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Apr 4th, 11:04 AM

# Using Systems Thinking Tools to Inform the Implementation of a Cysticercosis Control Program in Rural Peru

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Dumet Poma, Lisset M. MBA; Spencer, Angela PhD; Atto, Ruth BSc; Cruz, Vanessa BSc; Vilchez, Percy MPH; and O'Neal, Seth MD, MPH for the Cysticercosis Working Group in Peru, "Using Systems Thinking Tools to Inform the Implementation of a Cysticercosis Control Program in Rural Peru" (2024). *OHSU-PSU School of Public Health Annual Conference*. 9.

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### **Presenter Information**

Lisset M. Dumet Poma MBA; Angela Spencer PhD; Ruth Atto BSc; Vanessa Cruz BSc; Percy Vilchez MPH; and Seth O'Neal MD, MPH for the Cysticercosis Working Group in Peru

# USING SYSTEMS THINKING TOOLS TO INFORM THE IMPLEMENTATION OF A CYSTICERCOSIS CONTROL PROGRAM IN RURAL PERU

Lisset Dumet Poma, MBA  
PhD Candidate in Health Systems and Policy  
School of Public Health Conference  
April 4<sup>th</sup>, 2024

Angela Spencer, PhD, Ruth Atto, BSc, Vanessa Cruz, BSc, Percy Vilchez, BSc, Javier Bustos, MD, PhD, Hector Garcia, MD, PhD, Sarah Gimbel, PhD, MPH, FAAN and Seth O'Neal, MD, MPH for the Cysticercosis Working Group in Peru



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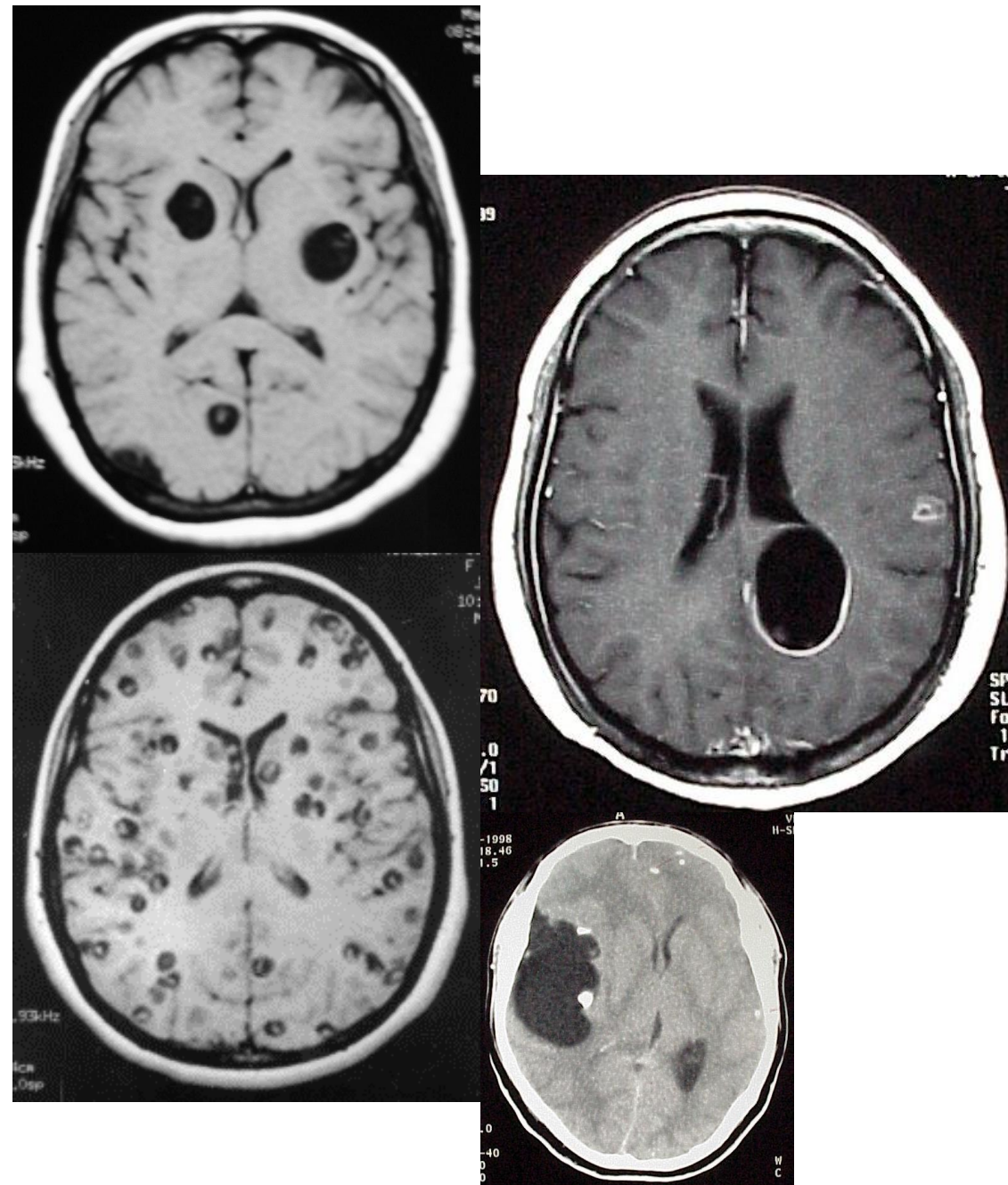


UNIVERSIDAD PERUANA  
CAYETANO HEREDIA



# CYSTICERCOSIS: INFECTION WITH PORK TAPEWORM

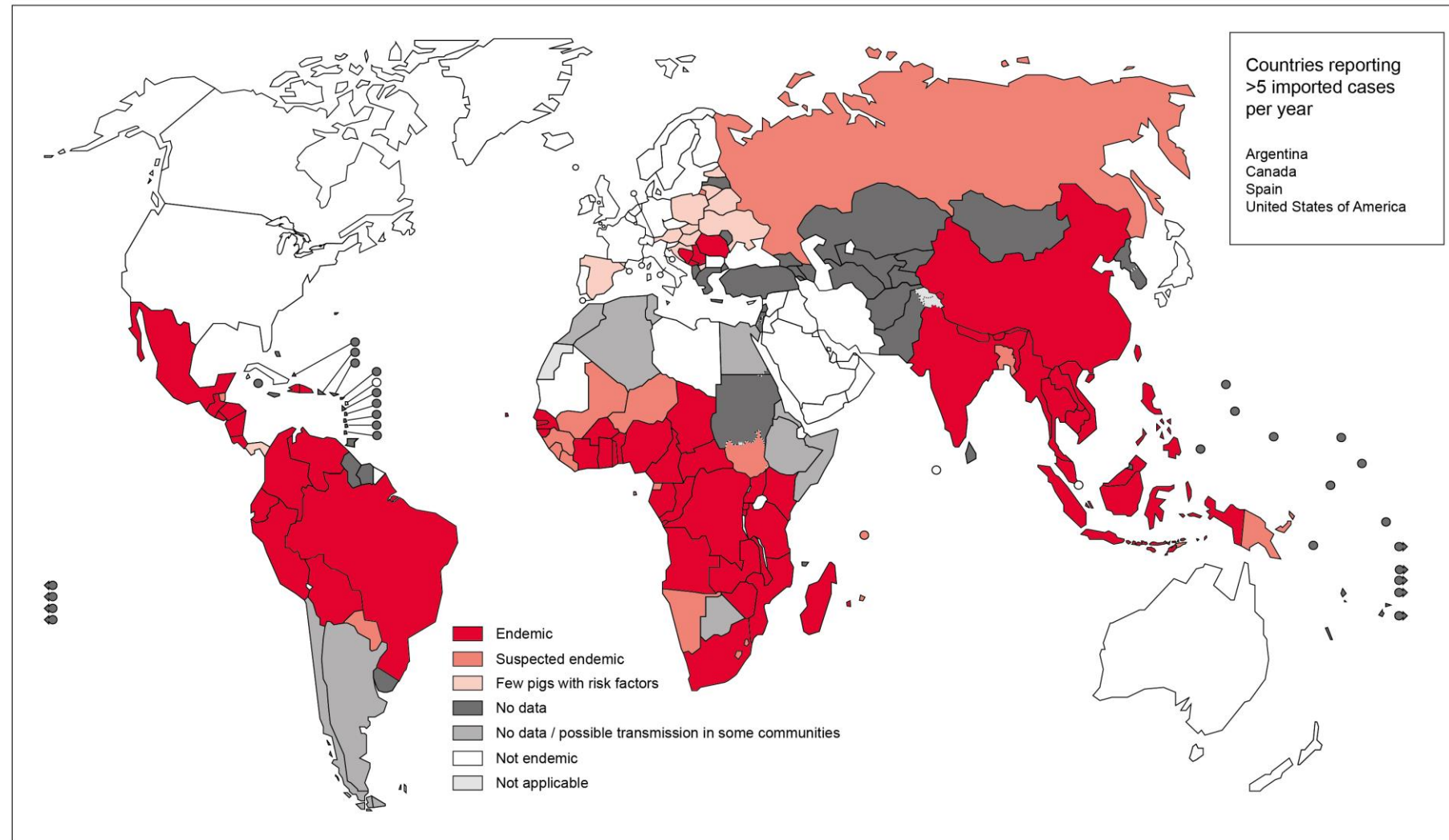
## Neuroimaging of people with a brain infection with tapeworm



- Seizures
- Chronic headache
- Hydrocephalus
- Increased intracranial pressure
- Encephalitis
- Stroke
- Cognitive disorders
- Asymptomatic infection
- .....

# PORK TAPEWORM IS A GLOBAL NEGLECTED HEALTH AND ECONOMIC PROBLEM

Endemicity of *Taenia solium*, 2015



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement. © WHO 2016. All rights reserved

Data Source: World Health Organization  
Map Production: Control of Neglected Tropical Diseases (NTD)  
World Health Organization



~ 30% of epilepsy across Asia, Latin America & Africa

(Fleury et al., 2003; Moyano et al., 2016)

# THE RING STRATEGY INTERVENTION

- Focal control intervention to **provide antiparasitic drugs to humans** living near infected pigs
- Ring Strategy (RS) is an effective and efficient intervention to control tapeworm infections
- Ring Strategy is complex

Transdisciplinary approach:  
Community + HC +  
Policy engagement

Multisectoral approach:  
Human + Animal  
systems

Low-income setting



# IMPLEMENTATION RESEARCH OF THE RING STRATEGY (NIH R01)

## FORMATIVE EVALUATION

Create a preliminary protocol

## ITERATIVE QUALITY IMPROVEMENT

- Engage community
- Refine protocol

## SCALE UP

- Roll out protocol
- Evaluate effectiveness

## REPORT RESULTS AND ISSUE GUIDELINES



# METHODS

Setting: Rural healthcare delivery systems that serve small, medium, and large municipal districts in Tumbes, Peru (population served <5000; <6000; <36000, respectively).

Expanded CFIR for low-resource settings to identify barriers and facilitators for the adoption of the intervention*	Social Network Analysis Identify key players for the adoption of the intervention	Process Mapping to understand the organizational context to inform the protocol
169 semi-structured interviews with healthcare workers	341 network surveys with healthcare workers	2 workshops with small district healthcare workers and community agents

\* (Means, et al., 2020)





# RESULTS OF EXPANDED CFIR

## Barriers

Healthcare workers' high turnover

Healthcare workers' high workload

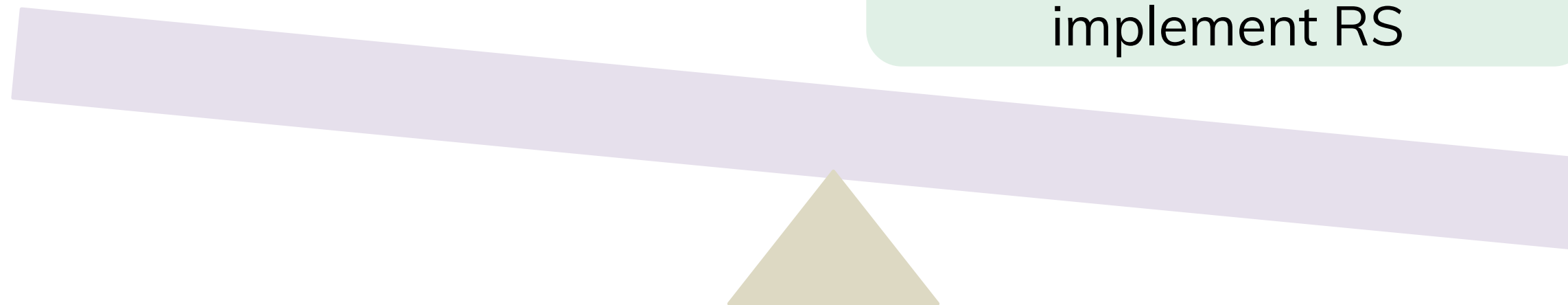
Uncertainty in access to funding and medicines

## Facilitators

RS is compatible with current public health system's strategies

Healthcare community activities are adaptable to RS

Healthcare workers recognized the need to implement RS



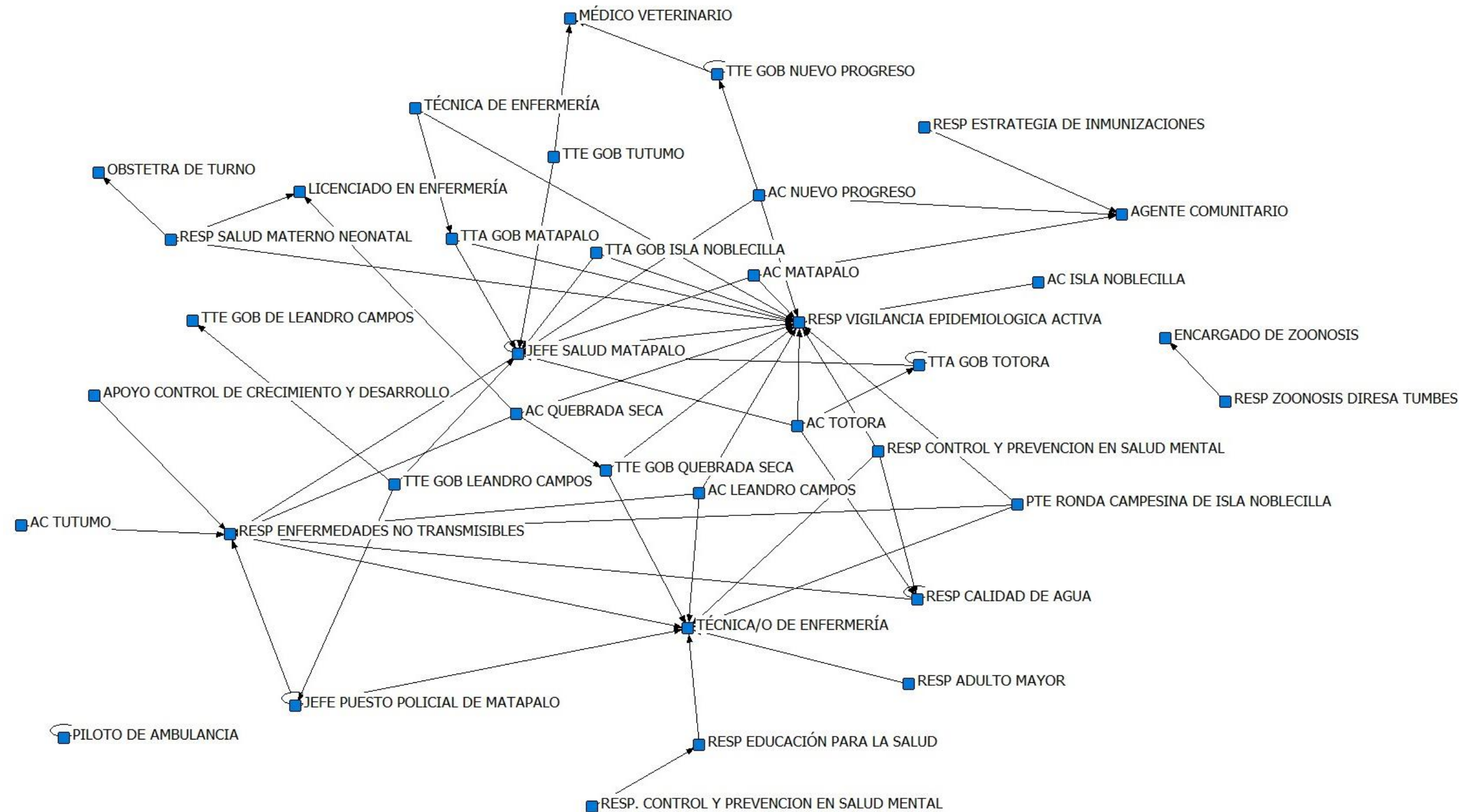
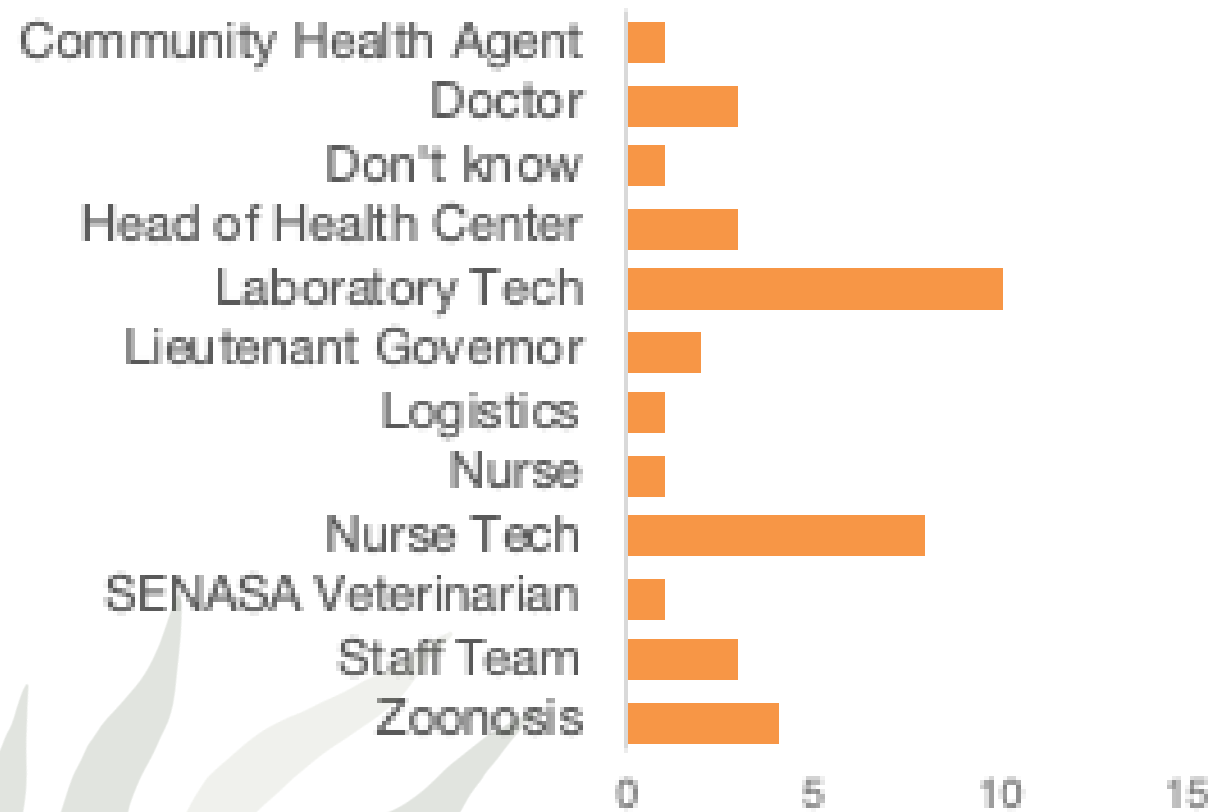
# RESULTS OF SOCIAL NETWORK ANALYSIS

Mapping health system networks

- Supervision
- Teams
- Roles in the implementation

Who should investigate the reported case?

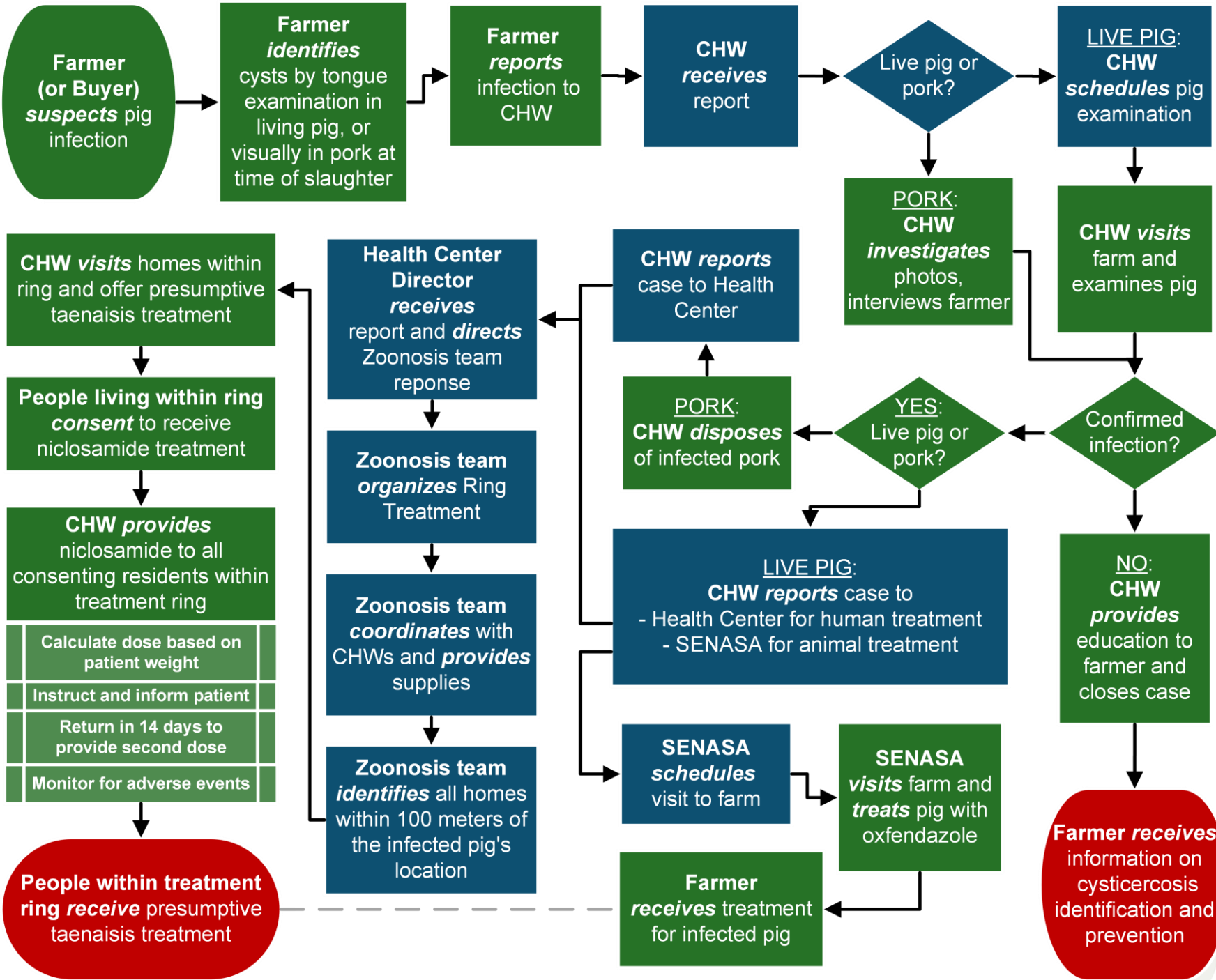
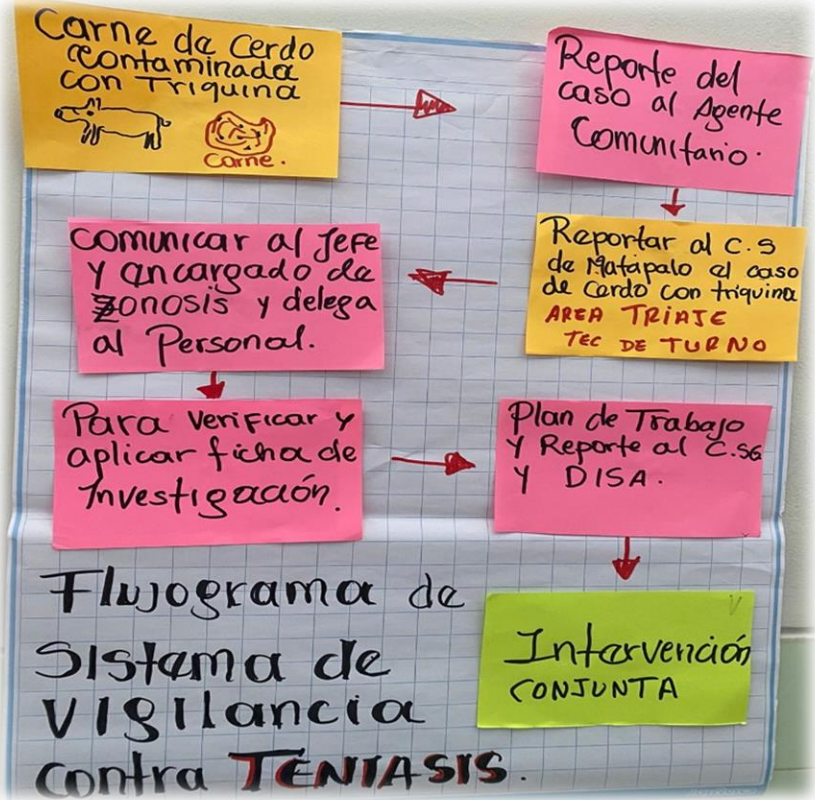
Who should investigate?



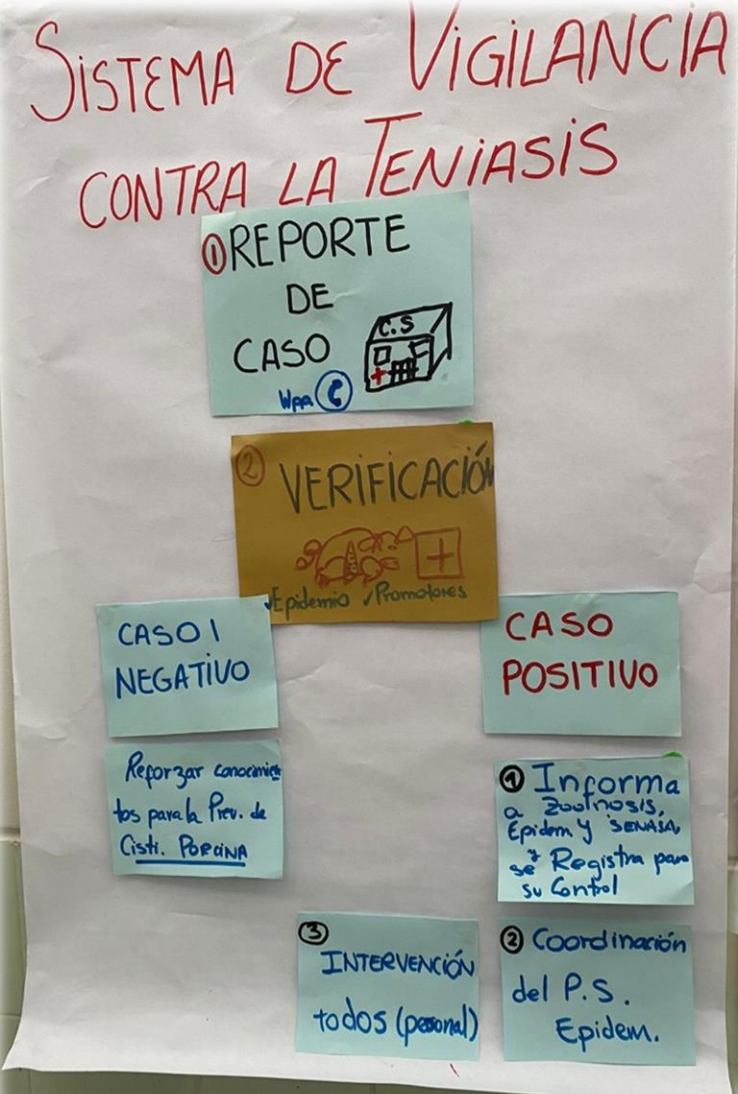
# RESULTS OF PROCESS MAPPING

- ✓ Identify actors
- ✓ Step-by-step instructions
- ✓ Materials

**Process Map of the Implementation of Ring Treatment (RT) in Peru**



**Process Mapping Workshop**



# PILOT STUDY- OUTCOMES

# of Rings	Date	Target population	Treated population	%
1	Sept, 2022	70	46	66%
2	Nov, 2022	156	92	59%
3	April, 2023	92	79	86%
4	April, 2023	41	32	78%
5	April, 2023	224	191	85%
		<b>583</b>	<b>440</b>	<b>75%</b>

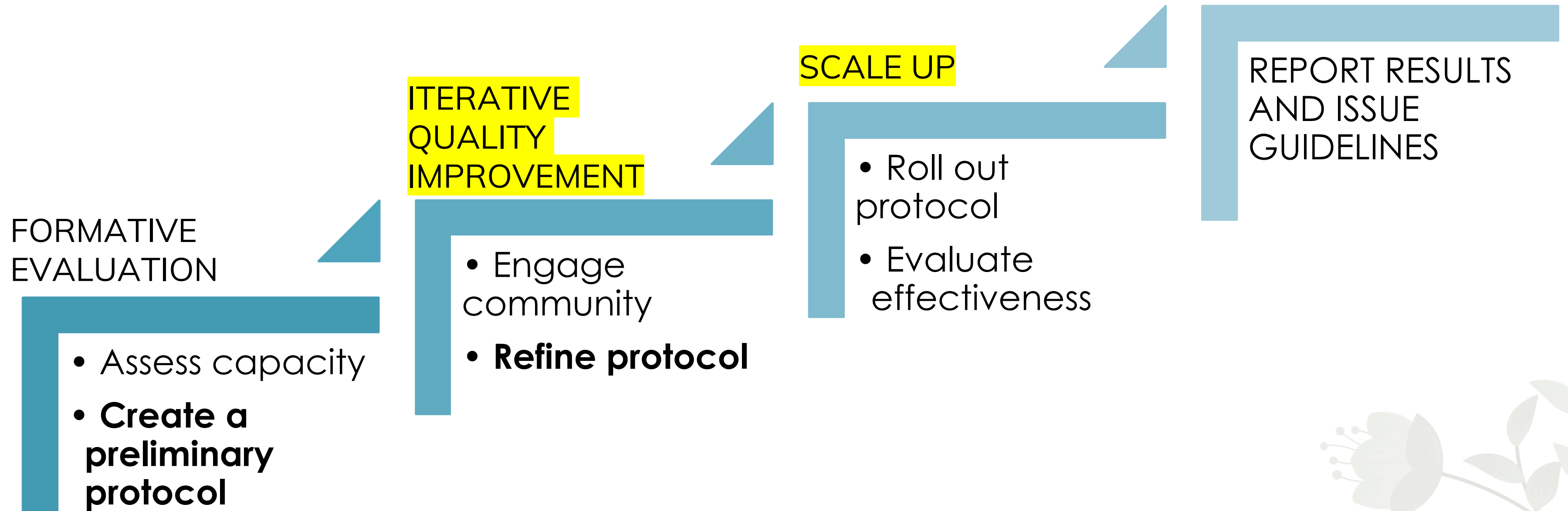
# IMPLEMENTATION OUTCOMES

- Adoption
  - High engagement of local policy actors and national policy stakeholders
  - High participation of community health agents
- Sustainability
  - Regional government anti-parasitic strategy to control pork tapeworm
  - Facilitated donation of an anti-parasite drug
  - Improved local capacity in implementation research



## ... NEXT STEPS

- Scale up and evaluate implementation outcomes (RE-AIM framework)



# ACKNOWLEDGEMENTS

- Center for Global Health in Tumbes, Peru
- Cysticercosis Working Group in Perú
- Human and animal study participants past, present, and future



- Funding: United States National Institutes of Health/National Institute of Neurological Disorders and Stroke, Brain Disorders in the Developing World 2R01NS080645
- NPGH Fogarty International Center
- OHSU-PSU School of Public Health Kickstarter Grant

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