

# Yellow Fever Outbreak in the Amazon

Group 9



# Emergency Operation Center (EOC)

Following suspected cases/deaths

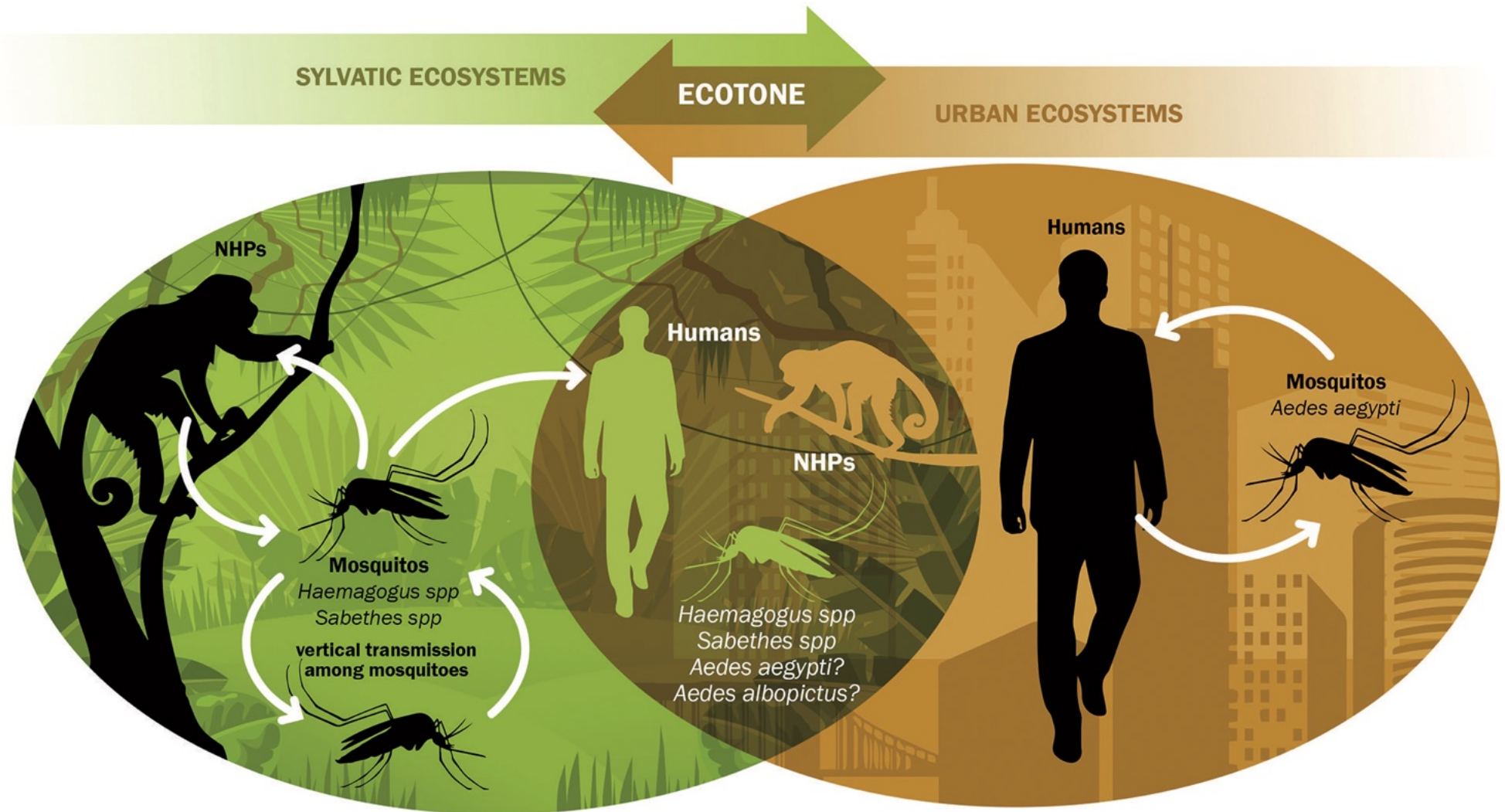


- **Other stakeholders**

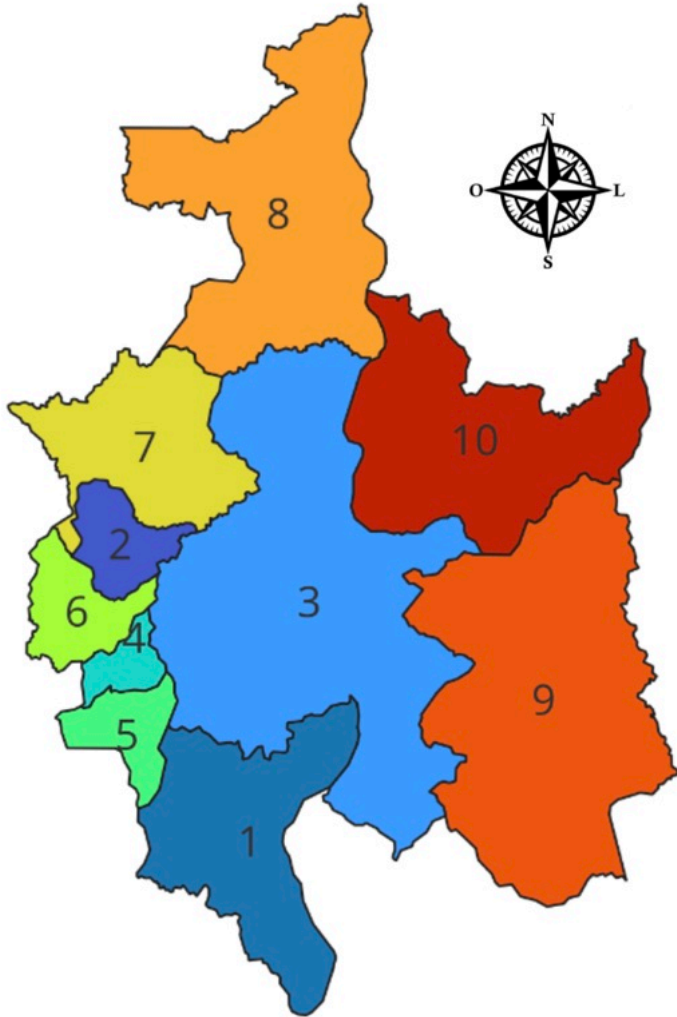
- Mayor
- Health secretary
- Health Care professionals

**Planning / Analysis / Logistics / Communications**

# Yellow Fever: An overview



# Municipality X



- **100.000** inhabitants
- **70%** vaccinated
- **Endemic** for yellow fever
- Mining + deforestation
- **Situation**
  - **1 death** of YF
  - **2 suspected cases**
  - Rumors of **3 dead primates**



# Approaching the situation

## 1) Outbreak confirmation

- Lab confirmation for **human** and **primate** cases
- Investigate **travel history**
- Cases' origins and correlations
- Clinical-epidemiological info

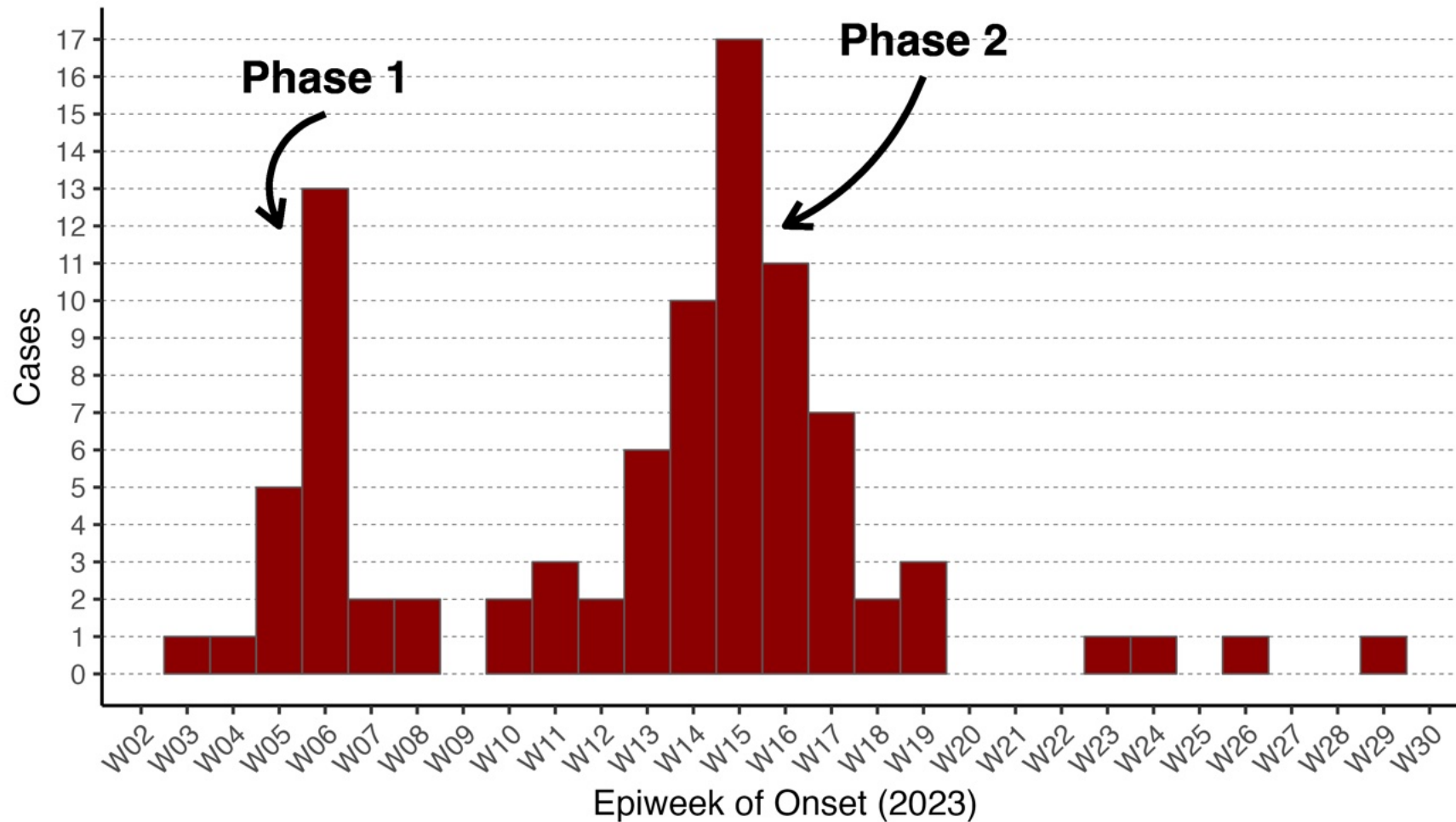
## 2) CONTROL

- **Alert** government/health system
- **Assess** and **promote** vaccination status
- Active search
- **Environmental surveillance** for
  - **Mosquitoes / Primates**
  - Urban cycle?

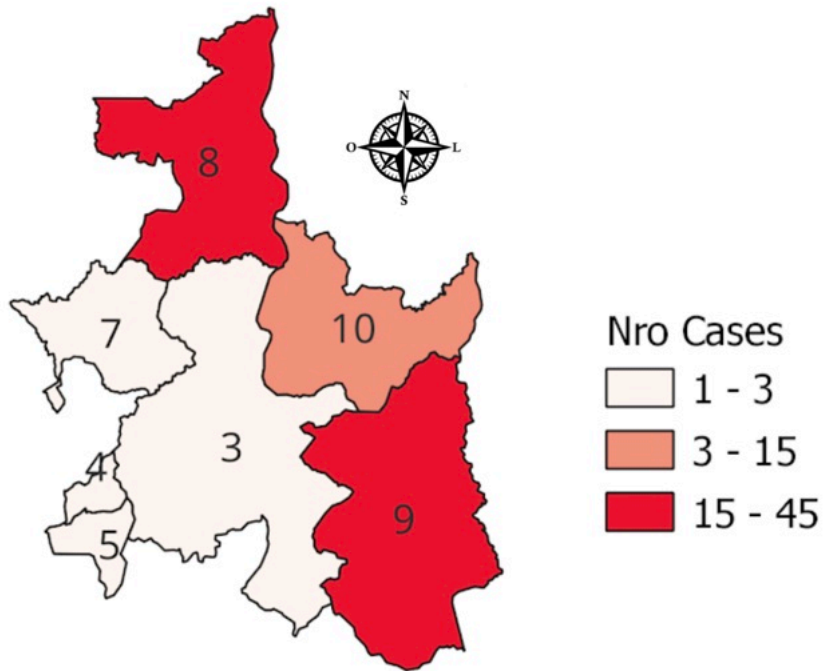
## 3) NEXT STEPS

- For **negative cases** perform metagenomic analysis
- To be **continued**

# Epidemic progression



# Spatial distribution



Number of Yellow Fever cases per region

- The cases were **concentrated** in region 8, 9, and 10.
- We hypothesize that these regions are **closest to mining area and the forest**
- **Risk of spread** to other areas in the city

# Demographics

- **93%** are in regions **8/9/10**
- **78%** are men: average 43.5 yo
- **80,28%** of hospitalization are men
- **71,43%** unvaccinated
- **56.34%** of Lethality

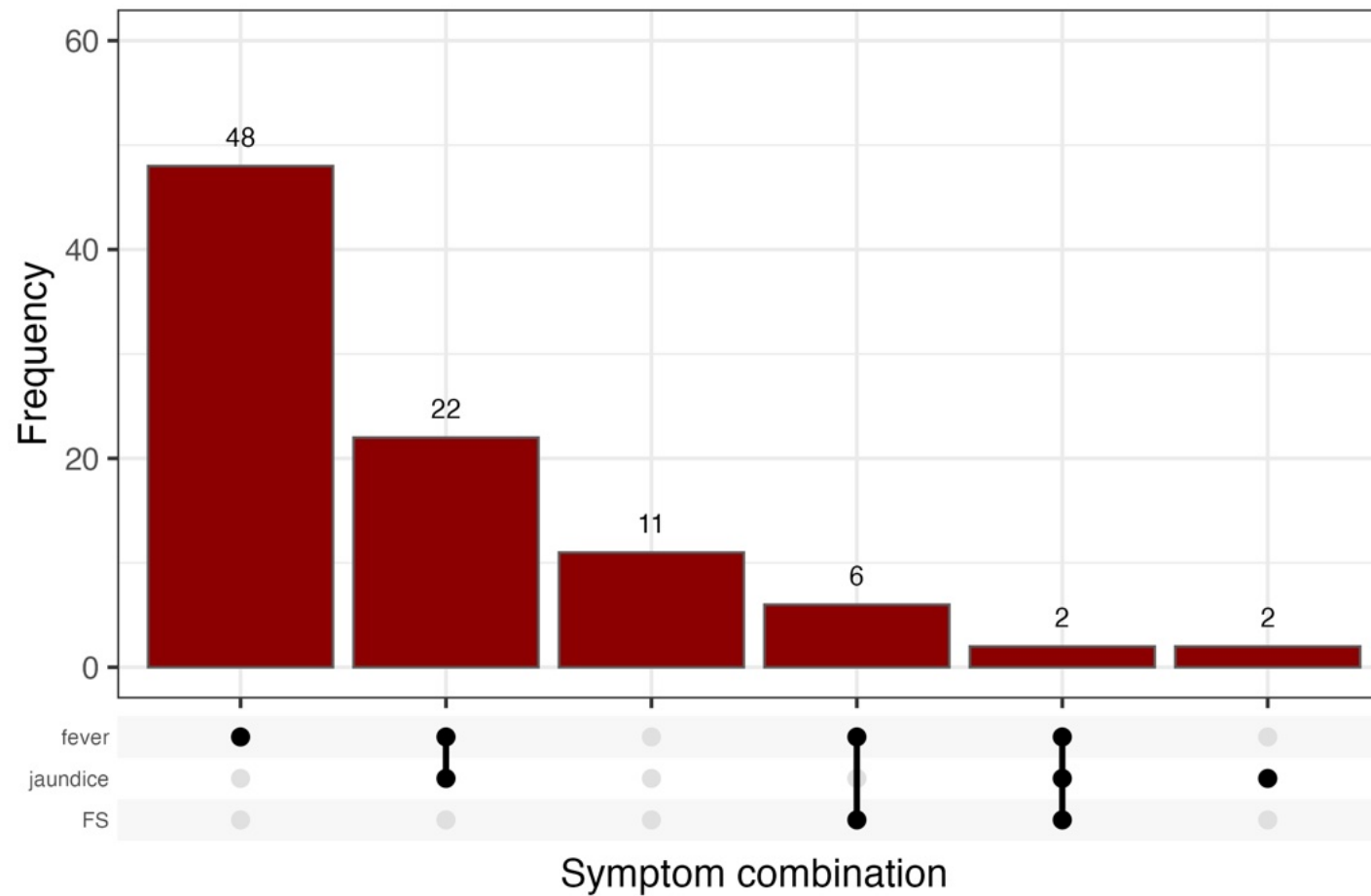
VARIABLES	OR (Logistic with 0 = Recovered/ 1 = Deceased)	95% CI
<b>Having faget signal</b>		
Yes	1	
No	0.24**	(0.08 - 0.77)
<b>Hospitalization</b>		
Yes	1	
No	0.35	(0.08 - 1.47)
<b>Gender</b>		
Female	1	
<b>Male</b>	<b>4.22**</b>	<b>(1.12 - 15.88)</b>
<b>Having jaundice</b>		
Yes	1	
No	0.25**	(0.07 - 0.92)
NA	0.32	(0.08 - 1.31)
<b>Constant</b>	2.20	(0.49 - 9.85)
Observations	82	
*** p<0.01, ** p<0.05, * p<0.1		



# Symptoms

Signs & symptoms Yellow-Fever

The most frequent combinations



# Plan of Action

## PREVENTION



### Vaccinations

- Request more vaccines.
- **Logistics:** campaigning, accessibility.
- If limited resources: **prioritize** higher incidence and mortality population.



### Vector control

- Space spray
- Mosquito surveillance in the households
- Mosquito repellents
- Bed nets

## RESPONSE



### Health-care

- Primary care and Hospital
- Fluids, medicines and Beds
- Human resources
- Health education



### Labs

- Diagnosis




### Secondary Response

- Social and Economical Support

# Communications


- **Strategies for defined target groups:**
  - Authorities
  - General public
  - Health workers
  - Schools
  - Community health agents
- **Daily situation report and weekly meetings**

## Yellow Fever



### What is it?

Acute infectious disease caused by an arbovirus. Transmitted by mosquito bites. With an incubation time (from bite to symptoms) of 3-6 days. Usually causes low severity cases and is preventable.




### Vaccination

Indicated to all individuals from 9 to 60 years of age without 1 previous dose of the vaccine. Can be taken from 08-17h on any UBS.

### Prevention and vector control



Avoid mosquito bites and exposing yourself to areas of jungle or where there are primates. Use bed nets and repellents. Use long sleeves, pants and closed shoes. Eliminate breeding focus: eliminate puddles of clean water.



### When to suspect?

If you present symptoms as:

- High fever
- Jaundice
- Fatigue, weakness
- Nausea, vomiting
- Generalized body pain, headaches, backaches
- Bleeding (specially stool or vomit)



### Severity signals

Bleeding  
Jaundice  
Persistence of symptoms

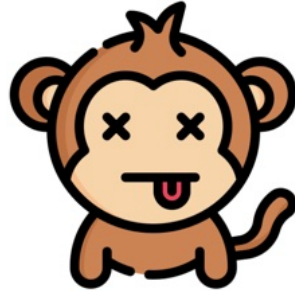
### In case of symptoms

Immediately call the Centro de Informações de Febre Amarela (20)98765-4321 or  
Go to the nearest Basic Care Unit (UBS) to be evaluate by a medical doctor.

# New challenges



**Most mining workers are undocumented immigrants**



**Rumours that mining workers are killing monkeys.**



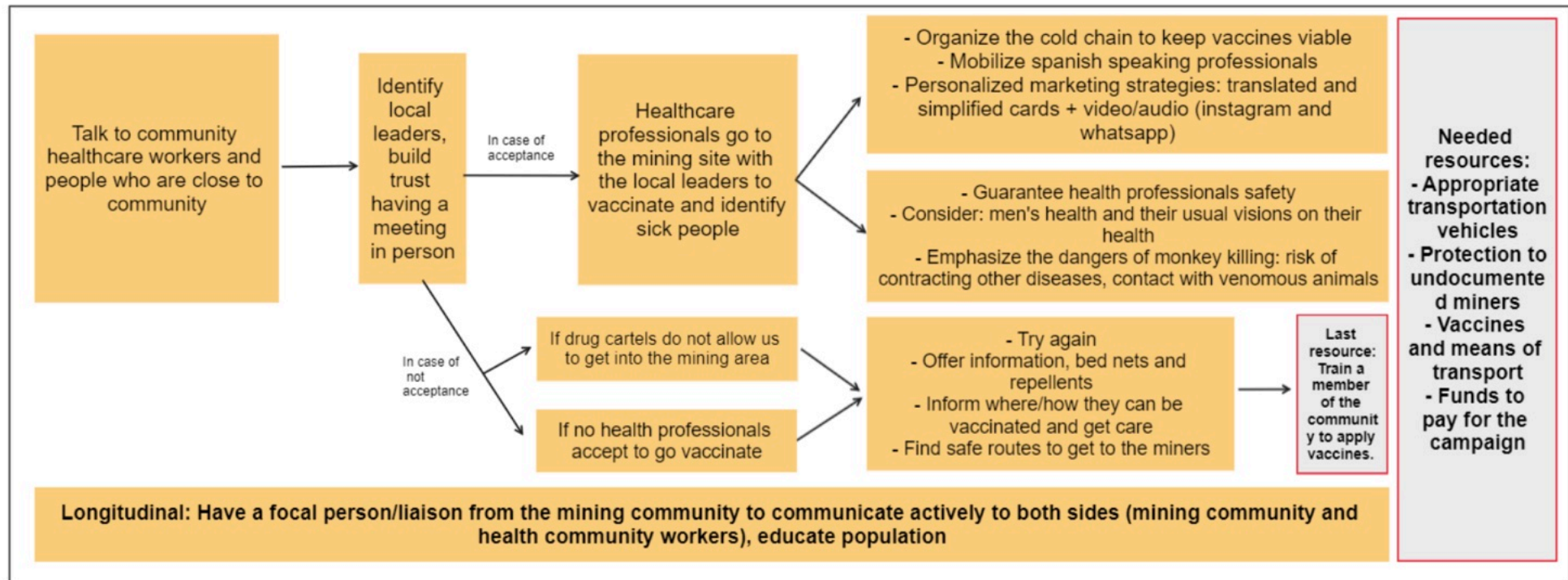
**Mayor and population pressure authorities to allow hunting of wild animal.**



**Drug cartel is partially controlling the mining area hindering access**

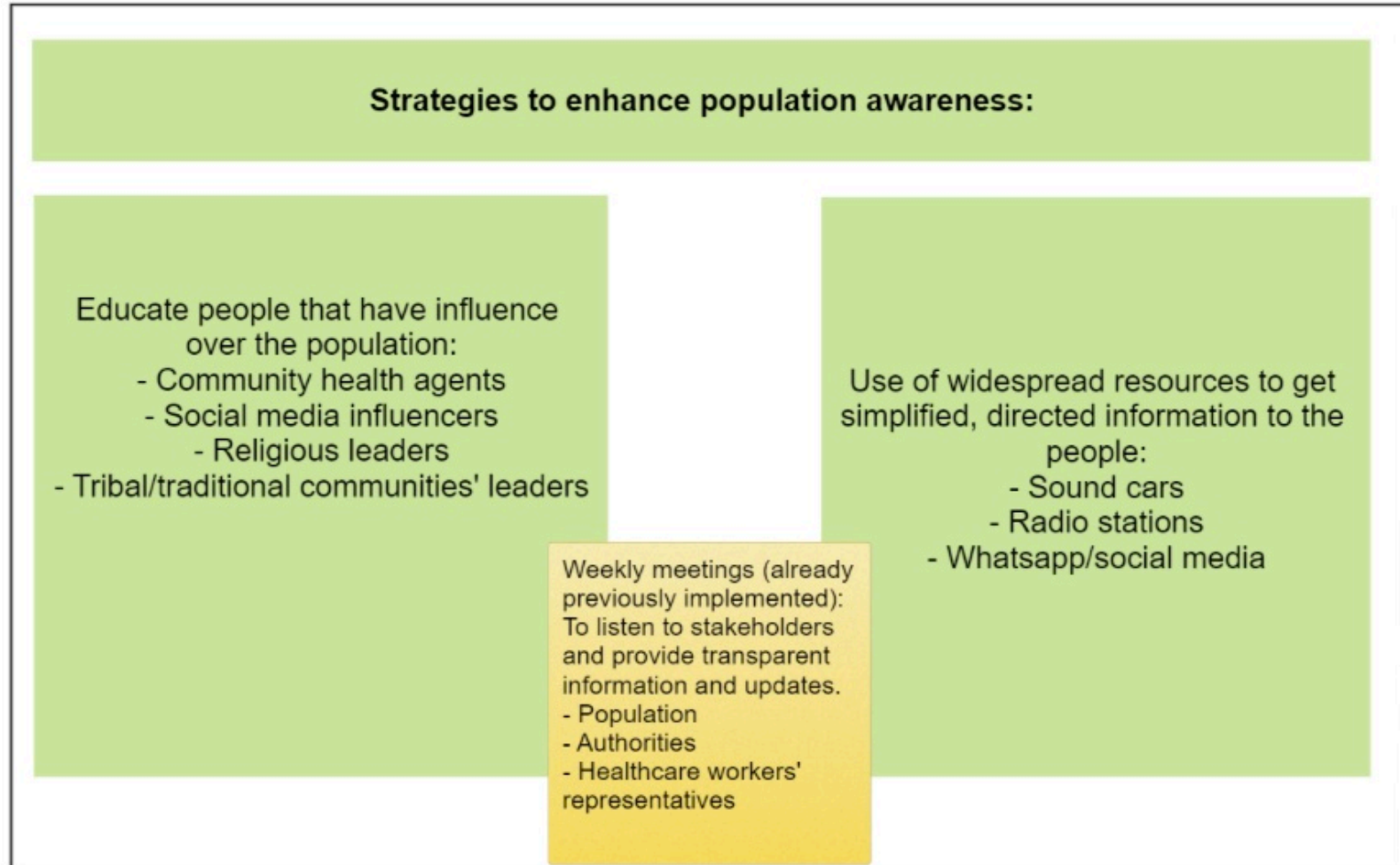
# Adapting to the new challenges

## Approaching the miners



# Adapting to the new challenges

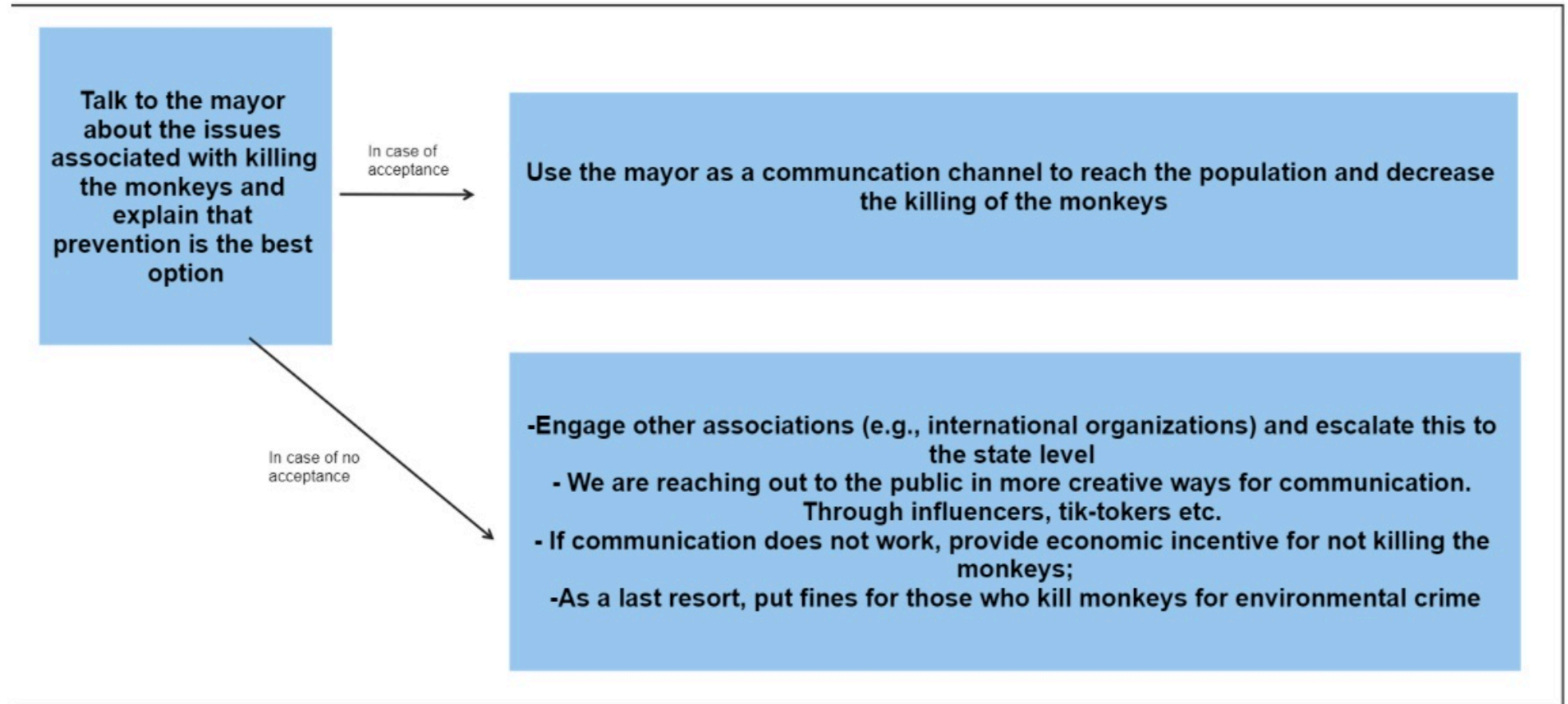
## Approaching general population





# Adapting to the new challenges

## Approaching authorities



# Addressing resource limitations

Shortage of vaccines, ICU beds ...

## Priorities

Investigate increased mortality

- Differential diagnosis
- Virus mutations
- Miners conditions, delay in treatment

Guarantee vaccination & hospital beds

Address vaccine hesitancy

Enhance prevention measures

Improve monitoring & data collection

Propose future research

# Lessons learned

- We need **collective** efforts from **multidisciplinary** backgrounds
- Define **priorities** and secondary steps
- Focus on hypotheses and plans that can give us **quick answers**
- Communicate and engage with **stakeholders** and **population**
- Think **outside the box**
- Make the most out of the **information we have** rather than focusing on what we don't have
- Capitalize on our **strengths** and our partnerships
- Public health is **political**
- **Life** can always get **harder**

**Thank you!**