

## Yellow fever epidemic – Angola experience



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October 2017

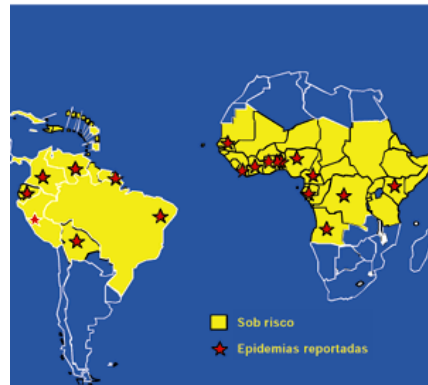
# + Content

- Context
- Detection of the epidemic
- Authorities & partners informed
- Diagnostic strategy
- Adopted measures
- Vaccination
- Geographical distribution of the epidemic – social and environmental determinants
- Main challenges





# CONTEXT



1 - Áreas sob risco de febre amarela e países que reportaram epidemias no período de 1985 a 2000. Fonte: OMS.





# Yellow Fever (YF) epidemic - context



- Usually disease of compulsory immediate notification;
- Continuous routine lab surveillance febrile icteric syndrome cases was ongoing at INSP
- Epidemic experienced from 5th December 2015 to 23rd December 2016
- 4,618 suspected cases reported, with 884 laboratory confirmed and 384 deaths .
- The average case fatality rate (CFR) was 13.6 among laboratory confirmed YF cases



# DETECTION OF THE EPIDEMIC



# + Detection of the epidemic

- Index case – 3 cases identified in Luanda, municipality of Viana – 5<sup>th</sup> December 2015.
- The samples were tested in the Laboratory of the National Institute of Public Health of Angola - positive for YF IgM.
- The samples were then sent to the Laboratory of the National Institute of Communicable Diseases of Johannesburg - South Africa, where additional tests were carried out to validate the results obtained by INSP Angola. Results received in January 2016.
- Nonetheless, the World Health Organization (WHO) recommended that the official confirmation of the disease should be obtained from the Institute Pasteur Laboratory in Dakar/Senegal, which was done on the 21<sup>st</sup> January 2016.



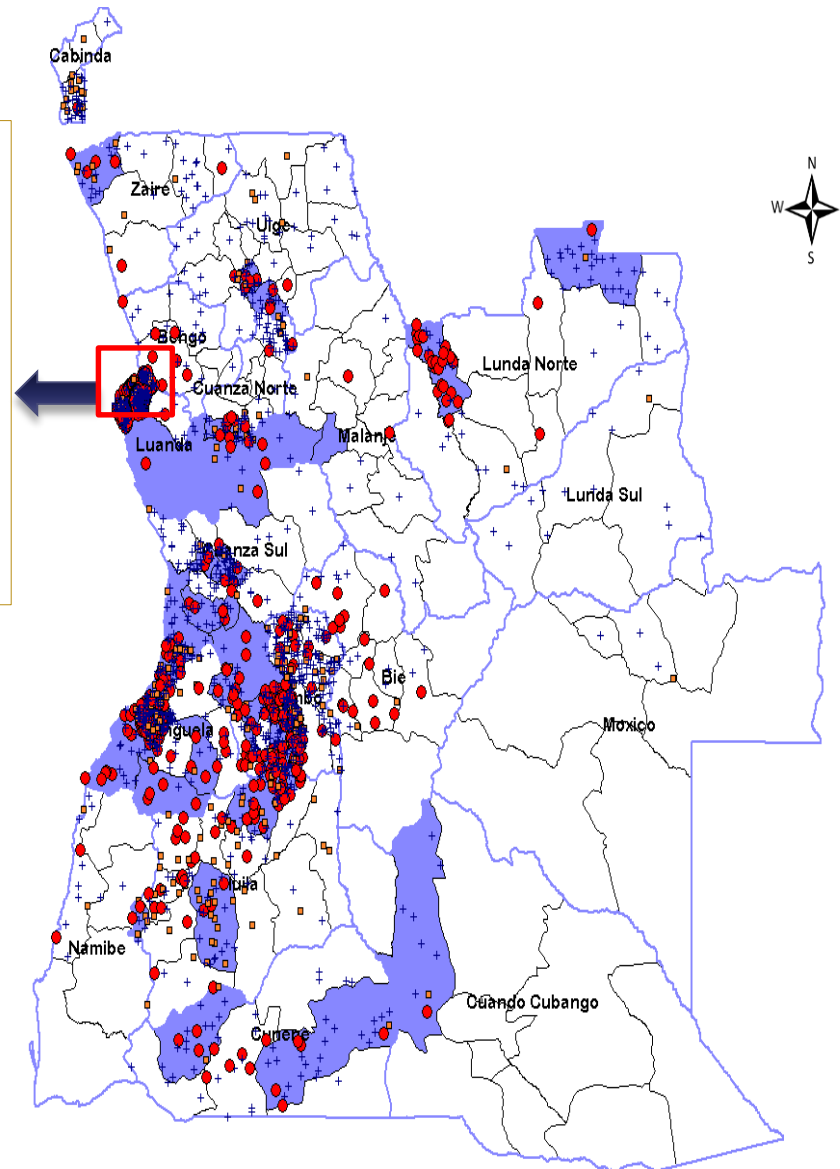
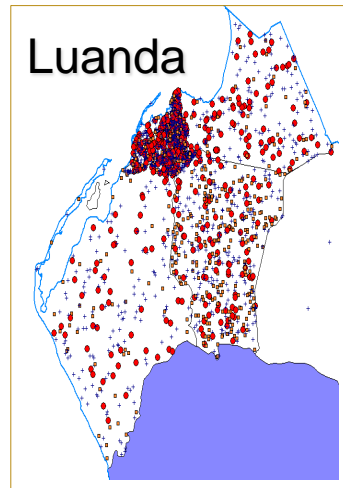
- Epidemic was characterized by an exponential increase and rapid geographical expansion, mainly in areas with high population density.
- Sequencing and phylogenetic testing indicated that this epidemic was caused by a YF virus highly similar to the one that circulated in 1971

## Resurgence of Yellow Fever in Angola, 2015–2016

Antoinette A. Grobbelaar, Jacqueline Weyer,  
Naazneen Moolla, Petrus Jansen van Vuren,  
Francisco Moises, Janusz T. Paweska



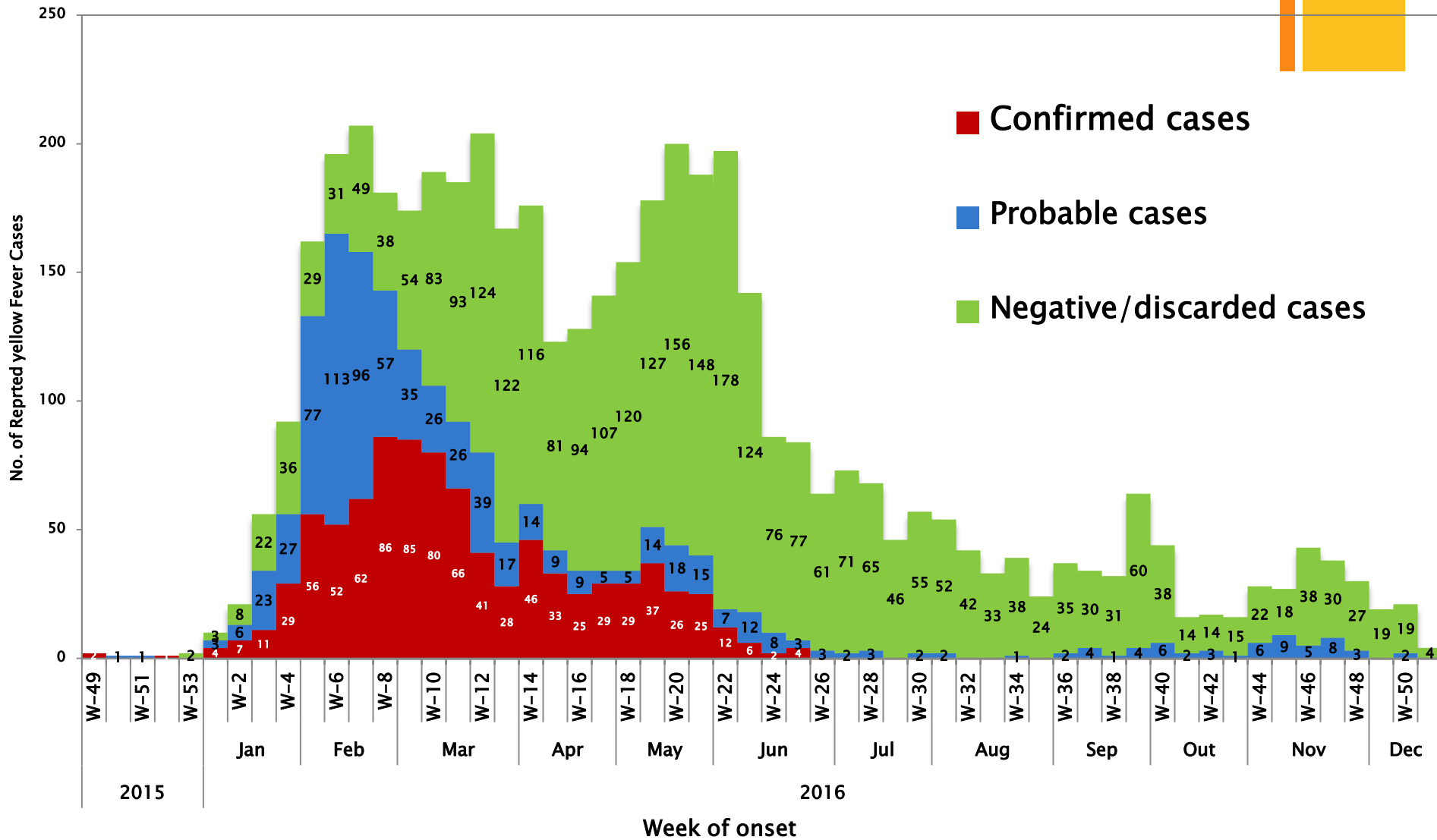
# Angola Map of Confirmed YF Cases (n=884)



- Casos confirmados N=884
- Casos prováveis N=735
- ⊕ Casos negativos/descartados N=2999
- Transmissão local



# + No of cases/epi week





AUTHORITIES &  
PARTNERS INFORMED





- Government of Angola
- WHO
- CDC-USA
- UNICEF
- Médecins sans Frontiers (MSF)
- Cuban Cooperation



World Health Organization





# NATIONAL CONTROL STRATEGY



REPÚBLICA DE ANGOLA  
MINISTERIO DA SAÚDE  
DIRECÇÃO NACIONAL DE SAÚDE PÚBLICA

## RELATÓRIO FINAL DA RESPOSTA À EPIDEMIA DA AMARELA EM ANGOLA, 2016



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Luanda, Dezembro, 2016

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# National Epidemic Response Plan



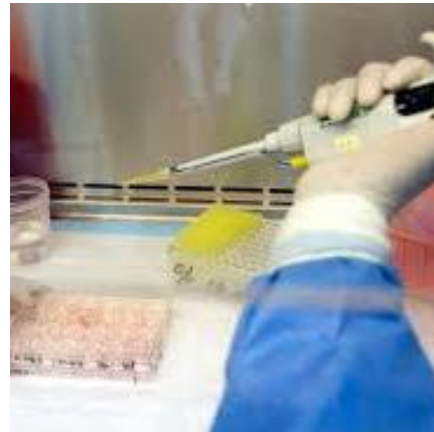
- Developed by the Angolan MoH in collaboration with WHO, UNICEF, CDC-USA, Médecins sans Frontiers (MSF), amongst other partners.
- 5 different components implemented:
  - Epidemiological and laboratory surveillance to monitor the epidemic trend which guided the response interventions;
  - Integrated vector-control measures to reduce the density of adult *Aedes aegypti* mosquitoes through fumigation, indoor spraying and application of bio larvicides in breeding sites;
  - Social mobilization to increase the level of awareness about the mode of transmission and prevention of infection with Yellow Fever Virus (YFV), adherence to vaccination and vector control measures;
  - Clinical management of patients to reduce the case fatality rate (CFR) and;
  - Mass vaccination of the Angolan population as the main control intervention, targeting individuals over 6 months of age and prioritizing people living in municipalities where local transmission had been detected.



- Weekly meetings between the MoH and partners to evaluate the efficacy of control measures implemented.



# DIAGNOSTIC STRATEGY



# + Diagnostic strategy



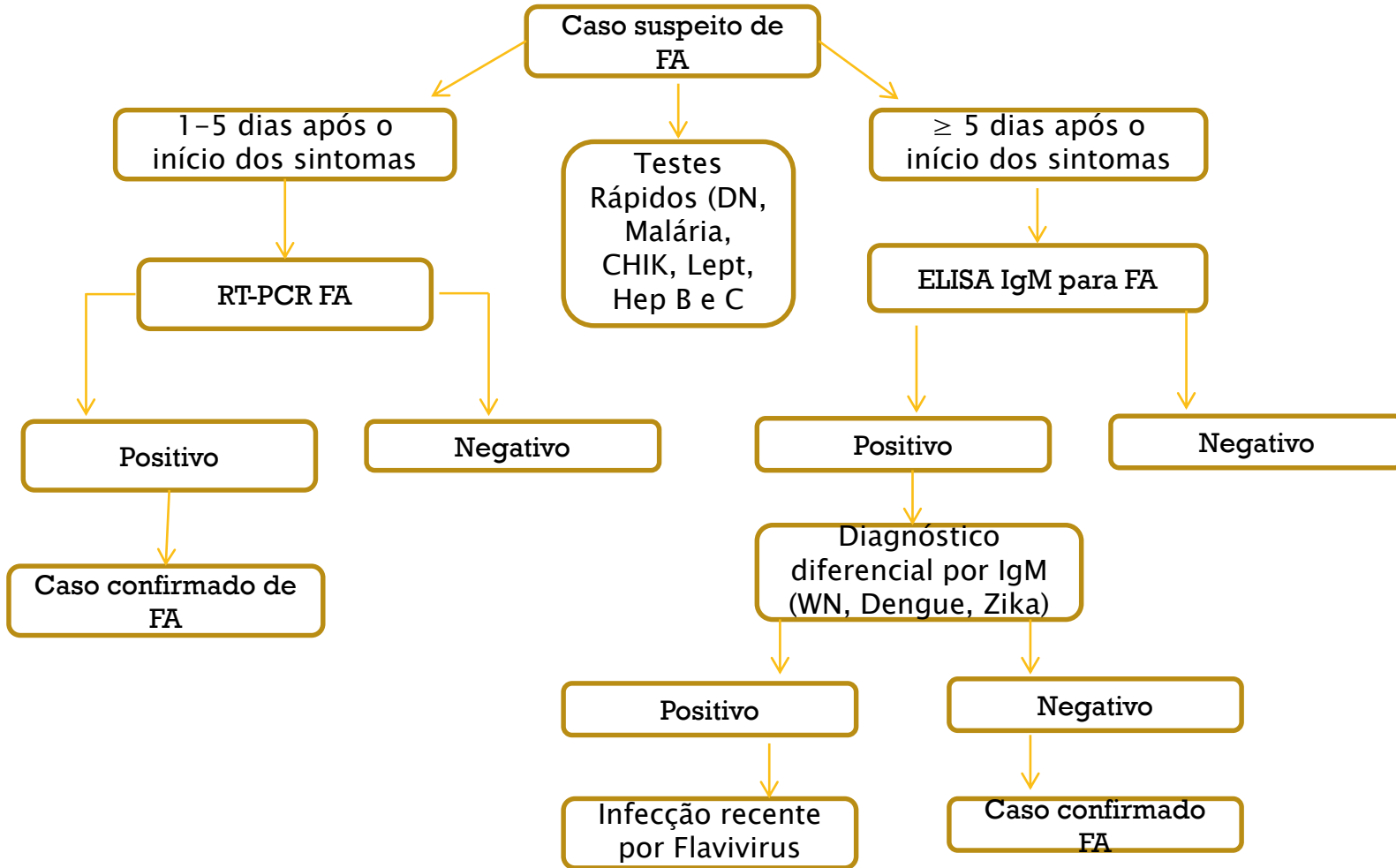
- The adopted laboratory testing strategy
  - detection of YF-specific IgM antibodies
  - detection of YF virus by real time RT-PCR, and
  - for specific cases the detection of YF neutralizing antibodies (IP-Dakar).
- The clinical condition of YF highly resembles that of other flaviviral infections (Dengue, Chikungunya) and may resemble Malaria.
- Differential Diagnosis:



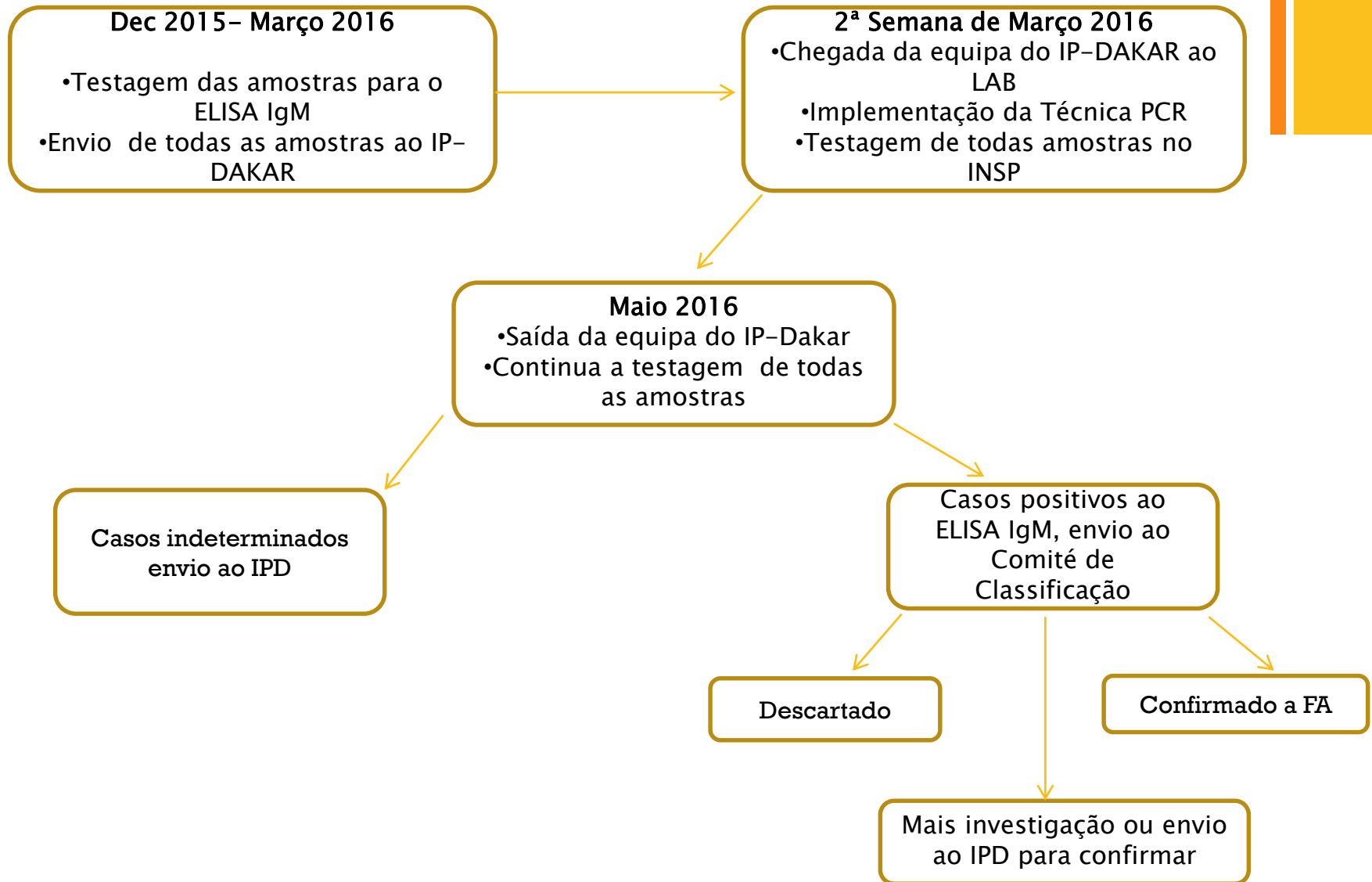


- The differential diagnosis using RDT revealed:
  - 449 positive malaria;
  - 207 positive Dengue;
  - 49 positive Chikungunya;
  - 53 positive Leptospirosis;
  - 25 positive HCV and
  - 54 positive HBV samples.
  
- Confirmation with EIA technique for Zika (539 samples), Dengue (317 samples) and West Nile Virus (78 samples), all revealed negative results.
  
- Among the municipalities in the province of Luanda, Viana was the most affected with 570 cases (32,7%), followed by Cazenga with 476 (21,7%), Belas with 322 (14%), Kilamba Kiaxi with 289 (12,6%) and Cacuaco with 256 (11,1%)

# + Testing algorithm



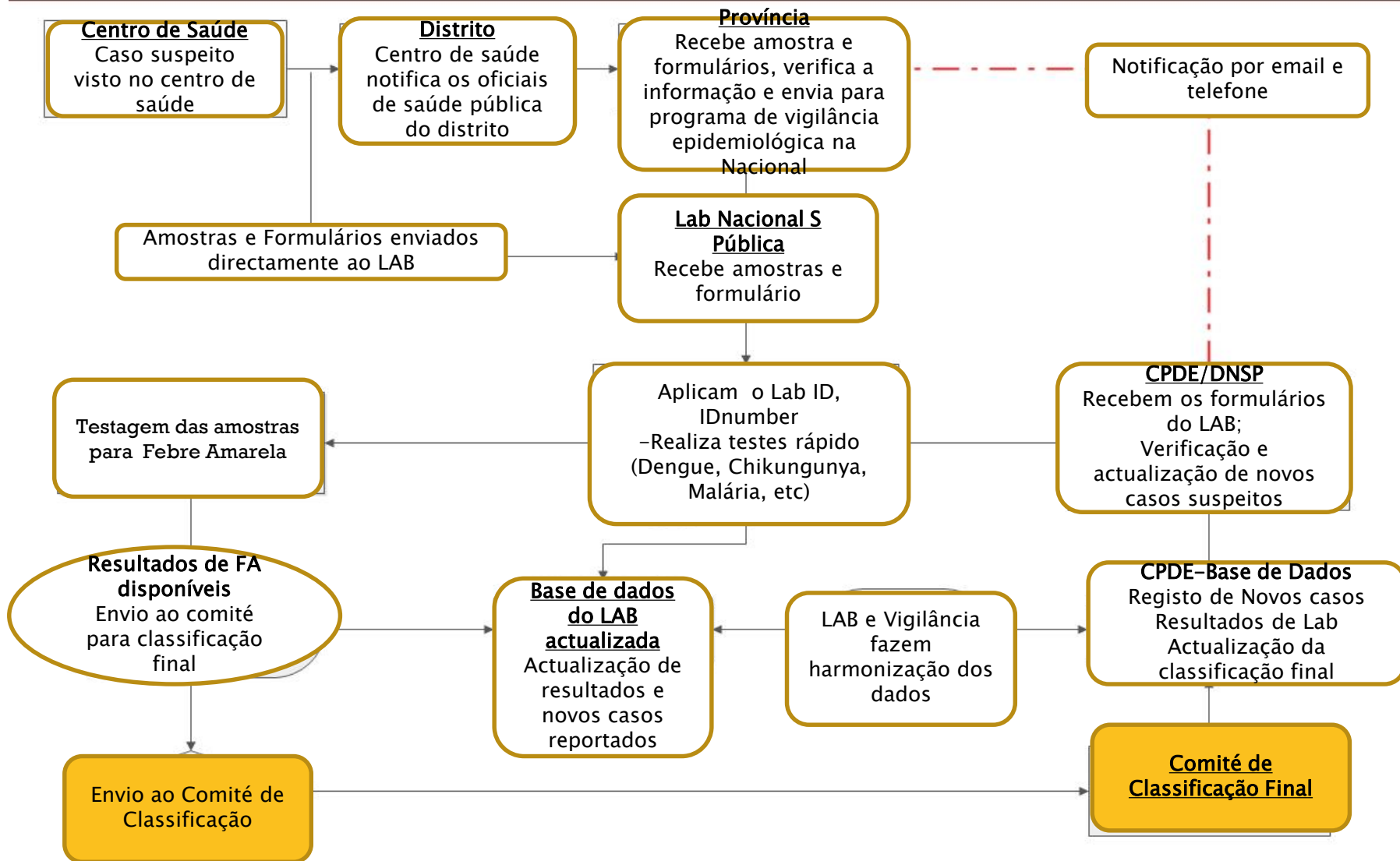
# + Laboratory testing quality control



## + Epi and Lab surveillance

- Each province had a surveillance team which did notification of both suspected and confirmed cases and referral of samples to the Reference LAB.
- Data was compiled in the central YF database of the Department of Hygiene and Epidemiological Surveillance of the Ministry of Health (MoH).
- A Technical Committee (PAV, Surveillance and LAB) for case investigation, evaluation and response was created.
- LAB conducted testing and gave retro information to the Technical Committee.
- Technical Committee was responsible for the response measures implemented (vector control, vaccination, etc).

# Processo de fluxo de dados para a resposta ao surto de FÁ em Angola





# VACCINATION





# Main control intervention



- Mass vaccination of the Angolan population estimated at 25.273.243 people targeting individuals over 6 months of age .
- Routine vaccine coverage was around 60% during the previous 15 years.
- No pediatric deaths during the epidemic.
- Enormous difficulty with mass vaccination, due to vaccine shortage in the international market.
- Under WHO and International Coordinating Group on vaccine (ICG) advice, vaccination was undertaken only in 85 of the 166 municipalities
  - reported local transmission and
  - other risk areas such as the border districts.



- The campaign began in Luanda on the 2nd of March 2016 until the 15th of October 2016, with 19,657,280 doses purchased and 18,057,272 individuals vaccinated in 85 municipalities, of which 71 (88.7%) reached vaccination coverages higher than 80%.
- Overall vaccine coverage was 88.9%.





# MAIN CHALLENGES



# + Main challenges

- Intensification of surveillance to reach all districts
  - Human resources, materials, vehicles, surveillance mechanisms, sample transportation
- Vaccine distribution (shortage in the international market)
- Vector control activities (climatic conditions, material, accessibility)
- Information and communication with the communities (disbelief in NHS, cultural habits)
- Clinical management of cases (shortage of essential medication, capacity for rapid differential diagnosis, saturated



- Climatic changes between December 2015 and December 2016:
  - higher intensity and frequency in rain fall,
  - high temperatures
  
- Favourable conditions for the increase in vector reservoirs
  
- Poor sanitation
  
- Saturated Public Health System
  
- Ongoing Malaria outbreak



Obrigada pela atenção

Gracias

Danke

Merci

Thank you