Working with citizens to monitor tick-associated risk

Lessons learned from the CiTIQUE project

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Poll questions on stereotypes about ticks

- Do ticks fall from trees to bite you?
- 1. Yes 2. No 3. It's better than trees falling on me!

- Should you care about ticks when you're taking care of your garden?
- 1. Yes 2. No 3. I can only dream to have a garden

- It's dangerous to let the mouthparts of the ticks in your skin after removing its body?
- 1. Yes, because it can still infect you with a pathogen 2. No, because the pathogens are localized in its body 3. Yes, because the body will regrow from the mouth parts

Ticks and tick-borne diseases

- In Europe, ticks are the most important vector for vector-borne diseases for both human and animal health.

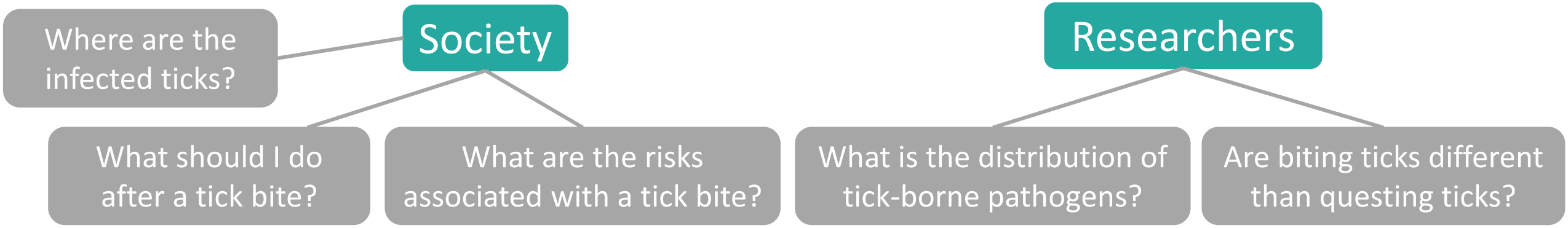
- Tick-borne diseases can be caused by bacteria (e.g. Lyme disease), parasites (e.g. babesiosis), viruses (e.g. tick-borne encephalitis).

- There are around 900 different species of ticks in the world, adapted to different ecosystems.






Ticks and citizen science



- Importance of Tick-borne Diseases (TBDs) for public health and society.

  TBDs are a social problem that calls for the implication of citizens.

- Citizen science projects on ticks are increasing in the world.

CiTIQUE: a citizen science program

Where are the infected ticks?

Society

What should I do after a tick bite?

What are the risks associated with a tick bite?

Researchers

What is the distribution of tick-borne pathogens?

Are biting ticks different than questing ticks?

Started in 2017

To improve our knowledge of ticks and tick-borne disease ecology in order to improve prevention

CiTIQUE: How can citizens participate?

Different levels of citizen engagement

Started in 2017

Level 4 *Co-construction of prevention messages with professionals*



+ 100 trained professionals

Level 3 *Analyzing the ticks during small internships*



19 internships
197 students-researchers
77 citizen-researchers

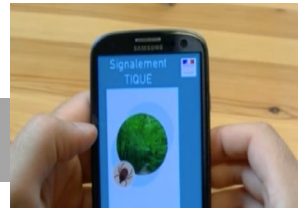
Level 2 *Sending biting ticks*





+ 50 000 biting ticks stored in the 1st biting tick bank in France

Level 1 *Reporting tick bites*



- www.citique.fr
- App Signalement Tique
- Paper form

+ 61 000 animal and human tick bite reports

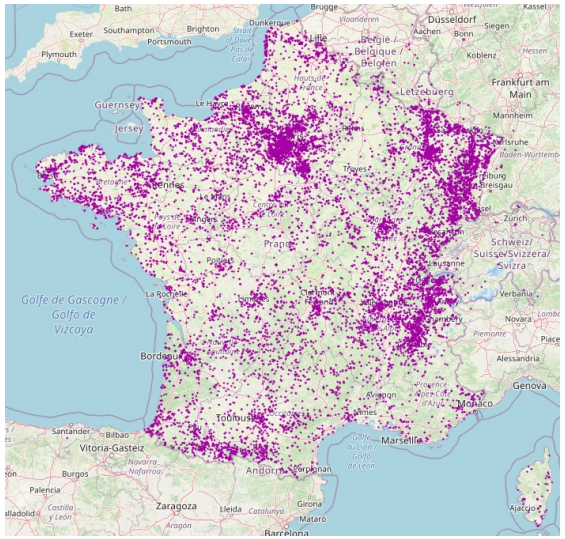
Level 0 *Helping with the outreach of the program*
Adopting good methods to prevent tick bites



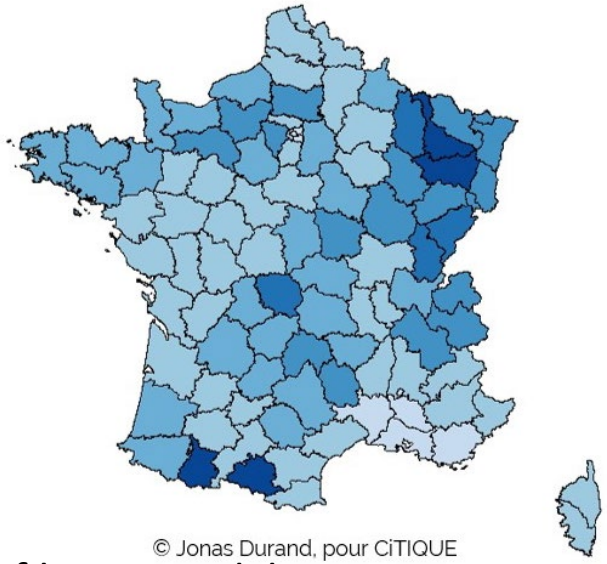
+ 100 partners (Associations, professionals, companies, collectivities…)

Level 1 & 2: results from 2020

18 306 human and 5 300 animal tick bite reports in 2020

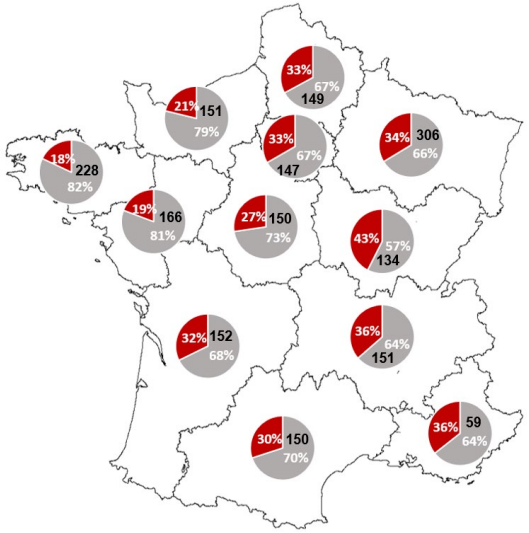


Location of tick bite reports

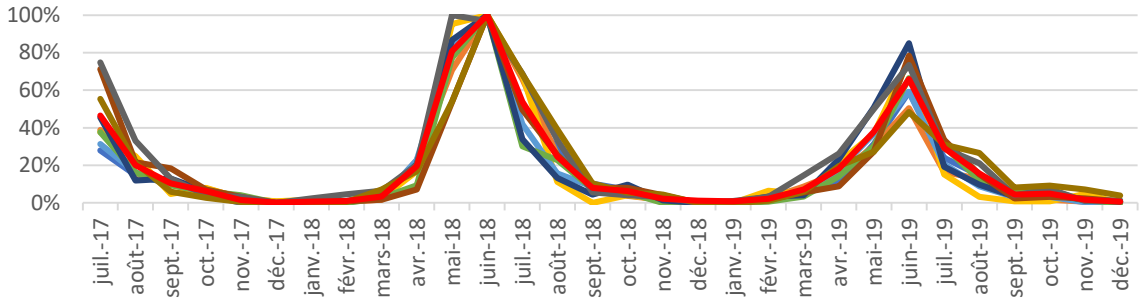


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Number of human tick bites per 100 000 inhabitants



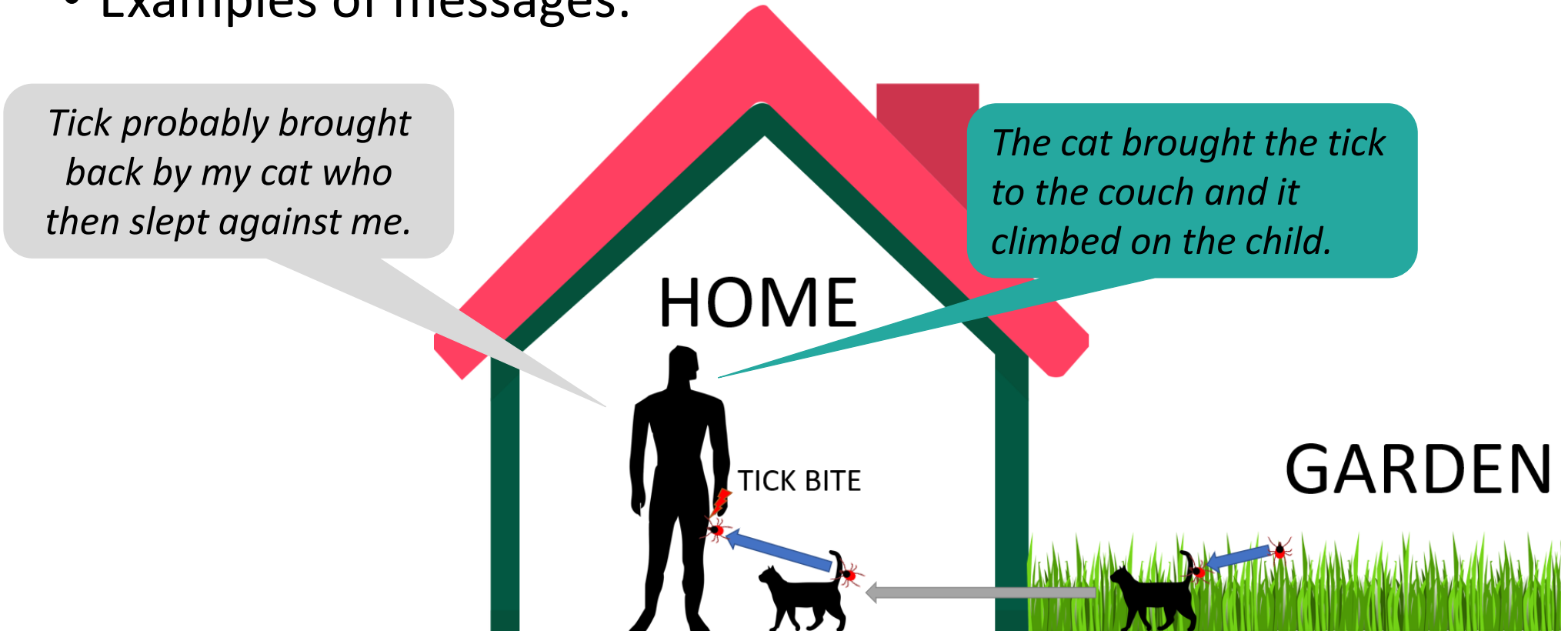
Percentage of ticks infected by a pathogen



Dynamics of tick bite reports

Level 1 & 2: Importance of citizens' contribution

- More than 2000 emails in two years, and 1-2 phone calls per day during peak tick activity.
- Examples of messages:



Level 3: Tous Chercheurs internships

- Tous Chercheurs = Everyone's a researcher
- Tutored by scientists
- Example of a 2-days program:

First Day	Second Day
Discovery and discussion of the scientific method, ticks and tick-borne pathogens ecology Co-construction of a research question, hypothesis	**2nd experiment:** PCR on tick DNA to look for *Borrelia* infection
1st experiment: morphological identification of ticks	**Analysis and discussion** of the results

Level 3: Tous Chercheurs internships

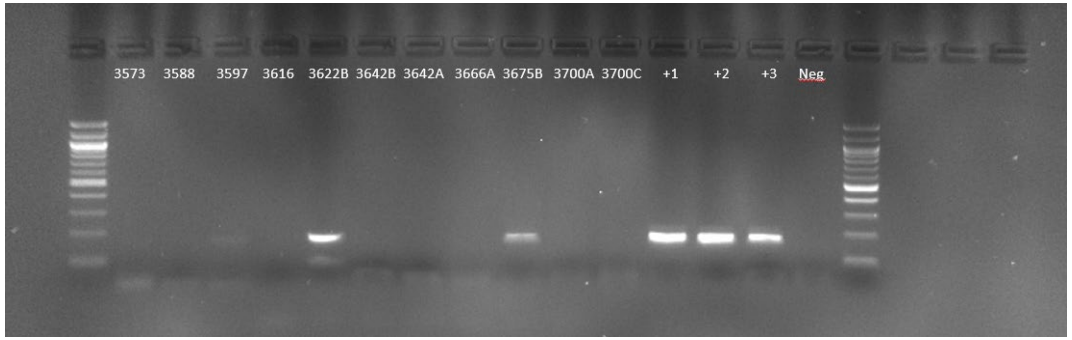


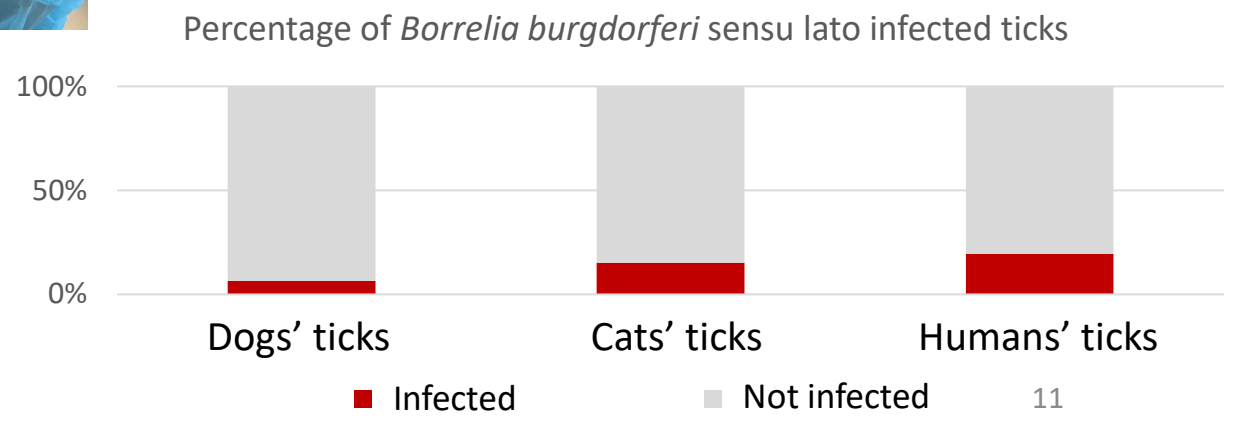
- Started in 2019
- Are pet-biting ticks representing a risk for human health?
- 19 internships (people from 11 to 73 yo)
- 502 analyzed ticks











Level 3: Impact of Tous Chercheurs internships

- Humanities and social science study by Leyat C., Puppo C. and Préau M. (2021)

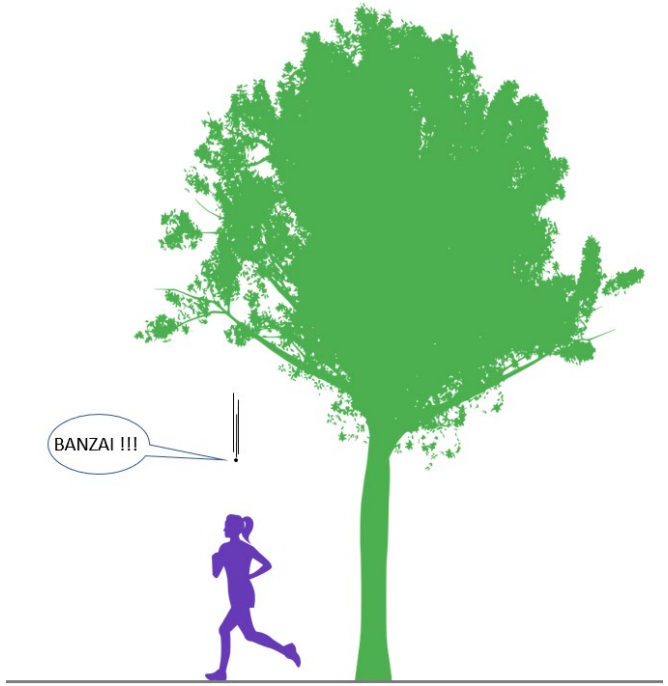
- **Impact on prevention:** citizens more aware of the risks, more confident to prevent tick bites and to share their knowledge with others.

- **Impact on science representation:** renewal of confidence in scientists, new (or confirmed) attraction for science.

- **Impact on stereotypes:** 3 main stereotypes have been the most cited.

Level 3: Impact of Tous Chercheurs internships

- Impact on stereotypes: Results from the polls
- Ticks do not fall from the trees to bite you
- Ticks can be found in private gardens



- If you left the tick mouth parts in your skin when you remove it, it's not dangerous as pathogens are contained in its body.

How to make it work?

CiTIQUE: a small team



Julien Marchand
Cyril Galley
and Irene Carravieri







Annick Brun-Jacob
and Sandrine Capizzi
Enseignants-chercheurs





Tom Beyeart

Jonas DURAND

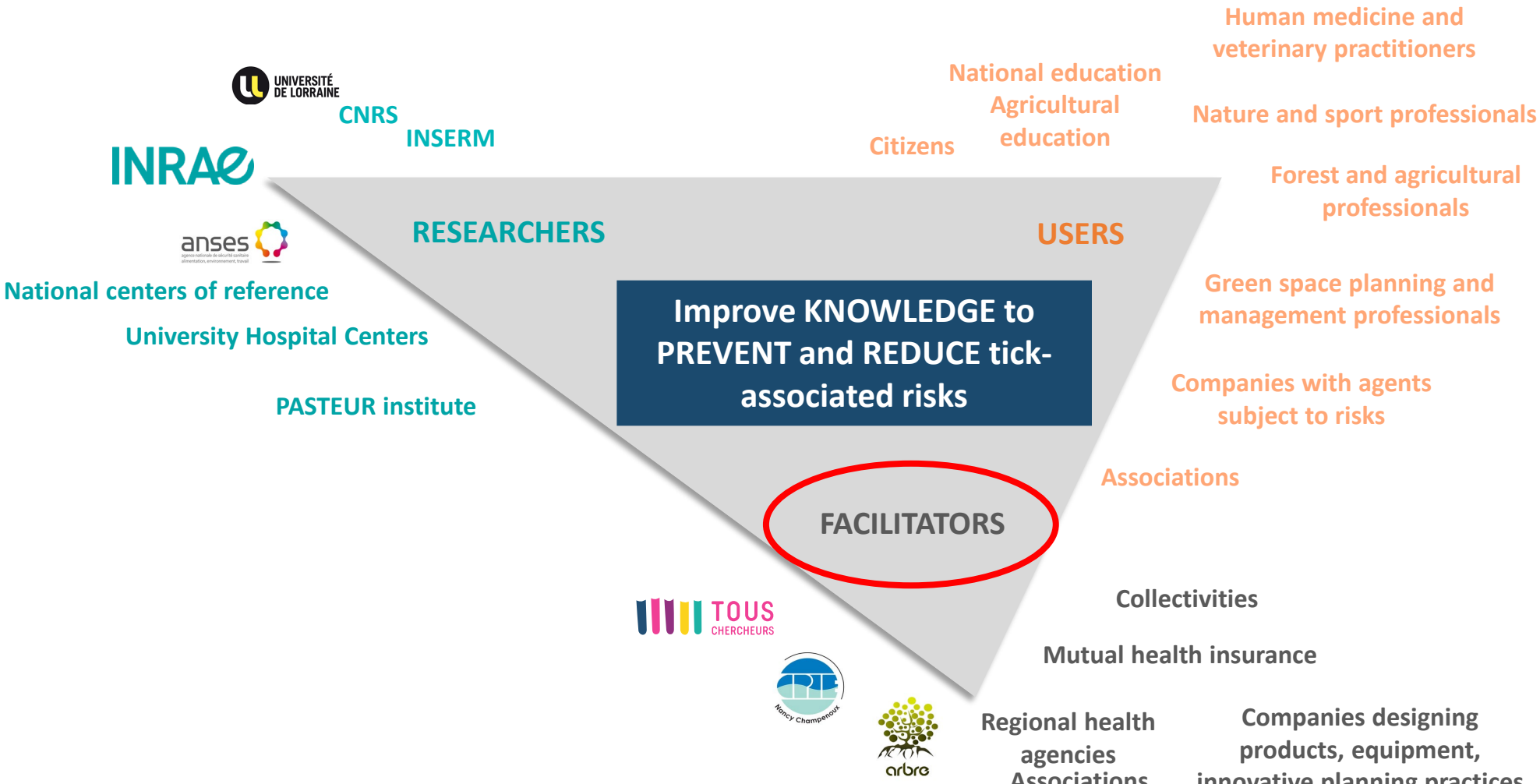


Gwenaël Vourc'h



Pascale Frey-Klett

CiTIQUE: a multi-actors program focused on research



Facilitators with different roles

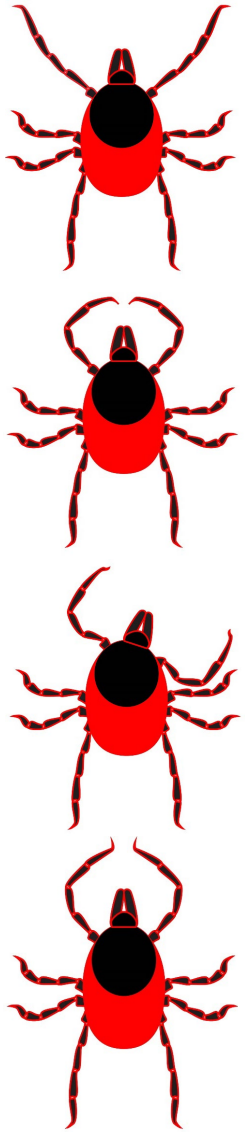
- Linking researchers and users
- Fostering and maintaining engagement in the program
- Program's ambassadors
- Science communication
- Establishment of structures for participatory research (physical or virtual structures)

Take-home messages

- Interaction with citizens is important: they do not have to only be data providers.
- Proposing different level of engagement for citizens.
- It is possible to make scientist-grade research with citizens in an open lab.
- You cannot do everything alone! Facilitators are important.

Acknowledgements

- All the citizens participating in CiTIQUE
- EWDA Network Meeting organizers
- Our financers:



Thank you for your attention!

Bonus : diapos non utilisées

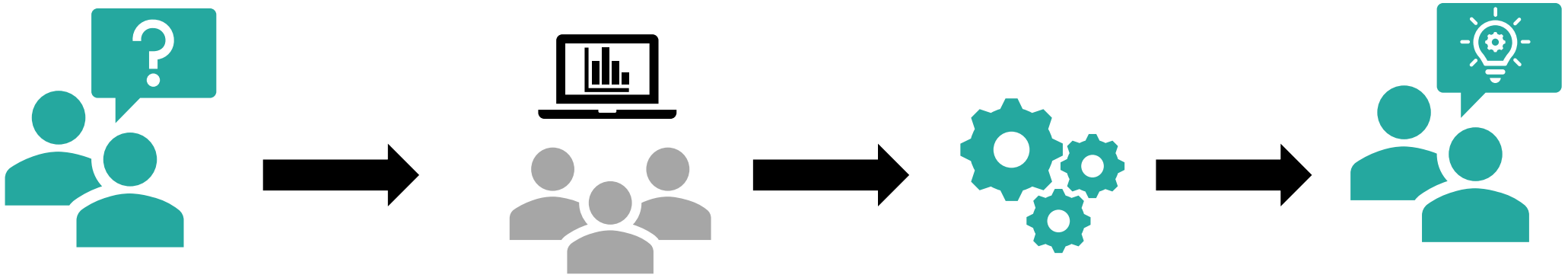
What is a classical citizen science program

Scientists ask a question

Citizens help as data gatherer

Scientists analyze the data

Scientists find the answer



Contributory citizen science

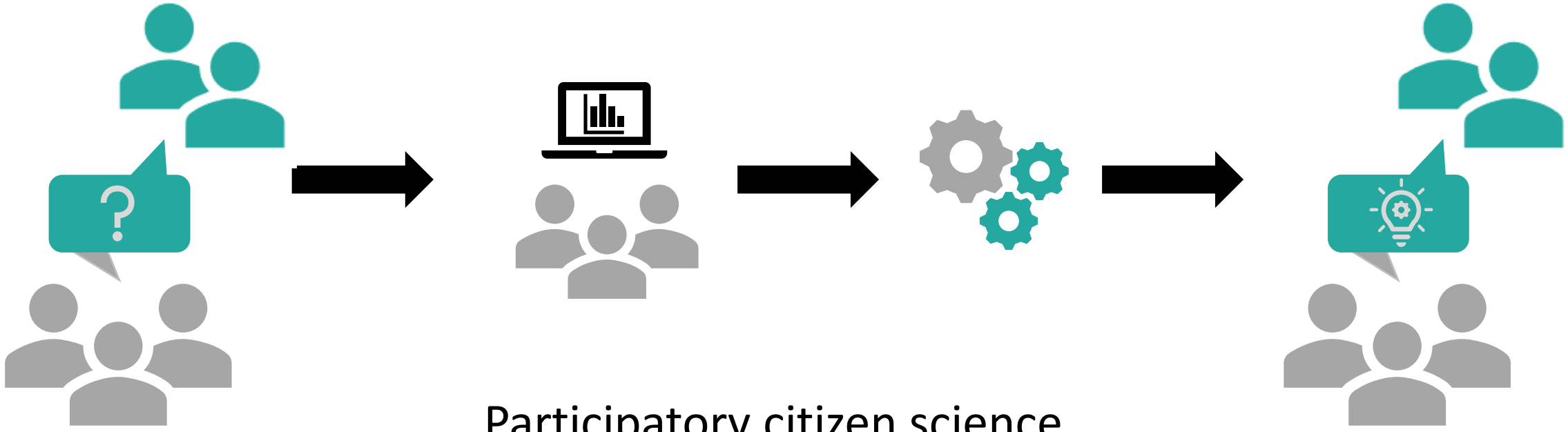
CiTIQUE: a citizen science program with a participatory approach

Scientists and citizen co-construct a question

Citizens help as data gatherer

Scientists and citizens analyze the data

Scientists and citizens find the answer



Participatory citizen science