



**CONCEPT PAPER FOR ESTABLISHING  
THE JORDAN REGIONAL INSTITUTE OF  
EXCELLENCE FOR INFECTIOUS  
DISEASES AND ANTIMICROBIAL  
RESISTANCE**

**“Transforming global livelihoods through  
building human and animal health capacity”**

**Jordan University of Science and Technology Irbid,  
Jordan**

**In collaboration with**

**Colleges, Institutes, and Pillars of Excellence, Purdue  
University, West Lafayette Indiana, USA**

## **Concept summary**

We propose the establishment of a multidisciplinary, infectious diseases and antimicrobial resistance institute, based on the Jordan University of Science and Technology campus, to strengthen human and animal health capacities throughout the Middle East. While integrating existing health experts and laboratories, the **Jordan Regional Institute of Excellence for Infectious Diseases and Antimicrobial Resistance** will revolutionize efforts to mitigate national, regional, and global threats of infectious diseases, provide rapid and effective regional responses, and bolster health capacities. For the first time, this framework will combine critical national and regional multidisciplinary expertise to facilitate research and training in infectious and zoonotic diseases, disease diagnosis, vaccine development, and rapid epidemiologic surveillance and response to emerging diseases and antibiotic resistance. The institute will lead regional efforts to support the Global Health Security Agenda (GHSA) and be uniquely positioned to participate in GHSA Action Packages while responding to disease threats and promoting unity and peace in the region.

### **Rationale:**

Jordan is committed to the Global Health Security Agenda (GHSA) as a member of the 50-nation partnership that includes countries bordering Jordan and the USA. (<https://www.ghsagenda.org>). The global threats of infectious disease along with destabilization of populations in the Middle East and their exodus to neighboring countries, including Jordan, heighten the risk of transfer of infectious diseases. In addition, conflict in the region has severely damaged human and animal health capacities. Coordinated regional efforts and collaboration with universities in GHSA partner countries are needed, yet an effective framework does not exist.

The **Jordan Regional Institute of Excellence for Infectious Diseases and Human and Animal Health Capacity**, in collaboration with Purdue University's colleges and pillars of excellence, will be a multidisciplinary and multinational facility for research and disease surveillance, tracking, and early warning of infectious, zoonotic, and emerging diseases. This institute will also promote the judicious use of antimicrobials, develop vaccines, and coordinate immunization efforts. The institute will provide a unique opportunity for scientists from different disciplines, countries and continents to come together to address urgent issues related to disease-causing agents, disease surveillance, antimicrobial drug resistance, vaccine development, and training of future scientists.

The institute will maximize the use existing faculty expertise and equipment in areas of bacteriology, parasitology, virology, biological sciences, epidemiology, infectious diseases, statistics, immunology, medicinal chemistry, pharmaceutical sciences, public health, computer engineering and data visualization (for global and regional tracking of emerging diseases such as Avian influenza, Zika and SARS). The Institute would develop research agenda, coordinate input from diverse disciplines, and develop MS/Ph.D. postgraduate training programs, as well as training programs for certificates and diplomas. In doing that, the institute would contribute to strengthening capacity of countries in the Middle East to effectively respond to infectious diseases threats and contribute to the accelerated development of GHSA efforts to promote global health security.

## **Background**

While control of known infectious diseases is a daily burden on animal and human health systems and providers, unknown or undiagnosed emerging infectious diseases often overwhelm existing health care capacities. Since transboundary infectious diseases do not recognize borders, collaborative global efforts are required to fight against their spread. Jordan remains a resourceful and stable anchor in the Middle East while surrounded by areas of conflict and critically-damaged health infrastructures. The Jordan University of Science and Technology (JUST) is the premier provider of applied life sciences and technology within the Middle East, hosting world-class researchers and educators. Over one-fourth of JUST undergraduate and graduate students are international students, many of which will eventually serve throughout the Middle East. The Jordan University of Science and Technology bolsters human and animal health capacity throughout this critical region through scientific research and development that leads to prioritization of public health efforts and provides experiential training opportunities in infectious and zoonotic diseases, food safety and security, emerging disease surveillance, and health technology. As a synergistic partner, Purdue University has a long history of international collaboration and high research input in life sciences including infectious diseases, pharmaceutical sciences, biological sciences, and in computer sciences and engineering. Through collaboration, JUST and Purdue, as well as other partners in the region, have boundless potential to build human and animal health capacity throughout the Middle East, helping to stabilize the region, and accelerate progress to protect global public health.

## **Mission**

1. Promote global health security efforts and accelerate progress in combating threats from infectious diseases to the region and the world.
2. Build sustainable human and animal health capacity in the Middle East while bolstering Jordan University of Science and Technology strategic plans and collaborating with Purdue University.
3. Provide synergistic development and empowerment of human and veterinary health professionals that foster multidisciplinary efforts to enhance public health, animal health, and community livelihoods throughout the Middle East.
4. Transform lives by empowering application of human and animal health information and improving community livelihoods by addressing zoonoses, transboundary animal diseases, international trade, environmental impacts, livestock and poultry product-related food safety and security, animal disease surveillance systems, health capacities within areas of conflict and crisis preparedness.
5. Lead multidisciplinary teams and cooperate with national and regional offices of Food and Agriculture Organization (FAO), World Organization for Animal Health (OIE), World Health Organization (WHO), and Centers for Disease Control (CDC) to enhance global networking in order to address threats of infectious disease, control transboundary diseases, improve health, and meet global challenges of emerging infectious and zoonotic diseases.
6. Conduct research on infectious and zoonotic disease surveillance, tracking, and development of control and prevention strategies and provide evidence-based scientific findings to inform policy regarding infectious, zoonotic, emerging diseases, and antimicrobial drug resistance.
7. Develop state-of-the-art intervention methods to control diseases and develop vaccines that are safe, feasible, confer long-lived immunity, and resist high and low temperatures.

8. Develop strategies and programs to increase the public awareness of infectious and zoonotic diseases, antimicrobial resistance, food safety, and the importance of protection, intervention and control.
9. Develop graduate (MS/PhD) and technical training (certificates/diplomas) programs for empowering a future regional cadre of scientists, epidemiologists, public health and food safety specialists, disease diagnosticians, and healthcare providers.
10. Increase regional collaboration with Purdue University in research, grant proposal writing, and dissemination of results through publication and other outreach activities.

### **Major Areas of Emphasis**

- Infectious and zoonotic diseases
- Epidemiologic disease surveillance, online disease tracking, and reporting
- Antimicrobial resistance and judicious use of antimicrobials in humans and animals
- Vaccine production and immunization, prevention, intervention, and disease control
- Graduate and technical training
- Engagement, outreach, and informing public policy

### **Future Impact and Planned Foci:**

- Participate in the GHSA Action Plans (Antimicrobial Resistance, Zoonotic Disease, Biosafety and Biosecurity, Immunization, and Reporting).
- Build, in collaboration with Purdue, regional health-related crisis response capacities by bolstering surveillance and control of transboundary, zoonotic, and emerging diseases.
- Build research capacities on antimicrobial resistance and vaccine production.
- Improve community livelihoods through sustainable public health and animal health programs, targeting devastating diseases.
- Employ One Health and participatory epidemiology techniques to enhance international disease databases to develop strategic plans to manage crises of biological threat.
- Improve regional and national economies by opening international trade opportunities for animal products and enhancing animal marketing.
- Develop joint degree programs in public health and One Health and increase the number of graduate students trained in areas including infectious diseases, epidemiology, therapeutics and intervention, molecular microbiology and drug resistance.
- Increase the dissemination of research findings by publications and international meetings.
- Increase capacity for Purdue's research and training in foreign animal diseases, disease tracking, and drug resistance.
- Improve livestock/poultry systems while addressing environmental impacts, limited resources, and antimicrobial resistance.
- Improve safety of livestock and poultry products.
- Enhance farmer/herder knowledge of transboundary diseases and establish herderdriven surveillance and reporting systems.
- Establish multidisciplinary agriculture extension initiatives to improve collaboration among agricultural industries, small stakeholders, and governmental ministries in Jordan and the region.

## **Risk and Potential Barriers**

- Program implementation in areas surrounding Jordan remain dynamic and highly dependent upon security, understanding, and cooperation.

## **Collaboration Expectations**

- JUST will use its geographic location, local disease expertise, cultural knowledge, and regional relationships to empower Purdue University's global human and animal health strategies.
- Purdue University will share scientific and technological expertise to improve regional human and animal health capacities in the Middle East.
- Regional universities and Purdue share experiences, and benefit from opportunities for graduate and postdoctoral training, sabbatical and merit-based international exchange programs.
- Scientists and students benefit from the multidisciplinary working environment and approach to solving problems.

## **Way Ahead**

- Following feedback from Purdue University, develop organizational charts for the institute, including key positions and sections (e.g., Institute Director, Epidemiologic Surveillance, Vaccine R&D, Outreach and Extension).
- Assess institute needs and establish a range of options for facilities and equipment, including integration of existing laboratories.
- JUST seeks the approval from the University bodies, Board of Trustees, and Ministry of Higher Education to establish the Regional Institute to honor commitments to the Global Health Security Agenda and achieve mutual goals in improving human and animal health capacities in the region.
- JUST assesses research and teaching faculty positions and authorizes splitappointments for critical positions in this newly formed Regional Institute of Excellence.
- JUST recruits members from academia and industry throughout the region in order to build an effective multidisciplinary alliance.
- JUST and Purdue sign Memorandum of Understandings with governmental ministries of Health and Agriculture and Animal resources, WHO, FAO, OIE, and CDC.
- JUST and Purdue orchestrate agreements that foster the involvement of universities in bordering countries as partners in the Regional Institute.
- Establish on-line presence, followed by a brick-and-mortar temporary offices on the JUST campus for the institute's director and staff.
- Assess current regional activity for health-related development and research.
- Together, with Purdue University, prepare collaborative grant proposals and seek funding sources in accordance with planned foci.
- Establish and host annual international conferences to enable critical networking.
- Establish a Journal of Infectious Disease and Drug Resistance in order to distribute research findings and encourage collaboration.
- Improve capacities in public health and animal health systems and expand national, regional, and international collaboration

## **Estimated Budget**

A parsimonious budget will be developed in accordance with specific institute needs. Start-up expenses are expected to exceed five million US dollars for infrastructure, equipment, personnel, scientists, mobility, graduate training scholarships, publications, and development of visual analytics and other technologies needed for disease tracking.

## **Sources of funding**

National, regional, and International organizations and foundations that support multidisciplinary research, Global Health Security Agenda, training of future scientists, detection, control and eradication of infectious, emerging, zoonotic diseases, and related areas such as antimicrobial resistance, vaccine development, and immunization.



**The concept note is prepared (31 JAN 2017) by:**

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