25th ADVANCED COURSE OF VACCINOLOGY

5 - 16 MAY 2025

Course objectives

General objectives

The Course aims to facilitate critical decision-making in vaccinology by providing participants with a comprehensive overview of the various aspects of vaccinology (immunology, vaccine development, clinical trials, regulatory processes, vaccine-specific issues including new vaccines, vaccination strategies and policies, programme implementation, humanitarian emergencies, social, economic, political and ethical issues, financing, and communications…).

By the end of the course, participants should be able to:

(1) Use rational criteria for decisions related to evidence-based introduction of new vaccines into immunization programs;

(2) Identify requirements for vaccination strategies to be used in special conditions: eradication strategies, vaccination of neonates, elderly, immunocompromised and HIV infected persons;

(3) Deal with issues regarding vaccine trials (including site selection, recruitment aspects, monitoring, evaluation and ethical considerations);

(4) Identify recent developments towards new or improved vaccines and new vaccination strategies;

(5) Appraise all aspects of vaccines and vaccination safety, including vaccine delivery and reporting of adverse events following immunization;

(6) Initiate appropriate actions in crises associated with real or alleged vaccine adverse events;

(7) Recognize the role of communication in vaccine program and policy;

(8) Determine any necessary important change to their practice of vaccinology.

With its 360° vision of vaccinology, the ADVAC program describes the approaches required for the translation of scientific and epidemiological evidence into effective policy development related to vaccines and immunization.

ADVAC aims to expand the scientific foundation of the participants and their knowledge in vaccinology areas outside of their current expertise, showing the multifaceted aspects of

vaccinology, allowing them to explore novel technologies and think more globally and holistically, and providing them with a unique skill set to develop their leadership in vaccinology.

ADVAC represents a unique networking opportunity where participants can form valuable and sustainable professional relationships and serves as a platform where problems to professional challenges can be shared, and solutions identified.

By learning from, and alongside, other ADVAC students from other fields and organizations, ADVAC is uniquely oriented to help advance the field of vaccinology by sharing practical insights focused on implementation at a basic science level and on a public health scale. It brings together some of the leading experts in vaccinology and motivated students in a favourable environment, making it an excellent incubator for the development of concepts.

Specific objectives for each training activity

(lectures, interactive sessions, small group exercises and parallel sessions)

SESSION 1 - THE VACCINES JOURNEY: FROM VACCINES TO VACCINATION (INCLUDING IMPACT OF VACCINES). The purpose of this session is to describe the various steps needed from research to immunization of individuals and the roles, responsibilities and perspectives of the multiple players involved in the field of vaccinology and describe the complexities of their tasks.

From research to individual protection: the A-to-Z vaccine's journey

- To describe the different steps between research and the immunization of individuals
- Highlight the complexity and uncertainty of every step behind the journey of a vaccine from fundamental research to the act of vaccinating.
- Describe the basic concepts at the basis of vaccinology: immunogenicity, efficacy, effectiveness, safety, correlates of efficacy etc.

Vaccines Preventable Diseases' Burden and Vaccines Impact on Public Health

- Demonstrate the public health value of vaccines beyond efficacy and safety and present a public health value proposition for vaccines.
- Describe measures and outcomes to define the public health value of vaccines.
- Explain how to calculate vaccine preventable disease incidence and number needed to vaccinate to prevent a specific outcome.
- Define total systems effectiveness.

Measuring vaccination's impact in populations

- Describe how to measure key epidemiological parameters (e.g. the basic reproductive number, R_0) for serological profiles.
- Describe the impact of vaccination on epidemiological pattern.
- Define vaccination coverage levels by age to halt transmission.
- Define what an imperfect vaccine is.
- Discuss challenges in measurement and observation in the epidemiological study of mass vaccination.

Where are we with vaccine-preventable diseases & immunization coverage worldwide: the state of the immunization

- Give an overview of the epidemiology of Vaccine Preventable Diseases worldwide
- Give an overview of the Immunization coverage for the various vaccines
- Give a summary of the main challenges and issues behind the current immunization coverage rates in LMICs and HICs

Using vaccines to address a public health problem: the example of Polio eradication immunization strategy

- Assess the progress made so far towards global polio eradication (WPV and CVDPVs)
- Analyze the unique socio-political, and epidemiologic challenges in remaining endemic areas.
- Explain how vaccines have and will support the eradication strategy for both Wild Polio and cVDPVs

SESSION 2 - HOW VACCINES WORK. The purpose of this session is to describe the relevancy of foundational immunological knowledge to practical applications. Contemporary and historical examples of successes and failures are used to re-enforce the concepts.

How do vaccines protect?

- Explain vaccine-induced systemic and mucosa immune effectors that protect against diverse pathogens

How are vaccine responses elicited?

- Explain where and how B and T cells are elicited by vaccination

How to use vaccine platforms to tailor immune responses?

- Describe the immune response induced by vaccine platforms and related mechanisms, including reactogenicity

Use and limitations of correlates of immunity in vaccinology

- Describe the different definitions of correlates/surrogates that are used.
- Explain how correlates have been derived and what is measured.
- Explain how correlates of protection can accelerate development, licensure and implementation of vaccines.

Variability of vaccine responses in the real world (Interactive session 1)

- Describe the key factors that influence vaccine response using real life examples, including vaccination and host parameters (schedule, dosing, genetic and environmental factors)

Immunological memory

- Explain the process of immunological memory, demonstrating its practical importance including:
    - Mechanisms involved in B cell memory using the example of influenza.
    - Mechanisms involved in T cell memory with related examples.
- Define the different steps in building immunological memory and the potential effect of adjuvants or live vaccines on immunological memory.

Non-specific effects of vaccines

- Summarize the epidemiological evidence that suggests non-specific effects (NSE) exist.
- Describe the immunological evidence of NSE of vaccines in animals and humans.
- Evaluate the evidence for and against related hypotheses, e.g. gender-specific effects, live and non-live vaccine effects and discuss the gaps and limitations in current knowledge e.g. mechanisms/details of apparent effects on mortality.
- Describe strategies that have been proposed for advancing knowledge in this field that may permit NSE to be used to generate public health benefits.

SESSION 3 - VACCINE TECHNOLOGY, MANUFACTURING. (PART 1/2) The purpose of this session is to build up the basic research vaccine concepts previously presented and define the pre-clinical, manufacturing and approval considerations involved for vaccines. Efforts to identify contemporary issues and approaches being discussed in this area are highlighted, as are the various positions being debated.

Landscape in vaccine and immunization technologies

- Describe the different technologies that are currently being applied in the research setting to address different challenges in vaccine development. Examples will include vaccine design, manufacturing, delivery, stabilization and evaluation.
- Describe the stage of development of different vaccines/vaccine technologies.

Vaccine market, market shaping and regional initiatives for vaccine production

- Who are the vaccine manufacturers and what do they produce
- How prices and productions are considered
- What are the regional and global activities to try to shape the vaccine production

Concepts of Chemistry, Manufacturing, and Controls (CMC) for vaccines

- Describe the different components of CMC at the different level (research, clinical trial, production…)
- Explain the complexity of the quality assessment
- Deviation of lots quality and consequence on lots release
- Risk Management Plans

The complexity of quality control in vaccine manufacturing

- Describe the different steps involved in the manufacturing of vaccines and the complexity of quality control during and after manufacture including the regulatory environment.
- Explain the complexity of any process modification during manufacture and its real impact on potential shortages of vaccines.

SESSION 4 - VACCINE REGULATORY AFFAIRS. The purpose of this session is to understand the roles, responsibilities and processes of regulatory agencies.

The Role of regulatory agencies

- Explain the role and functioning of National and Regional Regulatory Authorities (NRAs).
- Describe the different stages of review and regulation of vaccines (investigational new drug application, biologics license application, post-licensure).
- Describe the evolution of vaccine regulations overtime and the current status of NRAs functionality globally in HICs and LMICs
- Measurement of the immune response for NRA (e.g. discussion and validation of cellular assays like T cells ICS)

How to manage regulatory requirements during vaccine development and vaccine production in both HICs and LMICs (small group exercise 1)

- Understand the role and responsibilities of the Regulatory Agencies during vaccines development and production
- Understand the Regulatory Agencies' requests to the Manufacturers
- Discuss how to ensure Regulatory Agencies and Manufacturers can collaborate better for the benefit of the populations

From ideas to implementation - the realities of funding for vaccine research and development in the private sector (Interactive session 2)

- Understand the information needed and criteria used by various funders (National Research Agencies, Multilateral Donors, Philanthropy, Manufacturers, Investment Funds…) to support vaccines research (Go and No-Go" decisions)
- Understand the differences perspectives from donors for vaccines targeting the high income countries market and vaccines as global goods for LMICs (and vaccines in-between)

SESSION 3 - VACCINE TECHNOLOGY, MANUFACTURING AND APPROVAL. (PART 2/2) The purpose of this session is to build up the basic research vaccine concepts previously presented and define the pre-clinical, manufacturing and approval considerations involved for vaccines. Efforts to identify contemporary issues and approaches being discussed in this area are highlighted, as are the various positions being debated.

Delivering a pandemic vaccine in 100 Days: what does it take?

- Identify the challenges and issues countries and manufacturers will face for a vaccine to be developed, produced and distributed in case of a pandemic
- Identify the areas where time can be gained without jeopardizing safety for a vaccine to be developed, produced and distributed
- Share about the current initiatives worldwide aiming at accelerating the delivery of a vaccines in case of a pandemic

Everything you always wanted to know on what makes funders support research-development: ask all your questions to governmental agency, venture capitalists, industry and philanthropic organizations. (Interactive session 3)

- Understand the rationale behind a decision to support vaccine research and development
- Understand the different perspectives of the various potential funders: governmental agency, venture capitalists, industry and philanthropic organizations.

SESSION 5 - ASSESSING VACCINES IN CLINICAL TRIALS (1/2). Building on the knowledge obtained from the previous session, this session will expand into a description of vaccine clinical trials including design options for the various categories of trials. The role of the students will also expand as they participate /lead small group/individual role play involving design of clinical trials and financing of vaccine development ideas. Real world complexity and context are explained

Clinical trials: an overview of issues to be considered

- Describe how clinical trials fit into the progression of vaccine development, leading stepwise (Phases 1-4) to licensed products.
- Demonstrate how the design and performance of clinical trials have changed over the decades, increasing in sophistication and complexity.
- Discuss the various options that may, or may not, be available to demonstrate the efficacy of a vaccine in Phase 3 trials on a track for licensure by regulatory agencies.
- Discuss the different trial designs in regards of the different objectives

Introduction to statistical aspects of clinical trials:

- Describe the concepts of statistical significance and statistical power of a trial and necessary sample size and design.
- Discuss non-statistical factors to consider when planning trial size.
- Define the concept of statistical analysis plan and describe the CONSORT guidelines for reporting.
- Describe simple analysis methods for 2-arm trials.
- Discuss practical statistical analysis issues in trials including variable follow-up periods, adjusting for confounding variables, and sub-group analysis.
- Discuss “per protocol” and “intention to treat” analyses, case-control evaluation of vaccine effectiveness, and trial designs considered (e.g. for Ebola vaccines).

How to design, write a protocol and implement a phase 2/2b/3 trials (Small group exercise 2)

- Design and write the protocol of a Phase 2/2b/3 trial
- Plan the implementation of a Phase 2/2b/3 trial

Assessing herd protection and vaccine effectiveness (and use for licensure)

- Discuss the different mechanisms by which vaccine herd protection can occur, including the role of observational studies.
- Describe new methodological approaches for measuring vaccine herd protection in cluster-randomized and individually randomized clinical trials.

- Demonstrate the role of measuring vaccine herd protection in assessing vaccine cost-effectiveness.

Clinical trials: role of a Data Safety Monitoring Boards (DSMBs)

- Discuss the importance of DSMBs in vaccine clinical trials, including under what clinical trial scenarios a DSMB is needed.
- Describe the critical elements of the implementation of a DSMB including membership, charter, and relationship with other committees.

Introduction to Human Challenge Trials

- Explain the concept of Human Challenge Trials.
- Explain the increased interest in using Human Challenge Trials (HCT) to shorten the time required to identify the best vaccine candidate and thus shorten the time/expense associated with licensure of vaccines.

SESSION 6 - VACCINE SAFETY - ASSESSMENT OF ADVERSE EFFECTS. The purpose of this session is to describe in depth and synthesize all issues related to vaccine safety and ways to assess, prevent and mitigate adverse events

How do vaccines cause adverse events?

- Discuss the different mechanisms by which vaccine can create adverse events
- Describe the different types of adverse events
- Describe the process of identifying a rare severe adverse event in relation to a vaccine (signal detection).
- Describe the impact of such an unexpected safety event on vaccine development and uptake.

WHO Guidance on how to manage safety issues

- Describe what information is necessary to determine the likelihood of a causal relationship between a vaccine administration and reported adverse events
- Explain the necessary process to evaluate the likelihood of a causal relationship using standard guidelines (including WHO guidelines)
- Demonstrate the importance of Surveillance and reporting of adverse events possibly associated with immunizations and the limitations of passive surveillance.
- Describe the management of signals (at country level, NRA, Industry etc…).

Population-based post-licensure surveillance

- Discuss, with specific examples, the role of vaccine pharmacovigilance and epidemiological studies in safety assessment.
- Describe the main study designs used for safety assessment.
- Explain the self-controlled case-series design, its benefits, and when it can be used.

Immunization safety in low- and middle-income country vaccination programs

- Describe the range of potential immunization safety issues including differences between low- and middle- income and high-income countries.

- Discuss the real problems and challenges including injection safety and waste management.
- Describe the range of necessary actions to ensure immunization safety including WHO's activities in support of global immunization safety.

SESSION 5 - ASSESSING VACCINES IN CLINICAL TRIALS (2/2). Building on the knowledge obtained from the previous session, this session will expand into a description of vaccine clinical trials including design options for the various categories of trials. The role of the students will also expand as they participate /lead small group/individual role play involving design of clinical trials and financing of vaccine development ideas. Real world complexity and context are explained

Analyzing the results of selected phase 3 trials (small group exercise 3)

- Demonstrate the degree of completeness of reporting of phase 3 vaccine trials according to the CONSORT guidelines.
- Analyze the results and draft a manuscript for submission to a high-impact scientific journal.
- After participating in this exercise, participants will be able to critically appraise and compare results arising from different randomized controlled trials.

SESSION 7 - ETHICAL ISSUES. The purpose of this session is to describe ethical considerations and challenges and identify accepted ethical guidelines relevant to vaccines

Applied ethics in immunization programs and practice

- Identify the key factors in obtaining consent for immunization in different settings.
- Outline ethical issues in financing and access to immunization.
- Describe the ethical basis for and against mandatory immunization laws.
- Outline the ethical issues of dismissing patients from practice if choose not to immunize.
- Explain why reporting of AEFI and feedback to health care workers and patient /family is required for ethical practice.
- Explain why not supporting pain mitigation on immunization is unethical.

Principles, guidelines and framework for ethical considerations in clinical trials of vaccines

- Examine ethical complexities in vaccine trials using various resources (ethics guidance; ethics frameworks; empirical data) e.g. 'community' participation; informed consent.
- Identify ethical issues to be addressed by researchers planning and implementing vaccine trials and how to best address them.

Ethical considerations in vaccine trials (Small group exercise 4): Using a student-led role play approach to address issues arising from the trial and study objectives, context and participants' health status, after the exercise, participants will be able to:

- Appraise ethical issues related to vaccines and vaccine trials.
- Adjust the design of clinical trials to take into consideration ethical issues.

SESSION 8 – DECISION MAKING FOR VACCINES (PART 1/2) **Continuing down the vaccine development pathway, this session will focus on an in-depth discussion of the science/factors/approaches involved in bringing a vaccine into the public-health setting.**

The decision-making processes for vaccines use: global, regional and local perspectives

- Describe the various forum and processes used at global, regional and national level (NITAGs) to make recommendations for vaccine use
- Discuss challenges and solutions to establish and strengthen NITAGs, as well as approaches to evaluate the functioning of NITAGs.
- Discuss considerations related to the development of off-label recommendations (NITAG vs NRA).

The decision-making processes for vaccines' use: what should experts consider

- Describe the evidence and criteria used to make an informed based decision making for vaccine use in countries
- Describe the methods to assess the strength of evidence
- Describe the sources of evidence
- Describe the mechanisms for NITAGs to exchange information

The example of the WHO SAGE decision making processes

- Describe the process used by WHO SAGE to make recommendations for vaccine use
- Describe the GRADE process used by SAGE working group to assess the strength of evidences
- Describe the Declaration of Interest mechanisms in place at SAGE to ensure transparency around recommendations

The role of health economics (including modelling) as a tool in analysing vaccine policy options

- Describe the different health economics analysis that can support the decision making for vaccine policy (e.g. CEA, modelling…)
- Describe the limitations around the use of health economics tools to support the decision making for vaccine policy
- Share about the possible support that can be provided to countries around health economics tools

Decision-making for the evaluation and impact assessment of new vaccines introduced in selected countries: safety and effectiveness. (small group exercise 5)

Through a small group exercise focusing on different vaccines and which aim to develop the rationale for the introduction of the selected vaccine to the selected target groups and culminating in a 2-3 minutes oral presentation to a simulated Minister of Health, participants will be able to:

- Identify what facts are needed in a decision-making process and how other factors influence the outcome.

- Organize data needed for a policy decision to introduce a new vaccine in a country – identifying what data are available and needs for further data collection.
- Identify options for a structured monitoring of vaccine safety and effectiveness following introduction of a new vaccine.

SESSION 9 – UPDATES ON VACCINES (Part 1&2) **The objective of this session is to provide an exhaustive view of some key vaccines included in national programs and to give the latest information regarding those vaccines (new vaccines, changes of schedule…).**

Response to polysaccharides and conjugates vaccines

- Discuss the role of bacterial capsular polysaccharides, including the interaction between the human immune system and bacterial polysaccharides.
- Explain the molecular basis for the improved response to conjugate vaccines.
- Discuss the Immunology of carbohydrates and how conjugation transforms the molecules into potent antigens
- Discuss the Conjugate vaccines Correlates of Protection (examples of PCV, Men and GBS) - concepts of GMT, SBI, affinity
- Discuss the use of Controlled Human challenge (CHIM) especially the new exciting data about the pneumococcus human model

Impact of Pneumococcal conjugate vaccines

- Describe pneumococcal vaccines with their characteristic and immunogenicity including PCV and PPS23 and discuss their potential limitations.
- Describe pneumococcal conjugate vaccines likely to be licensed in the near future.
- Describe the variety and endpoints expected to be impacted by the use of PCV in children, including nasopharyngeal carriage, IPD, mucosal diseases, antibiotic resistance, and the extent and importance of indirect protection with PCVs.
- Describe the basics of serotype replacement post-PCV.
- Discuss the relationship between pneumococcal disease in adults and children.
- Describe the impact of PCV immunization in children on disease burden in unvaccinated populations.
- Describe adult pneumococcal disease epidemiology in settings with and without infant PCV programs.
- Discuss the possibilities of future vaccine strategies designed to maintain herd rather than individual protection.

HPV vaccines

- Describe the burden of disease and the current prophylactic HPV vaccines (composition, mechanism of action, recommended schedules).
- Discuss current data on vaccine impact and effectiveness – disease, virus prevalence, herd immunity.
- Examine vaccine confidence- impact on new and established HPV vaccine programs.
- Discuss the contemporary debates – one dose regimen, elimination of vaccine HPV types.

Typhoid vaccines

- Describe the burden of disease of typhoid and paratyphoid fevers

- Describe the current and future vaccines against Typhoid and Paratyphoid (composition, mechanism of action, recommended schedules).
- Discuss current data on vaccine impact and effectiveness – disease, virus prevalence, herd immunity.

Meningococcal vaccines

- Describe the benefits of conjugate over polysaccharide vaccines.
- Explain the importance of understanding carriage dynamics, including the difference between direct and indirect immunity and importance of herd protection and the importance of whole genome sequencing in monitoring spread of meningococci globally.
- Synthesize information on the new sub-capsular vaccines for serogroup B disease.

Vaccines against arboviruses (Dengue, Zika, Chikungunya)

- Describe the burden of disease related to arboviruses
- Describe the current and future vaccines (composition, mechanism of action, recommended schedules).
- Discuss current data on vaccine impact and effectiveness – disease, virus prevalence, herd immunity.

Rotavirus and norovirus vaccines

- Describe the global burden of rotavirus and norovirus diarrhoea and the value of vaccination.
- Describe the progress with implementation of rotavirus vaccination programs, including post-licensure impact and safety data.
- Describe the progress with norovirus vaccine development.
- Discuss the remaining issues and challenges for full prevention and control of these diseases.

Influenza vaccines

- Discuss seasonal and pandemic influenza including the currently available influenza vaccines, their advantages and limitations.
- Discuss tools and strategies to facilitate influenza prevention through vaccination in low- resource settings (includes maternal and paediatric examples).

COVID vaccines

- Describe the existing Covid vaccines with focus on their effectiveness and brief description of safety profile.
- Describe the pipeline of new Covid vaccines.
- Discuss the various vaccination schedules strategies

SESSION 8 – DECISION MAKING FOR VACCINES (PART 2/2)

Decision-making for the evaluation and impact assessment of new vaccines introduced in selected countries: safety and effectiveness. (Small group Exercise 6: Presentations, discussion and conclusions of small group exercise 5.)

SESSION 10 - SELECTING APPROPRIATE VACCINATION STRATEGIES. **The purpose of this session is to describe additional considerations to proposals for a vaccine implementation program, specifically rationales for population choice, schedules, and follow-up**

RSV

- Describe the existing RSV vaccines with focus on their effectiveness and brief description of safety profile.
- Describe the pipeline of future RSV vaccines.
- Discuss the various vaccination schedules strategies

Vaccination and pregnancy and early life

- Discuss mechanisms of maternal antibody transfer across the placenta in healthy women and the potential for decreased transfer to those with underlying medical conditions such as HIV or malaria.
- Explain when, where, and why maternal immunization should be considered.
- Describe the impact of maternal immunization on the prevention of neonatal tetanus, pertussis, and influenza disease.
- Discuss potential pathogens and vaccines that may be suitable for maternal immunization.
- Describe the unique challenges associated with immune responses in early life.
- Discuss the basic principles that shape early life immune / vaccine responses, including how this understanding should apply to considerations for an infant vaccine schedules.

Vaccination schedules: Past, present and future – is there some rationale?

- Describe the critical elements of immunization schedule design past, present and in the future.
- Analyse the paradigms of immunization schedule research, design and implementation.
- Identify the conditional elements and challenges faced by immunization schedules around the world.

Vaccine responses and efficacy in the elderly

- Describe the changes in the ageing immune system including the changes in disease burden in older adults.
- Describe the concept of waning immunity and its consequences
- Describe the concept of frailty and health aging
- Describe the added value of immunization in elderly populations and the immunization strategies but also the known limitations of vaccines in the elderly.
- Share about the ideal characteristics of vaccines for the elderly population

Vaccination in immuno-compromised individuals

- Describe safety concerns of vaccines in the immuno-compromised patient.
- Describe the mechanisms of vaccine effectiveness in patients with different immunocompromised states.
- Devise individualized vaccine plans for patients with HIV

PARALLEL WORKING GROUP SESSIONS

The six proposed working group activities will be highly interactive and foster an exchange of views. During the parallel sessions, students will be able to choose and attend two of the working group activities offered. (2 sessions of 45 mn each).

1. **National decision-making for immunization programs:** Through case-studies and an interactive session building on the experience, expertise and perceptions of the entire group, participants will after the workshop be able to:
   - List factors that should be considered in making recommendations.
   - Identify the key stakeholders and how they should interact with/within NITAGs and discuss their role in decision making (including NRAs, industry, medical societies, CSOs...).
   - Describe factors affecting the credibility and performance of NITAGs.
   - Assess the effectiveness of NITAGs.

2. **Clinical vaccinology: patients' problem solving:** Through an interactive session, participants after the working group session will be able to:
   - Design approaches for providing a patient with a "catch-up" vaccine dose.
   - Discuss approaches for dealing with potential vaccine-induced adverse events.

3. **New approaches towards vaccination e-registries:** Through an interactive session, participants will after the session, be able to:
   - Identify the organization and funding needed for the development and maintenance of electronic immunization registers.
   - Describe the minimum data set for an electronic immunization register to collect data on vaccines administered.
   - Discuss the different uses of such a register on individual and population level (e.g. to generate reminders and recall vaccination notices for each client or to provide official vaccination certificates, and to allow vaccination coverage and timely assessments).
   - Assess the possibilities for data linkage of different electronic health care databases (vaccine impact assessment, both for effectiveness and safety).
   - Recognize the implications of data protection laws when setting up and using the e-immunization registers.

4. **Cold Chain management:** Through an interactive session, participants will after the session be able to:
   - Describe the importance and important elements of cold chain.
   - Identify the important elements of satisfactory cold chain management.
   - Identify the different tools and devices to facilitate cold chain management.
   - Apply necessary changes to their practices.

5. **Monitoring and evaluation of vaccine programs:** After the working group session participants will be able to:

- Describe what information is needed to manage and monitor an immunization program and the various tools used in immunization programs?
- Describe the different measures used to measure vaccination coverage with their advantages and limitations.
- Discuss the issue of poor data quality and challenges related with secondary data sources and how one can ensure reporting of good quality data.
- Describe Global immunization monitoring

6. **AEFI: WHO causality assessment:** Through an interactive case-study session, participants will after the workshop be able to:
   - Apply the principles and concepts of AEFI causality assessment to review and classify an AEFI.
   - Describe the benefits and challenges of such assessments.

SESSION 9 – UPDATES ON VACCINES (PART 3 & 4) The objective of this session is to provide an exhaustive view of some key vaccines included in national programs and to give the latest information regarding those vaccines (new vaccines, changes of schedule…).

Cholera vaccines

- Describe the current situation of the cholera outbreaks.
- Describe the existing cholera vaccines with their characteristic and immunogenicity.
- Describe the situation of the cholera vaccines stockpile and the production capacity perspectives.
- Describe the other vaccines currently under development and the possible future strategies for cholera outbreaks prevention and response.

Malaria vaccines

- Describe the different targets/life cycle stages for malaria vaccines and explain how immune responses to different parts of the life cycle have different clinical implications.
- Identify the key role of non-vaccine measures in malaria control.
- Discuss the current status of the malaria vaccine pipeline.

Tuberculosis vaccines

- Discuss the current state of tuberculosis vaccine development, the limitations of BCG and the challenges in tuberculosis vaccine development and innovative approaches being used to overcome these challenges.

SESSION 11 – REACHING SPECIFIC GROUPS. During this session, participants will explore the challenges and solutions for reaching out all the populations that can benefit from immunization (hard to reach, life-long immunization etc…).

How to better reach the zero-dose or under-vaccinated children in LMICs

- Describe the current global targets, achievements and challenges with respect to vaccinate hard-to-reach children including zero-dose children

- Identify the current major barriers to increasing or maintaining immunization coverage (weak health systems, missed opportunities, vaccine shortages, vaccine hesitancy, disruption of immunization, availability of quality data).
- Show how to apply best practices to increase vaccination coverage and options to simplify and facilitate vaccine delivery.

Life-course vaccines: how to better reach individuals from childhood to elderly?

- Describe the concept of life-long immunization
- Describe the current global targets, achievements and challenges with respect to vaccinating teenagers, adults, pregnant women, elderly population
- Identify the current major barriers to increasing or maintaining immunization coverage for those populations
- Show how to apply best practices to increase vaccination coverage and options to simplify and facilitate vaccine delivery.

The determinants of vaccine acceptance

- Describe the spectrum of vaccine hesitancy/acceptance/anti-vaccine sentiments
- How to measure vaccine hesitancy and for what?
- Describe the determinants of vaccine hesitancy
- Describe the individual and collective solutions trying to address vaccine hesitancy

How to address vaccine hesitancy at individual and community levels? (Interactive Session 4)

- Panellists will share about existing solutions used in various context and for various vaccines to overcome vaccine hesitancy at individual and community levels (including mandatory and voluntary vaccination)

SESSION 12 - FACING THE MEDIA: WHAT THE VACCINOLOGIST SHOULD KNOW IN THE CONTEXT OF VACCINE HESITANCY AND ANTI-IMMUNIZATION LOBBY: Introduction to media dynamics: how to best deliver vaccinology-related messages to different interest groups

After this highly interactive session, students will gain confidence to discuss the complexities of vaccine with multiple audiences. The learning will apply to all kinds of communication with the public including 1-2-1, with patients, in panel discussions and video conferencing. Specific objectives include the ability for participants to:

- Discuss how people perceive confidence in others and make judgements using emotions, rather than facts.
- Identify their professional Brand Values.
- Project confidence, expertise and personal warmth through body language, voice and words
- Appear (and sound) more authoritative and trustworthy.
- Match their image to their Brand Values (allowing for cultural differences).
- Bring science to life – make it real for people.
- Learn the ABC technique for media interviews.
- Win hearts as well as minds.
- Calm their nerves and ‘anchor’ their confidence.

SPECIAL LECTURES

Each year special lectures are delivered on a current topic of interest by world renowned experts allowing to present state of the art developments on immunological, vaccine development and strategy issues.

LAMBERT LECTURE

- **The 9th LAMBERT LECTURE:** The future of Health

PLOTKIN LECTURE

- **The 17th PLOTKIN LECTURE:** Multiple Antigen Presenting System Vaccines (MAPS)

SPECIAL SESSION:

25 Years of ADVAC:

- The history and the future of ADVAC