



# RESILIENCE INFORMATICS WORKSHOP

## SUMMARY REPORT

2023



THE UNIVERSITY OF ARIZONA  
Mel & Enid Zuckerman  
College of Public Health

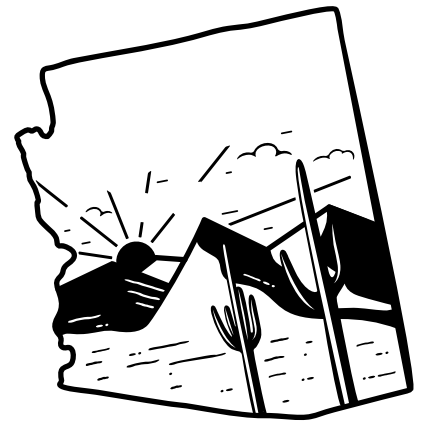
THE UNIVERSITY OF ARIZONA  
MEL & ENID ZUCKERMAN COLLEGE OF PUBLIC HEALTH  
Center for Rural Health

THE UNIVERSITY OF ARIZONA  
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Humanitarian Assistance  
Technical Support



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What tools have practitioners been needing in the field to address resilience issues in public health?

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# Resilience Informatics Workshop in Public Health Recap

On November 20th, 2023, a group of around 40 experts in the fields of public health, medicine, weather, informatics, environmental science and resilience from in and out of Arizona gathered to discuss the scope of the emerging field of resilience informatics for public health. The purpose of the workshop was to shape the field's future directions and applications.

At the during the workshop, we heard presentations from experts in this field including:

- Sriram Iyengar, Associate Professor, Internal Medicine Director, Associate Professor, BIO5 Institute at the University of Arizona
- Mary Hayden, Lyda Hill Institute for Human Resilience from the University of Colorado, Colorado Springs
- Greg Collins, Associate Vice President, Resilience & International Development from the Arizona Institute of Resilience at the University of Arizona
- Liz Petterson, Associate Director from the Arizona Institute for Resilience at the University of Arizona
- Jose Florez-Arango Assistant Professor of Population Health Sciences and Director of the MS in Health Informatics Program from Weill Cornell Medicine
- Enrique Noriega, Natural Language Processing and Machine Learning Research Scientist from AZHEALTHTXT at the University of Arizona
- Antonio Hernandez, Community Integration Officer Directors Office from the Office of Health Equity Arizona Department of Health Services
- Sameer Halai, Chief Executive Officer and Founder of WeHealth
- Andrew Martinez, Salt River Pima-Maricopa Indian Community Research Coordinator from the Collaboratory for Indigenous Data Governance at the University of Arizona.

During the discussion sessions attendees reflected and collaboratively brainstormed answers to the following questions:

- What does resilience mean to me?
- To what do we need to be resilient?
- What informatics tools are you using?
- What are the barriers to technological solutions and how do we address them?
- What tools do we need?
- How do we ensure equity across these solutions?

The following is a summary of some of the main takeaways from this workshop which will help to guide the next steps of the development of this field of resilience informatics.

# What Is Resilience Informatics for Public Health?

**Informatics** has been defined as the study of information sciences and the collection and storage of data (Luddy School of Informatics, Computing, and Engineering). Informatics tools include data science, artificial intelligence (AI), mobile health, and augmented and virtual reality.

**Resilience** has been defined as the ability of groups of people to weather against adverse events such as climate change related calamities and pandemics (USAID)

**Resilience Informatics (RI)** is the use and development of informatics techniques to materially improve and promote the ability of people, communities, and organizations, to effectively cope with natural and man-made stressors (Iyengar et al, 2023). RI is all about using modern informatics techniques to support the resiliency efforts in handling pandemics, the health effects of climate change and man-made disasters.

We asked our workshop participants:

# What does resilience mean to you?

Here are a few of their responses...

A person/ community's ability to **bounce "back" to baseline** without sacrificing too much during an incident. This requires necessary prep: education, resources, supports, and strong baseline.  
Response: Resources, investment, time and meeting basic needs.

**Preparedness to future events that stress public health response or food supply**

**Networks**

Resilience is the ability of systems, communities, and societies exposed to hazards to **assist absorb, accommodate in recovery from the effects a hazard** in a timely and efficient manner

The ability to build a sustainable ability to respond to public health issues by being able to **withstand, adapt and recover.**

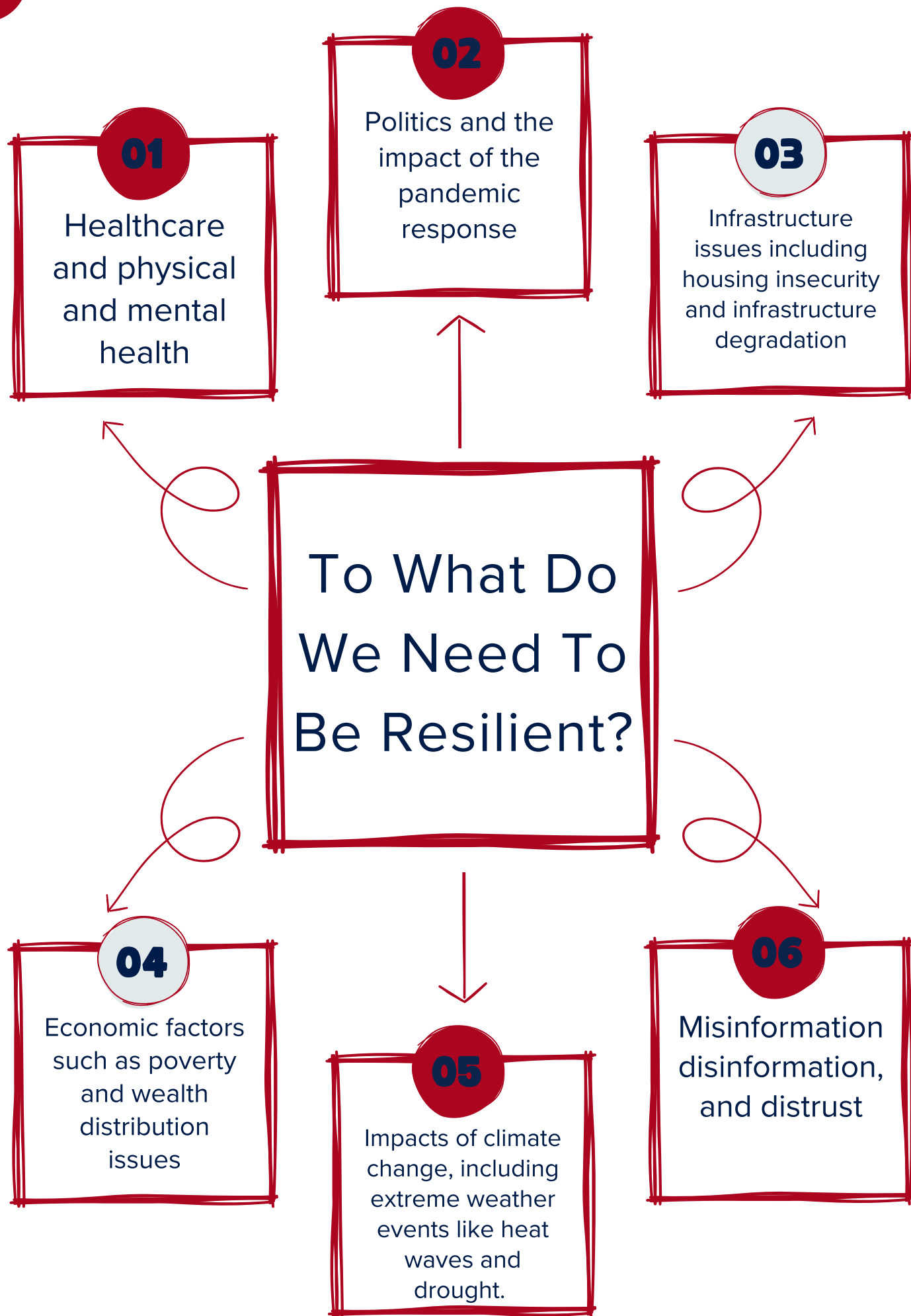
Individuals and communities are able to **thrive** in the face of hardship, climate, social, event based.

Resilience to me looks like **continuing onward despite tragedy**. When I think of resilience, I think of home and my community. Our ability to **use humor as a way to heal** and continuously teaching our **traditions and culture**.

For me resilience is making sure **everyone has everything they need to live a healthy life**. Water, food, health providers, housing, with a accurate temp.  
Everyone being able to respond to the disaster with the resources available to all **no matter color, race, etc.**

The ability (resources) to **cope with and recover from setbacks.**

From informatics, [resilience] is **how information contributes to the capabilities to adapt** of individuals and communities



# What tools do we have?

## Technological Resources

- Artificial Intelligence and Natural Language Processing (e.g., ChatGPT and HuggingFace)
- Programming (e.g., Python and Application development)
- Message Passing Interface (MPI) models
- Data analysis software (e.g., Stata and MAXQDA)
- Data visualization software (e.g., R, Tableau, ArcGIS)

## Databases

- CDC/ATSDR Social Vulnerability Index
- Master Person Index
- Heat Risk Index
- Vaccine Desert Map
- Community Needs Assessments
- Public Health Epidemiology Dashboards
- AHCCCS Data
- FEMA Community Resilience Estimates
- White House Climate Portal

## Dissemination of Information

- Websites and apps to help people find resources and events (e.g. Pinal Health & Active, AZHEALTHTXT)
- Text-to-talk youth based application
- AzCHER Emergency Management Training
- Sim Triages and Sim Riesqo
- Arizona Resilience Network (AZ-RN)

## Community Supports

Support for community resources (e.g., libraries and greenhouses)

## Existing Standards

CLAS Standards

## Assessment

Quality assurance and organizational assessments.

# WHAT TOOLS DO WE NEED?

1

## Equity-oriented tools

We need transformative tools that will have the ability to compute in a language for everyone and that will be available on and offline. We additionally need standards to guide these tools development.

2

## Human centered design

We need design thinking focusing on integral components, fundamentals, and core human values.

3

## Succession Planning

We must identify the best practices in health-related settings. Health departments should prioritize the implementation of necessary policies.

5

## Informatics Response to Needs

We need systems and infrastructure to process data and inform response to shocks to our communities, not for the focus to be on the tools themselves.

4

## Improved Surveillance

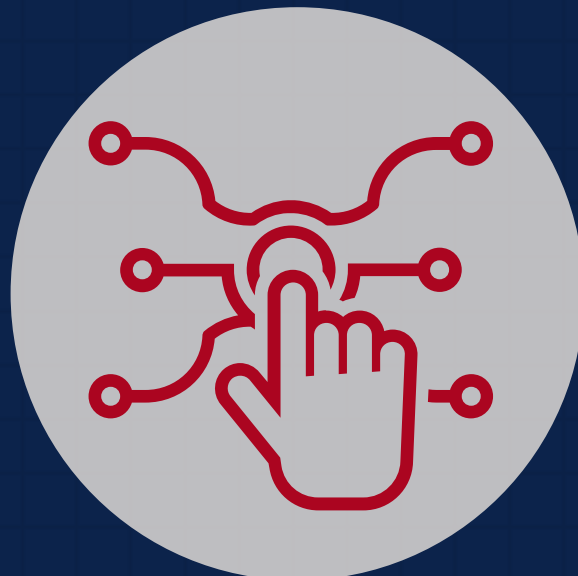
We must expand our surveillance from just infectious diseases to include chronic illnesses.





# BARRIERS TO TECHNOLOGICAL SOLUTIONS

*and how to address them*



## BARRIER 1

Making sure everyone has access

1

## SOLUTION 1

Create public-private partnerships like asking Dollar Generals in rural communities to set up hotspots.  
Create tools in multiple modalities and languages.

2

## BARRIER 2

Misleading Information, misinformation and disinformation.

3

## SOLUTION 2

Build trust with the community. Include more people from the community on a long term basis. Engage people by integrating health information into engaging materials for communities.

4

## BARRIER 3

Utilization of data to inform an actual response.

5

## SOLUTION 3

Use AI to digest and summarize relevant complex information. Present ideas in a user-friendly manner and usable way.

6

# HOW DO WE ENSURE EQUITY?

## Address Policies

We must use policies in the government and private sectors to create tools for discriminatory impact, and change them if need be.

## Engage the Community and Access Resources

*Make sure that the community is engaged upfront, and that resources are widely available and financially accessible.*

## ENSURE EMPATHY

Sustainability and environmental change require long-term commitment. Cultivating empathy may help bridge gaps in healthcare.

## CULTURAL RESPONSIBILITY

We need list of criteria that must be met before release of a given informatics tool to ensure cultural responsibility, sustainability, and accuracy.

## Respect Tribal Data Sovereignty

*Tribal sovereignty is key to empowering tribes to become involved with these conversations surrounding public health and resilience Informatics.*

## Work with Equity in Mind

*Put people from community into key roles and pay them equitably.*

## COMMUNITY NEEDS FIRST

It is important to identify and prioritize needs of target populations first and in order to support community needs *The tools are made to help, they do not come first..*

# CONCLUDING THOUGHTS

## TAKEAWAYS AND WHAT'S NEXT?



### Takeaway 1: Tools need Guidelines

Resilience Informatics tools need to have principles to which a tool should adhere to extend the reach and efficacy.



### Takeaway 2: Tools must be Equitable

These tools may be able to help Vulnerable populations need these tools, so issues like ensuring offline access and language accessibility must be kept in mind.



### Takeaway 3: Tools should build Empathy

We need to shift societal norms around empathy using these tools, otherwise sustainable change may not be possible.



### Idea for the future 1: Keep in Touch

Keep in touch with other participants from the workshop and form partnerships to keep sharing ideas and resources so that we can continue to grow in this field of resilience informatics.



### Idea for the future 2: Share Best Practices

Contribute to the literature in the area of resilience informatics to continue to strengthen the evidence base and share ideas with others interested in this field.



### Idea for the future 3: Hold an EpiHack

Plan a multi-day EpiHack event to work together to create prototypes to address specific resilience in public health issues we are facing in the field.

# Appendices

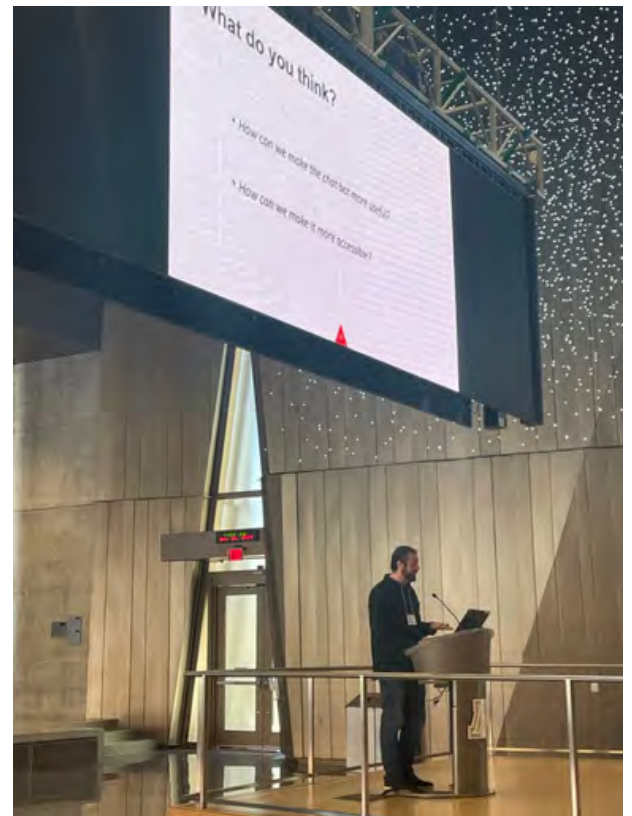
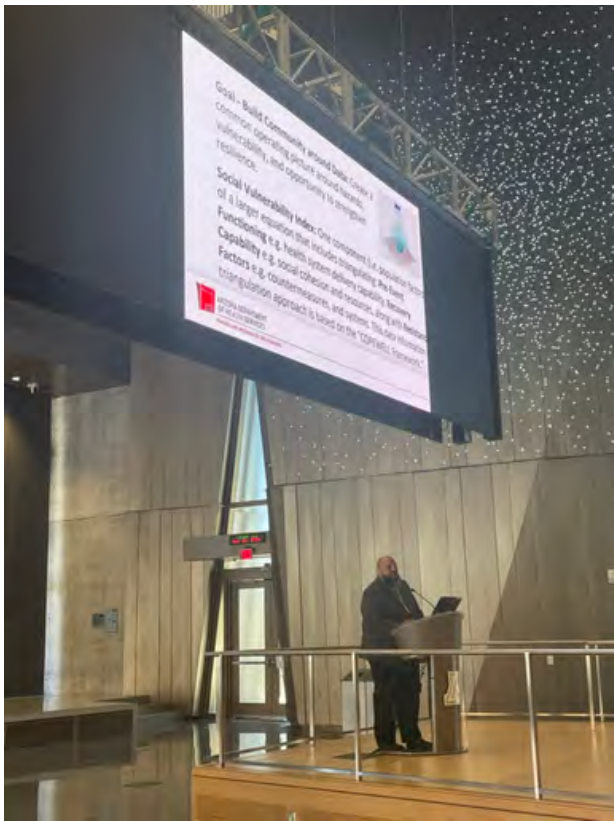
Photos from the workshop



# Appendices



# Appendices



**[See Presentation Slides and Recordings Here](#)**

# THANK YOU

We respectfully acknowledge and thank our speakers, facilitators, partners and funders for their help putting together this event,



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