WHO continues to support the Ministry of Public Health and other national authorities in Madagascar to monitor and respond to the outbreak of plague. Since mid-October 2017, there has been a decline in the overall incidence of the disease and the number of patients hospitalized due to plague infection across the country. From 7 - 8 November 2017, no new suspected cases of pulmonary plague and no new deaths have been reported in Madagascar.

From 1 August to 8 November 2017, a total of 2,034 confirmed, probable and suspected cases of plague, including 165 deaths (case fatality rate 8%), have been reported from 55 of the 114 districts in the country. Of these, 1,565 (77%) were clinically classified as pulmonary plague, 297 (15%) were bubonic plague, one was septicaemic, and 171 were not yet classified (further classification of cases is in process). Since the beginning of the outbreak, 82 healthcare workers (with no deaths) have been affected.

Of the 1,565 clinical cases of pneumonic plague, 371 (24%) have been confirmed, 581 (37%) are probable and 613 (39%) remain suspected (additional laboratory results are in process). Twenty-eight specimens cultured Yersinia pestis, which were sensitive to antibiotics recommended by the National Program for the Control of Plague.

Overall, 14 of the 22 (64%) regions in Madagascar have been affected. Analamanga Region has been the most affected, with 71% of all recorded cases.

About 95% (6,866) of 7,122 contacts identified thus far have completed their 7-day follow up and a course of prophylactic antibiotics. Only eleven contacts became suspected cases. On 8 November 2017, 316 out of 343 (92%) contacts under follow-up were reached and provided with prophylactic antibiotics.

Plague is endemic on the Plateaux of Madagascar, including Ankazobe District, where the current outbreak originated. A seasonal upsurge, predominantly of the bubonic form, usually occurs yearly between September and April. This year, the plague season began earlier and the current outbreak is predominantly pneumonic, and is affecting both endemic and non-endemic areas, including major urban centres such as Antananarivo (the capital city) and Toamasina (the port city).

There are three main forms of plague, depending on the route of infection: bubonic, septicaemic and pneumonic (for more information, see the link http://www.who.int/mediacentre/factsheets/fs267/en/).
NB: The figures in the External Situation report are subject to change due to continuous data consolidation, cleaning and reclassification, and ongoing laboratory investigations. The data reported are based on best available information reported by the Ministry of Public Health.

Figure 1. Geographical distribution of cases of plague in Madagascar as of 8 November 2017

Figure 2. Distribution of pulmonary plague cases reported in Madagascar, 1 August - 08 November 2017.
Current risk assessment

While the number of new cases and hospitalizations due to plague is declining in Madagascar, WHO cannot rule out the possibility of flare ups of additional cases until the typical plague season ends in April 2018, and thus recommends maintaining vigilance until then.

Based on available information and response measures implemented to date, the potential risk of further spread of plague at national level remains high. The risk of international spread is mitigated by the short incubation period of pneumonic plague, implementation of exit screening measures and advice to travellers to Madagascar, and scaling up of preparedness and operational readiness activities in neighbouring Indian Ocean islands and other southern and east African countries. The overall global risk is considered to be low.

WHO is re-evaluating the risk assessment based on the evolution of the outbreak and information from response activities.

Strategic approach to the prevention, detection and control of plague

WHO recommends the implementation of proven strategies for the prevention and control of plague. These strategies include (i) coordination of the response, (ii) enhanced surveillance, (iii) laboratory confirmation, (iv) contact identification, prophylactic antibiotic administration and follow-up, (v) case management, (vi) infection prevention and control, (vii) safe and dignified burials, (viii) social mobilization and community engagement, (ix) logistics, (x) risk communication, (xi) vector control, (xii) partner engagement, (xiii) research (xiv) strengthening preparedness in priority countries, and (xv) resource mobilization for response.

2. Actions to date

Coordination of the response

- A high level inter-Ministerial coordination forum, chaired by the Prime Minister, has been established in-country to provide strategic and policy directions to the plague outbreak response. Similarly, the Country Humanitarian Team of the United Nations System established a strategic coordination platform for partners, chaired by the Resident Coordinator.
- The health response is coordinated by the Ministry of Public Health, co-led by WHO and supported by agencies and partners directly involved in the health response. The health sector response is organized into four major committees: (i) surveillance, (ii) community engagement and education, (iii) case management, and (v) communication; with the logistics committee crosscutting all committees.
- Coordination of partners in the Health cluster has been strengthened to ensure effectiveness, avoid duplication in the field and ensure efficient coverage of the affected areas. The Health cluster is having weekly meetings, with some partners participating in the national coordination platforms. The 4W matrix is updated regularly.
- Cross sectoral non-Health actors (media, transport, defence, education, etc.) are being coordinated by the National Risk and Disaster Management Office (BNGRC).
- Since the declaration of the outbreak, WHO (Country Office, Regional Office for Africa (AFRO) and Headquarters (HQ) are providing direct technical and operational support to the country, and collaborating closely with partners, including partners in the Global Outbreak Alert and Response Network (GOARN) to ensure rapid and effective international assistance to this outbreak response.
- WHO has classified the event as a Grade 2 emergency, based on its internal Emergency Response Framework. Accordingly, WHO has established its Incident Management System (IMS), and has repurposed internal resources and mobilized external resources.
- A stakeholder’s meeting is scheduled for 10 November 2017 to develop a short to medium-term strategic plan in response to the plague outbreak.

Surveillance, contact identification and follow-up

- Active surveillance, including active case finding, is being strengthened in the 3rd and 5th districts of the city of Tana, from where majority of cases originated in the last 2 weeks.
- There is an ongoing exercise to classify unspecified cases in the database, aimed to provide a clear epidemiological picture of the outbreak.
Training modules for field investigators, community agents and supervisors have been updated and distributed to all the regions. Training of investigators, community agents and their supervisors has been completed in Vakinankaratra and Atsinanana Regions.

An emergency and death alert system, known as Emergency PESTE 910, has been set up, with the support of UNICEF, PSI and WHO.

The Ministry of Public Health, in close collaboration with the Institut Pasteur Madagascar and WHO, continues with collection, compilation, updating, and cleaning of the plague database, and preparation of situation and epidemiological reports.

An automated data collection tool (VOOZANOO), which transmits district data to the central level, is being implemented in all relevant regions.

A total of 1,800 community health workers in Antananarivo and 2,632 from other affected regions are carrying out contact tracing activities, being supervised by 340 medical doctors and students.

**Laboratory**

- Diagnostic capacity for plague is provided at the Institut Pasteur de Madagascar (IPM). All the samples collected are analysed at IPM and the results are shared regularly.
- A new sample transportation system has been established to facilitate timely delivery of samples to IPM and provide rapid feedback of results to the health facilities.

**Case management**

- The case management committee validated a new patients screening guideline, which was disseminated to all triage and plague treatment centres.
- The International Federation of Red Cross (IFRC), in association with the Malagasy Red Cross, opened its plague treatment centre at Andohatapenake Hospital, with an initial capacity of 10 beds.
- Nine plague treatment centres have been established, of which six are in Antananarivo. The treatment centres are supported by IFRC, MSF, MdM, UNICEF, and WHO.
- USAID has provided six mobile clinics to transport patients to hospitals within Antananarivo.

**Infection prevention and control**

- All schools were disinfected and a watch committee set up in each school prior to reopening of public primary and secondary schools on 6 November 2017.
- A total of 346 healthcare providers have been trained on infection prevention and control measures at various health facilities, including the three plague treatment centres in Ambalavao, Antsirabe and Fianarantsoa. Thirty of the participants were from Haute Matsitra Region.
- The partners supporting water, sanitation and hygiene (WASH) and infection prevention and control (IPC) activities during the plague outbreak include UNICEF, WHO, ACF, MSF, USAID RANOWASH, CDC, OCHA, and others.
- UNICEF supported distribution of WASH and IPC supplies, materials and equipment to three new treatment centres in Ambalavao, Antsirabe and Fianarantsoa. Some of the materials include handwash facilities, garbage cans, laundry soap, chlorine powder, hydroalcoholic solutions, sprays, and personal protective equipment.
- Action Against Hunger installed a bladder tank.
- A total of 198 staff made up of hygienists, guards, launderers, coordinators, and logisticians have been hired in the six treatment centres in Antananarivo and 70 additional staff have been hired for treatment centres in Tamatave and Fenerive East.

**Social mobilization, community engagement and risk communications**

- A total of 8,000 community leaders have been trained to conduct community-based surveillance, counter rumours and fears and respond to information needs related to the plague in the communities.
- In preparation for the national polio vaccination campaign set to begin on 22 November 2017, preventive messages for plague have been integrated with the polio vaccination messages.
Public health information and preventive messages are being developed targeting anticipated resumption of major sporting events in the country.

Social mobilization and community engagement training modules in French and Malagasy have been developed. Training of trainers using the new modules started on 30 October 2017 in Tamatave and Antananarivo. Eventually, a total of 768 volunteers and 192 Fonkontany leaders in Tana and 548 volunteers and 137 supervisors in Tamatave will be trained.

Training of hospital receptionists, intended to improve communication with and provide a cordial welcome to patients, medical staff and families of patients, has been planned.

The dignified and safe burial protocol has been finalized and submitted to the national authorities for validation. Implementation of this protocol is expected to reduce reluctance and encourage communities to report all cases of deaths. A report of pre-tests of the protocol conducted in Antanarivo Ville and Tamatave shows that 90% of the population consulted were in favour of the measures proposed in the protocol.

A series of recommendations have been developed to guide medical staff in how to handle patients and their families in care centres and hospitals in a sensitive manner.

The WHO risk communication team are managing a message bank to ensure that the technical content of all messages is appropriate and validated by specialists from each pillar. The message bank allows harmonization of all messages used by the various communication media. The messages are reviewed by the national teams in Antananarivo and Tamatave to facilitate customization to the regional context.

UNICEF supported production of field-tested public awareness/education materials (posters, brochures, radio/television spots). A total of 69,000 posters and brochures have been produced and distributed, including to partners in the Ministries of Transport and Tourism, church groups and other key influencers.

**Logistics**

- The Logistics Committee is conducting regular meetings to improve supply management chain.
- UNICEF donated 23 tents, 50 beds, 150 adult body bags, 64 children’s mortuary bags, 300 boxes of 100 pairs of gloves, 12,000 surgical masks, 400 masks, and three inter-agency emergency health kits.
- A total of 1.2 million doses of antibiotics donated by WHO have been delivered to the national authorities in the country.
- USAID has donated 18,000 respirator masks, 100,000 simple masks and 10 vehicles to support operations of the Department of Public Health.

**Partnership**

- Partners in the Global Outbreak Alert and Response Network (GOARN), in coordination with WHO, continue to monitor the evolution of the outbreak and deploy experts and technical assistance to support various aspects of the outbreak response and affected communities.
- In support of the Ministry of Public Health and the other national authorities, WHO and the GOARN partners deployed emergency response teams. By 6 November 2017, a total of 135 experts (85 from the WHO Country Office in Madagascar, 35 through the WHO Headquarters and 15 from the WHO Regional Office for Africa) were deployed to support the response in various fields. An additional 16 experts were deployed through the GOARN partners.
- China CDC bilaterally deployed a team of experts to Madagascar.
The joint response plan between the Government of Madagascar and its partners has been adjusted to US$ 9.5 million, to reflect the multisectoral and multidisciplinary response to the urban plague outbreak.

Financial contributions from partners include: WHO US$ 1.5 million, UNICEF US$ 500 000, the International Federation of the Red Cross (IFRC) US$ 250 000, UNDP US$ 200 000, and UNFPA US$ 331 000.

The US Government provided US$ 1 million through USAID to support response efforts of partners in Madagascar, including USAID Mikolo, Mahéfa Miaraka and Institut Pasteur Madagascar; and in-kind contributions of personal protective equipment (PPE). ECHO has provided US$ 300 000 to support IFRC and UNICEF response activities. Switzerland supported the response through a CHF 200 000 contribution to Action Contre la Faim (ACF).

In addition, donors and partners have provided in-kind assistance bilaterally: China has provided medicines worth US$ 200 000. France provided 255 000 pairs of gloves. Morocco sent medical aid in form of 34 tons of medicines, medical material and protection equipment. Japan provided masks, blankets and thermometers. Support from the private sector has been increasing, amounting to a financial contribution of US$ 16 000 and in-kind contributions, including storage facilities.

Notwithstanding the financial support and contributions from partners, WHO urgently requires an additional US$ 4 million to sustain response operations in the next 3 months of the plague outbreak in Madagascar. The funding is needed to interrupt ongoing transmission, provide care for those affected by the disease, reduce the risk of international spread, and provide effective coordination and operations support. To date, WHO has provided US$ 1.5 million from its Contingency Emergency Funds (CFE) for the immediate outbreak response activities and has received US$ 1.23 million from Norway and US$ 117 000 (EUR 100 000) from Italy.

WHO thanks all partners and donors for their vital support to the plague response in Madagascar and for the contributions to the Contingency Fund for Emergencies, which allowed efficient and timely joint response to the outbreak.

While progress has been made in response to the plague outbreak in Madagascar, WHO remains vigilant, and cannot rule out the possibility of future flare-ups. More support is urgently needed to sustain the response until the end of the usual plague season in April 2018.

IHR travel measures

Based on the available information to date, the risk of international spread of plague appears very low. WHO advises against any restriction of travel or trade on Madagascar. To date, there are no reported cases related to international travel.

WHO continues to monitor travel measures being implemented by countries at points of entry.

In a press release on 3 November 2017, following a visit by the Secretary General of the World Tourism Organization (UNWTO), the UN body expresses confidence in tourism in Madagascar and is echoing the WHO advice against any travel or trade restrictions against Madagascar.

Information on the plague situation in Madagascar is published weekly and is available at: http://www.afro.who.int/health-topics/plague/plague-outbreak-situation-reports

Preparedness/operational readiness

To date, no cases of plague have been reported outside Madagascar.

Nine countries and overseas territories have been identified as priority countries in the African Region for plague preparedness and readiness by virtue of having trade and travel links to Madagascar. These countries and overseas territories include Comoros, Ethiopia, Kenya, Mauritius, Mozambique, La Réunion (France), Seychelles, South Africa, and Tanzania.

While progress has been made in response to the plague outbreak in Madagascar, WHO remains highly cautious. The plague season runs between September and April and an increase in cases can be expected. Sustainability of ongoing operations remains critical to mitigate further cases of plague in the country. Funds for operations are running low. Additional response support needs to be provided and efforts to strengthen outbreak control measures should continue.

Proposed ways forward include:

- Improve timely flow and analysis of surveillance data in order to monitor the evolution of the outbreak and provide evidence for effective response operations.
- Fast-track approval of the dignified and safe burial protocol and initiate its implementation in the communities.
- Improve timely shipment of laboratory specimens from remote and distant districts to the capital.
- Strengthen animal and vector surveillance and control interventions.
- Increase funding of the national response plan to enable the national authorities and partners to effectively contain the outbreak and put in place additional measures until the end of the epidemic season in April 2018.
- Continue strengthening response operations at the community level, especially case detection and referral.
- Continue to provide adequate supplies of personal protective equipment and rapid diagnostic test kits at operational level.
- Continue to strengthen community-based surveillance systems to facilitate early detection of cases.
- Enhance and sustain risk communication and social mobilization through the various communication channels. Continue to strengthen preparedness and readiness activities in priority countries.

3. Summary of public health risks, needs and gaps

While progress has been made in response to the plague outbreak in Madagascar, WHO remains highly cautious. The plague season runs between September and April and an increase in cases can be expected. Sustainability of ongoing operations remains critical to mitigate further cases of plague in the country. Funds for operations are running low. Additional response support needs to be provided and efforts to strengthen outbreak control measures should continue.

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Annex 1: Timeline of reported events during the plague outbreak in Madagascar, 11 September - 2 November 2017