Behavior, Beliefs, and Bugs: Protecting Communities from Arboviral Diseases

Valerie A. Paz-Soldan, PhD, MPH
Professor, Tropical Medicine and Infectious Disease
Director, Health Office for Latin America
vpazsold@tulane.edu

Tulane University

What is the role of a social scientist on a dengue grant?

- **Interdisciplinary** work at the heart of all our dengue research over past 25 years
- The new research project we are working on is built on the learnings and infrastructure of these past 25 years.

In my role as a social scientist, I have…

- Developed, evaluated, and applied various methods to study human movement…

Strengths and Weaknesses of Global Positioning System (GPS) Data-Loggers and Semi-structured Interviews for Capturing Fine-scale Human Mobility: Findings from Iquitos, Peru

Valerie A. Paz-Soldan[1]*, Robert C. Reiner Jr[2,3], Amy C. Morrison[2,4], Steven T. Stoddard[2,3], Uriel Kitron[3,5], Thomas W. Scott[2,3], John P. Elder[4], Eric S. Halsey[6], Tadeusz J. Kochel[6], Helvio Astete[6], Gonzalo M. Vazquez-Prokopec[3,5]

Am. J. Trop. Med. Hyg., 82(4), 2010, pp. 723–730
doi:10.4269/ajtmh.2010.09-0496

Assessing and Maximizing the Acceptability of Global Positioning System Device Use for Studying the Role of Human Movement in Dengue Virus Transmission in Iquitos, Peru

Valerie A. Paz-Soldan,* Steven T. Stoddard, Gonzalo Vazquez-Prokopec, Amy C. Morrison, John P. Elder, Uriel Kitron, Tadeusz J. Kochel, and Thomas W. Scott

- We then used human movement data to assess how epidemiological, entomological, and social-behavioral factors—individually and together—influence dengue transmission dynamics; also, how human movement affects our evaluations of effectiveness of vector control.

The Role of Human Movement in the Transmission of Vector-Borne Pathogens

Steven T. Stoddard[1]*, Amy C. Morrison[1], Gonzalo M. Vazquez-Prokopec[2], Valerie Paz Soldan[3], Tadeusz J. Kochel[4], Uriel Kitron[2], John P. Elder[5], Thomas W. Scott[1]

Inapparent infections shape the transmission heterogeneity of dengue

Gonzalo M. Vazquez-Prokopec[a,*], Amy C. Morrison[b], Valerie Paz-Soldan[c], Steven T. Stoddard[d], William Koval[e], Lance A. Waller[f], T. Alex Perkins[g], Alun L. Lloyd[h], Helvio Astete[i], John Elder[d], Thomas W. Scott[j] and Uriel Kitron[a]

House-to-house human movement drives dengue virus transmission

Steven T. Stoddard[a,b,1], Brett M. Forshey[c,d,e], Amy C. Morrison[a,c,d], Valerie A. Paz-Soldan[f], Gonzalo M. Vazquez-Prokopec[b,g], Helvio Astete[c,d], Robert C. Reiner, Jr.[a,b], Stalin Vilcarromero[c,d], John P. Elder[h], Eric S. Halsey[c,d], Tadeusz J. Kochel[c,d,2], Uriel Kitron[b,g], and Thomas W. Scott[a,b]

Asymptomatic or mild cases of dengue may contribute up to 80% of dengue transmission

In my role as a social scientist, I have…

- Assessed **acceptability** of various methods to guide study design, as well as acceptability of new strategies for vector control.

RESEARCH ARTICLE

Acceptability of *Aedes aegypti* blood feeding on dengue virus-infected human volunteers for vector competence studies in Iquitos, Peru

Amy C. Morrison[1,2¤*], Julia Schwarz[3], Kanya C. Long[1], Jhonny Cordova[1], Jennifer E. Rios[2], W. Lorena Quiroz[2], S. Alfonso Vizcarra[1], Robert D. Hontz[2], Thomas W. Scott[1], Louis Lambrechts[4,5], Valerie A. Paz Soldan[6]

Some preferred direct mosquito feeding to needles – "it's just a tickle" compared to a needle!

Am. J. Trop. Med. Hyg., 84(2), 2011, pp. 208–217
doi:10.4269/ajtmh.2011.09-0615

Initial Assessment of the Acceptability of a Push-Pull *Aedes aegypti* Control Strategy in Iquitos, Peru and Kanchanaburi, Thailand

Valerie A. Paz-Soldan,* Valaikanya Plasai, Amy C. Morrison, Esther J. Rios-Lopez, Shirly Guedez-Gonzales, John P. Grieco, Kirk Mundal, Theeraphap Chareonviriyaphap, and Nicole L. Achee

In my role as a social scientist, I have…

- Examined factors associated with correct and consistent use of innovative vector control strategies – from insecticide-treated curtains to lethal ovitraps to spatial repellents.

Potential Use of Community-Based Rapid Diagnostic Tests for Febrile Illnesses: Formative Research in Peru and Cambodia

Valerie A. Paz-Soldan[1,2*], Amy C. Morrison[3,4], Heng Sopheab[5], Julia Schwarz[6], Karin M. Bauer[1,7], Jennie L. Mckenney[8], Chhorvann Chhea[5], Vonthanak Saphonn[9], Dyna Khuon[9], Robert D. Hontz[4,10], Pamina M. Gorbach[8]

Factors Associated with Correct and Consistent Insecticide Treated Curtain Use in Iquitos, Peru

Valerie A. Paz-Soldan[1☯*], Karin Bauer[1☯], Amy C. Morrison[2,3☯], Jhonny J. Cordova Lopez[2☯], Kiyohiko Izumi[1☯], Thomas W. Scott[3‡], John P. Elder[4‡], Neal Alexander[5‡], Eric S. Halsey[6‡], Philip J. McCall[7‡], Audrey Lenhart[8☯]

RESEARCH ARTICLE

Design and Testing of Novel Lethal Ovitrap to Reduce Populations of *Aedes* Mosquitoes: Community-Based Participatory Research between Industry, Academia and Communities in Peru and Thailand

Valerie A. Paz-Soldan[1,2,3*], Josh Yukich[3,4], Amara Soonthorndhada[5], Maziel Giron[6], Charles S. Apperson[7], Loganathan Ponnusamy[7], Coby Schal[7], Amy C. Morrison[8], Joseph Keating[3,4], Dawn M. Wesson[4,9]

The impact of insecticide treated curtains on dengue virus transmission: A cluster randomized trial in Iquitos, Peru

Audrey Lenhart[1], Amy C. Morrison[2,3*], Valerie A. Paz-Soldan[4,5], Brett M. Forshey[3], Jhonny J. Cordova-Lopez[2], Helvio Astete[3], John P. Elder[6], Moises Sihuincha[7], Esther E. Gotlieb[4], Eric S. Halsey[3], Tadeusz J. Kochel[3], Thomas W. Scott[8], Neal Alexander[9], Philip J. McCall[1]

With all that we have learned and evaluated in Iquitos, WHAT CAN WE DO to prevent and control dengue in Iquitos?

Amy C. Morrison, PhD

Applying implementation science models and systems thinking to prevent and control dengue

- We keep repeat using strategies that “don’t work well enough”…
  - Or do they work and have not been measured? Or are our goals not realistic? (Inadequate **monitoring and evaluation**?)
  - Or have we not **implemented these strategies adequately**?
  - Or have we not engaged the right stakeholders?

Proyecto Tariki*: Implementation science for community-mobilized risk reduction of dengue in Iquitos

Tulane University

UC DAVIS
UNIVERSITY OF CALIFORNIA

Amy Morrison, PhD

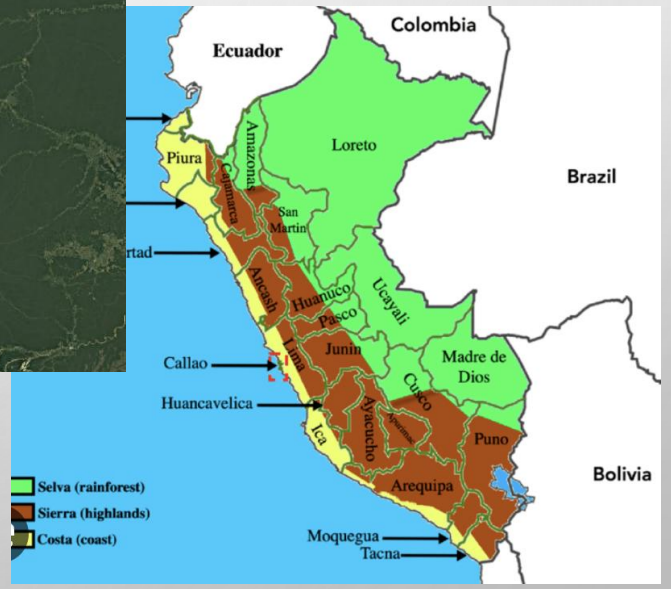
Berkeley
UNIVERSITY OF CALIFORNIA

Josefina Coloma, PhD

prisma

James Holston, PhD

*Tariki: “I found you” in Quechua



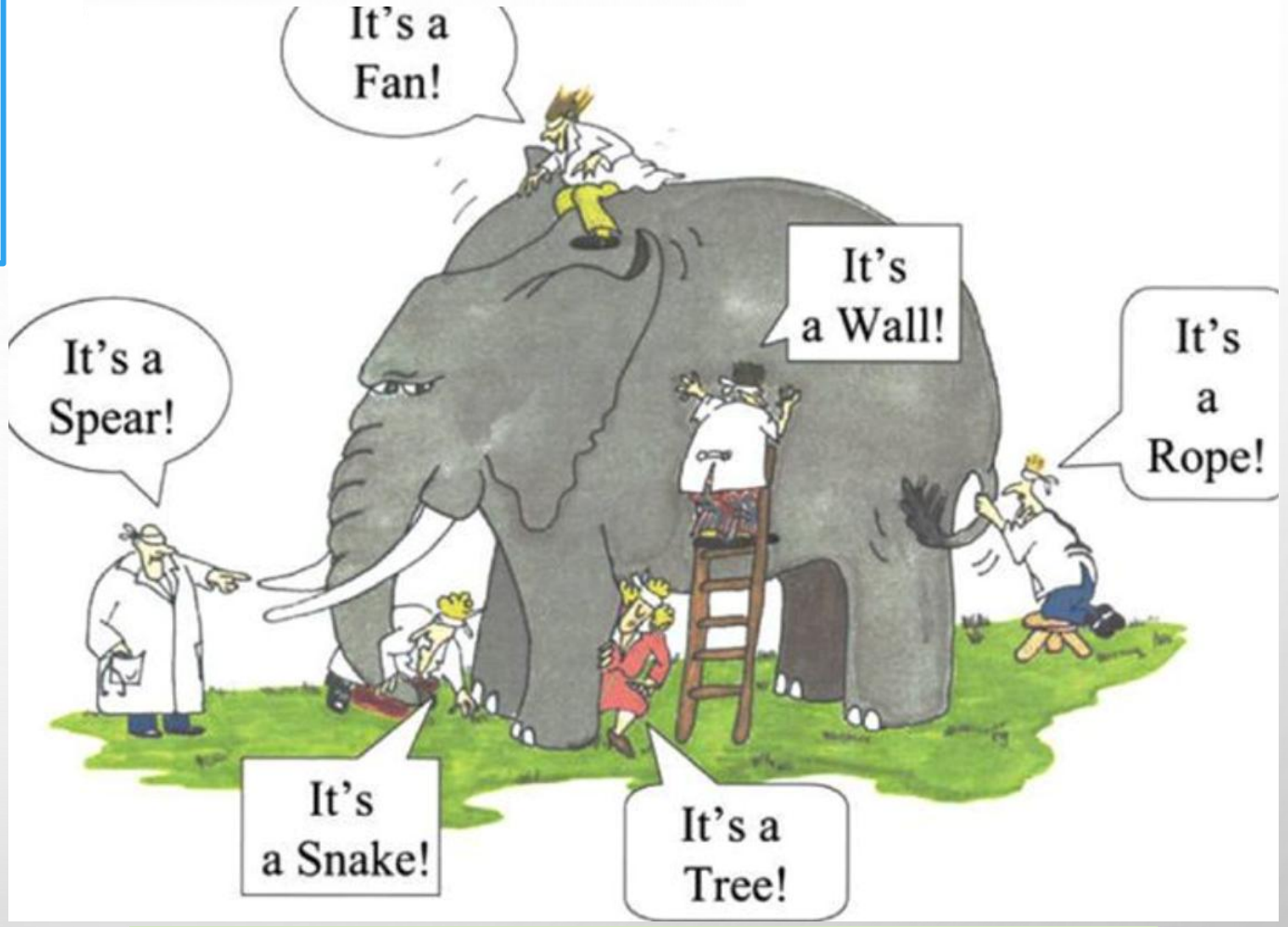
Funded by NIH/NIAID R01-176380

CANCER EPIDEMIOLOGY, BIOMARKERS & PREVENTION | RESEARCH ARTICLE

Integrative Systems Praxis for Implementation Research (INSPIRE): An Implementation Methodology to Facilitate the Global Elimination of Cervical Cancer

Patti E. Gravitt[1], Anne F. Rositch[2], Magdalena Jurczuk[3], Graciela Meza[4], Lita Carillo[5], Jose Jeronimo[6], Prajakta Adsul[7], Laura Nervi[8], Margaret Kosek[9], J. Kathleen Tracy[1], and Valerie A. Paz-Soldan[3]; for the Proyecto PreCancer Study Group

Challenge:
How do we develop solutions and interventions, if we don't <u>really</u> understand the problem?



The "problem" depends on who you are talking to – we need a systems lens.

Phase 1: Understand the problem

Phase 1: Understand the Problem

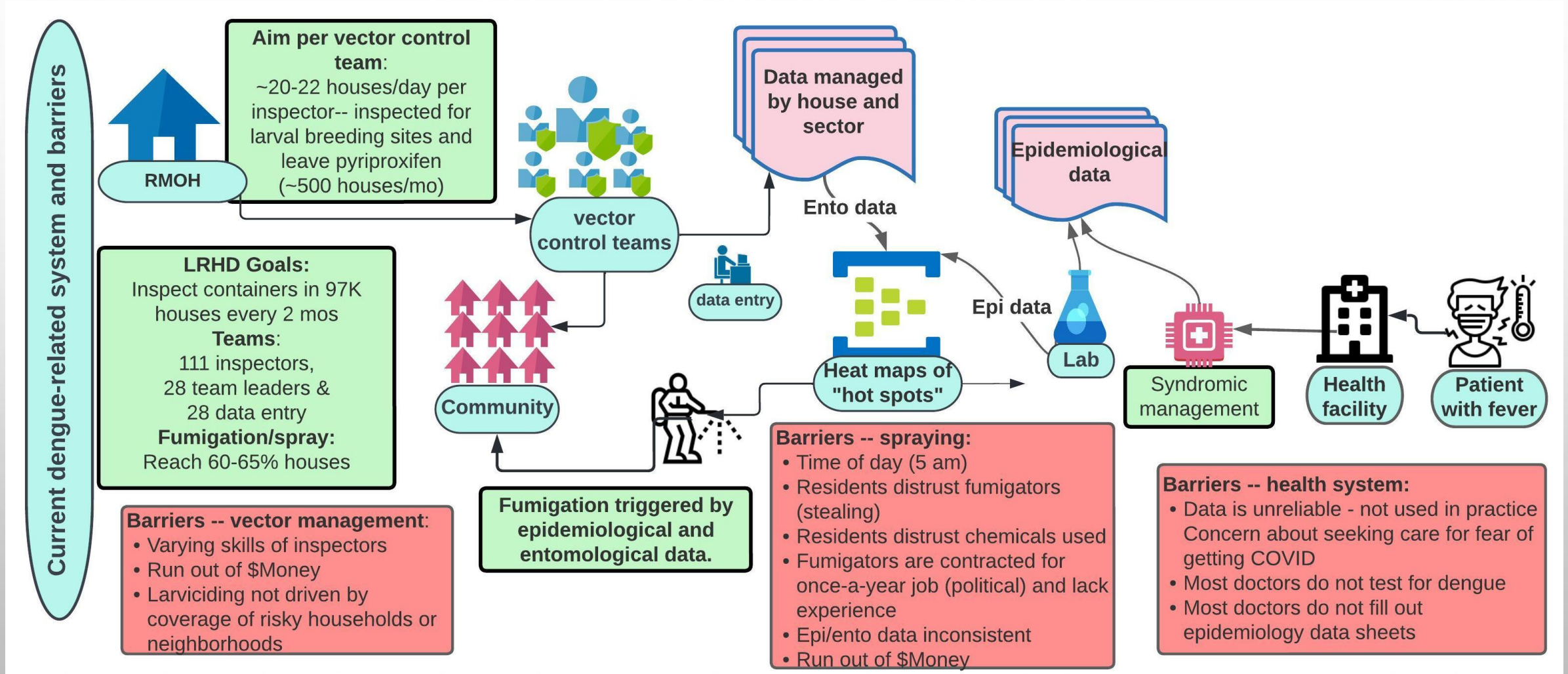
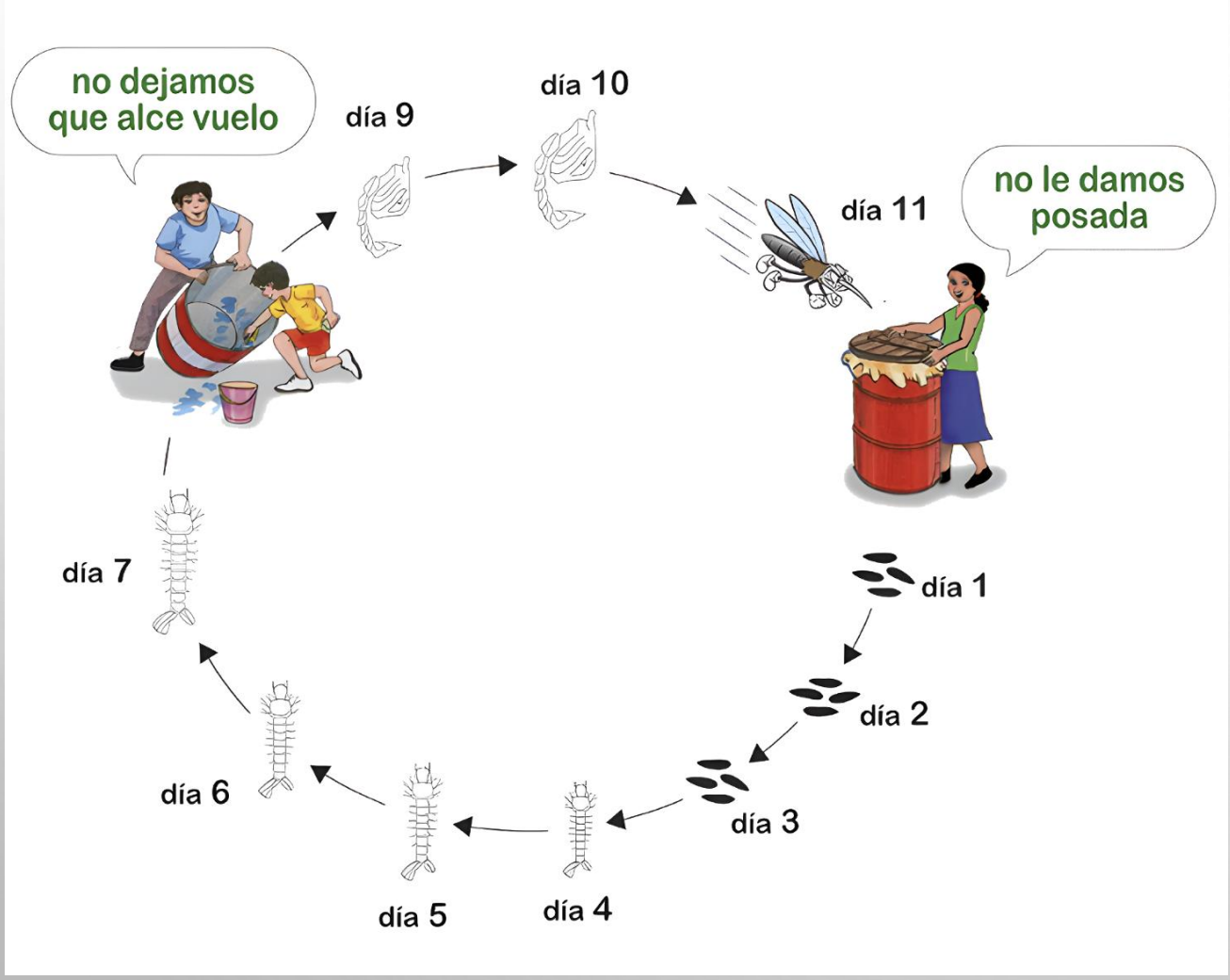


Figure 4. Visual depiction of current dengue-related system and vector control management barriers. Green boxes represent RMOH activities, turquoise are descriptors, and red boxes are system barriers.

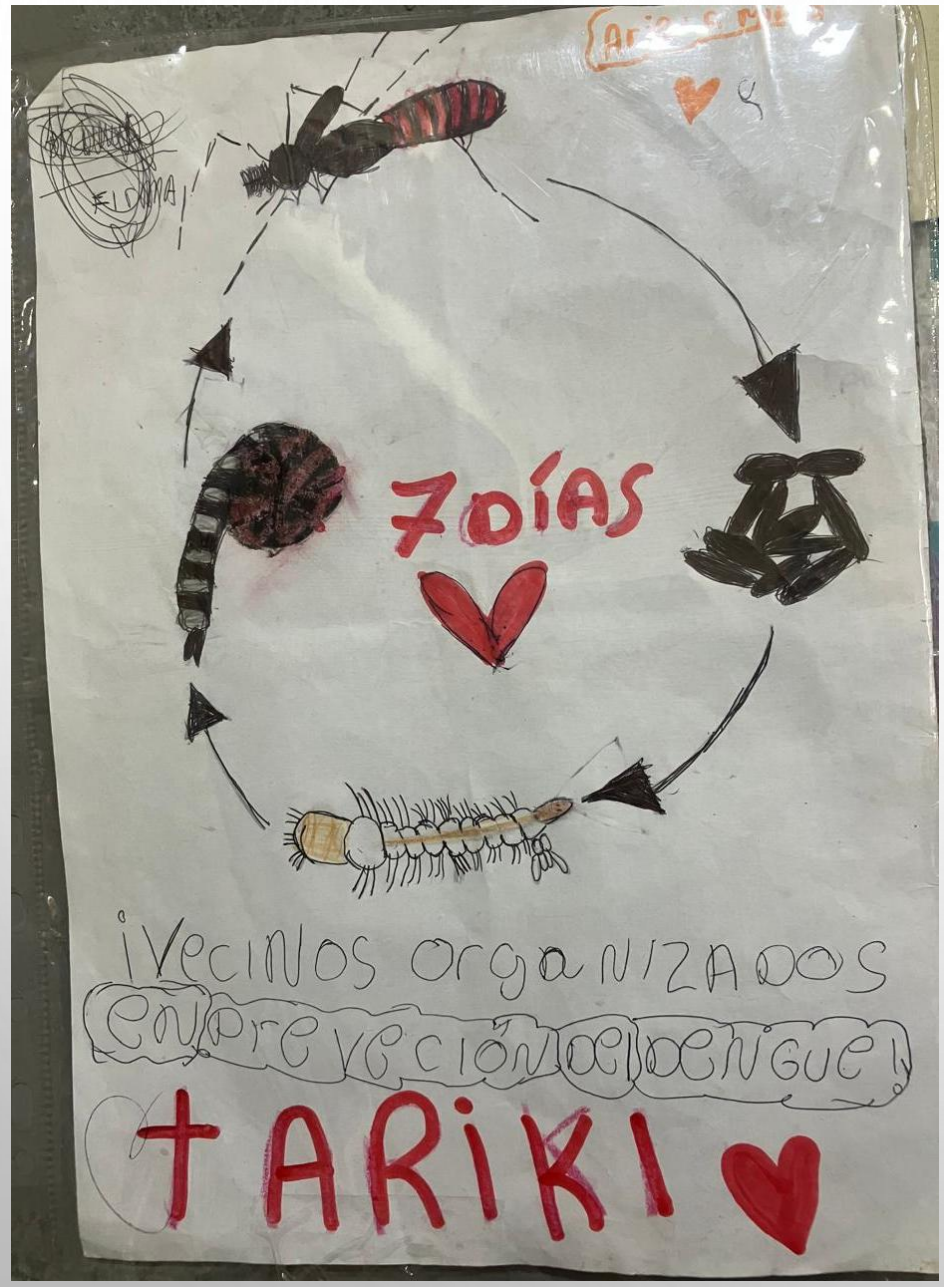
Phase 2: Find leverage for change (What are feasible options?)



Focused on Three Key Elements

1. Larval habitat control every 3 mos is not enough – **community mobilization** is necessary.
2. Once dengue transmission is high, hard to contain. Need to **improve febrile surveillance – by community – for rapid response.**
3. **Evaluation** needs to be integrated in all vector control activities using a pragmatic design.

Phase 3: Plan and implement

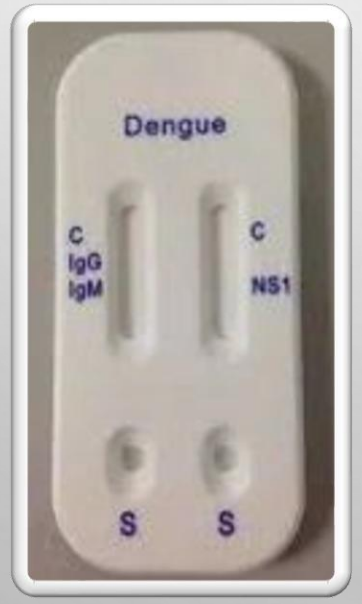


Phase 3: Plan and implement…

1. Community Mobilization and Empowerment

- Focus on *Aedes* life cycle
- Build community expertise
- Share data to inform and motivate communities
- Learned from COVID-19: hard to keep behaviors “on” constantly
- Sustainability: engaging university students – from different disciplines!
- Coordination with health authorities

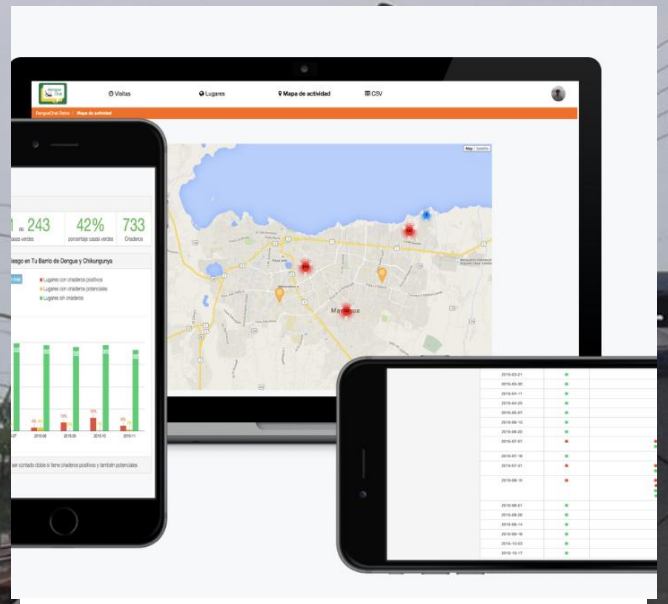
Phase 3: Plan and implement…



2. Febrile Surveillance – by community – for rapid response

- Identify outbreaks early, respond quickly
- Early detection using Rapid Diagnostic Tests (RDTs)
  - Community volunteers can use RDTs effectively

Phase 3: Plan and implement…



DengueChat app for data collection and sharing

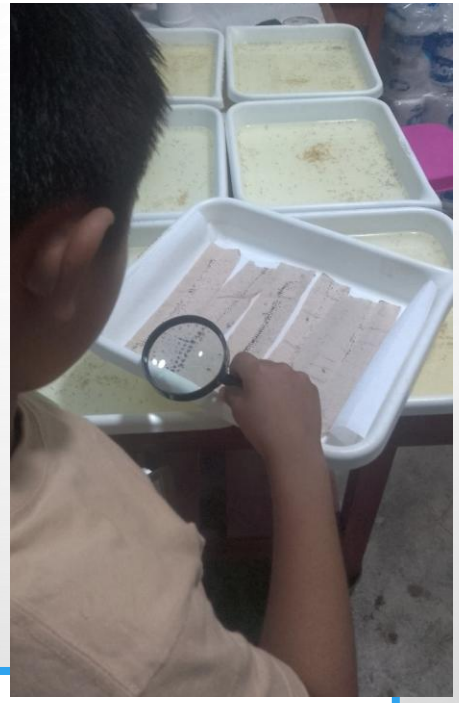
3. Evaluate… evaluate and evaluate!

- Use data to inform decisions and make adaptations to vector control
- Communicate findings to community – motivating!

Phase 3: Plan and implement…

Ensure selected strategies are feasible, appropriate and sustainable!

- "Proctor's Implementation Outcomes"
  - Feasible
  - Appropriate
  - Adoptable
  - Acceptable
  - Sustainable
  - Cost effective
  - Fidelity
  - Coverage



Adm Policy Ment Health (2011) 38:65–76
DOI 10.1007/s10488-010-0319-7

ORIGINAL PAPER

Outcomes for Implementation Research: Conceptual Distinctions, Measurement Challenges, and Research Agenda

Enola Proctor · Hiie Silmere · Ramesh Raghavan · Peter Hovmand · Greg Aarons · Alicia Bunger · Richard Griffey · Melissa Hensley

Phase 4: Learn and adapt

- Monitoring and evaluation (mixed methods)
  - Overall study design: stepped wedge trial
  - RE-AIM measures: Examine coverage, implementation, adoption, maintenance and effectiveness (mixed methods)
  - Independent entomological evaluations
  - M&E throughout the implementation of Tariki

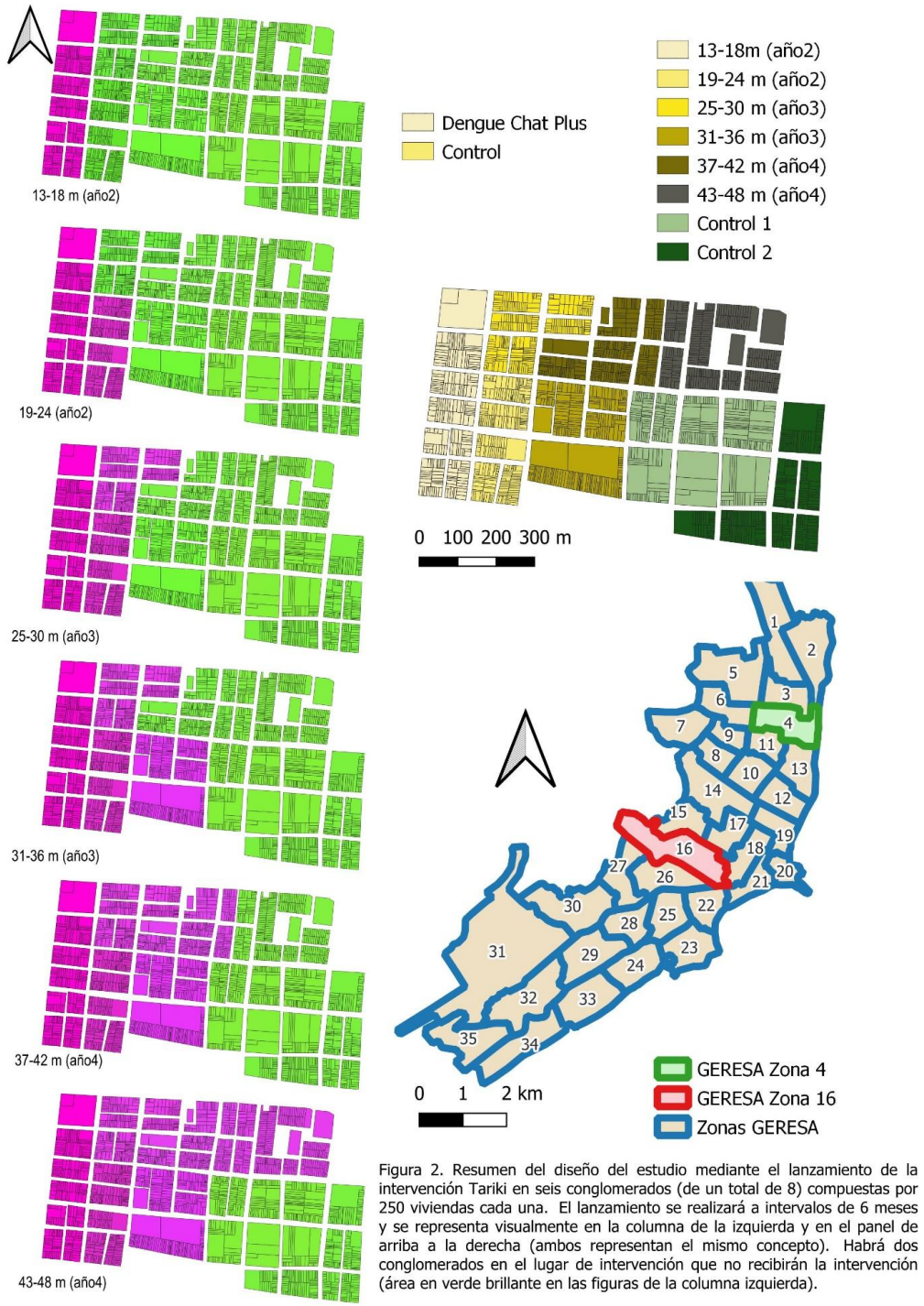


Figura 2. Resumen del diseño del estudio mediante el lanzamiento de la intervención Tariki en seis conglomerados (de un total de 8) compuestas por 250 viviendas cada una. El lanzamiento se realizará a intervalos de 6 meses y se representa visualmente en la columna de la izquierda y en el panel de arriba a la derecha (ambos representan el mismo concepto). Habrá dos conglomerados en el lugar de intervención que no recibirán la intervención (área en verde brillante en las figuras de la columna izquierda).

Will Tariki work?

- Adaptations from our original plans (quick veering)
- Intense planning – hard to replicate without adaptation

Applying social science methods to arbovirus disease prevention and control has improved the quality of our science. It has improved the design of our studies, our understanding of findings, and ultimately, our vector control strategies.

If you want to go fast, go alone.

If you want to go far, go accompanied.

Some of our wonderful volunteers!

Some members of our incredible research team!