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LMU Munich was thrilled to organise and host the first onsite EUGLOH Annual Student Research Conference. After four online or hybrid events held at the University of Szeged (2020), Université Paris-Saclay (2021) and Lund University (2023), **EUGLOH's 4th Annual Student Research Conference** was successfully carried out on 5 December 2023 at LMU Munich.

Following the well-established tradition of encouraging and showcasing excellent research outcomes produced by students and creating the conditions for students to exchange approaches and ideas with peers and already-established researchers at the participating institutions, the **4th EUGLOH Annual Student Research Conference** was organised in the context of the **EUGLOHRIA Final Conference on Pandemics and Global Health Crises**. Embedding the **4th EUGLOH Annual Student Research Conference** within the programme of EUGLOHRIA's Final Conference created ideal opportunities for students to join a scientific conference with a strong focus on the research and innovation aspects of the EUGLOH Alliance while at the same time actively contributing to shaping this high-level meeting with high-quality presentations.

Fifty-three eligible students registered and applied with abstracts to the **4th EUGLOH Annual Student Research Conference**. The motivation to participate was high since selected participants would be invited to present their work onsite in Munich, which created a big incentive to apply with high-quality abstracts. Due to student mobility-related constraints, the selection had to be restricted to nine participants, one from each member of the Alliance. The **4th EUGLOH Annual Student Research Conference** was given the topic "Pandemics and Global Health Crises" to match the overall topic of EUGLOHRIA's Final Conference and enhance the exchange between presenting students, conference participants and the audience. Students from all disciplines were encouraged to submit abstracts for specific topics ranging from Epidemiology and disease modelling during pandemics to Global health policy and governance during health emergencies, Data science and AI applications in pandemic response and Lessons learned from historical pandemics and their relevance today.

Prospective participants were required to submit abstracts containing not only initial ideas or preliminary outcomes but also actual results to comply with the requirements of a research conference. The delivery would then take the form of a poster presentation for students to have the chance to perform this essential scientific exercise and maximise the exchange opportunities.

EUGLOH Students delivered a high-quality pool of abstracts from which LMU had the difficult task of selecting the best abstracts to be presented during the event as posters. Due to the divergence of study terms between the EUGLOH Partner institutions, the number of

applications varied across the universities. At the end of the selection process, eight abstracts were chosen to be turned into posters and presented by their authors during the 4th EUGLOH Annual Student Research Conference. Selection criteria included relevance, methodological and scientific soundness and originality. Inclusion and diversity were also considered during the selection process, which LMU carried out.

At the end of the selection process, eight abstracts from LU, UiT, USZ, UPorto and UPSaclay students were accepted to participate in the 4th EUGLOH Annual Student Research Conference. Invitations and travel arrangements were organised closely with the respective EUGLOH Institutional Managers and WP3 for students to attend this onsite event in Munich. Participation was not restricted to the EUGLOH Annual Student Research Conference but also included the opportunity to take part in other sessions and activities organised in the context of the EUGLOHRIA Final Conference, such as a Science Communication Workshop and an excursion to LMU's Biomedical Center in Martinsried. This opportunity was seized by students who enjoyed the conversations and exchanges during these activities and learned skills that would benefit their professional careers.

A few days before the scheduled events, Munich was surprised by an unprecedented snowfall, which brought the city to a halt and rendered the railway system and airport inoperable for various days. Expecting the worst, the organising team rapidly began preparing for changes in the execution of this event as it became clear that many delegations wouldn't be able to get to Munich on time for the conference. This would thankfully not apply to the selected students: all but one managed to travel to Munich and take part in this experience. For the student unable to participate onsite, a hybrid option was quickly organised for her to present her poster and interact with the audience onsite.

The 4th EUGLOH Annual Student Research Conference took place on 5 December with participation from delegations from almost every EUGLOH Alliance member, including not only students, researchers, and administrative staff but also presidents and vice-presidents who actively engaged with the presenting students and the content of their posters. At the same time, posters and their delivery were evaluated by selected researchers who considered the content (research questions, methodology, results, etc.), visual appeal, presentation, originality, relevance, and engagement to choose the "Best Poster" Price. This price comprises a certificate and an invitation to participate in LMU's Global Health Day in April 2024, an event dedicated to making visible and strengthening Global Health teaching and research in Munich. The winner was Arezki Guerda, PhD Student at UPSaclay.

LMU wants to thank all institutions for their assistance during the application and selection process, the LMU EUGLOH Team for their support in the successful organisation of this event, and the anonymous evaluators for their contribution. Our gratitude goes especially to Milena, Ana, Khushi, Tatiana, Arezki and Mohammad for having made the 4th EUGLOH Annual Student Research Conference an excellent opportunity to exchange knowledge, foster interdisciplinary collaboration, and contribute to the advancement of our collective understanding of pandemics and global health crises.

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Flyer & Poster

Website: https://www.eugloh.eu/events/4th-eugloh-annual-student-research-conference

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Participants & Abstracts

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Ana Aslanikashvili

Associations between hepatitis C infection, hepatitis C treatment and COVID-19 hospitalizations in Georgia.

Authors: **Ana Aslanikashvili**[a], Charlotta Rylander[a], Tinatin Manjavidze[a b], Amiran Gamkrelidze[c], Davit Baliashvilid[d], Erik Eik Anda[a]

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Introduction:

COVID-19 pandemic has spurred efforts to repurpose existing medications, such as direct-acting antivirals (DAAs), originally designed for hepatitis C virus (HCV) infection, to combat SARS-CoV-2. However, the conclusive evidence supporting their efficacy remains elusive. In this study, we aimed to assess the impact of HCV infection status and DAA treatment on COVID-19-related hospitalizations.

Methods:

From Georgian health registries, we identified COVID-19-positive adults from February 26, 2020, to December 31, 2021. We categorized individuals into five groups: i) HCV antibody negatives (n = 493,020), ii) HCV antibody positives with negative viremia testing (n = 5,734), iii) individuals with HCV viremia who initiated DAA treatment ≤90 days prior to COVID-19 (n = 221), iv) individuals with HCV viremia who initiated DAA treatment >90 days before COVID-19 (n = 15,112) and v) individuals with HCV viremia who were not treated before COVID-19 (n = 3,137). Logistic regression models were used to estimate odds ratios (ORs).

Results:

Compared to HCV antibody-negative individuals, those initiating DAA treatment before COVID-19 displayed lower odds of COVID-19-related hospitalizations (OR = 0.64, 95% CI 0.45-0.91), as did those commencing DAA treatment >90 days before COVID-19 (OR = 0.82; 95% CI 0.79-0.86). Conversely, individuals with HCV viremia who did not initiate DAA treatment before COVID-19 exhibited increased odds of COVID-19-related hospitalization (OR = 1.35, 95% CI 1.25-1.46).

Discussion:

This study is the first national registry-based analysis of COVID-19 hospitalization rates in individuals with varying HCV infection and treatment statuses. Our findings suggest that initiating DAA treatment within 90 days of COVID-19 may reduce the odds of COVID-19-related hospitalization in HCV-positive individuals. Although these results should not be used to justify DAA agents for COVID-19 treatment, but they indicate that HCV positives should at least not refrain from DAA treatment facing possible infection from SARS.

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Mohammad Thoriq Bahri

Global Implementation of Vaccine Passports: A Social Network Analysis of Public Sentiment and Challenges from an Immigration Law Perspective

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Abstract

The COVID-19 pandemic has persisted, leading to numerous countries implementing stringent travel restrictions and modifying their immigration policies. As of April 2020, over 40,000 travel restrictions were implemented globally, encompassing border closures, medical restrictions such as quarantine, changes to visa policies, nationality-based restrictions, and other measures. Consequently, international travel decreased by 74 percent, causing a substantial 49.1 percent decline in the global Gross Domestic Product (GDP) from the tourism sector in 2021. In response to curbing the pandemic, global vaccination emerged as an effective policy, with the World Health Organization (WHO) introducing the concept of "Vaccine Passports" as a mandatory immigration document for international travel. This research analyzes 18,247 tweets worldwide, collected between March and October 2021 using the NodeXl Social Network Analysis (SNA) tools, to comprehensively understand the prevalent concerns, stakeholders, and sentiment surrounding the implementation of vaccine passports from an Immigration Law perspective. The findings reveal that prominent users actively shaping public opinion on the subject are political figures and airline accounts, emphasizing a positive narrative. However, a critical issue lies in the prevalence of misinformation about the policy implementation, leading to a negative sentiment towards vaccine passport adoption. Furthermore, the unequal access to vaccination programs among international migrants in various destination countries, particularly in relation to their immigration status, poses a significant challenge to the successful global implementation of the Vaccine Passport policy.

Keyword: *Vaccine Passport; International Migration; Migration Theory; Big Data; SNA Analysis*

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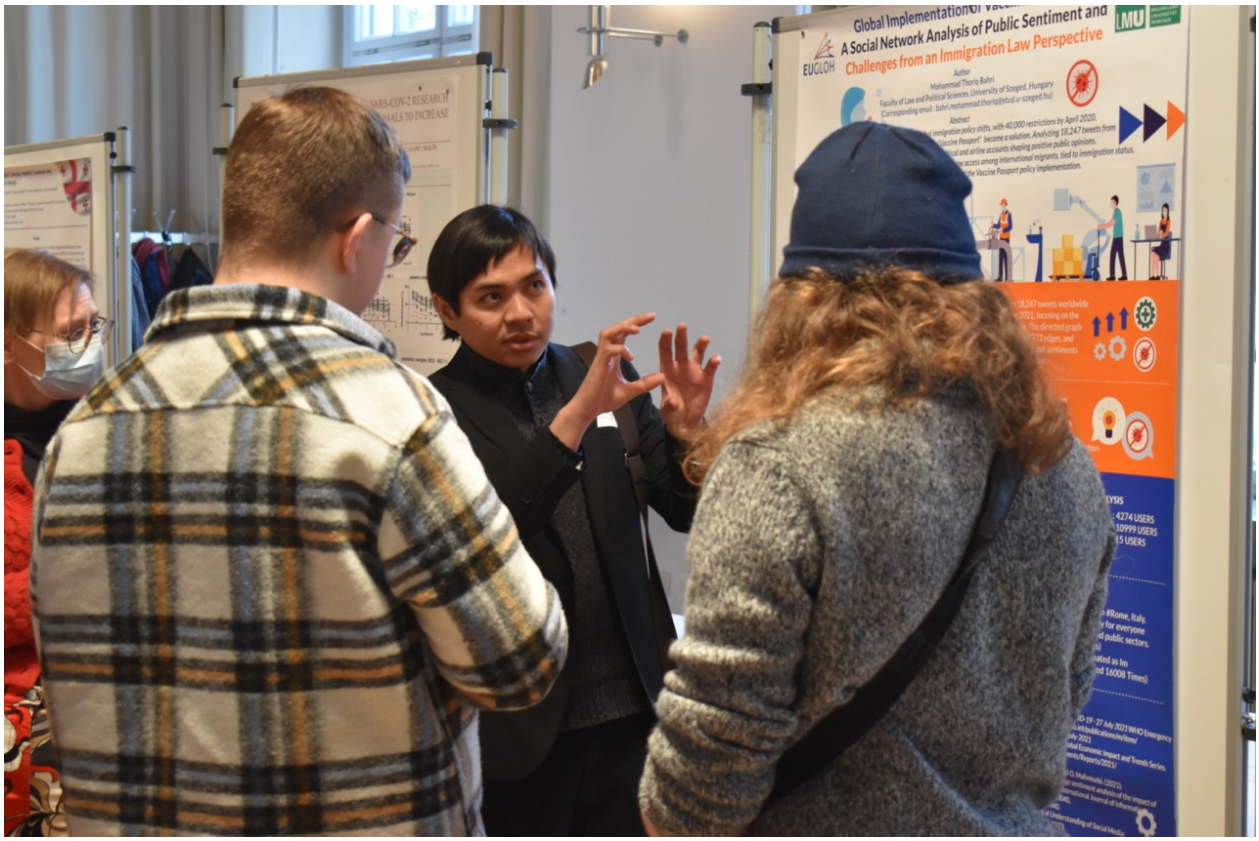

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Mohammad Thoriq Bahri

Mitigating Disparities in Vaccine Access: The Needs of a Global Convention as Legal Basis for Vaccination

Mohammad Thoriq Bahri

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Introduction:

The COVID-19 pandemic highlighted the issue of unequal vaccine access, with vaccination rates reaching 70.5% in middle-high-income countries compared to 32.5% in low-middle-income countries. Among the unvaccinated groups, undocumented migrants and migrant laborers have the highest rate of infection. This highlights the significance of a Global Vaccination Convention as a necessary legal framework for addressing vaccine distribution discrepancies to address a future pandemic.

Methods:

This study uses a qualitative framework, specifically a doctrinal legal method. Data is gathered through a thorough literature study and secondary data analysis, especially using authoritative sources such as WHO databases and doctrinal legal analyses. The evaluation of original legal sources, particularly United Nations (UN) legal research materials, is a critical component of the approach of this research.

Results:

Several findings are reached after completing analysis. To begin, the TRIPS agreement, as stated in articles 27 and 28, with the principles of intellectual property rights, prohibits the vaccine from being manufactured outside of the nation of origin. Second, Advance Purchase Agreements (APAs) prevent Lower Middle Income (LMIC) countries from obtaining vaccine directly from the manufacturer, disrupting distribution access. Finally, in certain countries, if the vaccine is solely available to locals, migrants do not have access to it.

Discussion/conclusion:

These findings highlight the compelling need for the establishment of a Global Convention on Vaccination, which would serve as an international fulcrum for the calibrated resolution of the issue of unequal vaccine access, emphasizing its relevance to marginalized subpopulations, particularly migrants. If implemented, such a convention might foster equitable allocation methods, facilitate technology diffusion empowering LMICs in local vaccine production, inspire collaborative research and development, and foster a culture of global solidarity relevant to pandemic preparedness.

Arezki Guerda

Development of an innovative vaccine immunotherapy based on non-mutated neoantigens targeting immune-escaped tumors

Arezki GUERDA, PhD Student

Abstract:

Although promising, immunotherapy is effective in only a fraction of cancer patients, and the mechanisms associated with resistance to PD-1 blockade are still not well understood. Tumors use severalstrategies to evade CD8 T-cell immunity, in particular impaired peptide processing via downregulation/loss of transporter associated with antigen processing (TAP). My research team has identified a tumor antigen,the preprocalcitonin (ppCT), and derivednon-mutant neoepitope(ppCT16-25), named T-cell epitope associated with impaired peptide processing (TEIPP), recognized acytotoxic T lymphocyte and processed from ppCT signal peptideby a TAP-independent pathway. TEIPP are unique shared neoantigens selectively presented by tumor cells deficient for TAPand thereby major histocompatibility complex class I (MHC-I) surface expression. My team has developed a cancer vaccinebased on ppCT peptides, including ppCT16-25, able to control growth of tumors that have attempted to evade CD8 T-cell immunity by downregulating TAP. My PhD projectaimsatidentifyingnovel TEIPP from leadersequences of self-proteins (over)expressed in tumors with defects in the antigen-presentation machinery (TAPlow/MHC-Ilow) derived from patients who hadresponded to anti-PD-1. I will use a combinatorial screening approach to predict the most immunogenic TEIPP. The TEIPP candidates will be filtered for a predicted high binding affinityto MHC-I, in particular HLA-A2.I will test the immunogenicity of the selected TEIPP by analyzing their capacity to activate CD8 T cells *in vitro* using PBMC from responder patients. I will then validate the most immunogenic peptides *in vivo*using HHD-DR3 mice (transgenic for HLA-A2 and -DR3)and select the best peptide cocktails able to induce CD8 and CD4 T-cell responses. My preliminary results using public sequence datasetconfirmed the feasibility of our pipeline and biocomputational approach,and the immunogenicity of the selected TEIPP. TEIPP-specific CD8+T cells are promising effectors for the treatment of tumors that have escaped conventional immunotherapies.

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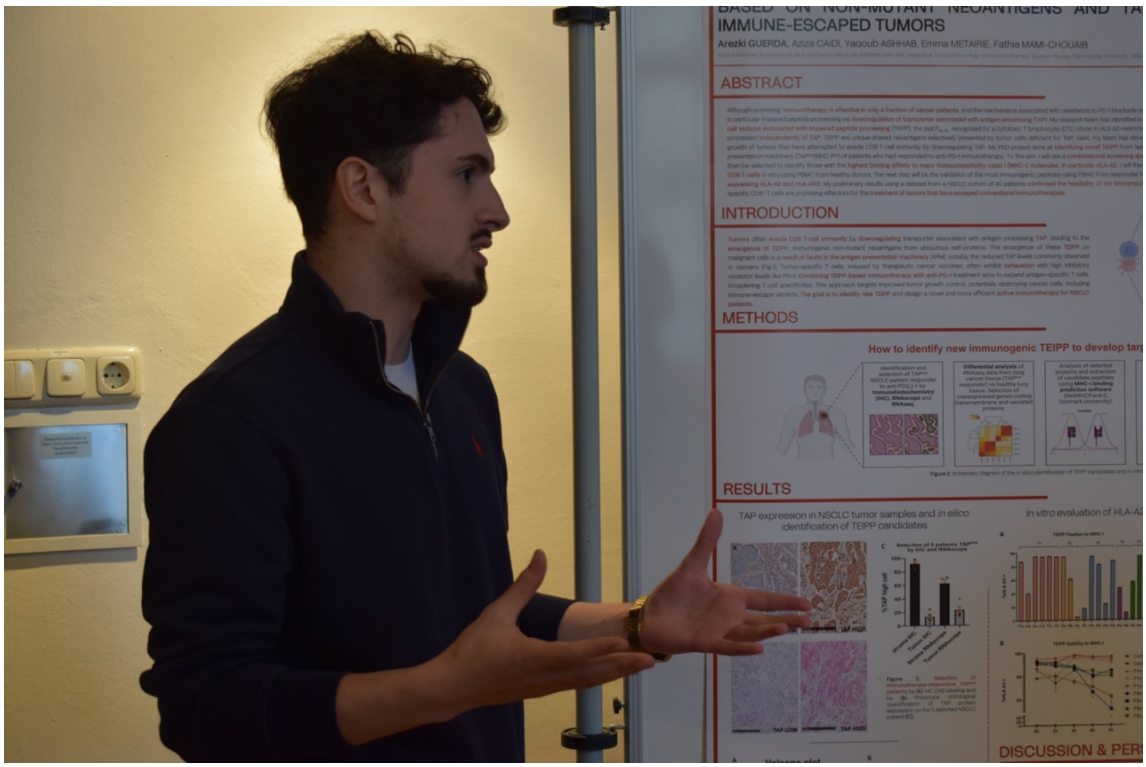

Nigam Khushi

Healthcare systems resilience: scoping review mapping action-oriented strategies based on thematic areas

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Abstract

Primarily, research on the healthcare systems has been focused on the theoretical development of the concept and its dimensions. How the resilience has to be built in the healthcare systems in practice remains an identified knowledge gap in the research. Utilizing the empirical research on the healthcare systems resilience, this study aims to identify the practical strategies for building resilient healthcare systems.

Due to the expected heterogeneity of resilience strategies across the research evidences, a scoping review was chosen. A scoping review of 15 articles published between 2010-2022 included empirical research on healthcare systems resilience from peer-reviewed literature. The articles included applied research on strategies for resilience through analysis of secondary data. After the comparison of resilience strategies and findings, based on the identified thematic areas, the strategies were then grouped together.

The papers for final analysis were empirical papers and evidence synthesis papers. The studies in the papers were conducted in low or middle- income countries. The results demonstrate strategies employed or recommended within five identified thematic areas: governance and financing, collaboration and communication, organizational capacity and learning, use of community resources and, healthcare system strengthening.

The findings emphasized the significance of improved governance and financing and strengthened surveillance systems. With better mainstreaming of health security and international healthcare regulations, a re-emphasized focus on healthcare systems strengthening is demonstrated in results as crucial strategy for building resilience. Appropriate strategies can be taken up and implemented by the practitioners , when the mechanisms that build the healthcare system resilience are better understood. The identified gaps for resilience in the future are a lack of strategies for recovery and lessons learnt from the crises.

Keywords: strategies, resilience, healthcare systems

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Tatiana Pereira

Empowering Mozambique and Beyond: Public Health Responses to Infectious Disease Outbreaks in Developing Countries

Tatiana Pereira, Masters Integrated in Medicine, Faculdade de Medicina da Universidade do Porto (FMUP).

Introduction:
Infectious disease outbreaks can have devastating consequences in developing countries, where healthcare systems often struggle with limited resources. This informative abstract introduces the critical need for innovative public health responses to mitigate the impact of outbreaks in Mozambique and similar regions.

Methods:
To formulate effective strategies, this study conducted a thorough literature review, analyzed historical outbreaks in Mozambique, and engaged with key stakeholders in the public health sector. Six primary data sources were utilized for this research.

Results:
The research identified several key findings: 1. Community Engagement – Engaging local communities through education and awareness campaigns significantly improved outbreak control and response; 2. Surveillance and Early Detection - Developing robust surveillance systems and early detection mechanisms helped identify outbreaks at their onset, facilitating timely interventions; 3. Capacity Building - Strengthening healthcare infrastructure and workforce capacity enabled better preparedness and response; 4. International Collaboration - Collaborative efforts with international organizations and neighboring countries were crucial in resource mobilization and knowledge sharing; 5. Risk Communication - Effective risk communication strategies reduced misinformation and promoted adherence to preventive measures; 6. Vaccination Campaigns - Mass vaccination campaigns targeting high-risk populations helped in disease prevention.

Discussion:
With the National Health System in Mozambique facing precarious conditions, empowering Mozambique and similar developing countries to respond effectively to infectious disease outbreaks requires a multifaceted approach. By engaging communities, strengthening surveillance systems, building capacity, fostering international collaboration, improving risk communication, and implementing vaccination campaigns, public health responses can become more robust and agile. These strategies are not only applicable to Mozambique but also to other resource-constrained regions facing similar challenges. The lessons learned from this study can guide future efforts to enhance public health responses to infectious disease outbreaks in developing countries.

Keywords:
Infectious disease outbreaks; Innovative strategies; Empowering Mozambique; Strengthening healthcare infrastructure.

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Milena Samojlovic

ONE HEALTH APPROACH ON SARS-COV-2 RESEARCH – _USING SHEEP AS SENTINEL ANIMALS TO INCREASE FUTURE PANDEMIC PREPAREDNESS

Milena Samojlović[1]_, Joakim Esbjörnsson[1], Fariba Vaziri-Sani[1], Malin Neptin[1], Sérgio Santos-Silva[2], João Mesquita[2]

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Coronaviruses are a family of viruses that can infect a number of species of birds and mammals with great zoonotic potential to cross species barriers and cause spill-over events. SARS-CoV-2 has been shown to cause clinical and unapparent disease and mortality in several animals cohabitating with humans. Sheep are also susceptible to SARS-CoV-2 and have potential to harbor and spread the virus, as well as develop neutralising antibodies due to similarities of virus-receptor interactions to those in humans. **The main aim of this project is to investigate the prevalence of anti-SARS-CoV-2 neutralising antibodies in sentinel animals.** The sera have been collected from sheep in Portugal both prior to and during the COVID-19 pandemic. The sera will be tested using already established SARS-CoV-2 pseudovirus systems at Lund University. We aim to investigate whether different SARS-CoV-2 variants circulating in people at certain time points had different influence in eliciting the neutralization antibody responses in sheep at corresponding time points. We will assess if potential SARS-CoV-2 virus cross-species transmission could have been established through contacts between people and animals on sheep farms, as wll as between grazing animals and susceptible wildlife, especially during pandemic. The experimental part of the project is currently on-going. The proposed project represents a translational pipeline between different research fields – _human and veterinary medicine – _for better validation and more comprehensive implementation of developed diagnostics against this and potential future coronaviruses. The proposed project has the potential to address some of One-Health challenges like disease outbreak and surveillance through the development of effective and efficient translational diagnostic tools for zoonotic viruses, and through establishing an interdisciplinary scientific collaboration between two Universities from EUGLOH Alliance. Following the key goals of EUGLOHRIA, the Universities of Porto and Lund will in a joint effort create an One Heath approach on coronavirus research.

Key words: SARS-CoV-2, One Health, sentinel animals, sheep, pandemic preparedness

Acknowledgment: This research is funded by EUGLOHRIA Research seeding grant 2023.

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Pedro Videira

Data Science and Artificial Intelligence Applications in Pandemic Response: Achievements and Future Prospects

The COVID-19 pandemic has underscored the critical importance of data science and artificial intelligence (AI) in responding to global health emergencies. This poster provides a comprehensive analysis of the achievements and future directions of data science and AI applications in pandemic response, addressing their impact on control strategies, diagnostics, forecasting, and epidemiological surveillance.
To contextualize current achievements and future prospects, we conducted a systematic literature review, examining studies, reports, and projects related to the use of data science and AI during the COVID-19 pandemic. Additionally, we critically analyzed the methodologies employed and results achieved in various application areas.

Our findings demonstrate that data science played a pivotal role in real-time analysis and interpretation of epidemiological data. Machine learning models were effective in predicting virus spread trends, enabling timely implementation of mitigation measures. AI-based contact tracing applications expedited the identification of transmission chains, contributing to virus containment.

The discussion explores the applicability of AI-driven approaches to vaccine development, optimization of distribution strategies, and monitoring of clinical trials. Furthermore, we delve into ethical challenges related to data privacy and equity in access to AI-based technologies. We also consider the ongoing need for interdisciplinary collaboration to develop adaptive AI models capable of effectively responding to future pandemics, taking into account pathogen evolution.

This poster provides a comprehensive overview of the current achievements and challenges of data science and AI applications in pandemic response. While celebrating significant advancements made thus far, we emphasize the continued importance of research and innovation to further enhance our ability to address global health crises. The ethical and effective use of data science and AI can be a valuable asset in preparing for and responding to future pandemics, offering the opportunity to save lives and safeguard communities worldwide.

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