

Network for Education and Support in Immunisation

Saving lives through immunisation

**ANNUAL
REPORT
2021**



**University
of Antwerp**



nesi
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FOR EDUCATION AND SUPPORT
IN IMMUNISATION

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COVID-19	Coronavirus Disease 2019
ECAVI	East Africa Centre for Vaccines and Immunization
EPI	Expanded Programme on Immunisation
EVM	Effective Vaccine Management
GHD/ EMPHNET	Global Health Development/ Eastern Mediterranean Public Health Network
GNN	Global NITAG Network
GVAP	Global Vaccine Action Plan
HCW	Healthcare Worker
HPV	Human Papillomavirus
IA2030	Immunization Agenda 2030
KMTC	Kenya Medical Training College
LIVE	Leading International Vaccinology Education
MoH	Ministry of Health
MoU	Memorandum of Understanding
MPH	Master of Public Health
MSc	Master of Science
NESI	Network for Education and Support in Immunisation
NGO	Non-Governmental Organisation
NITAG	National Immunisation Technical Advisory Group
PhD	Doctor of Philosophy
RITAG	Regional Immunisation Technical Advisory Group
SAGE	Strategic Advisory Group of Experts
SAVIC	South African Vaccination and Immunisation Centre
SMU	Sefako Makgatho Health Sciences University

LIST OF ABBREVIATIONS

SOMIPEV	Société Marocaine d'Infectiologie Pédiatrique et de Vaccinologie
UNICEF	United Nations Children's Fund
UNPAD	Universitas Padjadjaran
VACFA	Vaccines for Africa Initiative
VLIR-UOS	Flemish Interuniversity Council – University Development Cooperation
WHO	World Health Organization
WHO/AFRO	WHO Regional Office for Africa
WHO/EMRO	WHO Regional Office for the Eastern Mediterranean
WHO/HQ	WHO Headquarters
WHO/IVB	WHO Department on Immunisation, Vaccines and Biologicals
WHO/SEARO	WHO Regional Office for South East Asia



The Network for Education and Support in Immunisation (NESI) was officially launched in 2002. The Executive Secretariat of NESI is hosted at the Department of Family Medicine and Population Health (previously Department of Epidemiology and Social Medicine), University of Antwerp in Belgium. NESI was built on the experience of the International Network for Eastern and Southern Africa on hepatitis B vaccination, which was established in 1999 by five universities in Eastern and Southern Africa (Kenya, South Africa, Tanzania, Zambia and Zimbabwe), Ministries of Health (MoH) in Africa and the University of Antwerp. The purpose of this network was to translate research on hepatitis B through capacity building and advocacy into universal access to hepatitis B vaccination in the partner countries.

With the development of new vaccines and increased commitment by development partners and private sector initiatives to strengthen vaccine supply and immunisation services, there are more opportunities to prevent more diseases in more people. This led to the establishment of NESI, which is an international multidisciplinary network with the mission to strengthen immunisation programmes, in particular in low- and middle-income countries. As human resources play a crucial role in the delivery of quality immunisation services to the public, NESI focusses on capacity building, education and training, and institutional strengthening through partnerships and collaboration with the World Health Organization (WHO), the United Nations Children's Fund (UNICEF), Gavi, the Vaccine Alliance, academic institutions, Ministries of Health and other immunisation stakeholders.

Due to its links with universities and other health professional training institutions, which are vital to achieving sustainable capacity and competence building in the field of vaccinology, NESI is unique in its attention on pre-service training, particularly on the development of curricula and training for nurses, medical doctors, pharmacists, public health specialists and other related health professionals.

A Memorandum of Understanding (MoU) between NESI and the WHO Regional Office for Africa (WHO/AFRO) clearly defines the overall goal and activities of NESI in the area of capacity building in the African Region. Collaboration in the Eastern Mediterranean Region (WHO/EMRO) and in the South-East Asian Region (WHO/SEARO) is based on joint work plans with partner organisations. To ensure the sustainability of the Network and to increase its reach, NESI has signed Collaboration Agreements with partner institutions/organisations in the different WHO regions. This validates the position of NESI as an integral partner in capacity building within the different Regions.

Mission

The mission of NESI is to improve the quality and sustainability of immunisation programmes and services, in particular in low- and middle-income countries, through education and training, technical support, operational research and networking and advocacy.

NESI aims to build the capacity of managers and staff working in the Expanded Programme on Immunisation (EPI) in their respective countries, as well as to improve pre-service and post-graduate training at the different faculties of health training institutions involved in immunisation, including medicine, nursing, pharmacy, and public health. NESI also aims to strengthen the capacity of the National Immunisation Technical Advisory Groups (NITAGs) in evidence-based recommendation-making.

Strategies

To accomplish its mission, NESI engages in a number of activities, which are grouped into four strategic areas: education and training, technical support, operational research and networking and advocacy. NESI offers the following in each area:

1. EDUCATION AND TRAINING

- Organises training courses and workshops in collaboration with partner institutions/organisations;
- Serves as faculty in national and international vaccinology courses;
- Validates the content of educational and training materials;
- Develops up-to-date, high-quality training materials for different levels of the immunisation programmes, capturing the needs of all staff;
- Collaborates with health training institutions to strengthen the curriculum for health professionals involved in immunisation and advises on regular refresher courses in collaboration with Ministries of Health.

2. TECHNICAL SUPPORT

- Monitors and evaluates currently implemented education and training programmes;
- Performs training needs assessments in collaboration with academic and other partners;
- Assists countries in developing comprehensive training plans as part of their Multi-Year Plans;
- Provides support to country staff to implement training activities;
- Supports institutional strengthening to improve national and regional capacity to deliver education and training.

3. OPERATIONAL RESEARCH

- Supervises MSc, MPH and PhD students;
- Evaluates pre-service EPI curriculum at health training institutions;
- Conducts post introduction evaluations;
- Evaluates effectiveness and impact of training activities;
- Writes scientific and review articles.

4. NETWORKING AND ADVOCACY

- Facilitates a forum to discuss and coordinate actions related to education, training, and support for immunisation programmes in low- and middle-income countries;
- Maintains a network of specialists drawn from international organisations, universities, national immunisation programmes, Non-Governmental Organisations (NGOs), industry, and other relevant stakeholders, to deliver high-quality training in all aspects of immunisation and at different stages of implementation of immunisation programmes;
- Collaborates with local, regional, and global training initiatives to advocate for better education and training;
- Offers a website that houses training materials and links to other relevant sites.





The mission of NESI is to improve the quality and sustainability of immunisation programmes and services, in particular in low- and middle-income countries, through education and training, technical support, operational research and networking and advocacy.

Structure

NESI is a partnership between the University of Antwerp and the public and private sector. An Executive Secretariat, based at the Department of Family Medicine and Population Health (previously Department of Epidemiology and Social Medicine), University of Antwerp, Belgium, coordinates and implements activities for the Network.

Collaboration with partner institutions/organisations in the different WHO Regions is an essential component for the implementation of NESI's activities. Collaboration Agreements have been established with the following institutions: South African Vaccination and Immunisation Centre/Sefako Makgatho Health Sciences University (SAVIC/SMU), South Africa; Société Marocaine d'Infectiologie Pédiatrique et de Vaccinologie (SOMIPEV), Morocco; Universitas Padjadjaran (UNPAD), Indonesia; East Africa Centre for Vaccines and Immunization (ECAVI), Uganda; Global Health Development/Eastern Mediterranean Public Health Network (GHD/EMHPNET), Jordan.

NESI scientific advisors are engaged in advising on strategic areas and reviewing outputs, identifying potential funding and reviewing proposals/applications.

NESI has full operational and scientific independence

Funding

During 2021, NESI was supported by educational grants from GlaxoSmithKline Vaccines and Janssen Vaccines & Prevention B.V., Janssen Pharmaceutical Companies, Johnson & Johnson, and by funds from the University of Antwerp, which also provides infrastructure, ICT, administrative, and legal support.

Previously, NESI received support from MSD, the Flemish Interuniversity Council - University Development Cooperation (VLIR-UOS) and the Flemish Government.



Education and Training

CHAPTER ONE

Human resources are key to providing good quality healthcare services to the population. A national immunisation programme relies on the support of well-trained medical and nursing staff, in order for the population to benefit of receiving the right vaccine at the right time in the right way. Therefore, training of health personnel must be relevant to national needs. Education and training must be coordinated and integrated with the developing health system as it moves towards meeting the objectives of health for all in the 21st century. For the current decade, the key global immunisation strategies are conveyed through the Global Vaccine Action Plan (GVAP) adopted at the 65th World Health Assembly in 2012.

Evidence from various EPI reviews and health facility surveys conducted at national and provincial/district levels showed that important barriers to reaching every child with immunisation services are related to planning and management of human, material and financial resources at district and service delivery levels. To overcome these barriers, capacity building will be key to improve planning and managerial skills and to integrate the immunisation services within the overall health system.

Training needs assessments conducted at various health training institutions revealed several gaps: incomplete or outdated EPI content in the pre-service curricula; lack of demonstration equipment and current EPI reference material; insufficient time allocation for EPI theory; insufficient knowledge on current EPI theory and practice. Clinical and public health training that incorporates the learning objectives of EPI will enable students to develop a firm basis of EPI core knowledge and skills. A strong collaboration between the EPI programme and the health training institutions, linking professional education with service reality, is key to the overall success.

1.1 Pre-service training

Pre-service health training institutions are critical in delivering medical and nursing staff deployable in immunisation programmes capable of addressing complex situations, sustaining routine immunisation, and introducing new vaccines and technologies. The incorporation of EPI into undergraduate medical education, nursing/midwifery, and other health professional training programmes is important towards improving and strengthening immunisation service delivery, logistics, surveillance, communication and management practices. Clinical and public health training that incorporates the learning objectives of EPI will enable students to develop a firm basis of EPI core knowledge and skills.

To facilitate the systematic revision of EPI curricula at training institutions in the African Region, two EPI prototype curricula for medical and nursing/midwifery schools were developed by WHO/AFRO and partners in 2006 and revised in 2015, and are available in English and French.

1.1.1 Kenya Medical Training College, Nairobi, Kenya

Kenya Medical Training College (KMTCC) and NESI/University of Antwerp are closely collaborating since 2015 to improve the pre-service training in immunisation at nursing and midwifery training institutions in Kenya. KMTCC is one of the leading health training institutions in Kenya, and the driving force advocating for updating the EPI curriculum at all pre-service nursing and midwifery training institutions in the country.

Building on the successful strengthening of EPI pre-service education at KMTCC, a joint effort between KMTCC, UNICEF and NESI has been initiated to strengthen pre-service education in Effective Vaccine Management (EVM). The aim of the initiative is to incorporate EVM content within pre-service curricula for specific health cadres in the relevant courses at KMTCC.

The experience of KMTCC in strengthening EPI pre-service training has been published in the “Pan African Medical Journal”:



Juma M, Masresha B, Adekola A, Dochez C. 2022. Strengthening pre-service training of healthcare workers in immunisation and effective vaccine management: the experience of Kenya Medical Training College. *Pan African Medical Journal* 41: 47.

<https://doi.org/10.11604/pamj.2022.41.47.30502>

<https://www.panafrican-med-journal.com/content/article/41/47/full/>

In addition to the ongoing activities related to strengthening EPI pre-service education, the ongoing COVID-19 pandemic has urged to prioritise training for all nurse lecturers at KMTCC on COVID-19 vaccines and vaccination. Therefore, KMTCC with support from NESI, organised two training sessions; the first session trained 33 nurse lecturers from 14 to 18 June 2021 at Embu Campus in Kenya, the second session trained 19 nurse lecturers from 20 to 23 December 2021. The course consisted of 9 modules and included a pre- and post-test.





- Module 1** Overview of COVID-19 vaccination training approach and objectives
- Module 2** Rationale, justification and objectives for deployment of the COVID-19 vaccine
- Module 3** COVID-19 vaccine eligibility criteria and contra-indications
- Module 4** COVID-19 vaccines attributes, storage and supply logistics
- Module 5** COVID-19 infection prevention and control
- Module 6** COVID-19 vaccine administration and safety
- Module 7** Communication for COVID-19 vaccines
- Module 8** COVID-19 data management and reporting
- Module 9** COVID-19 vaccine safety monitoring and surveillance

1.2 In-service training

To be effective, a national immunisation programme relies on the support of well-informed medical, nursing and support staff. To provide immunisation services of good quality it is essential to have a workforce that is sufficient in numbers, well-educated and trained, adequately deployed and motivated.

1.2.1 Vaccinology courses

In-service vaccinology courses are key to build national vaccinology expertise by strengthening the capacity of academics in vaccinology (involved in teaching/research related to infectious diseases, mother and child healthcare, vaccines and immunisation) and to guide policy makers and programme managers to make evidence-based recommendations and decisions on:

1. immunisation policies and strategies;
2. introduction of new vaccines and technologies;
3. sustaining routine immunisation;
4. adjustments of existing immunisation programmes (e.g. adolescent or adult vaccination);
5. adjustments to vaccination schedules;
6. conducting phase 1 to phase 3 clinical trials, and post-marketing surveillance (phase 4 studies).

The target audience of vaccinology courses are:

1. teachers at health training institutions from the different faculties involved in immunisation: medicine, nursing, public health and pharmacy;
2. NITAG members;
3. EPI managers;
4. MoH support staff;
5. staff of multilateral (WHO, UNICEF) and bilateral organisations, and of NGOs; and
6. MSc/MPH and PhD students.

The general objective of the vaccinology course is *“to master the basic principles and specificities of a vaccine, how it is developed, produced and utilised, including its use within the EPI programme”*. The vaccinology courses are built around 9 themes:

1. The scientific basis of vaccinology;
2. Vaccine development and evaluation;
3. Routine EPI vaccines and optimising the impact of immunisation;
4. New vaccines;
5. Future vaccines;
6. Vaccine safety and the value of vaccination;
7. Prequalification, registration, production and control;
8. Programmatic issues; and
9. Training and research.

1.2.1.1 Diplôme Virtuel Inter-Universitaire de Vaccinologie, Université Cadi Ayyad, Marrakech, Morocco

The inter-university diploma course in vaccinology is offered in French through an online platform by the Faculty of Medicine and Pharmacy at the University Cadi Ayyad in Marrakech, Morocco.

The aim of the course is to provide an integrated vision of vaccinology to acquire e.g. fundamental and practical knowledge on vaccines, disease epidemiology, infectious diseases and their prevention, vaccine development and policies, and delivery of vaccines to the respective target populations.

The course is targeted at scientists, medical doctors, pharmacists, and other health professionals involved in e.g. vaccinology research or clinical development, program design and delivery of vaccines, disease surveillance, evaluation of immunisation programmes, and pharmacovigilance. The course was attended by 33 participants from the following countries: Burkina Faso, Guinea, Morocco and the Republic of Congo.

NESI was invited by the Dean of the Faculty of Medicine and Pharmacy to give 2 presentations:

1. Type of vaccines
2. Hepatitis B vaccines

1.2.1.2 ECAVI vaccinology course, Kampala, Uganda, June 2021

The vaccinology course for health professionals was organised by the East Africa Centre for Vaccines and Immunization (ECAVI) from 21 to 25 June 2021 in Kampala, Uganda. Due to the COVID-19 pandemic, the course was delivered online.

The aim of the vaccinology course was to equip health professionals with up-to-date knowledge and skills on vaccines and immunisation in order to enable them deal with current and emerging challenges related to the immunisation programme.

The format of the course included: formal lectures; case studies; debate and discussion; and presentations by participants.

Upon completion of the course, participants were able to:

- Understand the concept and principles of vaccination
- Describe how vaccines work and their side effects
- Describe indications, contraindications, efficacy, and safety of vaccines according to WHO criteria
- Identify, manage and report adverse events following immunisation
- Identify ways to improve communication with patients, parents, and caregivers about vaccination
- Identify best practices for implementing or improving immunisation programmes
- Understand how to link and partner with other stakeholders involved in immunisation
- Champion and advocate for uptake and promotion of immunisation

A total of 107 participants attended the course online. The participants came from the following countries: Kenya, Uganda, Tanzania, Rwanda, South Africa, Zimbabwe, Guatemala, Malaysia, Democratic Republic of Congo, India, Ethiopia, South Sudan and Sudan.

NESI was invited by ECAVI to chair 2 sessions and to give the following lectures: (1) Overview of vaccine-preventable diseases and their epidemiology; (2) Human Papillomavirus (HPV) vaccines. NESI participated online in the course.

1.2.1.3 Erasmus+ Mundus Joint Master Degree “Leading International Vaccinology Education” (LIVE), Lyon, France, September 2021



The Erasmus+ Mundus Joint Master Degree “Leading International Vaccinology Education” (LIVE) was launched September 2016. LIVE is a two years Master’s programme between five European universities: Université Claude Bernard Lyon 1, France (coordinating university); Universitat Autònoma de Barcelona, Spain; Universitat de Barcelona, Spain; University of Antwerp, Belgium; Université Jean Monnet Saint-Etienne, France. The programme is supported by a worldwide network of 31 international associated partners and 16 supporting partners. NESI is supporting partner to the LIVE programme.

A total of 25 students are currently enrolled in the fifth LIVE promotion, called the “Françoise Barré-Sinoussi” Master LIVE Promotion 2020-22.

NESI was invited to give a lecture on 21 September 2021 at the Université Claude Bernard Lyon 1, during the third semester of the LIVE programme in the session on “Communication on vaccines and public health”. However, due to the COVID-19 pandemic, the lecture was delivered online. Topics presented included: History and rationale of vaccination schedules; role of the NITAGs; and Immunisation Agenda 2030 (IA2030).

From the fourth LIVE promotion, the “Maurice Hilleman” Master LIVE Promotion 2019-21, two students successfully completed their 6-months internship with NESI (see section 3.1.1).

1.2.2 Mid-Level Management training

National immunisation systems are constantly undergoing changes, including the introduction of new vaccines and technologies, and programme expansion beyond infants and children towards a life-course approach to immunisation. In addition, the EPI programme faces external changes related to administrative decentralization, health reforms, among others. EPI programmes operate within the context of the national health systems, in alignment with global and regional strategies.

To address these changes and to ensure the smooth implementation of immunisation programmes, EPI managers and staff require skills in problem solving, priority setting, decision-making, planning and managing human, financial and material resources as well as monitoring the implementation, supervision and evaluation of services.

To understand the current training needs and preferred training platform in order to develop strategies to guide the work of EPI capacity building within the WHO African Region in

the coming years, an online Training Needs Assessment was conducted at the national and provincial level in nine priority countries. The selected countries included: Chad, Cote d'Ivoire, Democratic Republic of Congo (DR Congo), Gabon, Liberia, Malawi, Namibia, South Sudan and Togo.

The results of the Training Needs Assessment have been published in the “Pan African Medical Journal”:



Masresha B, Dochez C, Bwaka A, Eshetu M, Paluku G, Mihigo R. 2021. Immunization program training needs in 9 countries in the African Region. Pan African Medical Journal 39: 41. <https://doi.org/10.11604/pamj.2021.39.41.29492>

1.3 Strengthening evidence-based decision-making

Before embarking on the introduction of a new vaccine, countries must make an evidence-based decision whether a new vaccine merits introduction into the national immunisation programme. As more new vaccines become available, countries face several challenges in introducing these vaccines in the existing immunisation programme:

- a. decision-making and prioritisation of which vaccines to be introduced;
- b. addressing strengths and weaknesses in the immunisation programme;
- c. managing more complicated vaccination schedules;
- d. developing multi-year plans to ensure sustainable use of the new vaccines;
- e. integrating vaccines in the broader context of health systems.

Since these tasks are multiple and complex, these issues need to be addressed in a comprehensive and detailed manner. Through round table discussions and workshops, bringing together NITAG chairs/members and MoH representatives, NESI aims to strengthen national teams of experts and to build an international network.

1.3.1 NITAG vaccinology course for the Eastern Mediterranean Region

Following a coordination meeting in January 2020 between the Global Health Development/Eastern Mediterranean Public Health Network (GHD/EMPHNET) and NESI, regular teleconferences have been organised to discuss the development of a Vaccinology course for NITAGs in the Eastern Mediterranean Region.

The overall aim of the vaccinology course is to equip the NITAG members with up-to-date knowledge and skills on vaccines and immunisation in order to enable them to make evi-



dence-based recommendations, to support the national policy, strategy and decisions on vaccines and immunisation. The vaccinology course is comprised of 9 modules, each consisting of a PowerPoint presentation with explanatory notes and several case studies relevant to the work of NITAGs.

The face-to-face piloting of the course was first planned during 2020, but was postponed due to the COVID-19 pandemic. The pilot course was then planned during the last quarter of 2021, but again postponed due to the Omicron variant to early 2022. The course was organised from 30 January to 3 February 2022 in Amman, Jordan, with the possibility of online facilitation. The course was attended by NITAG chairs/members and MoH representatives from 7 countries: Afghanistan (1), Iraq (2), Jordan (3), Lybia (2), Oman (2), Palestine (2) and Sudan (2). In addition to GHD/EMPHNET and NESI, the course was supported by other partners, including Vaccines for Africa Initiative (VACFA)/University of Cape Town, the Task Force for Global Health, UNICEF, WHO/EMRO and WHO Headquarters (WHO/HQ). The collaboration among different partners in this vaccinology course, is an excellent example of working towards the common goal of NITAG partners to strengthen the NITAGs in the region (see section 2.1).

Outline of the NITAG Vaccinology Course:

Module 1	Immunisation Agenda 2030 and Regional situation Session 1A: Immunisation Agenda 2030 Session 1B: Briefing on regional situation
Module 2	Immunisation system situation Session 2: Immunisation system situation
Module 3	Scientific concepts of immunisation Session 3A: Concepts on immunology, vaccine development and clinical trials Session 3B: Epidemiological concepts
Module 4	Vaccination schedules Session 4A: History and rationale of vaccination schedules Session 4B: Life-course approach to immunisation
Module 5	Vaccine prioritization Session 5A: Critical role of the NITAG Session 5B: Overview of vaccine prioritization Session 5C: Legal and ethical issues Session 5D: Adverse events following immunisation Session 5E: Vaccine supply chain
Module 6	Recommendation-making process Session 6A: Recommendation-making process Session 6B: Applying recommendation-making process
Module 7	Monitoring and evaluation Session 7: Monitoring and evaluation
Module 8	Communication and networking Session 8A: Communication and networking NITAG, RITAG, SAGE, GNN Session 8B: Communication and networking with MoH and other stakeholders Session 8C: Addressing vaccine hesitancy and misinformation
Module 9	Trends and new technologies Session 9A: Vaccine pipeline and new technologies

2



2.1 NITAG partners meeting

November 2021 & December 2021

Since 2019, NESI participates in the NITAG partners' meetings, which are coordinated by WHO/HQ and the Global NITAG Network (GNN). The NITAG partners meetings are important to exchange, align and coordinate activities among the different partners involved in supporting NITAGs.

On 24 November 2021 a virtual meeting was organised with the different NITAG partners to discuss the progress of respective projects supporting NITAGs. During the meeting the following topics were discussed: (1) Overview of current global projects, including the maturity model, Sysvac, training activities and NITAG survey; (2) NITAG work plan for 2022; and (3) Regional activities.

NESI was also invited to attend the GNN webinar on 15 December 2021. This virtual meeting was important to exchange, align and coordinate activities with the main stakeholders involved in supporting NITAGs at various levels. The objectives of the webinar included: (1) Share latest evidence on heterologous COVID-19 vaccine schedules, COVID-19 booster vaccination and children vaccination; (2) Exchange different countries' experiences; and (3) Present learnings from the Sysvac registry.

2.2 Training in immunisation

at South African Vaccinology and Immunisation Centre/ Sefako Makgatho Health Sciences University

The South African Vaccination and Immunisation Centre/Sefako Makgatho Health Sciences University (SAVIC/SMU) developed the online "**Higher Certificate in Vaccinology**" (HCert Vaccinology) programme, which is a basic introductory programme for in-service healthcare workers (HCWs) who work in the South African EPI programme and private sector clinics offering vaccination services. The training programme is divided into 2 blocks consisting of 11 modules over 30 weeks. Accreditation for the Higher Certificate in Vaccinology was received in 2018.

NESI was invited by SAVIC/SMU to be **external moderator** for three modules in the HCert Vaccinology programme:

1. Introduction to immune response against infectious diseases;
2. Introduction to vaccinology; and
3. Introduction to vaccine manufacture and distribution.

..... **Joint publication:**



Milondzo T, Meyer JC, Dochez C, Burnett RJ. 2021. Misinformation drives low human papillomavirus vaccination coverage in South African girls attending private schools. *Frontiers in Public Health* 9: 598625.
<https://doi.org/10.3389/fpubh.2021.598625>

2.3 Global Collaboration on Vaccinology Training

The Global Collaboration on Vaccinology Training was established in November 2018 during the first Global Vaccinology Training Workshop, organised by the Mérieux Foundation and the University of Geneva. NESI is an active member of the Global Collaboration on Vaccinology Training. The collaboration aims to identify gaps and future needs as well as to strengthen the collaboration between the different vaccinology courses.

To address these aims, four working groups have been established:

1. e-portal;
2. industry engagement;
3. evaluation and;
4. needs assessment.

NESI is member of the working group on “needs assessment”. An e-portal has been developed, providing an overview of existing vaccinology courses to assist interested persons to choose the vaccinology course best suited to their needs.

Teleconferences are being organised every six months to discuss any updates of the working groups and the collaboration.

The second Global Vaccinology Training Workshop is scheduled to take place during the first quarter of 2022. NESI is member of the organising committee of the workshop and is being involved in updating the landscape analysis of global vaccinology courses.





3.1 Internship projects

3.1.1 Internship project Erasmus+ Mundus Joint Master Degree “Leading International Vaccinology Education”

In the framework of the Erasmus+ Mundus Joint Master Degree entitled “**Leading International Vaccinology Education**” (LIVE), two MSc students have completed their internship at NESI from January to July 2021. LIVE is a two years Master’s programme, between five European universities: Université Claude Bernard Lyon 1, France (coordinating university); Universitat Autònoma de Barcelona, Spain; Universitat de Barcelona, Spain; University of Antwerp, Belgium; Université Jean Monnet Saint-Etienne, France. NESI is supporting partner to the LIVE programme.

Internship project 1: Dennis Misac D. Giron

Assessing Knowledge and Acceptability of COVID-19 Vaccine among Healthcare Workers in Oman.

Vaccines have been proven to decrease the burden of diseases globally. It is currently one of the most important public health interventions employed globally. However, vaccine hesitancy is a big problem. With the availability of COVID-19 vaccines, there is a lack of available information on the general acceptability of the COVID-19 vaccines among healthcare workers in Oman. Hence, the study aimed to investigate the level of knowledge and acceptability of COVID-19 vaccines and the factors affecting vaccine hesitancy. Included in this are analyses to determine the sources of information and vaccine recommendation behavior of healthcare workers in Oman regarding COVID-19 vaccines. The study used an online cross-sectional survey that was conducted in the eleven governorates of Oman. The study employed Crosstab analysis, Friedman’s test, Bivariate, and Multivariate logistic regression analyses. The Crosstab and Bivariate analyses describe and tabulate the frequency and odds ratio of different variables like social demographics against willingness to be vaccinated. Similarly, multivariate logistic regression models were employed to examine and identify the factors associated with being vaccinated. Friedman’s test was used to rank the most common and suitable source of information and to prioritize groups for vaccination.

The student successfully defended his master thesis in Lyon on 18 June 2021.

Internship project 2: Sergio Castillo

Assessing COVID-19 vaccine acceptability in the general public, especially adults and elderly, in Oman.

The novel COVID-19 disease has overwhelmed the world since 2019, leading to a dramatic loss of human lives worldwide. The WHO officially declared the SARS-CoV-2 outbreak a Public Health Emergency of International Concern on 30 January 2020, right before being declared as a global pandemic on 11 March 2020. Vaccination is considered a key strategy to control the COVID-19 pandemic, therefore it is important to evaluate the degree of COVID-19 vaccine acceptability of the target population. Although Oman has been recognized as a nation with one of the best childhood immunisation programmes in the world, adult immunisation programmes like the influenza vaccination have been subject of mistaken beliefs leading to low vaccine uptake. The exact reasons for the low influenza vaccine acceptability in Oman when the vaccine is available and free of costs are multifaceted and include misperceptions and erroneous interpretations of the safety and efficacy of the vaccine, among others. This set of factors might also affect the current COVID-19 vaccination uptake in Oman. It is of special attention as Oman started the COVID-19 vaccination on 27 December 2020 and since then, several vaccines were authorized to prevent COVID-19 in the country. However, people still have doubts about the safety and efficacy of COVID-19 vaccines, especially regarding possible side effects and the relevance of COVID-19 vaccination. Thus, the study aims to assess the COVID-19 vaccine acceptance among the general public in Oman by analysing the knowledge, attitude, and perception of adults and elderly regarding the COVID-19 pandemic and COVID-19 vaccines.

A cross-sectional study was conducted using a structured and validated online questionnaire. Adults and elderly residing in Oman were invited between 22 to 25 December 2020 to participate in this study. Findings suggested the need to develop tailored strategies to address the vaccine hesitancy to ensure optimal vaccine acceptance among the general population in Oman.

The student successfully defended his thesis in Lyon on 18 June 2021.

..... Publication:



Al Awaidy ST, Khatiwada M, Castillo S, Al Siyabi H, Al Siayiby A, Al Mokhaini S, Dochez C. Knowledge, Attitude and Acceptability of COVID-19 vaccine among the General Public in Oman: A cross-sectional study. Oman Medical Journal. Accepted on 27 December 2021.

<https://www.omjournal.org/articleDetails.aspx?coType=2&aId=3046>

3.1.2 Publications from previous internship projects

..... Publication from internship project in 2019:



Khatiwada M, Kartasasmita C, Mediani HS, Delprat C, Van Hal G, Dochez C. 2021. Knowledge, attitude and acceptability of Human Papilloma Virus (HPV) vaccine and vaccination among university students in Indonesia. *Frontiers in Public Health* 9: 616456.
<https://doi.org/10.3389/fpubh.2021.616456>

..... Publication from internship project in 2020:



Okello G, Izudi J, Ampeire I, Nghania F, Dochez C, Hens N. 2022. Two decades of regional trends in vaccination completion and coverage among children aged 12-23 months: an analysis of the Uganda Demographic Health Survey data from 1995 to 2016. *BMC Health Services Research* 22; 40.
<https://doi.org/10.1186/s12913-021-07443-8>

3.2 Assessing acceptability of COVID-19 vaccine in Indonesia

Vaccines are key to prevent and control the ongoing COVID-19 pandemic. However, vaccine hesitancy is a growing problem worldwide, also in Indonesia, and a lot of misinformation on COVID-19 and COVID-19 vaccines is being spread, which might negatively impact on the implementation of COVID-19 vaccination programmes.

The success of COVID-19 vaccination programmes is dependent on the willingness of the general public to receive the vaccine, but also the attitude of healthcare workers towards COVID-19 vaccines is important. Healthcare workers are key in communication with the general public. Therefore, they need to be highly knowledgeable on vaccine-preventable diseases and vaccination and confident to recommend vaccinations to the public and address their concerns, as well as any misinformation on vaccines and immunisation. Therefore, a research study was initiated between Universitas Padjadjaran, Bandung, Indonesia and NESI/University of Antwerp.

The study aimed to evaluate the acceptability of COVID-19 vaccines in two study populations in four different provinces of Indonesia. The survey aimed to understand COVID-19 vaccine acceptability among healthcare workers to receive the vaccine themselves, but also to understand their behaviour in recommending the vaccine to their patients.

The survey also assessed the acceptability and perception of the community (especially university students and lecturers) towards COVID-19 vaccines. An anonymous cross-sectional study, using two questionnaires, was conducted online between 23 December 2020 and 15 February 2021.

The results of the study were presented on 10 July 2021 during an **online seminar** organised by Universitas Padjadjaran in collaboration with NESI. Over 210 participants from different universities and teaching hospitals attended the seminar.

Part of the study results have also been presented at the 15th Elsevier Congress (see section 4.2.1).

Seminar Online
PENERIMAAN VAKSIN DAN IMUNISASI COVID-19
DI EMPAT WILAYAH DI INDONESIA

Keynote Speech
Ir. Budi Gunadi Sadikin, CHFC, CLU
Menteri Kesehatan Republik Indonesia

Sambutan
Prof. Dr. Hj. Rina Indriastuti, S.E., M.SIE
Rektor Universitas Padjadjaran

Moderator
Prof Rizky Abdulah, S.St., Apt, Ph.D

Narasumber
dr. Sili Nadia Tarmizi, M.Epid
(Direktur PDPML dan Jubir Pemerintah Vaksin COVID-19)

Pembicara
Carine Dochez, M.Sc., PhD

Pembicara
Prof. Cissy B. Karlasasmita dr., M.Sc, SpA(K), Ph.D

Moderator
Mas Rizky A. A. Syamsunarno, dr., M.Kes., Ph.D.

Pembicara
Madan Khaliwada M.Sc.

Pembicara
Ryan Rachmad Nugraha, dr., MPH

Pembicara
Laili Rahayuwati, M.Kes., M.Sc., DrPh.

Pembicara
Kuswandewi Mulyara, dr., M.Kes., M.Sc.

Panelis
Prof. DR. Dr. Soedjatmiko, Sp.A (K), Msi

Panelis
Dr. Ardini S. Raksanagara, dr., MPH

Supported by: Abbott, SANOFI

Narahubung : 081 222 7000 67 Akbar

10 JULI 2021
13.00 - 17.30

bit.ly/PenerimaanVaksinCOVID
Meeting ID : 956 0572 0440
Passcode : 10072021

zoom



3.3 Research Topic in Frontiers in Public Health

In December 2020 NESI/University of Antwerp and VACFA/University of Cape Town launched a Research Topic in Frontiers in Public Health, titled “Advances in adolescent vaccination programs in Low- and Middle-Income Countries: A focus on HPV vaccination capacity strengthening”.

The Research Topic is open for submission of manuscripts focusing on the following areas (but not limited to):

- HPV vaccination workshops or conferences
- Introduction of national HPV vaccination programmes
- HPV vaccination acceptability studies
- Integration of HPV vaccination with other health-related interventions
- Strategies to improve adolescent vaccination
- Recommendations for adolescent vaccination

The Research Topic can be accessed on:

www.frontiersin.org/research-topics/18600/advances-in-adolescent-vaccination-programs-in-low--and-middle-income-countries-lmics-a-focus-on-hpv

4+



Networking and advocacy

CHAPTER FOUR

NESI works with both the public and private sector to develop and deliver high-quality pre- and in-service training programmes. Through networking and advocacy NESI aims to align the different stakeholders in immunisation to achieve faster and coordinated introduction of new and under-utilised vaccines. Therefore, building and sustaining international networks is paramount in sharing experiences and best practices.

The NESI website (www.nesi.be) plays an important role in the dissemination of up-to-date information on vaccines and immunisation. The website hosts high-quality training materials, which can be downloaded if required.

A database keeps track of all alumni and training activities organised. A mailing list linked to this database has been established in order to send out news updates and updated training materials.

Participating in networking meetings is important for NESI to discuss and plan collaborative activities, to share experiences with other immunisation partners, and to receive latest updates and recommendations on vaccines and immunisation.



4.1 Meetings

4.1.1 Strategic Advisory Group of Experts meeting, Geneva, Switzerland, March and October 2021

The Strategic Advisory Group of Experts (SAGE) meetings were organised by WHO from 22 to 25 March 2021, and from 4 to 8 October 2021, in Geneva, Switzerland. SAGE advises WHO on overall global policies and strategies, ranging from vaccine research and development, to delivery of immunisation services and linking immunisation with other health interventions. SAGE usually meets twice a year and reports directly to the Director-General of WHO. Due to the ongoing COVID-19 pandemic, the in-person SAGE meeting was replaced by a virtual meeting.

SAGE is an excellent opportunity for NESI to network but also for understanding the rationale supporting WHO's recommendations on vaccines and immunisation. These evidence-based arguments can immediately be incorporated in NESI's education and training activities enriching discussions with the most up-to-date information, especially relevant for vaccinology courses and workshops focusing on new vaccine introduction.

TOPICS ADDRESSED BY THE STRATEGIC ADVISORY GROUP OF EXPERTS DURING 2021	
Topics discussed at SAGE March 2021	Topics discussed at SAGE October 2021
Report from WHO/IVB and Regional Reports	Report from WHO/IVB and Regional Reports
Vaccine acceptance and uptake	Monitoring IA2030/Zero dose children/ Immunisation during and post-COVID-19 pandemic
Measles and rubella	Polio
COVID-19 vaccines	COVID-19 vaccines
COVID-19 post-introduction considerations	Malaria vaccine
Polio	Influenza vaccine
Ebola vaccines	Behavioural and social drivers of vaccine uptake
	Hepatitis E vaccines

4.2 Conferences

4.2.1 The 15th Elsevier Vaccine Congress, **Italy, October 2021**

The 15th Elsevier Vaccine Congress organised by Vaccine Journal was delivered online from 4 to 6 October 2021. The congress brought together leading experts from around the world, ranging from basic science to vaccine service delivery, to share their knowledge on the current ground-breaking development and discoveries in the field of vaccines, including COVID-19 vaccines.

The congress was attended by over 200 participants from academia, research institutes, non-profit organisations, and pharmaceutical industry. The conference provided an excellent platform to exchange ideas through presentations and discussion sessions led by session chairs, as well as through online interactive poster sessions among the participants.

Two abstracts from the research project “Assessing acceptability COVID-19 vaccine in Indonesia” were accepted for poster presentations during the congress (see also section 3.2).



ABSTRACT 1

COVID-19 vaccine acceptance among university students and lecturers in four different provinces of Indonesia: A cross-sectional study. Khatiwada M, Nugraha RR, Mutyara K, Rahayuwati L, Dochez C, Kartasasmita C

Introduction:

The COVID-19 pandemic has imposed a pressing threat globally. Vaccines against COVID-19 are attributed as a key tool to prevent and control the ongoing pandemic. The success of COVID-19 vaccination programs will largely depend on public willingness to receive the vaccine. Various factors might potentially influence vaccine acceptance. This study aimed to evaluate the acceptability of COVID-19 vaccines among university students and lecturers in four different provinces of Indonesia.

Methodology:

An anonymous cross-sectional study was conducted online among university students and lecturers in Indonesia between 23rd December 2020 and 15th February 2021. The questionnaire collected sociodemographic characteristics, awareness, risk perception, impact of COVID-19, acceptance and factors influencing vaccination decision, information sources and trust. Logistic regression was used to evaluate the factors influencing the acceptance of COVID-19 vaccination.

Results:

Out of 3895 total participants, 50.3% stated that they would accept COVID-19 vaccination, whilst 10.7% expressed unwillingness to receive COVID-19 vaccine and 39% were not sure about receiving the vaccine. Concerns about the side-effects after COVID-19 vaccination was the main reason for unwillingness to receive the vaccine among the participants. Logistic regression showed that being male, being associated with the health sector, having a higher monthly expenditure and having health insurance could increase the acceptability of COVID-19 vaccine. In addition, preference for higher efficacy, willingness to pay, high risk perception and awareness on COVID-19 vaccine phase-III clinical trial study also positively influence COVID-19 vaccine acceptance. However, low trust in the government and low confidence towards vaccine safety and efficacy could hinder participants decision to be vaccinated.

Conclusion:

Health education, social listening, targeted communication and community engagement can address the concerns regarding COVID-19 vaccination. In addition, simple, clear and fact-based information on regular basis from trusted sources will be important to build confidence towards COVID-19 vaccination program.

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ABSTRACT 2

Assessing COVID-19 Vaccine Acceptance in Healthcare Workers (HCWs): Findings from Multi-Site Vaccine Hesitancy Survey in Indonesia. Nugraha RR, Khatiwada M, Mutyara K, Rahayuwati L, Dochez C, Kartasasmita C

Background:

Despite being regarded as one of the fastest developed vaccines globally, COVID-19 vaccines and vaccination program worldwide have been hindered by due to hesitancy and spreading of misinformation, particularly for priority vaccine recipients, including healthcare workers (HCWs). This study aims to shed light on hesitancy profile on COVID-19 vaccines particularly for specific HCW group in Indonesia.

Methods:

This study is a retrospective, cross-sectional study aimed at HCWs in four (4) provinces (Aceh, West Java, West Nusa Tenggara, and Maluku). Primary data collection was conducted using an online questionnaire from January to March 2021. Total of 3,112 samples were gathered and analyzed, exploring socioeconomic profile, infection-risk profile, as well as hesitancy profile (towards COVID-19 vaccine) from healthcare workers' perspective. Statistically significance was found to differentiate between predictors and non-predictors of vaccine hesitancy using odd ratio (OR) and 95% Confidence Interval (CI).

Results:

Of 3,112 sampled HCWs, approximately 20% expressed hesitancy towards receiving vaccines. Controlling for religion and HCWs' profession, Aceh (OR: 0.23, 95% CI: 0.17 - 0.33) region was found to be associated with hesitancy compared to Maluku as control region (statistically significant at p-value .01), which was in contrary with West Java (OR: 1.86, 95% CI: 1.17 - 2.95) which expressed eagerness. Other variables that were associated with willingness to receive vaccine include willingness-to-pay and vaccine efficacy.

Conclusion:

Hesitancy profile in Indonesia varies depending on socio-economical and geographical factors. In Indonesia, clinical profile of vaccine might influence willingness to receive vaccine, so it is important for government to yield transparent and scientific facts when it comes to disseminating information related to COVID-19 vaccines and vaccination. Ultimately, national strategic plans need to accommodate factors than might influence key population such as HCW to increase uptake and move forward in its national COVID-19 vaccination program.

4.2.2 GHD/EMPHNET Monthly Technical Day Meeting, October 2021

GHD/EMPHNET organises monthly technical day meetings on the first Saturday of each month, where all GHD/EMPHNET senior and technical staff in headquarters (Amman) and in countries come together to discuss relevant, priority and contextual technical topics.

NESI was invited to participate in the monthly technical day meeting on 2 October 2021 via Zoom. The main objective of this meeting was to share information, build and sustain internal technical capacities and promote collaboration and synergies between GHD/EMPHNET departments and teams. With a total of 41 participants, the meeting was attended by many GHD/EMPHNET technical staff (including those in countries), some support staff (Directors and some relevant Team Leaders), as well as country representatives from regional countries.

The meeting was opened by the Executive Director from GHD/EMPHNET, Dr Mohannad Al-Nsour.

NESI gave a presentation on HPV vaccines and current status of introduction and impact of the pandemic on the HPV vaccination programme.





Scientific advisors

NESI scientific advisors are engaged in advising on strategic areas and reviewing outputs, identifying potential funding and reviewing proposals/applications.

The input of the scientific advisory members will contribute to

1. refinement of strategic areas;
2. identification of additional resources;
3. identification of new collaborations; and
4. overall improved functioning of NESI.

Current scientific advisors:

- Dr Robin Biellik, DrPH
Retired Epidemiologist WHO – Geneva, Switzerland
- Dr Edith Maes, DBA, MSc
Health Economist Global Health, Planet Strategy Group, Strassen, Luxembourg
- Prof Dr Fred Were, MD, PhD
Professor of Paediatrics, Department of Paediatrics and Child Health, University of Nairobi – Nairobi, Kenya
- Dr Salah Al Awaidy, MD, MSc
Sr. Consultant Epidemiologist, Communicable Disease Surveillance and Control Advisor to the office of the Undersecretary of Health Affairs at the Ministry of Health – Muscat, Sultanate of Oman

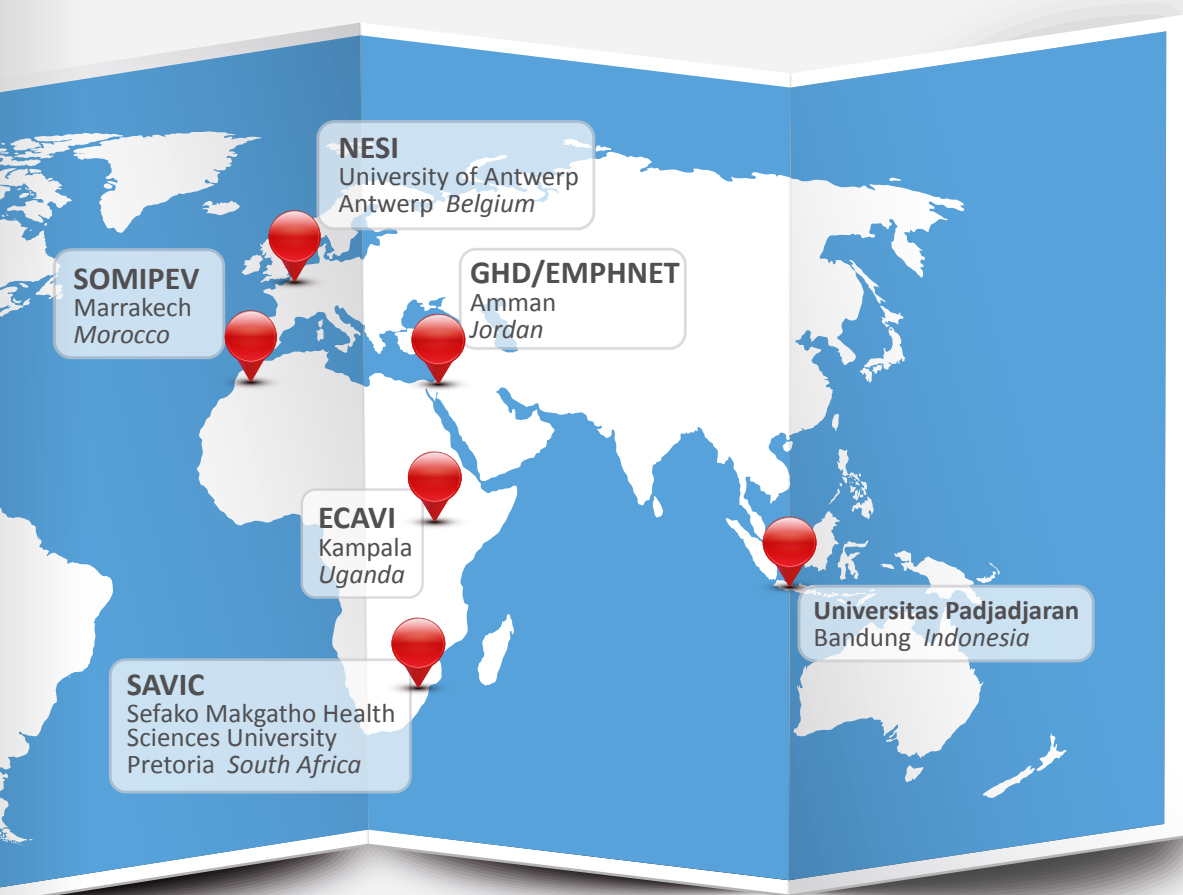
Collaboration with partner institutions/organisations

Collaboration with partner institutions/organisations in the different WHO Regions is an essential component for the implementation of NESI's activities. Each partner will bring in their own strength and expertise, consequently strengthening the overall Network, ensuring its sustainability and extending its reach.

NESI has established Collaboration Agreements with five partner institutions:

- South African Vaccination and Immunisation Centre/ Sefako Makgatho Health Sciences University | SAVIC/ SMU, South Africa
- Société Marocaine d'Infectiologie Pédiatrique et de Vaccinologie | SOMIPEV, Morocco
- Universitas Padjadjaran | UNPAD, Indonesia
- East Africa Centre for Vaccines and Immunization | ECAVI, Uganda
- Global Health Development/Eastern Mediterranean Public Health Network | GHD/EMHPNET, Jordan





Colophon

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**Network for Education and Support in Immunisation
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Social Epidemiology and Health Policy (SEHPO)**

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