# The Second

# Syria Health Research

# Conference

30/10/2020

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# Letter of Welcome

*The "Second Syria Health Research Conference'' is Co-hosted by the Research for Health in Conflict in the Middle East and North Africa (R4HC-MENA) and Research for Health Systems Strengthening in northern Syria (R4HSSS) programmes in the Conflict and Health Research Group at King's College London, the Union of Medical and Relief Organisations (UOSSM), the Syrian Research Group (SyRG) at the London School of Hygiene and Tropical Medicine and National University of Singapore and the Syria Public Health Network.*

*This one-day conference will bring together experts from academia, front-line health actors and NGOs to showcase original research on current health issues in Syria, spanning from health system governance to epidemiology to many other disciplines within global health.*

*Entering its tenth year, the Syrian conflict is still one of the most devastating humanitarian crises in the world. The conflict has severely impacted the health of Syrians both inside Syria and those who fled the country seeking refuge in neighbouring countries and Europe. The detrimental impacts on health have been caused by both direct effects; such as death, injuries and destruction of health infrastructure; and indirect effects such as the collapse of the health system and interruption of treatments. While the humanitarian health response has attempted to alleviate some of the suffering, it is important to draw lessons on health needs, response, and consequences of this conflict. Research plays a key role in drawing upon these lessons which could help improve the health response in Syria and elsewhere.*

*This event will sit at the interface of academia and practice and touch upon theoretical and practical dilemmas when conducting health research in the Syrian conflict. Co-hosted by several research groups heavily involved in Syria health research along with an international Syrian health NGO that continues to be involved in all aspects of the health response in Syria, the aim of this event is to bring academics and practitioners together to discuss the challenges and the opportunities of conducting health research in the Syrian conflict and in conflict settings more widely.*

*The conference will include presentations of papers and research conducted inside Syria and in neighbouring countries by both Syrian and international researchers. The presentations are grouped in the following themes:*

- *The impact of the COVID-19 pandemic on health in Syria*

- *Health systems adaptation in the Syrian conflict*
- *Health research, medical education and training*
- *Non-communicable diseases.*
- *Reviews and evaluations of clinical interventions*
- *Multidisciplinary partnerships between research institutions and humanitarian actors, and evaluation of humanitarian interventions.*

# Speakers Bios

### Dr Maher Alaref

*Maher Al-Aref is a Senior Partnerships Manager at UOSSM with a degree pharmaceutical studied graduated from Aleppo University in 1998 and a master's degree in Health Economics and Politics awarded from Liverpool University in 2011. He has eight years of experience in the health humanitarian context in Syria. He is the Head of the Partnerships and Development Division of UOSSM's main operating office in Gaziantep, he is an HLG member, former SC member in the SNA and on several platforms representing UOSSM and advocating for the voice of the organization, humanitarian and health workers active in this context, and UOSSM's mission and vision to support all individuals and communities affected by the Syrian crisis on several platforms. He is part of UOSSM since 2013.*

### Natasha Howard

*Natasha Howard is an interdisciplinary health policy and systems researcher, focused primarily on low and middle-income countries. She draws primarily from sociology, social psychology, and global health/development to engage in policy-relevant research in infectious disease control in Asia and strengthening health system responses during protracted adversity (e.g. fragility, complex emergencies, displacement). Her teaching has included developing and managing a postgraduate course and modules, editing and writing textbooks, supervising doctoral and masters-level student research, and mentoring students and professionals. Dr Howard is also the director of Syria Research Group (SyRG) which is a team of primarily Syrian health system researchers based at the London School of Hygiene & Tropical Medicine (LSHTM) and the National University of Singapore Saw Swee Hock School of Public Health (SSHSPH).*

### Manar Marzouk

*Manar is a global health researcher with a focus on health policy and health systems in refugee and conflict settings. She is currently working with the COVID-19 International Modeling Consortium (CoMo) at the University of Oxford on modeling the impact of COVID-19 mitigation measures in different regions in Syria. She is also involved in several projects on health systems and policy analysis in different countries in the MENA region, including UNESCWA - The National Agenda for the Future of Syria (NAFS Programme), Lebanon Support - The Right to Health in Lebanon and Jordan, and UNICEF/Valid International - CMAM*

*Evaluation in Sudan. She has previously worked on cancer care management for Syrian refugees in Jordan (WHO-EMRO, 2016), and minorities' experiences in accessing mental health services (Health Experience Research Group, University of Oxford, 2017), and has over 7 years' field experience in the humanitarian sector in Syria and the UK (Valid International, 2018-20; Asylum Welcome, 2016-2018; UNICEF, 2014-2015; UNHCR, 2013-2014). She holds an MSc in International Health and Tropical Medicine from the University of Oxford, and a bachelor's degree in Pharmacy from the University of Damascus.*

### Dr Naser Almhawish:

*Naser is a medical doctor with extensive experience in Surveillance system. Currently, he is Surveillance Coordinator  at ACU/ EWARN (Early Warning Alert and Response Network) in the North West of Syria. In 2016, he established the acute respiratory illness surveillance for EWARN which later developed to be COVID-19 surveillance system. In addition, he successfully developed an enhancement measures for AFP surveillance contextualised to conflict setting, and in accordance with the global standards. In 2017, he led  the surveillance team which detected vaccine-derived poliovirus outbreak in the north of Syria. In 2015, he worked as surveillance officer with EWARN focusing on Acute Flaccid Paralysis surveillance. In addition, Naser is currently a member in the CoMo modeling team in the North West of Syria*

*Prior to 2015, he had extensive field experience as surgeon in different hospitals on the  as surgeon in different hospitals on the Syrian-Turkish borders. Naser holds a MSc in Public Health, and a bachelor degree in medicine form the University of Aleppo ( 2006). In addition, he has a post graduate certificate in surgical studies in ( 2012)*

### Houssam Alnahhas

*The recipient of the joint MPH Syrian Scholarship and Sommer Scholar Award from the Johns Hopkins Bloomberg School of Public Health. Master of Public Health graduate with a certificate in Epidemiology for Public Health Professionals. Physician, with over eight years of experience in the field of humanitarian health, and public health researcher with strong skill sets on information management and focus towards studying health systems in conflicts. Extensive experience with data collection, data analysis, and program implementation. Fluent in Arabic, English, and Turkish. He supported many types of research related to public and global health and his work in this area has appeared in the European Journal of Public Health, JAMA Surgery, Diabetes & Metabolism and Annals of Global Health. He also joined FXB Center for Health and Human Rights as a research collaborator to support the data and information needs of the Lancet-AUB Commission on Syria and to support the technical work related to the development of platform prototypes for a Burden of War analysis.*

### Ibrahim Almasri

*An international medical graduate from Damascus University and a Master's of Science candidate in Health Services Research at the University of Calgary, Canada. I've been involved in the Refugee Health YYC Research program at the O'Brien Institute for Public Health - University of Calgary for over than three years. I was an experienced specialist doctor in pulmonology in Syria and a lead of health programs for refugees in Lebanon. I'm passionate and committed to serving vulnerable people, work with dedicated teams to initiate health systems, and enjoy the privilege of lending a hand to others. In addition to speaking at many international conferences over the last few years, I've been a co-author of several scientific publications. In addition to my career, I continue to volunteer with multiple organizations globally.*

### Kristen Meagher

*Kristen Meagher works at King's College London in the Conflict and Health Research Group on the Research for Health in Conflict in the Middle East and North Africa (R4HC-MENA)  and Research for Health Systems Strengthening in northern Syria (R4HSSS) programmes as a Research Associate and Programme Manager, as well as studying towards her PhD. Kristen also currently leads on the Women Leaders in Health and Conflict Initiative. Kristen's research interests focus on gender and health systems in conflict settings. Prior to working at King's, Kristen worked in refugee resettlement.*

### Massa Jabra

*Massa Jabra, a fifth-year medical student at Damascus University, passionate about humanitarian work, research and oncology*

### Amani Saleh Al-Oreibi

*Amani  holds a bachelor's degree in Pharmacy and has recently completed her master's degree in Public Health (Global Health) from the University of Nottingham. She is currently a researcher at the University of Nottingham, working on the United Kingdom Research*

*Study into Ethnicity And COVID-19 outcomes in Healthcare workers. Her research interests are health inequalities, refugees' health, wider disparities in access to care and health outcomes, and the impacts of COVID-19 on mental and physical health.*

### Joseph Burke

*Joseph is a researcher at the University of Edinburgh focusing on global mental health and research ethics. He has over 7 years of experience working in humanitarian response throughout the Middle East and Africa, most recently as Head of the Donor Relations and Projects Unit with UNRWA in Lebanon.*

### Sara Basha

*Sara is a Syrian-Scottish medical student at the University of Aberdeen; she is currently intercalating in a masters in Global Health and Management at the University of Aberdeen. She plans to pursue a career in the humanitarian field relating to Syria*

### Dr Ahmad Al-Khawam

*M.D, MSc, Neurologist, Division of Neurology, Department of Internal Medicine, Faculty of Medicine, Damascus University, Damascus, Syria*

### Salma Almidani

*Recent Masters of Public Health graduate from the Yale School of Public of Health in the Epidemiology of Microbial Diseases department with a concentration in Global Health. Her research interests lie at the crossroads between infectious diseases and conflict, displacement, and refugee health. During her time at Yale, she conducted a summer research project in Lebanon looking at vaccine coverage, awareness, and knowledge among displaced Syrians that were seeking healthcare at primary healthcare centers supported by International Medical Corps (IMC). She also organized a joint Yale-AUB Refugee Health workshop held in Beirut in 2019 that aimed at connecting public health students from both universities interested in conducting refugee health research.*

### Ibrahim Hanafi

*A medical doctor, a trainee researcher, a humanitarian worker and a Palestinian refugee, passionate about neuroscience, research, logic and mathematics; graduated from Damascus University in 2018 and is currently a master's degree student for translational neuroscience at Julius-Maximilians-Universität Würzburg in Germany.*

### Fatima Abbas:

*Fatima is a graduate medical doctor from Damascus University, Syria. She is continuing clinical training in internal medicine in France, the central hospital of Vire while studying for a diploma degree at the University of Paris in immunological therapies. She is an author, referee, and trainer at Cochrane collaboration and an author for many research articles since her undergraduate studies. She founded an educational research project in Syria *WeResearch) with which she impacted the medical community in Syria by helping students learn research methodology, evidence-based medicine, and academic writing by conducting wide-spread interactive workshops and startups in research. Education is the main core of most of her projects in Syria along with promoting public health and disastrous medicine research*

### Dorien Braam:

*Dorien has worked with government, nonprofit organisations and UN agencies across Asia, Eastern Africa and Europe on migration, health, labour and protection. She is currently Director of the global research consultancy Praxis Labs, and PhD Candidate at the University of Cambridge researching zoonoses in displacement in Jordan and Pakistan, funded by the Gates Cambridge Trust. Twitter: PraxisLabsHK, CambridgeDDU*

### Richard Sullivan

*Professor of Cancer and Global Health at King's College London, and Director of the Institute of Cancer Policy (ICP) and co-Director of the Conflict and Health Research Group.  As well as holding a number of Visiting Chairs, Richard is an NCD advisor to the WHO, civil-military advisor to Save the Children, and a member of the National Cancer Grid of India His research focuses on global cancer policy and planning, and health systems strengthening, particularly conflict ecosystems. He is principle investigator on research programs ranging from automated radiotherapy planning for low resource settings to use of augmented/virtual reality for cancer surgery, through to political economy to build affordable, equitable cancer control plans. Richard has led five Lancet Oncology Commissions and worked on four others. He is currently co-leading Lancet Oncology commissions on the Future of Cancer Research in Europe and Cancer Care in Conflict. In conflict systems, his research teams have major programs in capacity building in conflict medicine across the Middle East and North Africa (r4hc-mena.org), as well as studies of the basic package of health services in Afghanistan, civil-military co-operation in health security, polio eradication and insecurity in Pakistan, and use of intelligence in high security disease outbreaks.  Professor Sullivan qualified in medicine and trained in surgery (urology), gaining his PhD from University College London. He was also*

*clinical director of Cancer Research UK between 1999 and 2008. Following a period at the London School of Economics working on complex healthcare systems he moved to King's College London in 2011.*

### Dr Preeti Patel

*Dr Patel is a Reader in Global Health and Conflict in the Department of War Studies, King's College London. She is also a Co-Principal Investigator for the R4HC-MENA programme and a multi-disciplinary global health specialist working on countries and populations affected by armed conflict, with a focus on non-communicable disease issues, health systems and humanitarian health. At King's she co-directs the CHRG. She convenes modules on complex political emergencies and health in the Department of War Studies, and conflict and health at King's Centre for Global Health. Dr Patel has led several studies on tracking development aid for health in conflict-affected countries, global health governance and health systems in post-conflict areas.*

### Dr Zedoun Alzoubi

*Zedoun is a pacifist activist from Syria. He was the CEO of the Union of Medical Care and Relief Organizations UOSSM until August 2019 throughout the country, when he stepped out and stayed as advisor to the organization. But his responsibilities go further than that: at various levels he is engaged with civil society issues in Syria and beyond, he invests in networking, youth engagement, humanitarian support mechanisms, conflict resolution and mediation. A part of his engagement he took the responsibility to facilitate several initiatives for the Syrian civil society.  He is also engaged with UN Office of Special Envoy through facilitating Women Advisory Board and Civil Society Support Room.*

*Dr. Zedoun Alzoubi holds a PhD Degree in Management received from the Arab Academy for Finance and Banking Sciences, and his focus areas are governance and public policy.*

### Dr Aula Abbara

*Dr Abbara is a consultant in Infectious Diseases/ General Internal Medicine at Imperial College NHS Healthcare Trust, London and an Honorary Clinical Senior Lecturer at Imperial College. She teaches and supervises students on the Global Health BSc course at Imperial College and the TMIH at LSHTM.*

*She has volunteered in different humanitarian and refugee settings including direct clinical work, teaching healthcare workers and building capacity. Since 2012, this has been predominantly with Syrian non-governmental organisations. Between 2016 and 2018, she led a project for SAMS Hellas which provided over 30,000 primary healthcare consultations for refugees in Greece and received a Women in Global Health Award at the World Health Assembly for this. Other humanitarian work includes refugee camps in Lebanon and Syria (pre-conflict), the Rohingya crisis and in Sierra Leone with MDM for the ebola response in 2015 (for which she received an Ebola Medal of Service.)*

*She co-chairs the Syria Public Health Network a group which brings together academics, NGOs, policy makers and international organisations to highlight and influence policies relevant to the public health of Syrians. She chairs Health Professionals for Global Health and has been a collaborator on the Lancet Commission on Syria.*

### Dr Munzer Khalil:

*Munzer al-Khalil is the General Manager at Idlib Health Directorate from 2013 until now.*
*He has worked as an orthopedist and manager of many Hospitals in Idlib province between 2011-2015.*
*Dr. Munzer is a member of the Medical Board of Idlib province in 2012. Also, he was the head of the Medical Office in Idlib province in 2011.*
*In the period from 2006 to 2007, al-Khalil was the head of the administrative body of the faculty of medicine in Aleppo University.*
*He holds a university degree in human medicine from Aleppo university in 2017. And he had a certificate of specialization in orthopedics from the Syrian Board of Medical Specialties in 2017.*
*Dr. Munzer had many diplomas in hospital management and health governance and health system through crisis and recovery and health strategic planing from many universities.*

*He was granted many trophies from the presidency of the Syrian Arab Republic in 2009 about the active participation in the voluntary actions in Syria. and from Aleppo University – Faculty of Medicine in 2007 and from the Political body in Idlib province and others.*

### Dr Ciwan Mustafa:

*Dr Ciwan is a medical doctor who has been working in the health response in north east Syria since the start of the conflict. He contributed to the establishment of several local health coordination bodies in the region. He currently holds the position of the Health Director of northeast Syria under the Self Administration.*

# The Organising Committee

## Abdulkarim Ekzayez (KCL)

*Dr Abdulkarim is a Syrian medical doctor and an epidemiologist. Currently is a research associate and a PhD student at King's College London. He is also involved in several other projects and research with other academic and policy institutes including LSHTM, AUB, Chatham House and others. His research focuses on the public health impacts of conflict, as well as challenges around the protection of healthcare in conflict, both issues he has experienced first-hand in Syria.*

*In 2013, he was training to be a neurosurgeon when his residency was interrupted by the war. He joined Save the Children in North West Syria, where he led the health response until 2017. He is a trustee member of three NGOs, Shafak Syria, Refugee Trauma Initiative and Eye to the Future. Also, he is a volunteer consultant with Idlib Health Directorate.*

*He received his MD from Aleppo University and his MSc from London School of Hygiene and Tropical Medicine. Also, he completed a one-year residential fellowship on leadership in international affairs from The Queen Elizabeth II Academy for Leadership in International Affairs at Chatham House; and another one-year fellowship in international cultural relations from the Institute for International Cultural Relations at The University of Edinburgh.*

## Amina Olabi:

*Amina is a member of the UOSSM UK team, focusing on the research aspects of UOSSM's work. She holds a biomedical degree from the University of Liverpool. She worked on several research projects investigating the outbreak of leishmaniasis in Syria over the past few years, establishing a yearlong collaboration between the Liverpool School of Tropical Medicine, The Syria Relief Network, and the WHO in Gaziantep.*

*Amina spent the summers during her studies on the Turkish/ Syrian borders volunteering at field hospitals. At home in England, she spent years raising awareness for the situation in Syria in the North of England (Manchester and Liverpool) organising numerous events with different NGOs and Human Rights Organisations such as Amnesty international for which she was awarded the "Activist of the Year Award" by the Liverpool University Guild.*

*Amina was involved in an array of initiatives across Europe as the "refugee crisis" took centre stage in 2015. More locally, she also ran health workshops for female refugees at the Merseyside Refugee & Asylum Seekers Pre & Postnatal Support Group as well as being a trustee at different local community charities.*

*She has recently completed her MSc in International Public Health with Humanitarian Assistance from the Liverpool School of Tropical Medicine and undertook a thesis on COVID-19 in Syria as she is passionate about tailoring and adapting public health activities to conflict-stricken settings.*

## Bashar Farahat:

*Bashar is a member of UOSSM International team, working as a UK-based Partnership Officer.*

*He is a medical doctor, graduated from the medical school of Aleppo university in Syria. At the start of the uprising against Al Assad regime, Bashar was training to become a paediatrician. He was twice detained by the regime in 2012 and 2013, accused of participating in demonstrations, writing to support peaceful activities and helping wounded demonstrators in a field hospital.*

*After his release, he escaped to Lebanon. During his sixteen months in Lebanon, Bashar volunteered with a few organisations including MSF and Alphabet. Also he initiated a project of creative writing workshops with refugee children in camps near Beirut, in partnership with a local NGO, Basmeh & Zeitooneh and in support from the British Council. After arriving in the UK in 2015, he worked as a teacher and learning support assistant in a secondary school in London. In 2020, Bashar was registered with the General Medical Council in the UK and joined a medical training program under the National Health Service (NHS).*

## Yazan Douedari

*Yazan is a Syrian dentist and researcher, and a previous humanitarian worker currently living in London, UK. He has worked with several NGOs in Syria, Turkey, and the UK since the start of the 2011 Syrian revolution. Yazan is a co-founder of Syria Research Group "SyRG", a team of primarily Syrian health system researchers based at the London School of Hygiene &amp; Tropical Medicine (LSHTM) and the National University of Singapore Saw Swee Hock School of Public Health (SSHSPH). He has an MSc in Public Health in Developing countries from LSHTM, a diploma of Membership of the Joint Dental Faculties, and is currently working on several Syria-related research projects at LSHTM. His main research focus is on health system governance in Syria.  Additionally, Yazan is currently working as a dentist within the UK health system.*

## Itinerary of the day

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**9**:*15 – 9:30*
*Registration and welcoming*
*Chair: **Bashar Farahat** (Welcoming + House Keeping)*
*Welcoming note: **Dr Maher Aref (UOSSM)***

*9:30-9:45*
*Keynote speaker: **Dr Natasha Howard** (SyRG-LSHTM/NUS)*

*9:45-10:45*
*Plenary session: The impact of COVID-19 on health in Syria*
*• COVID-19 response in northwest Syria: innovation and community engagement in a complex conflict*
**Abdulkarim Ekzayez**

*• Modelling the impact of different interventions on the COVID-19 outbreak in Northwest Syria*
**Manar Marzouk & Dr Naser Almhawish**

*• COVID-19 in Fragile States – Barriers and Facilitators to Health Promotion: A Case Study from North West Syria*
**Amina Olabi & Houssam Alnahhas**

*10:45-11:00*
*Break*

*11:00-12:00*
*Breakout Group1: Health systems adaptation in the Syrian conflict*
*Chair: **Abdulkarim Ekzayez***

*• Health system governance and adaptation under three areas of military control in Syria*
**Yazan Douedari**

• *Structure, Processes and Costs of the novel Diabetes Care Program for Refugees in Lebanon*
**Ibrahim AlMasri**

• *Exploring the role of women's leadership and participation in health systems strengthening in northern Syria*
**Kristen Meagher**

*11:00-12:00*
*Breakout Group 2: NCD Chair:* **Hala Mkhalalati**

• *Breast cancer patients in Syria: Quality of life and prognosis*
**Massa Jabra**

• *The Prevalence of Non-Communicable Diseases Among Syrian Refugees in Syria's Neighbouring Host Countries: A Systematic Review and Meta-analysis*
**Amani Al-Oraibi**

• *Mental Health and Food Security amongst Displaced Syrians*
**Joseph Burke**

*12:00-12:45*
*Lunch break*

*12:45-13:45*
*Breakout Group 3: Reviews and evaluations of clinical interventions Chair:* **Bashar Farahat**
• *A scoping literature review of maternal health in Syria after 2011*
**Sara Basha**

• *Rivaroxaban Compared to Warfarin for Treatment of Cerebral Venous Thrombosis: A Randomized Controlled Trial*
**Ahmad Al-Khawam**

• *Vaccine Coverage and Perceived Barriers to Vaccination among Displaced Syrians in Lebanon*
**Salma Almidani**

*12:45-13:45*
*Breakout Group 4: Health workforce and multidisciplinary research Chair:* **Hala Mkhalalati**

• *Medical research conduct and publication during higher studies in Syria: attitudes, barriers, practices, and possible solutions*
***Ibrahem Hanafi***

• *Knowledge, attitudes, and practices of Syrian doctors towards COVID-19 pandemic Fatima Abbas*
• *Zoonoses and its link to COVID-19 among Syrian refugees and host communities in Jordan*
***Dorien Braam***

*13:45 – 13:55*
*Break*

*13:33-14:10*
*Chair: **Abdulkarim Ekzayez***
*Keynote speaker: **Professor Richard Sullivan** (R4HSSS-KCL)*

*14:10-14:55*
*Plenary session: Research for Health System Strengthening. Chair: **Abdulkarim Ekzayez***
*A panel discussion on the role of health research in strengthening the health systems in Syria.*
• ***Dr Preeti Patel (KCL)***
• ***Dr Zedoun Al Zoubi** (UOSSM)*
• ***Dr Aula Abbara** (SPHN)*
• ***Dr Munzer Khalil** (Idleb Health Directorate)*
• ***Dr Ciwan Mistefa** (The Health Department of the Self Administration in North-East Syria)*

*14:55-15:00*
*Closing remarks*

# Oral Presentations Abstracts

## COVID-19 response in northwest Syria: innovation and community engagement in a complex conflict

**Authors:** Abdulkarim Ekzayez, [1,2] Munzer al-Khalil, [3] Mohammed Jasem,[4] Raed Al Saleh, [5] Zedoun Alzoubi,[3] Kristen Meagher,[1] Preeti Patel.[1]

1 Conflict and Health Research Group and R4HC-MENA, King's College London, UK

2 Syrian Public Health Network, UK

3 Idleb Health Directorate, Syria

4 Early Warning and Response Network (EWARN), the Assistance Coordination Unit, Turkey

5 White Helmets (Syria Civil Defence), Syria

*Abstract*

*Despite lacking capacity and resources, the health system in northwest Syria is using innovative approaches for the containment of COVID-19. Lessons drawn from previous outbreaks in the region, such as the Polio outbreak in 2013 and the annual seasonal influenza, have enabled the Early Warning and Response Network, a surveillance system to develop mechanisms of predicting risk and strengthening surveillance for the new pandemic. Social media tools such as Whatapp are effectively collecting health information and communicating health messaging about COVID-19. Community engagement has also been scaled up, mobilising local resources and encouraging thousands of volunteers to join the "Volunteers against Corona" campaign. Bottom up local governance technical entities, such as Idleb Health Directorate and the White Helmets, have played key leadership role in the response. These efforts need to be scaled up prevent the transmission of Covid 19 in a region chronically affected by a complex armed conflict.*

*KEY MESSAGES*

- *Despite lacking capacity and resources, the health system in northwest Syria is using innovative approaches for the containment of COVID 19. These efforts need to be supported to scale up the capacity of the health system shall the virus spread in this region.*
- *Learning from previous outbreaks, such as Polio 2013 and seasonal influenza, was an important factor in predicting risk and strengthening surveillance.*
- *Social media tools such as WhatsApp, and newly developed websites are being used effectively to collect health information and communicating health messaging.*
- *The focus on community engagement have mobilised local resources and encouraged thousands of volunteers to join the "volunteers against corona" campaign.*
- *Bottom up local governance technical entities, such as Idleb Health Directorate and the White Helmets, played key leadership role in the response.*
- *The current health system indicators in northwest Syria are alarming with only about 1.4 medical doctor per 10,000 people, about 0.625 hospital beds per 1000 people, less than 5.7 Intensive Care Unit (ICU) beds per 100,000 people, and only 47 functioning adults-ventilators for the whole region.*
- *Protection of health workers should be a core principle in designing the COVID response in northwest Syria. Any loss for any medical human resources is irreversible.*
- *The required resources include: Personal Protective Equipment (PPE), funding for new health infrastructure, Oxygen supplies, ventilators, running cost for the health facilities.*
- *WHO should mobilise more resources to scale up the capacity of the health system in northwest Syria.*

# Modelling the impact of different interventions on the COVID-19 outbreak in Northwest Syria: Predictions from the CoMo modelling team

*Manar Marzouk MSc, Omar Alrashid Alhiraki MD, Wael Obaid, Hani Altaleb, Naser Almhawish MD, Hazem Rihawi MD MPH, Aula Abbara, MD, Mahmoud Hariri MD . In collaboration with the CoMo Consortium*

**Background:** *Nine years into Syria's protracted conflict, the conflict has decimated the health system, water and sanitation infrastructure and weakened public health mechanisms which are key to the containment of communicable diseases. North West Syria, an area which contains 4.17 million people of whom 2.6 million are internally displaced, has been particularly affected. The first case of COVID-19 in the NWS was confirmed on 9th July 2020. In this report, we have simulated the impact of different non-pharmaceutical interventions (NPIs) on COVID-19 related deaths, cases, and hospital occupancy.*

**Methods:** *In this model, we used an age-structured compartmental SEIR (susceptible-exposed-infectious-removed) model developed by the University of Oxford. We have simulated four scenarios for COVID-19 NPIs, with different coverage rates and durations (8 to 28 weeks). The model assumptions and parameters were customized to the NWS context by a group of Syrian experts and policy makers in NWS.*

**Results:** *The CoMo model predicts that the current scenario without additional mitigation measures would result in an infection of 59.3% of the NWS population, and 2,057 COVID-19 attributable deaths by the end of 2020. Implementing combination of NPIs for a period of 8 weeks is not predicted to have a notable impact on the epi-curve nor on COVID-19 deaths, while increasing the coverage and the duration of a combination of NPIs is predicted to result in a significant decrease in COVID-19 attributable deaths and hospital occupancy. Although school closure is predicted to have a significant impact on reducing deaths, the potential negative unintended consequences on child protection and developmental needs to be carefully balanced.*

**Conclusions:**

*Increasing the coverage of COVID-19 mitigation measures is crucial to decreasing the burden on hospital capacity in NWS. This model is a tool which has been developed under a set of assumptions however, it supports policymakers in decision making and implementing appropriate NPIs for this population.*

# COVID-19 in Fragile States – Barriers and Facilitators to Health Promotion: A Case Study from North West Syria

Amina Olabi & Houssam Alnahhas

## Abstract

*COVID-19 is a highly infectious disease spreading from country to country, health systems globally have been pushed to near-breakdown. In Syria, a conflict affected state, the health system is even more susceptible to collapse when faced with the pandemic. Opposition-held areas (NWS), rely heavily on local organisations to respond to the health needs of the population, as they are starved of governmental and international support. Displacement, lack of sanitation and poverty cripple NWS. With the lack of therapeutics, vaccines and rapid tests, the focus is shifted on preventing a large outbreak in NWS. Prevention campaigns are being carried out in the area, however, it was highlighted by local organisations that an assessment is needed to better understand the factors that may help or hinder people from following the guidelines and recommendations, shedding light on the realities communities are faced with. Such findings can inform more relevant policies and practice and improve interventions planned by collaborating NGOs, in turn informing future actions on other conflict settings as well. In a collaborative effort between researchers at LSTM, John Hopkins, Idleb Health Directorate, and UOSSM, this study aims to investigate such factors through the use of in-depth interviews as well as document review of relevant policies, based on the Health Belief Model. Interviews were conducted by UOSSM staff, and managed, analysed and processed by the main researcher at LSTM.*

*Facilitators to health promotion included the comprehensive knowledge communities had on symptoms, causes and prevention measures of COVID-19. Whilst high perceived susceptibility was recorded, the focus remained on specific groups e.g. the elderly being susceptible. Perceived severity was clear across all participants. However, worryingly participants reported that when comparing the pandemic to conflict-

*induced suffering, the pandemic did not seem severe. Benefits of engagement reported were centred around wanting to protect others and especially one's family and children.*

*Barriers to engagement included overcrowded living conditions, poverty, lack of access to healthcare and necessary prevention items e.g. masks, stigma and cultural barriers, and lack of resources and trust in the health system. Perceived self-efficacy was overall high; participants referenced their role as crucial to effective prevention of an outbreak. Cues to action included NGOs' activities and the media. However, the document review highlighted gaps in coverage of cues dissemination.*

*Overall, the prevention response in NWS was found to have been effective in engaging communities and promoting social responsibility and participation. However, significant, context-specific barriers were found which could threaten the uptake as the response gets dismissed as inappropriate by individuals. This highlights the importance for context-specific research into the detailed realities on the ground, and the crucial importance of providing communities with practical solutions alongside health promotion messages. Without which, local actors' credibility and trust-relationship with beneficiaries is at stake*

# Health system governance and adaptation under three areas of military control in Syria

Yazan Douedari, Mervat Alhaffar, Mohamed Twaish, Samer Jabbour, Aula Abbara, Natasha Howard

## Abstract

*Introduction: Despite nine years of conflict, published research on health system adaptation and governance in Syria - which could strengthen 'post-conflict' reconstruction efforts - is almost non-existent. Our study explored frontline health-worker and service-user perceptions on existing health system governance efforts in all provinces of Syria, to identify lessons, successful approaches, and potential governance strengthening interventions.*

*Methods: A qualitative design drew from semi-structured key informant interviews with purposely sampled public healthcare providers, private providers, and service-users in all of the three areas of military control (i.e. opposition, Syrian-Democratic-Forces, regime). We oversampled women due to their absence in previous research. We conducted 52 interviews in Arabic averaging 60 minutes each, using internet call applications. Data were transcribed and analysed thematically in Arabic, using deductive and inductive coding. The London School of Hygiene & Tropical Medicine provided ethics approval.*

*Results: Participants included hospital managers, doctors, nurses, pharmacists, dentists, and service-users approximately 60% women. Perceptions on health system governance elements varied slightly between providers and service-users and different areas of control. Transparency seemed challenging for all, with social media's role crucial to accountability and transparency. Ethics and service-user participation in decision-making appeared best in opposition-controlled areas. Rule-of-law seemed most unclear and challenging in non-regime-controlled areas. Private services usage increased during insecurity, as people chose nearby private facilities over distant public ones. However, private-sector governance appeared limited. Equity was interpreted differently by providers and service-users, with several service-users reporting discrimination. Most service-users were unaware of strategic plans. Accountability mechanisms existed, though service-users preferred direct informal complaints. Health information was collected, but rarely analysed. Reduced effectiveness and profit were blamed on conflict.*

*Conclusion:*
*Health system governance support in one or more area of military control could start by strengthening accountability and participation, preferably led by local health authorities as these remain the most legitimate governance actors in all areas. Support efforts should start now, to nurture burgeoning governance initiatives that could mature post-conflict.*

## Structure, Processes and Costs of the novel Diabetes Care Program for Refugees in Lebanon

Ibrahim AlMasri, MD; Kerry McBrien, MD MPH; David Campbell, MD PhD; Aula Abbara, MBBS; Gabriel E. Fabreau, MD MPH

## Abstract

**Background:** The UNHCR estimates that 14.6% of Syrian refugees in Lebanon have chronic diseases such as diabetes, but lack access to appropriate treatment. In response, a novel refugee-led Diabetes Care Program (DCP) was created. We characterized its structure processes and costs.

**Methods:** We conducted a case study of the DCP. We analyzed program documents including proposals, care protocols, monthly reports, training material, and financial audits according to the WHO's Six Building Blocks of Health Systems framework. Program costs were analyzed in US dollars (USD) and divided into direct patient care, staff salaries, and administrative costs respectively.

**Results:** Between September 2016 and March 2019 the DCP served 4,033 refugees with diabetes. The DCP collaborated with the International Diabetes Foundation (IDF), the Syrian American Medical Society, and Multi-Aid Programs to provide free medical consultations, investigations, and medications. It adapted IDF guidelines to train 10 Syrian refugee health workers (1 manager, 4 internists, 4 nurses, and 1 administrative assistant) and integrated them within seven existing clinics throughout Lebanon. DCP used paper medical charts and a basic electronic information system to organize clinical care. Over 2.5 years the total program costs were $550,000 USD (26% medication, 25% investigations, 40% salaries, 5% logistics, and 4% initial cost); Thus, the average cost per patient per year was $208 USD. All program resources were integrated with or sourced from the existing local healthcare system.

**Conclusion:** DCP partnered with international donors, leveraged existing local healthcare infrastructure, and displaced Syrian refugee providers to care for diabetic refugees at relatively low total costs. This may represent an effective NCD care model in conflict settings.

# Exploring the role of women's leadership and participation in health systems strengthening in northern Syria

Kristen Meagher

## Abstract

*The existing literature on health systems strengthening in conflict-affected humanitarian settings has mostly overlooked the role of women and, more widely, gender. Women are increasingly at the forefront of improving health for conflict-affected populations and have made important contributions to strengthening health systems in such settings. While a number of studies focusing on health systems research have been conducted in Syria, the literature does not incorporate gender analysis, and specifically the role of women in health systems, as both leaders, participants and beneficiaries.*

*There is substantive evidence that the lack of women in leadership has detrimental impacts across sectors, including global health, and also long term peace and state-building[1, 2]. Gender inequality in leadership inhibits productivity and performance within health systems and has individual and national health and socioeconomic impacts[3]. Furthermore, gender inequality and inequity undermines the ability of health systems to effectively improve health outcomes for women and girls[4]. Within health systems research, gender analysis seeks to understand how gender power relations create inequities in access to resources, the distribution of labour and roles, social norms and values, and decision-making[4]. Research has not, however, provided policy makers with clear guidance on how the functioning of health systems is impacted by gender inequalities and how strengthening health systems can improve gender equity[5]. Therefore, an examination of gender as an important locus of inequity in health systems is imperative[6].*

*This presentation will discuss how women contribute to, lead and participate in health systems strengthening in northern Syria, and explore how gender norms and socially constructed power relations influence this. Given the current global environment, it will also bring into discussion the role of gender inclusive leadership during the COVID-19 pandemic to support vulnerable populations in Syria.*

# Breast cancer patients in Syria: Quality of life and prognosis

Authors:

Sara Husein1*, Ibrahem Hanafi2*, Maram Balouli3, Zein Baradi4, Massa Jabra1, Yusra Alsheikhah5, Dana Abo Samra6

1 Faculty of Medicine, Damascus University, Damascus, Syria

2 Division of Neurology, Department of Internal Medicine, Faculty of Medicine, Damascus University, Damascus, Syria

3 Department of Gynecology, Faculty of Medicine, Damascus University, Damascus, Syria

4 Eye surgical Hospital, Damascus, Syria

5 Division of Endocrinology, Department of Internal Medicine, Faculty of Medicine, Damascus University, Damascus, Syria

6 Department of Oncology, Faculty of Medicine, Damascus University, Damascus, Syria

* These authors contributed equally to the work

*Introduction:*

*Despite of the late diagnosis and its prognostic value on long-term survival in breast cancer, studies revealed that the quality of life (QoL) of patients has a positive correlation with survival duration, especially in advanced stage and metastatic patients. According to a systematic review in 2016, thirteen QoL studies were conducted in the Arab world, however none of them recruited Syrian breast cancer patients.*

*Methods:*

*We conducted a cross-sectional and a retrospective study in Al Beiruni Hospital at Damascus University in 2019, and we collected the data through personal interviews using the QoL assessment of cancer patients receiving chemotherapy developed in English in Japan. Disease prognosis was assessed retrospectively from the patients records six months after the diagnosis.*

*Results:*

*We recruited 532 patients diagnosed between 2005 and 2019, and the internal reliability of our translated version of the QoL questionnaire was very high (Cronbach's alpha of 0.861). Not surprisingly, the percentage of patients who presented with an advanced stage during the worst war years 2011-2017 (61%) were significantly higher than patients who presented before or after this period (52%, P<.05), and this was also significantly associated with higher BMI, living in rural areas, having a job, consanguinity and self-reported delay in presentation. This advanced presentation resulted in significantly worse prognosis after six months. The QoL of our participants was comparable to other studies who used the same questionnaire, and it was higher for our participants when they had better financial status, higher educational levels, lower stage at presentation. Finally, patients diagnosed between 2011 and 2017 had significantly lower QoL, which was significantly associated with a worse prognosis.*

*Conclusion:*

*Educational and financial strengths allowed breast cancer patients in Syria to have a better QoL, although they did not prevent having an advanced presentation or a worse prognosis.*

# The Prevalence of Non-Communicable Diseases Among Syrian Refugees in Syria's Neighbouring Host Countries: A Systematic Review and Meta-analysis

**Authors:** Amani Al-Oraibi, Laura Nellums and Kaushik Chattopadhyay

*Affiliations: Division of Epidemiology & Public Health, University of Nottingham, Nottingham City Hospital, Hucknall Road, Nottingham NG51PB, UK.*

## *Abstract*

**Background**: *Alarming rates of non-communicable diseases (NCDs) have been observed in low- and middle-income countries where most refugees reside. There is concern Syrian refugees are increasing the NCD burden on neighbouring host countries. However, this has not been comprehensively examined. This systematic review and meta-analysis aimed to synthesise evidence on the prevalence of NCDs among Syrian refugees residing in neighbouring host countries.*

**Methods**: *The review was carried out in line with PRISMA guidelines and registered in PROSPERO (CRD420201970430). MEDLINE, CINAHL, EMBASE and PubMed were searched from 1 January 2011 to 25 June 2020. Peer-reviewed studies reporting primary prevalence data on NCDs in adult Syrian refugees living in Turkey, Lebanon or Jordan were included. Methodological quality was assessed using the Joanna Briggs Institute Critical Appraisal Checklist for Studies Reporting Prevalence Data. Meta-analysis was carried out to estimate the pooled prevalence of the five most common NCDs in community and primary care settings.*

**Results**: *Sixteen studies were included, representing 236,432 Syrian refugees. The most prevalent NCD in community settings was hypertension (22%, 95% CI: 14–31), followed by type II diabetes mellitus (8%, 95% CI: 5–12). The prevalence of hypertension (35%, 95% CI: 33–36) and type II diabetes mellitus (48%, 95% CI: 24–72) was much higher in primary care settings. There were no clear differences across the neighbouring host countries.*

**Conclusion**: *The findings demonstrate a high prevalence NCDs among Syrian refugees. The prioritisation of preventative and management interventions for NCDs and future research involving Syrian refugees and host communities are needed to enhance NCD care and tackle these diseases.*

# Mental Health and Food Security amongst Displaced Syrians

Authors:
• Dr. Clara CALIA – Clinical Psychologist, School of Health in Social Science, University of Edinburgh
• Prof. Lisa BODEN- Chair of Population Medicine and Veterinary Public Health Policy/ Global Academy of Agriculture and Food Security, University of Edinburgh
• Dr. Shaher ABDULLATEEF, Cara Syria
• Joy ABI HABIB – Mental Health Specialist, Lebanon
• Maria AZAR – Clinical Psychologist, Lebanon 3
• Prof. Liz GRANT - Professor of Global Health and Development/ Director Global
Health Academy, Usher Institute, University of Edinburgh
• Dr Suk-Jun KIM – School of Language, Literature, Music and Visual Culture, University of Aberdeen
• Mackenzie KLEMA - Researcher, Global Academy of Agriculture and Food Security, University of Edinburgh
• Dr. Stella MAZERI - Epidemiologist, The Roslin Institute, University of Edinburgh
• Kate ROBERTSON – Cara Syria
• Dr Ann-Christin ZUNTZ - Anthropologist of Development, University of Edinburgh
• Joseph BURKE
– Researcher, School of Health in Social Science, University of Edinburgh

*There is an established bidirectional relationship between food security and mental health amongst conflict-affected populations (IASC, 2007). The COVID-19 outbreak exacerbates this dynamic with increased stress and undermined access to nutritious foods compromising immune systems exposed to a highly infectious disease (Pérez-Escamilla, Cunningham & Hall-Moran, 2020). There is a dearth of data on the relationship between mental health and food security in Syria and its neighbours during COVID-19. From the Field is a multidisciplinary, global research collaboration seeking to address these gaps, exploring the impact of the virus on the lives and livelihoods of Syrians living in Lebanon, Iraqi Kurdistan, Jordan, Syria and Turkey using bespoke remote ethnographic approaches. Syrian responders to the crisis, the University of Edinburgh and Cara co-created and deployed 100 questionnaire surveys, comprising in part the Short Warwick-Edinburgh Mental Well-Being Scale (Clarke, et al., 2011) and the Food Security Coping Strategies Index (Maxwell, Watkins, Wheeler & Collins, 2003), through local researchers/practitioners using accessible technologies. The mean mental wellbeing score of the sample was 24.58 (SD= 4.25; Min= 14.08, Max= 35) with women's wellbeing (n=25, M=22.83, SD=3.36) lower than men's (n=75, M=25.17, SD=4.37); t(98)=2.44, p=.016. Notably, greater food insecurity was correlated with lower wellbeing (rs(100)= - .255, p=.01), as were lower meal frequency (t(96)= -2.52, p= .013) and reduced food intake (t(98) 3.32, p= .001). Qualitative data further illuminated the interconnections between food security and psychosocial wellbeing, expanding on the context within which Syrians are experiencing COVID-19 through various aspects of their daily lives.*

*In exploring the relationship between food security and mental health amongst Syrians, this study enhances epidemiological understanding and supports calls for mainstreaming mental health in humanitarian interventions (Horn, Waade & Kalisky, 2016). Further attention to these connections is necessary if global health objectives are to be met during this COVID- 19 'syndemic' (Horton, 2020).*

# A scoping literature review of maternal health in Syria after 2011

Sara Basha[1], Mohammed Akhter[2], Alex Socarras[2], Ahmad Albaik[2], Imad Hussein[2], Fadi Hakim[2], Ahmad Tarakji[2], Mufaddal Hamadeh[2], Aula Abbara[2]

1. University of Aberdeen, Scotland
2. Syrian American Medical Society (US/ Turkey Offices)

*Abstract:*

*Introduction: Pre-conflict, improvements had been made to maternal health in Syria however conflict is known to negatively affect maternal health indicators. The aim of this scoping literature review is to determine the quantity and quality of academic and grey literature published about maternal health with a view to informing future research.*

*Methods: A scoping review of the literature was performed to assess maternal health in Syria during the years of conflict since 2011. 3 academic and 2 grey literature databases were searched as well as sites of several relevant organisations e.g UNFPA, World Bank, humanitarian organisations. Relevant articles were screened using pre-established inclusion and exclusion criteria.*

*Results: Of 2824, 2607 were excluded after title and abstract screening. After full text screening, 21 articles remained including 13 peer reviewed articles. Main areas of focus were cesarean section (CS) rates, perinatal care and maternal mortality. 12 studies reported CS rates; these varied from 16 to 64%: Northern Syria (19-45%,) Damascus including rural (16-54%) with rates of 64% and 59% in Lattakia and Tartous respectively. 6 studies reported on the availability of antenatal care (ANC) which suggest that coverage fell after the onset of conflict. A study in Damascus noted that 33% attended less than 4 ANC visits and one in*

*Atmeh reported that 39% received no ANC visits. MMR estimates from different sources varied but were reported to be 68 per 100,000 in 2015.*

***Conclusion:*** *The quality of published literature was poor with varied representation across the country and some generalisations of data from international organisations e.g. UNFPA, World Bank which may not be representative of all regions. CS rates varied greatly across regions with most studies reporting rates higher than the WHO recommended of 10-15%. Further research which explores the state of maternal health in Syria during the conflict is required.*

# Rivaroxaban Compared to Warfarin for Treatment of Cerebral Venous Thrombosis: A Randomized Controlled Trial

Authors:
Ahmad Al-Khawam1, Ibrahem Hanafi1, Ali Ibrahim2, Juman Isstaif1, Sami Alhoulaiby3, Lina Okar1
1 Division of Neurology, Department of Internal Medicine, Faculty of Medicine, Damascus University, Damascus, Syria
2 Division of Neurology, Department of Internal Medicine, Damascus Hospital, Damascus, Syria
3 Division of General Surgery, Department of Surgery, Damascus University, Damascus, Syria
Correspondence: Ibrahem Hanafi, 00491781417588, Ibrahem.W.Hanafi@Gmail.com

*Introduction:*
*Cerebral venous thrombosis (CVT) is an uncommon venous type of stroke that tends to affect younger patients and has a better prognosis compared to arterial strokes. Anti-coagulation is the standard of treatment, initially with low-molecular-weight heparin (LMWH) followed by oral anticoagulants most commonly warfarin (W) for several months. Rivaroxaban (R) is a direct oral anticoagulant prescribed as a fixed-dose once daily with no need for laboratory monitoring. We aim to compare warfarin to rivaroxaban for CVT patients in term of clinical outcomes and complications.*

*Methods:*
*We conducted a randomized open-labeled clinical trial on CVT patients from three tertiary public hospitals in Damascus between 2017 and 2019. Risk factors, predisposing conditions, and full clinical and imaging profiles were assessed. The monthly follow-up period lasted for six months and included assessing sinus venous thrombosis severity scale (SVTSS), Barthel index for disability, and evaluation of intracranial pressure (ICP), in addition to complications screening.*

*Results:*
*The recruited sample consisted of 71 patients; 37 of them received R, while 34 received W. The duration of heparin bridging treatment was significantly longer in the W group. Neither of the two drugs was significantly inferior to the other in terms of clinical improvement, retained functionality, reduction of ICP, or overall recovery. Around 90% of the two groups reached full recovery before the end of the follow-up period. Two cases in the W group had major extracranial bleeding compared to none in the R group. Dose titration was required in nearly 17% of the follow-ups in the W group.*

*Conclusion:*
*Rivaroxaban and warfarin are comparable in terms of efficacy in treatment of CVT. However, warfarin administration carries more difficulties regarding longer LMWH bridging period, and necessity for laboratory monitoring and dose titration. It also tends to have higher bleeding risk.*

# Vaccine Coverage and Perceived Barriers to Vaccination among Displaced Syrians in Lebanon

Salma Almidani

## Abstract

**Background:** *With the large influx of displaced Syrians into Lebanon since 2011, the burden on primary health care centers has significantly increased. Most of this displaced population is made up of children (53.3%) which emphasizes the importance of vaccination coverage and access since it has been proven as the most cost-effective way to prevent the outbreak of vaccine preventable infectious diseases. The risk of infectious disease outbreaks is high in Lebanon where it has already seen measles outbreaks (provide the year) that prompted the response of vaccination campaigns. In our study we assessed vaccine coverage and perceived barriers to vaccinations among displaced Syrian children aged 1-59 months in several regions in Lebanon.*

**Methods:** *A survey was administered in 22 primary healthcare centers run by International Medical Corps (IMC) across 5 regions (Beirut/Mount Lebanon, Tripoli, Akkar, South, and Beqaa). The survey was adapted from the Lebanese Ministry of Public Health, the Lebanon country office of the WHO and the United Nations Children's Fund (UNICEF) combined with the SAGE Working Group on Vaccine Hesitancy surveys.*

**Results:** *Among surveyed children aged 1–59 months, 74.1% had complete vaccinations including those that had been drop-outs and recovered, while 25.9% were dropouts or had delayed vaccines. Vaccination completion was higher among children with mothers who had a university level education, had knowledge of the vaccine schedule, and trusted the quality of the vaccines. The most commonly reported barrier was 'child was sick' followed by not trusting the quality of the vaccine.*

**Conclusions:** *From the results, we need to address reported barriers particularly lack of trust in vaccine quality. An increased commitment is needed to ensure compliance of the national vaccine schedule and retention of vaccination cards. Additionally, efforts to increase awareness include more outreach and assessment of the specific needs in each region.*

# Medical research conduct and publication during higher studies in Syria: attitudes, barriers, practices, and possible solutions

Authors:
Ibrahem Hanafi1, Luma Haj Kassem2, Mouaz Hanafi3, Sulafa Ahmad4, Ola Abbas5

1 Division of Neurology, Department of Internal Medicine, Faculty of Medicine, Damascus University, Damascus, Syria
2 Department of Otolaryngology, Faculty of Medicine, University of Aleppo, Syria
3 Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Damascus University, Damascus, Syria
4 Department of Dermatology, Faculty of Medicine, Tishreen University, Latakia, Syria
5 Faculty of Pharmacy, Damascus University, Damascus, Syria

## Abstract

*Background:*

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# Knowledge, attitudes, and practices of Syrian doctors towards COVID-19 pandemic: A crosssectional study

Fatima Abbas

## Abstract

**Background:** *On March 11, 2020, the coronavirus disease has been declared as a pandemic. Fully aware and well-trained healthcare workers are a unique resource to keep health systems active and tackle the pandemic.*

**Aims:** *We investigated the knowledge, attitudes, and preparedness towards COVID-19 among Syrian doctors during the rise period of the COVID-19 outbreak.*

**Methods:** *A cross-sectional online survey-based study conducted between 22 March and 7 April 2020. The Institutional Review Board at Damascus University approved this research. Consent was included at the beginning of the Form. The survey was anonymous.*

**Results:** *We included 806 participants, average age of 30.5 years, 59.7% males. Most gather their information from academic articles. General disease information like the incubation period, common symptoms... etc. were correctly answered from most participants. The participants showed some uncertainty about COVID-19 knowledge questions. Although they had good practice information regarding handling suspected patients. Most had high expectations of working with COVID-19 patients at the time of this survey. The participants showed a positive attitude and fulfillment of commandment towards the community. Most see the pandemic as a serious problem, but they show a positive attitude about overcoming this pandemic.*

*Conclusion:*

*The COVID-19 pandemic is spreading rapidly worldwide. Strict infection control and prevention measures are of utmost importance, especially in the Syrian situation in which the ongoing crisis had significantly affected the healthcare system. Continuous education training for healthcare providers with simple guides for handling suspected patients will ensure community safety and help contain the current health crisis*

# Zoonoses and its link to COVID-19 among Syrian refugees and host communities in Jordan

Dorien Braam

## BACKGROUND
*Covid-19 has reiterated the risk of cross-boundary zoonoses - diseases transmittable between animals and humans - to global health. Poverty and low socio-economic status are main determinants of people's vulnerability to disease, with those affected by conflict and displacement at an even higher risk. Complex emergencies affect health services and staff, as well as disease pathogen, vector and host environments. Zoonotic disease dynamics are insufficiently understood and animals remain an afterthought in many humanitarian responses, even though zoonotic disease outbreaks of Leishmaniasis, Tuberculosis and rabies increased within Syria and neighboring countries due to the collapse of healthcare services and subsequent displacement. This study aims to determine how displacement affects the vulnerability of refugees and host communities to zoonotic disease transmission, to support policy development and humanitarian responses.*

## METHODS
*Using a case study methodology, expert interviews were conducted in Amman, Irbid and Mafraq in with policy makers and responders in public health, livestock and migration management. Household interviews were conducted with Syrian refugees and Jordan livestock owners in Mafraq Governorate. Data was analyzed using a conceptual framework based on the ecosocial theory.*

## RESULTS
*The availability of services including healthcare, water and sanitation, shelter and food affects refugees' general health status and interspecies, intrahuman and interhuman barriers to disease. In particular in settings where refugees are not allowed to formally own livestock due to their status as temporary residents, their access to veterinary services is limited, increasing endemic zoonotic disease risk to public health.*

## DISCUSSION
*Zoonoses in displacement need to be addressed using a transdisciplinary, multilevel approach, focusing not only on disease but also underlying political, social and economic risk factors. Due to the protracted nature of displacement of Syrian refugees in Jordan, comprehensive legal and regulatory frameworks would improve public health, including refugees into health, veterinary and social welfare schemes.*