic toxicology practices at a national level, strengthens chain-of-custody procedures, improves analytical reliability, and enhances long-term evidence preservation.

By removing financial and procedural barriers, the program facilitates earlier testing and broader access to care. It fosters structured interdisciplinary collaboration among physicians, pharmacists, Clinical biologists, forensic experts, and judicial authorities, reinforcing the strategic role of pharmaceutical and clinical laboratory expertise within medico-legal pathways.

Conclusion: This French pilot program represents an innovative model at the intersection of public health policy, forensic biology, and medico-legal practice. By integrating reimbursement reform, standardized analytical toxicology, and victim-centered care, it establishes a scalable national framework for improving responses to drug-facilitated crimes.
If successful, this coordinated approach may serve as an international reference model for strengthening collaboration between healthcare and judicial systems in addressing drug-facilitated offenses.

Nationwide prescription-free, fully reimbursed STI testing in France: A public health reform strengthening access and the clinical role of medical biologists

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Background: Sexually transmitted infections (STIs) remain a major public health concern in France. In recent years, increasing incidence has been observed for chlamydia and gonorrhea, particularly among individuals under 30 years of age. Syphilis cases have re-emerged, and chronic hepatitis B infection continues to pose long-term risks.

In 2023, HIV testing reached 7.5 million laboratory-based serologies, reflecting intensified screening efforts. However, 43% of newly diagnosed HIV cases were still identified at a late stage, highlighting persistent gaps in early detection.

Historically, STI screening required a medical prescription, which could delay testing. France progressively implemented nationwide prescription-free, 100% reimbursed laboratory testing for HIV, and extended this model to chlamydia, gonorrhea, syphilis, and hepatitis B. This reform enables direct access to testing in medical laboratories without prior consultation or advance payment. It represents a structural public health strategy that places clinical biologists at the center of prevention.

Purpose: This study evaluates the epidemiological and organizational impact of nationwide prescription-free, fully reimbursed STI testing on:

• Testing volumes across HIV, chlamydia, gonorrhea, syphilis, and hepatitis B

• Early diagnosis and access to care

• The expanded clinical responsibilities of clinical biologists

Method: A retrospective analysis of national surveillance data (Santé Publique France) and National Health Insurance databases was conducted from 2019 to 2023. Trends in laboratory testing volumes, positivity rates, and stage at diagnosis were analyzed before and after nationwide implementation.

Professional practice evolution was assessed through qualitative analysis of laboratory workflows, focusing on patient counseling, confirmatory testing, and care coordination.

Results: Following nationwide implementation:

• HIV testing increased from 5.4 million tests in 2020 to 6.5 million in 2022 (+20%) and 7.5 million in 2023 (+15%).

• Prescription-free HIV testing accounted for 15% of total HIV tests in 2023.

• Laboratory-based screening volumes for chlamydia and gonorrhea increased significantly, particularly among young adults.

• Expanded testing for syphilis and hepatitis B improved access to comprehensive STI panels.

• Removal of financial and administrative barriers enhanced uptake in underserved populations.

Clinical biologists assumed expanded responsibilities beyond analytical testing:

• Disclosure of positive results

• Organization of confirmatory testing

• Coordination of referral pathways to infectious disease and primary care services

Conclusion: France has implemented a unique nationwide model of prescription-free, fully reimbursed STI testing integrated within medical laboratories. This policy has significantly expanded access to comprehensive screening and strengthened early diagnosis across multiple infections.

By positioning clinical biologists as frontline actors in prevention, diagnosis communication, and care coordination, this reform redefines the laboratory's role in public health.

The French model illustrates how structural policy reform, universal reimbursement, and laboratory integration can contribute to reducing STI transmission and improving continuity of care.

Feasibility of finger-prick blood sampling for androgen monitoring by ultra-performance liquid chromatography–tandem mass spectrometry (UPLC–MS/MS)

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Background: Long-term monitoring of circulating androgens is essential in patients receiving testosterone replacement therapy, transgender individuals undergoing gender-affirming hormone treatment as well as athletes participating in competitive sport. Conventional venous sampling requires clinic visits and trained personnel, which limits monitoring frequency and accessibility. Small-volume blood collection obtained by finger-prick may offer a patient-friendly alternative; however, analytical methods for steroid measurement in such samples remain limited. This study aimed to develop a UPLC–MS/MS method for the quantification of testosterone and androstenedione in fingertip capillary blood and to evaluate its feasibility in a pilot clinical application.

Method: Finger-prick blood samples were collected from 11 adult volunteers (5 males, 6 females) using Haiim device. Haiim (Winnoz) is a vacuum-assisted microsampling system that uses controlled suction to draw blood directly into a closed microtube, standardizing blood flow and improving sample quality. Serum samples (100 µL) were processed by supported liquid extraction prior to UPLC–MS/MS analysis of testosterone and androstenedione. Method performance was evaluated in terms of linearity, limit of detection (LOD), and limit of quantification (LOQ). Collected blood and serum volumes were recorded to determine sampling feasibility.

Results: The assay achieved LOD/LOQ of 0.02/0.05 ng/mL for testosterone and 0.05/0.1 ng/mL for androstenedione. Calibration curves showed linearity over the range of 0.1–10 ng/mL for testosterone and androstenedione (R^2 = 0.9995 and 0.9982, respectively). The median age of participants was 28 years (range 23–56). The average blood volume collected was 249.1 ± 164.2 µL, with a corresponding serum volume of 110.3 ± 70.8 µL. Measured testosterone concentrations were 3.46 (2.15–3.70) ng/mL in males and 0.17 (0.12–0.27) ng/mL in females. Androstenedione concentrations were 0.42 (0.36–0.48) ng/mL in males and 0.63 (0.38–1.04) ng/mL in females, consistent with expected physiological ranges.

Conclusion: Sensitive determination of testosterone and androstenedione was achieved using small serum volumes

obtained by finger-prick sampling. This microsampling approach may support decentralized androgen monitoring and suggests potential applicability for endogenous blood steroid analysis in the athlete biological passport. Further large-scale studies comparing fingertip and venous samples are warranted to establish clinical equivalence and long-term monitoring performance.

Unveiling a mechanism of periodontitis-brain diseases relationship: Transport of periodontal pathogen P.gingivalis-derived outer membrane vesicles at blood-brain barrier and brain parenchymal cells

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Background: There is growing evidence of a relationship between periodontitis and brain diseases. A previous report has demonstrated that gingipain, a toxic component of Porphyromonas gingivalis (P. gingivalis), is detected in the brains of patients with Alzheimer's disease and contributes to the disease progression (Sci Adv 5:eaau3333, 2019). One promising strategy to prevent periodontitis-related brain diseases is to inhibit the brain distribution of P. gingivalis. However, the mechanisms by which P. gingivalis is transported from the gums to the brain parenchyma via the bloodstream remain unclear. It has also been reported that P.gingivalis-derived outer membrane vesicles (Pg-OMVs) induced neuroinflammation in mice (Front Cell Infect Microbiol 12:925435, 2022). Based on these findings, we hypothesized that Pg-OMVs could be efficiently transported from circulating blood to the brain parenchymal cells across the blood-brain barrier (BBB). The purpose of this study was to clarify transport characteristics of Pg-OMVs at the BBB and in brain parenchymal cells.

Method: In vivo blood-to-brain transfer of Pg-OMVs was analyzed following intravenous administration in mice. Tissue distribution of Pg-OMVs were evaluated by amplifying a P. gingivalis specific gene with real-time PCR. The transport of Pg-OMVs which were fluorescently labeled with PKH67 was analyzed using human cerebral miscrovessel endothelial cells (hCMEC/D3) and neurons differentiated from human iPS cells. The transport of Pg-OMVs across the BBB was evaluated using a 3D cerebral microvascular microfluidic model established by co-culturing human cerebral vascular endothelial cells, astrocytes and pericytes.

Results: Pg-OMVs were detected in the brain after intravenous administration in mice. Pg-OMVs uptake by hCMEC/D3 cells was detected as punctate fluorescent signals increased in a time-dependent manner. The uptake was significantly decreased in a type of virus receptor-knockout hCMEC/D3 cells. Tri-culture of human cerebral vascular endothelial cells, astrocytes and pericytes in a gel channel of microfluidic device resulted in spontaneous vasculogenesis and the formation of brain microvascular networks. When mouse whole blood was introduced into a media channel of the device, the blood cells flowed through the microvasculature network. When Pg-OMVs were perfused in the 3D microvascular microfluidic mode, the fluorescent signals were detected in the vascular endothelial cells as well as in the astrocytes and/or pericytes. The Pg-OMVs uptake in neurons revealed that Pg-OMVs were detected as punctate fluorescent signals in neuronal cell bodies and dendrites. These results suggest that Pg-OMVs would cross the BBB via receptor-mediated endocytosis and be transported to neuronal cell bodies and dendrites.

Conclusion: Pg-OMVs can be transported from circulating blood to neuronal elements beyond the BBB. This may present a potential mechanism underlying the relationship between periodontitis and brain diseases.

Hepatic, renal, and calcium profile alterations in people living with HIV on HAART in Niger Delta, Nigeria

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Background: The introduction of Highly Active Antiretroviral Therapy (HAART) has significantly improved the prognosis of people living with HIV (PLHIV), reducing both morbidity and mortality. However, HAART has been associated with alterations in physiological and biochemical parameters, particularly liver and kidney function. Liver diseases and renal failure account for approximately 14 – 18% of deaths among HIV-infected individuals. Despite evidence linking HAART to elevated liver enzymes and reduced renal function, routine monitoring of these parameters is often neglected in settings such as Nigeria, where emphasis is placed primarily on viral load and CD4 count assessment. This study aimed to evaluate abnormalities in selected physiological and biochemical parameters among PLHIV on HAART (Tenofovir, Lamivudine, and Dolutegravir) and to identify factors associated with these abnormalities. Specific objectives included assessing liver enzyme levels (AST and ALT), determining serum

creatinine and calcium levels, comparing these parameters with HIV-negative controls and evaluating the influence of demographic and clinical factors such as age and duration of treatment

Method: A comparative cross-sectional study was conducted involving 100 adult participants, comprising 60 PLHIV on HAART for more than one year and 40 HIV-negative controls. Data were collected using self-administered questionnaires and hospital case records. Blood samples were analyzed for liver enzymes, serum creatinine, and calcium levels. Statistical analysis was performed using IBM SPSS version 23, employing Chi-square tests and Pearson's and Spearman's correlation analyses. Results were presented using frequencies, tables, and bar charts, with statistical significance set at $p < 0.05$.

Results: Results
The majority of PLHIV participants were female (68.3%), within the 40 – 49-year age group, and 56% were married. Approximately 45% had been on HAART for 5 – 9 years. PLHIV demonstrated higher mean levels of aspartate aminotransferase (AST) and alanine aminotransferase (ALT), with a statistically significant increase observed for ALT ($p < 0.05$), suggesting hepatic involvement. Serum creatinine levels were also significantly higher among PLHIV compared to controls (108 vs 88 µmol/L; $p < 0.0001$), indicating possible renal impairment, particularly in participants older than 60 years. Although the AST/ALT ratio was higher in the PLHIV group, this difference was not statistically significant ($p = 0.341$). However, both duration of treatment and age showed a significant influence on this ratio ($p < 0.0001$), implying cumulative drug-related hepatic effects over time. Plasma calcium levels were lower in PLHIV compared to controls, although the difference was not statistically significant. Reduced calcium levels in older patients may suggest compromised bone mineral density, potentially linked to long-term antiretroviral therapy.

Conclusion: This study demonstrated that PLHIV on HAART exhibit elevated liver enzymes, increased serum creatinine levels, and altered AST/ALT ratios, with duration of treatment significantly influencing hepatic outcomes. These findings suggest that prolonged HAART use may contribute to hepatic and renal dysfunction. Additionally, reduced calcium levels may indicate a risk of decreased bone mineral density. Routine monitoring of liver function, renal parameters, and calcium levels is therefore essential for early detection and prevention of treatment-related complications in PLHIV.

Systematic review of the relationship between dynamic changes in inflammatory markers and drug efficacy during EGFR-TKIs therapy in NSCLC patients

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Background: Non-small cell lung cancer (NSCLC) accounts for approximately 85% of all lung cancer cases, and epidermal growth factor receptor-tyrosine kinase inhibitors (EGFR-TKIs) represent the first-line standard of care for patients harbouring EGFR mutations. Despite their clinical efficacy, inter-individual variability in treatment response and prognosis remains a significant challenge. Inflammatory biomarkers, such as the neutrophil-to-lymphocyte ratio (NLR), derived neutrophil-to-lymphocyte ratio (dNLR), platelet-to-lymphocyte ratio (PLR), monocyte-to-lymphocyte ratio (MLR), lymphocyte-to-monocyte ratio (LMR), and interleukin-6 (IL-6), have emerged as potential predictors of treatment outcomes in various malignancies. However, the dynamic changes in these inflammatory indices during EGFR-TKIs therapy and their correlation with therapeutic efficacy in NSCLC patients have not been systematically synthesised. This systematic review aims to evaluate the association between dynamic changes in inflammatory biomarkers and clinical outcomes, including progression-free survival (PFS), overall survival (OS), and objective response rate (ORR) in NSCLC patients receiving EGFR-TKIs, to provide evidence-based support for clinical prognosis assessment and treatment strategy optimisation.

Method: A systematic literature search was conducted in PubMed, Embase, Cochrane Library, CNKI, WanFang, and SinoMed databases from their inception to 20 July 2025. Eligible studies were those that reported dynamic changes in inflammatory indices before and during EGFR-TKIs treatment, along with corresponding clinical outcomes in NSCLC patients. Two independent reviewers screened the literature, extracted data, and assessed methodological quality using the Risk Of Bias In Non-Randomized Studies - of Interventions (ROBIS-I) tool for randomised controlled trials and the Newcastle-Ottawa Scale (NOS) for observational studies. Discrepancies were resolved through discussion with a third reviewer. A descriptive analysis was performed due to heterogeneity in study design, patient populations, and outcome measures.

Results: There were totally eight studies, analysing the relationship between six inflammatory markers before and after treatment with six EGFR-TKIs and drug efficacy. Among these studies, seven studies demonstrated that lower pre-treatment levels of NLR, dNLR, PLR, and MLR, along with post-treatment decreased in NLR and MLR and increased in LMR,

were associated with improved PFS. Findings from five studies indicate that lower pre-treatment levels of NLR, dNLR, PLR, and IL-6, along with post-treatment decreased in NLR and dNLR and increased in LMR, are associated with improved OS. Findings from five studies indicated that post-treatment decreased in NLR, MLR, and PLR were associated with enhanced ORR. The relationship between IL-6 and mPFS or ORR remains controversial. The risk of bias assessment identified six high-quality studies and two moderate-quality studies.

Conclusion: Current evidence suggests that lower inflammatory levels during treatment with EGFR-TKIs correlate with improved efficacy in patients with NSCLC. However, given the limited number of studies included, further high-quality research is required to explore this association in greater depth.

Cade oil poisoning in children: When traditional medicine becomes life-threatening

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Background: Cade oil is a traditional product widely used in Morocco and associated with significant toxicity when ingested, particularly in children. However, data on its clinical management remain scarce. The role of the clinical pharmacist in such intoxications is still underreported.

Method: We report a case series of pediatric patients admitted for acute cade oil intoxication to the Mother and Child Hospital Abderrahim Harouchi, in Casablanca, Morocco. Clinical, biological, and therapeutic data were retrospectively collected, with a particular focus on pharmacological management and clinical pharmacist interventions, including medication review, dose optimization, and monitoring of drug-related complications.

Results: Four pediatric patients (aged 1 month to 6 months) were included. Exposure occurred mainly via oral ingestion. Clinical presentation ranged from mild symptoms (abdominal pain, respiratory distress) to severe neurological impairment, including altered consciousness, hypoglycemia, and seizures. From a pharmacological perspective, management was primarily supportive. Clinical pharmacist interventions included optimization of fluid therapy and glucose correction, evaluation and adjustment of antibiotic therapy, particularly in suspected infections, and monitoring for potential drug toxicity and interactions in critically ill patients. Electrolyte imbalances and hepatic cytolysis were also identified and managed.
One patient developed septic shock due to multidrug-resistant infection requiring broad-spectrum antibiotic therapy (imipenem and amikacin), with pharmacist-guided dose adaptation. Outcomes were favorable in most cases, with recovery of consciousness. One patient died due to refractory septic shock and multi-organ failure.

Conclusion: Cade oil intoxication is a potentially life-threatening condition in pediatric patients in Morocco. The involvement of the clinical pharmacist is essential to optimize pharmacotherapy, ensure medication safety, and improve patient outcomes. Increased awareness about the toxicity of traditional remedies is urgently needed.

Activities of the working group on traditional Chinese medicine and acupuncture of the Federal Council of Pharmacy of Brazil

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Background: Amidst the global advancement of Traditional Chinese Medicine (TCM) and Acupuncture, the Federal Council of Pharmacy of Brazil (CFF) established the Working Group on TCM and Acupuncture (GTSMTC) in 2012. This strategic move aimed to address the encroachment on pharmaceutical specialties by other health professions and to expand the clinical scope of pharmacists. The objective is to systematize TCM and Acupuncture clinical practice, offering the population natural therapeutic options through public and private health sectors while diversifying the pharmaceutical professional landscape in Brazil.

Method: The GTSMTC, comprising clinical pharmacists, collaborates closely with the Brazilian Health Regulatory Agency (ANVISA), providing technical consultancy for regulations on the manufacturing, quality control, and commercialization of traditional industrialized TCM formulas. Furthermore, the group coordinates with the Ministry of Health and the National Health Council to integrate these therapies into the Unified Health System (SUS), following National Ordinance No. 971/2006.

A cornerstone of this initiative is international cooperation. The CFF maintains direct diplomatic ties with the Embassy of the People's Republic of China and governmental bodies such as the National Medical Products Administration (NMPA) and the Chinese Pharmacopoeia Commission. This partnership has facilitated technical training for Brazilian pharmacists in China (2019) and participation in high-level seminars, including the 2024 forum on Integrating TCM and Western Medicine for Epidemic Diseases in Beijing and Wuhan.

Results: These efforts have culminated in a robust regulatory framework. The CFF has published key resolutions to guide pharmaceutical practice: Acupuncture (Res. 516/2009), TCM Prescription (Res. 710/2021), Auriculotherapy (Res. 733/2022), and Integrative and Complementary Practices (PICS) (Res. 732/2022). Currently, new regulations for Intravascular Laser Irradiation of Blood (ILIB) and technical manuals for clinical prescription are under development.

Conclusion: TCM and Acupuncture are established pharmaceutical specialties that integrate the pharmacist into a holistic healthcare model. By ensuring the fidelity of these ancient techniques, the profession reinforces the principles of the rational use of medicines and clinical pharmacy practice (Law 13.021/2014). This institutional movement ensures that the Brazilian population has access to millennium-old, safe, and effective therapeutic alternatives, consolidated through international exchange and rigorous technical-scientific oversight.

Endemic dengue transmission in Ghana: a community-based seroprevalence study with implications for surveillance and control

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Background: Dengue is an emerging public health concern in sub-Saharan Africa, yet its epidemiology in West Africa remains poorly characterized due to limited surveillance, underdiagnosis, and frequent misclassification as other febrile illnesses such as malaria. Increasing urbanization, population mobility, climate variability, and expansion of Aedes mosquito vectors have heightened the risk of dengue transmission across the region. Despite these drivers, Ghana has no well-documented history of large-scale dengue outbreaks, and population-level data on transmission dynamics remain scarce. This study assessed dengue seroprevalence, transmission intensity, and associated risk factors across diverse ecological settings in Ghana to inform targeted public health interventions.

Method: A community-based cross-sectional survey was conducted over three months across three regions in Ghana (Bono East, Greater Accra, and Upper West), enrolling 1,973 participants aged ≥2 years through multistage cluster sampling. Dengue IgG and IgM antibodies were measured using serological assays. Sociodemographic, behavioral, and household environmental data were collected via structured questionnaires. Logistic regression models were used to identify factors associated. The presence of IgG antibodies indicates past exposure, whereas IgM antibodies suggest recent or acute infection.

Results: Overall dengue seropositivity was 33.4% (IgG: 29.9%; IgM: 8.5%), demonstrating substantial prior exposure and ongoing transmission. Marked regional variation was observed, with the highest seroprevalence in Bono East (52.0%), followed by Upper West (41.9%) and Greater Accra (19.3%) ($p<0.001$). Seropositivity was highest in peri-urban areas (51.2%), compared to rural (41.8%) and urban (19.4%) settings ($p<0.001$). Age-specific patterns showed a progressive increase in seropositivity from 11.9% among children aged 1-4 years to 49.9% among adults aged 35-49 years. Multivariable analysis identified age and region as independent predictors: individuals aged ≥35 years had approximately five-fold higher odds of seropositivity compared to children aged 1-4 years (adjusted OR 5.16–5.25, $p<0.001$), while residents of Greater Accra had significantly lower odds than those in Bono East (adjusted OR 0.15, $p<0.001$). The estimated force of infection was 1.49% per year (95% CI: 1.38–1.61%), consistent with sustained endemic transmission. Environmental and behavioral factors, including household water storage, single-room occupancy, and evening indoor exposure, were significantly associated with increased seropositivity.

Conclusion: : The findings provide robust evidence of endemic dengue transmission in Ghana, with pronounced geographic heterogeneity and unexpectedly higher transmission in peri-urban and rural settings, challenging the conventional urban-centric paradigm of dengue epidemiology. The observed burden suggests substantial under-detection within existing surveillance systems. Strengthening integrated arboviral surveillance, expanding laboratory diagnostic capacity, and implementing context-specific vector control strategies, particularly in peri-urban and rural communities, are critical to mitigating dengue transmission in Ghana and similar West African settings.

Antimicrobial resistance and clinical outcomes in diabetic wound infections: A retrospective analysis from South Africa

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Background: Diabetic wound infections are a major cause of morbidity and mortality worldwide, with the greatest impact in resource-limited settings. In South Africa, constrained access to timely diagnostic services leads to delays in diagnosis and dependence on empiric antibiotic therapy. This contributes to adverse outcomes such as cellulitis, gangrene, sepsis and lower limb amputations. Despite the growing burden, there is a lack of locally relevant data linking microbial profiles, antimicrobial resistance patterns and clinical outcomes.
This study aimed to characterize the microbial profile, antimicrobial resistance patterns, and clinical outcomes in patients with diabetic wound infections, and to determine how these factors influence hospitalization, complications, and the need for surgical intervention. The authors hypothesized that high antimicrobial resistance and polymicrobial infections would be associated with poorer clinical outcomes.

Method: A retrospective review was undertaken of 540 patients with diabetic wound infections treated in public and private hospitals within the Nelson Mandela Bay Metro, South Africa. Data collected included microbial isolates, antimicrobial susceptibility profiles, frequency of hospitalization, length of stay, and infection-related complications. Comorbid conditions, particularly peripheral arterial disease (PAD), and laboratory markers such as hemoglobin, C-reactive protein, platelet count, and white blood cell count were assessed. Surgical outcomes, including major and minor amputations and debridement, were analyzed in relation to infection severity and overall patient outcomes.

Results: Hospitalization was required in 80.5% of patients, and 41.5% experienced multiple admissions. Length of stay ranged from 3 to 18 days, with a mean of 10.38 days. Polymicrobial infections were common and associated with more severe clinical presentations. High levels of antimicrobial resistance were observed across commonly used antibiotic classes, including penicillin's, cephalosporins, and carbapenems.
Although infection was present in all cases, PAD emerged as a key determinant of poor wound healing. Approximately 70% of patients had PAD, and these individuals frequently exhibited low hemoglobin levels, suggesting impaired oxygen delivery to the wound. This hypoxic environment likely increased susceptibility to infection and limited the effectiveness of antimicrobial therapy through reduced drug delivery and tissue perfusion. The findings suggest that, in this cohort, impaired circulation and tissue hypoxia may have a greater impact on outcomes than antimicrobial resistance alone. Serious complications, including cellulitis, gangrene, and sepsis, were common. Sepsis was strongly associated with progression to major amputation. Surgical interventions comprised major amputations (43.9%), minor amputations (32.6%), and debridement (19.5%).

Conclusion: The study concludes that diabetic wound infections impose a substantial clinical and economic burden, particularly where diagnostic capacity is limited. While antimicrobial resistance remains an important concern, PAD and tissue hypoxia appear to be critical drivers of adverse outcomes. These findings underscore the need for predictive tools to identify PAD early in patients with diabetes and for interventions that improve tissue oxygenation at the wound site. Enhancing oxygen delivery may augment antimicrobial efficacy, reduce infection risk, and help curb antimicrobial resistance. Integrating rapid point-of-care diagnostics with vascular assessment and targeted therapies could improve antimicrobial stewardship, decrease preventable amputations, and ultimately enhance outcomes. This work contributes to ongoing efforts to develop innovative diagnostic solutions for improved wound management.

A sudden and severe hyperlipidemia

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Background: A highly lipemic sample was received for analysis from a 56 year-old patient followed-up for B-cell acute lymphoblastic leukemia. Plasma triglycerides reached 83 mmol/L. He had no prior history of hyperlipidemia. He also had well-controlled type 2 diabetes, treated with metformine for several years.

Method: To understand this phenonemon, patient follow-up was conducted along with a review of his treatment history and his prior laboratory tests.

Results: The previous plasma sample collected one week before was clear. At that time the patient was prescribed vincristin and cyclophosphamide. L-asparaginase was introduced the week before. Hyperlipidemia can be caused by preanalytical errors (e.g. sampling shortly after a meal or a lipid-containing intravenous infusion), various pathophysiological conditions (e.g. multiple myeloma, diabetes mellitus, acute pancreatitis, kidney failure, hypothyreosis), or medications (e.g., ciclosporine, corticoids, asparaginase). Here, L-asparaginase therapy is suspected, because the hyperlipidemia was sudden, severe and transient. Severe hypertriglyceridemia interferes with

measured analytes through physical and chemical interactions. The patient is at risk of acute pancreatitis and thrombosis and must be followed-up.

Conclusion: medications can cause interferences in biological samples, as in the case presented here. the clinical pharmacist-biologist must be able to identify them, assess the impact on the results and notify the clinician.

Detection and molecular characterization of acute dengue infection among febrile patients in Ghana

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Background: Dengue is an underrecognized cause of acute febrile illness in sub-Saharan Africa, where limited diagnostic capacity and symptom overlap with malaria contribute to substantial underdiagnosis. In Ghana, despite the presence of competent Aedes vectors and proximity to countries with documented outbreaks, dengue is not routinely investigated in clinical settings. This study aimed to detect and characterize acute dengue infections among febrile patients presenting to hospitals in Ghana using combined serological and molecular approaches.

Method: A hospital-based cross-sectional study was conducted between September 2023 and February 2024 across three healthcare facilities in Ghana. A total of 776 febrile patients (temperature ≥38 °C) aged 1–90 years were enrolled. Blood samples were tested for dengue using rapid diagnostic tests (NS1 antigen and IgM/IgG antibodies) and NS1 antigen enzyme-linked immunosorbent assay (ELISA). Samples positive for NS1 antigen were further analyzed by reverse transcription polymerase chain reaction (RT-PCR) for viral RNA detection and serotype identification. Acute dengue infection was defined by NS1 antigen and/or IgM positivity, while IgG positivity indicated past or secondary exposure.

Results: Acute dengue infection was identified in 7.6% of febrile patients, indicating a notable but largely unrecognized contribution to febrile illness. Serological testing showed NS1 antigen positivity in 1.6%, IgM antibodies in 5.0%, and IgG antibodies in 18.8% of participants, suggesting both ongoing and prior transmission. ELISA confirmed NS1 antigen in 2.6% of cases. Among these, RT-PCR detected dengue viral RNA in 40% (8/20), with circulation of DENV-1 (n=6) and DENV-3 (n=2) serotypes. The median age of participants was 10 years, and 54% were female. Common clinical features included fever (100%), headache (82.7%), nausea/vomiting (71.9%), myalgia/arthralgia (64.5%), and fatigue (58.1%), highlighting the nonspecific clinical presentation and potential for misdiagnosis.

Conclusion: The findings demonstrate that dengue is an under-diagnosed but clinically relevant cause of acute febrile illness in Ghana, with evidence of active transmission and circulation of multiple serotypes. The reliance on syndromic management and malaria-focused diagnostics likely contributes to missed cases. Integrating dengue testing into routine febrile illness algorithms, strengthening laboratory diagnostic capacity, and enhancing arboviral surveillance are critical to improving case detection and guiding appropriate public health responses in Ghana and similar West African settings.