Fourth annual meeting of the network of Buruli ulcer PCR laboratories in the WHO African Region

Mundi complex, Yaoundé, 24–26 October 2022
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Acknowledgements

The World Health Organization (WHO) is grateful to the participants of the fourth (hybrid) meeting of the network of Buruli ulcer PCR laboratories (BU-LABNET) in Africa at the Mundi complex in Yaoundé, Cameroon, on 24–26 October 2022.

The meeting was organized by the Pasteur Centre of Cameroon (CPC) and the WHO Department of Control of Neglected Tropical Diseases (WHO/NTD), supported by the Anesvad Foundation and American Leprosy Missions.

The report was prepared by Mr Hycenth Numfor and Dr Sara Eyangoh (BU-LABNET Coordinating Centre, CPC) and reviewed by the meeting participants and the BU-LABNET advisory board. Dr Kingsley Asiedu (WHO/NTD) provided technical oversight along with Dr Priya Pathak (WHO/NTD). Ms Félicité Bana Owona and the CPC Communications Department gave administrative support.

Funding for the meeting was provided by the Anesvad Foundation, the Raoul Follereau Foundation and the American Leprosy Missions.
## Abbreviations and acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>BU-LABNET</td>
<td>Buruli ulcer laboratory network</td>
</tr>
<tr>
<td>COVID-19</td>
<td>coronavirus disease</td>
</tr>
<tr>
<td>CPC</td>
<td>Pasteur Centre of Cameroon</td>
</tr>
<tr>
<td>ITM</td>
<td>Institute of Tropical Medicine</td>
</tr>
<tr>
<td>NTD</td>
<td>neglected tropical disease</td>
</tr>
<tr>
<td>PCR</td>
<td>polymerase chain reaction</td>
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<tr>
<td>SOP</td>
<td>standard operating procedure</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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Introduction
Section 01

Introduction

In October 2019, WHO convened the first meeting of the Buruli ulcer laboratory network (BU-LABNET) in Yaoundé, Cameroon, bringing together 11 laboratories from nine countries at the Pasteur Centre of Cameroon (CPC), the network’s Coordinating Centre. The network was formally established at this meeting (1) and its members were those present. The objective of BU-LABNET is to improve diagnosis of Buruli ulcer based on polymerase chain reaction (PCR) using standardized testing protocols, involving external quality assurance programmes and sharing knowledge among member laboratories.

In July 2020 and December 2021, two further meetings were held virtually owing to the coronavirus disease (COVID-19) pandemic and associated disruptions. Given the gradual easing of COVID-19 restrictions and resumption of activities, it was decided to organize the fourth meeting onsite, with online participation for those unable to attend in person.

The fourth annual meeting of BU-LABNET was held at the Mundi complex in Yaoundé, Cameroon, on 24–26 October 2022. The meeting agenda is attached as Annex 1 and the participants are listed in Annex 2.
Objectives of the meeting
Objectives of the meeting

The overall objective of the meeting was to review the progress of BU-LABNET and plan activities for 2023. The specific objectives were:

- to present updates on activities including challenges encountered;
- to share ideas on how to enhance the visibility of the network through collaborative studies and publications;
- to discuss the integration of PCR-based case confirmation with that for other skin-related neglected tropical diseases (skin NTDs);
- to review and adopt the updated standard operating procedures (SOPs) for Buruli ulcer;
- to brainstorm on concrete activities to implement in 2023; and
- to discuss harmonization of procedures for PCR-based diagnosis of yaws.
Topics for discussion
### Topics for discussion

The following topics were reviewed and discussed:

- epidemiology and geographical distribution of skin NTDs in WHO's African and Eastern Mediterranean regions;
- BU-LABNET activities including those conducted by the Coordinating Centre, and challenges and status of member laboratories;
- activities of member laboratories, including research;
- PCR protocols for yaws, cutaneous leishmaniasis and mycetoma;
- SwiftX technology;
- integration of priority skin NTDs in the different network laboratories; and
- perspectives for collaborative studies.

#### 3.1 Epidemiology and geographical distribution of skin NTDs in the WHO African and Eastern Mediterranean regions

Dr Augustin Kadima and Dr Yves Barogui (WHO Regional Office for Africa) presented the epidemiology and geographical distribution of Buruli ulcer, yaws, leprosy and cutaneous leishmaniasis in the WHO African Region. Professor Ahmed Fahal (Mycetoma Research Center) presented the mycetoma situation in the WHO Eastern Mediterranean Region. The NTD road map targets for 2030 (2) were also presented.

#### 3.2 BU-LABNET activities

Dr Sara Eyangoh (BU-LABNET programme coordinator) summarized the milestones registered to date. The main challenge raised was that of communication to enhance the visibility of the network's activities. The strengths of the 11 member laboratories and areas for improvement are shown in Fig. 1.

The formal status of member laboratories was raised as an important issue, and it was agreed to establish a membership certificate (Annex 3). Certificates were duly produced, signed and awarded to all the member laboratories present at the meeting.

Revisions to the SOPs of the network were discussed. The SOPs were shared before the meeting with member laboratories for review and feedback. All comments were consolidated and re-shared with members before a final consolidated version 2 was prepared.

#### 3.3 Member laboratory activities including research

Representatives from the member laboratories of the network presented updates of their activities using the reporting template. Discussions focused on PCR test statistics for 2022, challenges, planned activities for 2023 and perspectives from the individual laboratories.

It was noted that:

- the number of samples received and tested by laboratories has fallen; and
- laboratories require additional training or refresher on diagnosis of Buruli ulcer.

During the update on research activities, five laboratories presented ongoing research studies, including general objectives, collaborating teams, results (if any) and next steps.

Dr Dziedzom de Souza (Foundation for Innovative New Diagnostics [FIND]) shared progress on research titled “A Buruli ulcer mycolactone rapid diagnostic test to enhance early diagnosis and treatment” implemented in Cameroon and Côte d’Ivoire.

Dr Michael Frimpong (Kumasi Centre for Collaborative Research in Tropical Medicine) presented on the “Development and validation of a portable, point-of-need Mycobacterium ulcerans qPCR test” study carried out in Cameroon and Ghana.

Both studies aim to decentralize diagnosis of Buruli ulcer to peripheral laboratories to facilitate access to diagnosis.

Dr Richard Akuffo (Noguchi Memorial Institute for Medical Research) discussed global perspectives and research history of cutaneous leishmaniasis in Ghana and summarized recent research conducted in the Oti Region of Ghana.
The network offers an important opportunity to conduct or participate in multicentric research activities, including clinical trials evaluating new drug treatments, diagnostic tools, molecular epidemiology and mapping studies, as well as surveillance of antimicrobial resistance. Some member laboratories are already carrying out research studies in collaboration with other institutions and/or partners.

### 3.4 PCR protocols for cutaneous leishmaniasis, mycetoma and yaws

The vision of the network is to integrate other skin NTDs in the Buruli ulcer platform. As countries with diagnostic capacity for these diseases are identified, existing PCR protocols will be harmonized using the same approach as for the PCR-based protocols for Buruli ulcer. A session was thus dedicated for presentations of diagnostic protocols currently used for yaws, cutaneous leishmaniasis and mycetoma.

Dr Serges Tchatchouang (CPC) presented the yaws PCR protocols.

Dr Sara Eyangoh (CPC) spoke about the implementation of yaws differential diagnosis, specifically the detection of *Haemophilus ducreyi*.

Dr Javier Moreno and Dr Carmen Chicharro (Carlos III Health Institute) presented the PCR protocols for cutaneous leishmaniasis.

Dr Wendy van de Sande (Erasmus Medical Center) and Professor Ahmed Fahal (Mycetoma Research Center) presented the PCR protocols for mycetoma.

To address the geographical distribution of mycetoma in the different endemic countries and the prevalent pathogens therein, it would be important to conduct a study to demonstrate evidence of the majority of the identified mycetoma pathogens. It would also be necessary to conduct a molecular identification survey for mycetoma to show evidence of the specific pathogens prevalent in endemic countries.

### 3.5 SwiftX technology

Dr Andy Wende (Xpedite Diagnostics GmbH) described the SwiftX technology and the advantages of the DNA extraction kits.

The presentations are available online (3). Photographs of the participants are shown in Annex 4.

### 3.6 Priority skin NTDs for integration in the different network laboratories

The possibility of advancing the current platform to capture the new vision of the network – integrating other skin NTDs into the Buruli ulcer platform – was discussed with the experts on yaws, cutaneous leishmaniasis, mycetoma and leprosy.

Integration will consider disease epidemiology in each of the network countries, sampling techniques, PCR testing and standard protocols available for each disease. This implies the importance of a needs assessment to guide future actions. It was agreed to start integration with yaws.

### 3.7 Perspectives for collaborative studies

Four working groups were created (Fig. 2). The discussion was led by Professor Richard Phillips (Kumasi Centre for Collaborative Research in Tropical Medicine). The recommendations arising from the group discussions are summarized below.

#### 3.7.1 Group 1 discussion and recommendations

The group is expected to develop guidance that includes the objectives of the collaborative study, the expected results and the implementation strategy.

**Recommendations**

- Perform a review of non-*M. ulcerans* ulcers.
- Explore any potential collaboration for mycetoma using artificial intelligence.
• Investigate the causes of ulcers not due to Buruli ulcer, yaws, cutaneous leishmaniasis and mycetoma or from H. ducreyi.
• Share images and data of chronic wounds in question with the network.
• Develop a differential diagnosis for each skin NTD.

3.7.2 Group 2 discussion and recommendations

FIND and WHO already support the development of some assays (prototype methods available), and the network could be partners in evaluating these diagnostic tools.

Recommendations

• Optimize evaluation protocols (the network should work on this).
• Consider signing an agreement to share samples available in countries among the laboratories.
• Develop a material transfer agreement and an SOP for sample conservation.

3.7.3 Group 3 discussion and recommendations

The existing tools for transmission research have been exhausted. Besides whole genome sequencing, other approaches may not address the distribution of M. ulcerans or identify potential reservoirs of bacterium.

Recommendations

• Investigate available studies on the risk factors of mycetoma transmission.
• Propose a study to sample the asymptomatic families of affected persons.

3.7.4 Group 4 discussion and recommendations

The main role of the network laboratories in different treatment studies would be to provide diagnostics. Also, the network website could be updated with post-research proposals; interested persons will join the discussions.

Recommendations

• Identify the role of the network in different treatment studies.
• Share post-research proposals on the network’s website to facilitate submitting research proposals and advancing work.

Additional group work on the visibility of the network was presented by Professor Phillips and is summarized in the Table below. The target audience is funders, scientific community, national programmes, media, biotech companies, health ministries, other networks, organizations and the general public.
### Table. Measurement of success and responsibilities, by activity

<table>
<thead>
<tr>
<th>Activity</th>
<th>How do we want to measure success?</th>
<th>Who is responsible?</th>
</tr>
</thead>
</table>
| Website                                      | Track site visits.                                                                                                                                                                                                                 | Coordinating Centre  
Web designer and content builder  
Remote developer/designer and maintenance                                             |
|                                             | Provide regular updates (photos on website, member laboratory posts network activities, member laboratory profiling, link of published articles, post grant awards or other achievements, short statements from scientist on the work of the network, regular scientific interviews about activities of the network, information on skin NTDs for public education, link website to other social media platforms (e.g. Twitter, LinkedIn – Institutional website should have a link to the network website)). | Network members  
Coordinating Centre  
Anesvad Foundation communication department                                        |
| Social media handles (Twitter, Facebook, LinkedIn, WhatsApp) | Provide website link to tweets or other posts on social media.  
Post quarterly/biannual quizzes on social media handles for young upcoming scientists.                                                                                                                                               | Member laboratories  
Coordinating Centre  
Partners  
Coordinating Centre/scientists Partners                                                                 |
| Scientific publications                      | Track publications by network members.                                                                                                                                                                                            | Coordinating Centre/scientists Partners  
Partners  
Member laboratories  
Coordinating Centre                                                                 |
| Presence at large meetings (e.g. WHO, ASTMH, ECMID, WHS) | Maximize number of and participation at meetings.                                                                                                                                                                                 | Coordinating Centre  
Member laboratories  
Partners  
Scientific publications                                                                 |
| Prepare fliers/posters for major meetings (e.g. WHO, ASTHM) | Track the numbers of fliers and posters.  
Print and distribute to laboratories (in English and French) in high resolution.                                                                                                                                               | Coordinating Centre  
Partners  
Prepare fliers/posters for major meetings (e.g. WHO, ASTHM)                                                                                                                                       |
| Organize webinars on the activities of the network | Record the number of webinars organized.  
Host webinars on NTDs (ISNTD).  
Design a course on molecular diagnosis of Buruli ulcer to post on the OpenWHO training platform.                                                                                                                                | Coordinating Centre  
Partners  
ASTMH: American Society of Tropical Medicine and Hygiene; ECMID: European Congress of Clinical Microbiology and Infectious Diseases; ISNTD: International Society for Neglected Tropical Diseases; WHS: World Health Summit. |
Recommendations and activities to be carried out in 2023
Recommendations and activities to be carried out in 2023

4.1 For the Coordinating Centre
- Implement activities to improve the visibility of, and communication around, the work of BU-LABNET. The focus here is to increase visibility among the general public through the website and social media.
- Finalize the reviewed SOPs on Buruli ulcer, obtain approval from the advisory board and distribute to member laboratories.
- Establish certificates of external quality assurance participation for distribution to participating laboratories in 2022.
- Finalize the global report of on-site laboratory evaluation of BU-LABNET member laboratories.
- Follow up on the harmonization of procedures to integrate skin NTDs under the responsibility of/in collaboration with disease experts.
- Promote all collaborative research on skin NTDs.
- Build an online system for laboratories to report data on their activities in DHIS2. This system would be used by laboratories in the network (laboratories in the WHO Region) to enter data which will then be transferred to the central database at the Coordinating Centre.
- Standardize data sharing agreements and material transfer agreements among the member laboratories to enhance collaborative work.
- Encourage best practices and research ethics for diagnosis and treatment of Buruli ulcer and other skin NTDs as prioritized by the network.
- Collaborate with the Coordinating Centre towards integrating other skin NTDs (yaws, H. ducreyi, cutaneous leishmaniasis and leprosy) in the Buruli ulcer PCR platform.
- Furnish the Coordinating Centre with working PCR protocols on yaws, leprosy and cutaneous leishmaniasis to help in the harmonization procedure.
- Make efforts to encourage research collaboration among member laboratories and to share opportunities for collaboration.
- Ensure timely reporting of laboratory PCR data on Buruli ulcer to the national programmes and the BU-LABNET Coordinating Centre.

4.2 For member laboratories
- Commit to raising the visibility of BU-LABNET according to its activities and the established communication strategy.
- Continue to use the updated SOPs for diagnosis of Buruli ulcer and other skin NTDs as provided by the Coordinating Centre.
- Improve collaboration with national control programmes and convene in-country meetings to harmonize data on Buruli ulcer activities.
- Participate in the external quality assurance programme.
- Furnish the Coordinating Centre with working PCR protocols on yaws, leprosy and cutaneous leishmaniasis to help in the harmonization procedure.
- Make efforts to encourage research collaboration among member laboratories and to share opportunities for collaboration.
- Ensure timely reporting of laboratory PCR data on Buruli ulcer to the national programmes and the BU-LABNET Coordinating Centre.

4.3 For national Buruli ulcer control programmes
- Strengthen collaboration with BU-LABNET member laboratories in training field workers on activities against endemic skin NTDs.
- Promote active case searches among communities, harmonize sample collection techniques in facilities and ensure timely transfer of samples to member laboratories.

4.4 For partners
- Support the BU-LABNET Coordinating Centre to achieve its objectives on visibility, development of standard documents and coordination of scientific studies.
- Explore additional funding avenues to sustain network activities.

4.5 For WHO
- Help to raise awareness of BU-LABNET at all levels.
- Advocate for support of the network’s activities.
- Share experiences from other laboratory networks (e.g. malaria and tuberculosis).
- Facilitate training of laboratories through the Coordinating Centre.
Closing remarks and next meeting
RECOMMENDATIONS AND ACTIVITIES TO BE CARRIED OUT IN 2023
Closing remarks and next meeting

After the customary exchange of courtesies, the meeting was closed.

The next meeting will be held in Ghana on 23–25 October 2023.
References


# Agenda

<table>
<thead>
<tr>
<th>Day/Time</th>
<th>Topic</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday, 24 October 2022 (Day 1)</td>
<td>Arrival of participants and registration</td>
<td>All</td>
</tr>
<tr>
<td>09:00–09:30</td>
<td>Opening ceremony</td>
<td>Mirdad Kazanjí</td>
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<tr>
<td></td>
<td>Welcome speeches by the Centre Pasteur, WHO and MOH</td>
<td>Phanuel Habimana</td>
</tr>
<tr>
<td>10:40–12:40</td>
<td>Presentation on the epidemiology and geographical distribution of skin NTDs in Africa (AFRO and EMRO)</td>
<td>Minister of Public Health</td>
</tr>
<tr>
<td>13:30–16:30</td>
<td>Updates on BU-LABNET activities</td>
<td>Ahmed Fahal/Augustin Kadima</td>
</tr>
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<td></td>
<td>Validation of the revised BU-LABNET SOPs</td>
<td>Sara Eyangoh</td>
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<td></td>
<td>Assessment of network laboratories: key findings</td>
<td>Hycenth Numfor</td>
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<td></td>
<td>Discussion on the laboratory network member status</td>
<td>All</td>
</tr>
<tr>
<td>16:30–17:00</td>
<td>Presentation of network laboratory activities</td>
<td>Network laboratories</td>
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<tr>
<td></td>
<td>Presentation plus discussion: 15 mins for each laboratory</td>
<td>Kingsley Asiedu</td>
</tr>
<tr>
<td>Tuesday, 25 October 2022 (Day 2)</td>
<td>Presentation of yaws qPCR protocols</td>
<td>Representative of yaws consortium</td>
</tr>
<tr>
<td>08:30–09:30</td>
<td>Discussion: Steps for implementation/integration of yaws in Buruli ulcer diagnosis platform</td>
<td>Representative of yaws consortium/Sara Eyangoh</td>
</tr>
<tr>
<td>11:00–11:30</td>
<td>Possible implementation of <em>Haemophilus ducreyi</em> and yaws differential PCR</td>
<td>Sara Eyangoh/Representative of yaws consortium</td>
</tr>
<tr>
<td>11:30–13:00</td>
<td>Research updates by member laboratories</td>
<td>Network laboratories</td>
</tr>
<tr>
<td>14:00–15:00</td>
<td>Presentation of cutaneous leishmaniasis PCR protocols</td>
<td>Javier Moreno/Carmen Chicharro/Israel Cruz</td>
</tr>
<tr>
<td>15:00–16:00</td>
<td>Presentation of cutaneous mycetoma PCR protocols</td>
<td>Ahmed Fahal/Sahar Bakhtiyan/Wendy van de Sande</td>
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<tr>
<td>16:00–17:00</td>
<td>Discussion and closing remarks</td>
<td>Kingsley Asiedu</td>
</tr>
<tr>
<td>Wednesday, 26 October 2022 (Day 3)</td>
<td>Discussion on other priority skin NTDs to integrate in the different network laboratories</td>
<td>Invited experts on skin NTDs</td>
</tr>
<tr>
<td>08:30–09:30</td>
<td>Presentation of the SwiftX technology and advantages of the DNA extraction kits</td>
<td>Andy Wende</td>
</tr>
<tr>
<td>10:30–12:30</td>
<td>Discussion on development of collaborative studies: Working groups</td>
<td>Experts plus network laboratories</td>
</tr>
<tr>
<td>13:30–15:00</td>
<td>Restitution and discussion</td>
<td>All</td>
</tr>
<tr>
<td>15:00–16:00</td>
<td>Recommendations and closing remarks</td>
<td>Sara Eyangoh, Sundeep Vedithi</td>
</tr>
</tbody>
</table>
List of participants

BU-LABNET members

Benin
Ms Line-Marlène Ganlonon, Centre de Dépistage et de Traitement de l’Ulcère de Buruli, Pobè

Cameroon
Ms Brigitte Félicité Bana Owona, Centre Pasteur du Cameroun, Yaoundé
Mr Jude Alexis Bondi, Mycobacteriology Department, Centre Pasteur du Cameroun, Yaoundé
Dr Valérie Flore Donkeng Donfack, National Reference Laboratory for Tuberculosis and Buruli ulcer, Centre Pasteur du Cameroun, Yaoundé
Dr Sara Eyangoh, Buruli Ulcer Laboratory Network Coordinator, Centre Pasteur du Cameroun, Yaoundé
Mr Yannick Willy Kamdem Simo, Mycobacteriology Department, Centre Pasteur du Cameroun, Yaoundé
Mr Hycenth Numfor, Buruli Ulcer Laboratory Network, Centre Pasteur du Cameroun, Yaoundé
Dr Sérges Tchantchouang, Centre Pasteur du Cameroun, Yaoundé

Côte d’Ivoire
Professor Solange Kakou Ngazoa, Institut Pasteur de Côte d’Ivoire, Abidjan
Mr Konan Albert Yavo, Plateforme de Biologie Moléculaire, Institut Pasteur de Côte d’Ivoire, Abidjan

Democratic Republic of the Congo
Dr Marie José Kabedi, Institut National de Recherche Biomédicale, Kinshasa
Dr Nadine Mintsey, Institut national de Recherche Biomédicale, Kinshasa

Gabon
Mr Arsène Mabika-Mabika*, Tuberculosis Laboratory, Bacteriology, Hygiene and Biosecurity, Franceville

Ghana
Dr Anthony Ablordey, Bacteriology Department, Noguchi Memorial Institute for Medical Research, Accra
Ms Bernadette Agbavor, Skin NTD research group, Kumasi Centre for Collaborative Research in Tropical Medicine, KNUST, Kumasi
Dr Adwoa Asante-Poku, Bacteriology Department, Noguchi Memorial Institute for Medical Research, Legon
Dr Lydia Mosi, Department of Biochemistry, Cell and Molecular Biology, University of Ghana, Legon
Professor Richard Phillips, Kumasi Centre for Collaborative Research in Tropical Medicine, KNUST, Kumasi
Ms Mabel Sarpong Duah, West African Centre for Cell Biology of Infectious Pathogens (WACCBIP), University of Ghana, Accra

Liberia
Ms Carmilia Johnson, National Public Health Institute of Liberia (NPHIL), Monrovia
Ms Vera Yatta Walker, National Public Health Institute of Liberia (NPHIL), Monrovia

Nigeria
Professor Pheabian Olaoluwa Akinwale, Molecular Parasitology Research Laboratory, Department of Public Health and Epidemiology, Nigerian Institute of Medical Research, Lagos
Mr Ignatius Ejofo, St Joseph’s Hospital Adazi-Nnukwu, Anambra State
Dr Vincent Pam Gyang, Molecular Parasitology Research Laboratory, Department of Public Health and Epidemiology, Nigerian Institute of Medical Research, Lagos

**Togo**

Ms Eninam Kouma, Laboratoire de Biologie Moléculaire-Virologie, Institut National d’Hygiène, Lomé

Dr Issaka Maman, Laboratoire de Biologie Moléculaire-Virologie, Institut National d’Hygiène, Lomé

**Centre Pasteur du Cameroun**

Dr Mirdad Kazanji, Director General, Centre Pasteur du Cameroun, Yaoundé, Cameroon

**External laboratory experts (advisers)**

Professor Bretzel Gisela,* Division of Infectious Diseases and Tropical Medicine, Ludwig-Maximilians University Munich, Germany

Dr Estelle Marion,* INSERM, PBH IRIS CHU Angers, Angers, France

Dr Sundeepl Chaitanya Vedithi, American Leprosy Missions and University of Cambridge, United Kingdom of Great Britain and Northern Ireland

**External partners**

Dr Alphonse Um Boock, FAIRMED, Yaoundé, Cameroon

Ms Anna Giné, International Cooperation, Anesvad Foundation, Bilbao, Spain

Dr Anthony Obiamaka Meka,* German Leprosy and Tuberculosis Relief Association, Enugu, Nigeria

Mr Smith Afanji, OCEAC/FAIRMED NTD Program, Yaoundé, Cameroon

Dr Earnest Njih Tabah, National Yaws, Leishmaniasis, Leprosy and Buruli ulcer Control Programme, Ministry of Public Health, Yaoundé, Cameroon

Dr Franck Wanda, Centre International de Recherches, d’Enseignements, et de Soins (CIRES), Akonolinga, Cameroon

**Other skin NTD experts**

Dr Richard Akuffo, Noguchi Memorial Institute for Medical Research, University of Ghana, Legon-Accra, Ghana

Dr Sahar Mubarak Bakhiet (mycetoma),* Department of Molecular Biology, Institute of Endemic Diseases and Laboratory Director, Mycetoma, Research Centre, University of Khartoum, Sudan

Dr Israel Cruz,* National School of Public Health, Instituto de Salud Carlos III, Sinesio Delgado, Spain

Dr Carmen Chicharro Gonzalo, (leishmaniasis),* WHO Collaborating Centre for Leishmaniasis, Instituto de Salud Carlos III, Majadahonda, Spain

Professor Ahmed Fahal (mycetoma), Mycetoma Research Centre, University of Khartoum, Sudan

Dr Javier Moreno (leishmaniasis),* Instituto de Salud Carlos III, Majadahonda, Spain

Dr Wendy van de Sande (mycetoma),* Department of Medical Microbiology & Infectious Diseases, Erasmus Medical Center, Rotterdam, Netherlands

Dr Andy Wende, Xpedite Diagnostics GmbH, Munich, Germany

**WHO**

Dr Kingsley Asiedu, Prevention, Treatment and Care, WHO Department of Control of Neglected Tropical Diseases, Geneva, Switzerland

Dr Mahoutondji Yves Thierry Barogui, Leprosy, Buruli ulcer & Yaws, Neglected Tropical Diseases, WHO Regional Office for Africa, Libreville, Gabon

Dr Abate Mulugeta Beshah,* Tropical and Vector borne Diseases, WHO Regional Office for Africa, Brazzaville, Congo

Dr Phanuel Habimana, WHO Representative, WHO Country Office, Yaoundé, Cameroon

Dr Augustin Kadima, Tropical and Vector borne Diseases, WHO Regional Office for Africa, Brazzaville, Congo

Dr Etienne Nnomzo'o, WHO Country Office, Yaoundé, Cameroon

Dr Priya Pathak, Prevention, Treatment and Care, WHO Department of Control of Neglected Tropical Diseases, Geneva, Switzerland

*Online participant

The following participants (listed alphabetically by surname) also joined the meeting online.
Kabiru Mohammed Abass
Gabriella Acquah
Ernesto Afonso
Gideon Akolgo
Abigail Agbanyo
Jennifer Seyram Amedior
Aby Christiane Amon
Margaret Anima Annang
Edwin Ampadu
N'da Kouassi Marcellin Assié
Esther Bikoro
Gisela Bretzel
Okechukwu Chukwuekezie
Tenkeu Daline
Maria Cecília De Almeida
Bahou Roger Dehe
Dziedzom de Souza
Ludovic Ebert
Emilienne Epee
Michael Frimpong
Inês B. Gomido
Balako Gumí
Justice Kyeli Boamah

Ijeoma Meka
Mourad Mokni
Patty Mulongo Makimuna
David Coulibaly Ngolo
Chijioke Odaghar
Chukwuanugo Ogbugu
Abimbola Olaitan
Chizaram Onyeaghala
Arantzazu Quintana
Santiago Ramón García
Chandrakant Revankar
Garba Roméo
Malkin Saar
Emma Sáez López
Raoul Saizonou
Sammy Sam-Wobo
Michael Sandel
Shirley Simpson
Igor Tebekem
Tamaz Tsulaia
Stefanie Weiland
Henri Yendjo
BU-LABNET membership certificate

CERTIFICATE

OF MEMBERSHIP

THIS IS TO CERTIFY THAT

Laboratory/Institution/Country

is a member of the Buruli ulcer Laboratory Network in Africa (BU-LABNET) and participates in its activities including the External Quality Assessment Program

This certificate is valid till December 2024

Dr. Sara Eyangoh
BU-LABNET Coordinator
Centre Pasteur du Cameroun

Dr. Kingsley Asiedu
WHO Global Buruli ulcer Initiative
Department of Control of Neglected Tropical Diseases
Annex 4

Meeting photographs

Group photo

On-site participation
Online participation