EACS European AIDS Clinical Society

# European Diploma in HIV Medicine

## CURRICULUM

European AIDS Clinical Society
Paddy Mallon, Chair | On behalf of the European Curriculum for HIV Medicine Advisory Committee

## Introduction and Aims

HIV Medicine is not a recognised speciality in many European countries but is regarded as a sub-speciality interest within several specialities, for example General (internal) Medicine, Infectious Diseases, Genito-Urinary Medicine and Dermato-Venerology, to name a few. Consequently, there is diverse and varied training for clinicians across Europe who are interested in including practice in HIV Medicine as part of their career.

EACS, therefore, aims to provide clinicians and practitioners with an accessible, standardised platform within which to demonstrate clinical knowledge in HIV Medicine according to a detailed curriculum. This curriculum focuses on competencies required to deliver high-quality care and an achievement of a minimum standard of background knowledge of the specialty.

The EACS European Curriculum in HIV Medicine will be used by EACS to develop content for the development of the EACS European Diploma in HIV Medicine, which was approved by the EACS Governing Board in 2017. The objective of the EACS Diploma in HIV is to accredit the attainment of a standard of knowledge deemed necessary to provide care for people with HIV in Europe. The European Diploma in HIV Medicine will be designed as an exam that will:

a. Promote minimal standards of education and training in HIV Medicine.
b. Test appropriate core knowledge, skills, attitude, and competencies in the practice of HIV Medicine as described in an approved curriculum.
c. Ensure delivery of a uniform standard of clinical care in the practice of HIV Medicine.

The curriculum will provide and benchmark the minimal standards of education and training in HIV Medicine in Europe with the objective to contribute to harmonisation of knowledge, skills, attitudes and competencies in the practice of HIV Medicine across Europe and beyond.

## EACS HIV Curriculum Advisory Committee

An advisory committee chaired by the lead for EACS Education and Training (Paddy Mallon) and comprising of senior advisors and junior faculty from across Europe has worked together to develop the curriculum that outlines the core required knowledge areas upon which the European Diploma in HIV Medicine will be examined.

***Senior advisors:***

Senior advisors are chosen for their knowledge and experience in curriculum design and examinations. The senior advisors provided oversight and advice on the direction of the Advisory Committee activities in developing the curriculum. They will continue to advise on the further development of the Diploma examination based on the approved curriculum.

***Junior faculty:***

The role of the junior faculty is to review and summarise available national guidance and curricula documents and to shape and review draft curriculum to agree on a final curriculum for onward review and approval by stakeholders associated with EACS, including the EACS Education & Training Committee and the EACS Governing Board.

# Faculty (2024)

## Chair

| First Name | Last Name | Institution | Country |
|---|---|---|---|
| Paddy | Mallon | University College Dublin | Ireland |

## Senior advisors

| First Name | Last Name | Institution | Country |
|---|---|---|---|
| Yvonne | Gilleece | Brighton & Sussex University Hospitals | United Kingdom |
| Nicky | Mackie | Imperial College Healthcare NHS Trust | United Kingdom |
| Sanjay | Bhagani | Royal Free Hospital | United Kingdom |

## Junior faculty

| First Name | Last Name | Institution | Country |
|---|---|---|---|
| Bogusz | Aksak-Wąs | Pomeranian Medical University, Szczecin | Poland |
| Adriana | Cervo | University Hospital Modena | Italy |
| Nathalie | de Castro | Hospitals Saint-Louis and Lariboisière, Paris | France |
| Christina | Ekenberg | CHIP - Rigshospitalet, University of Copenhagen | Denmark |
| Jennifer | Hart | Royal Free London | United Kingdom |
| Irina | Ianache | Victor Babes Clinical Hospital for Infectious and Tropical Diseases | Romania |
| Alexy | Inciarte | Hospital Clinic Barcelona | Spain |
| Miruna | Ispas | Victor Babes Clinical Hospital for Infectious and Tropical Diseases | Romania |
| Camilla | Muccini | San Raffaele Scientific Institute, Milano | Italy |
| Cathal | O'Broin | University College Dublin | Ireland |
| Padmasayee | Papineni | London North West University Healthcare NHS Trust | United Kingdom |
| Casper | Rokx | Erasmus - University Medical Center Rotterdam | Netherlands |
| Pablo | Ryan | Hospital Universitario Infanta Leonor, Madrid | Spain |
| Agata | Skrzat-Klapaczyńsk | Medical University Warsaw | Poland |
| Bernard | Surial | University Hospital Bern | Switzerland |

## Secretariat

| First Name | Last Name | Institution | Country |
|---|---|---|---|
| Joëlle | Verluyten | EACS | Belgium |
| Véronique | Van Haln | EACS | Belgium |

## Process of developing a Curriculum

The following stages of development of the curriculum were completed from 22 July 2021 to 30 September, comprising four meetings of the faculty.

***Stage 1. Scoping exercise to identify major areas of required knowledge.***

The faculty gathered relevant documentation relating to available guidance and curriculum available from member countries across Europe. EACS members from across Europe were invited to send their national programmes to support this initial phase of mapping. This was complemented by junior faculty working within subgroups to explore additional relevant documents where available.

The Junior faculty was divided into four groups aligned to four European regions (North, South, East and Central/West). They were then asked to review the available materials and summarise major areas of knowledge identified from these documents.

***Step 2. Development of areas of required knowledge into detailed sections.***

The summaries from each group were amalgamated and reformatted into specific sections of interest, each related to an area of expertise in HIV. Once these sections were agreed, each junior faculty was assigned specific sections aligned to their expertise or interest. The faculty then worked within section-groups to further refine the sections into relevant subsections, with essential and desirable knowledge specified within each subsection.

***Step 3. Review and sign-off of draft curriculum***

The faculty submitted draft sections which were amalgamated and reformatted by the Faculty Chair and the Faculty Secretariat into a single draft document. The whole faculty were then provided an opportunity to cross-review the sections. These reviews were address in a further revision and a final draft was developed for further review by EACS stakeholders.

***Step 4. Review and feedback from EACS stakeholders***

The draft is currently under review by the following stakeholder groups:

1. YING
2. WAVE
3. Community stakeholders (Simon Collins, Nikos Dedes, Luís Mendão, Alain Volny Anne)
4. Governing Board members

**Step 5.**

Feedback was collated and the final draft of the curriculum was approved by the Governing Board. This version (V1.0, dated 22nd February 2023) will be used in the setting of the first EACS Diploma in HIV Medicine examination.

**Step 6.**

The initial version of the Curriculum will undergo its first review after one year. Subsequently, it will be reviewed and updated every 18 months by the EACS Diploma Advisory Committee and approved by the EACS Governing Board.

**Review Version 2.0**

The curriculum was reviewed by the EACS Diploma Advisory Committee beginning in February 2024 and minor updates were proposed. This version (V2.0, dated 29th February 2024) is being utilised in the blueprinting of the EACS Diploma in HIV Medicine examination. The curriculum will be undergo another review in 18 months.

## Section 1 – HIV Pathogenesis

| Sub-Topic | Essential knowledge | Desirable/ Advanced knowledge |
|---|---|---|
| 1.1 HIV Virology | • Viral envelope, capsid and subcapsular viral structures (RNA)<br>• HIV target cell receptors/co-receptors and viral entry into cells<br>• HIV lifecycle and the role of antiretroviral drugs at each step<br>• HIV-1 subtypes and global distribution<br>• Common resistance associated mutations with clinical implications | • Sub-types and clades with impact on disease progression<br>• Intracellular HIV proteins and function within host cells<br>• Pre/post integration processes<br>• Host restriction factors<br>• Splice variants<br>• Recombination<br>• How mutations in HIV genome arise<br>• Hypermutation<br>• Archived mutations |
| 1.2 Pathogenesis of HIV transmission and establishment of infection | • Phases of infection following exposure:<br>- Eclipse, early and steady state phases of infection<br>- Crossing mucosal barriers<br>- Infection of dendritic/Langerhans cells, propagation to lymph nodes and CD4 T-cells, dissemination of virus and establishment of viral reservoirs<br>- Immunologic response and establishment of latency<br>• Viral transfer, replication and establishment of infection during eclipse phase<br>• Routes of transmission and pathophysiologic knowledge of associated infection risk factors that can impact transmission risk (increased and decreased)<br>• Pathogenesis behind main clinical phases; primary infection; asymptomatic phase, late disease (including AIDS) | • Zoonotic origin of HIV; simian-to-human transmission in early 20th century<br>• HIV reservoir formation and assays to measure it<br>• Relative risk reduction of transmission with specific interventions<br>• Global availability of risk reduction interventions<br>• Role of host genetic factors (HLA-B57/58, HLA-B27, HLA-B38, Δ32 mutation of CCR5) on HIV acquisition and disease progression<br>• Kinetics of immune response in all stages of HIV infection<br>• Mechanisms of lymphopenia<br>• Mechanisms of viral escape<br>• Gender differences |
| 1.3 Pathogenesis of long-term outcomes in HIV | • Immunological consequences of HIV infection (immune activation (innate and humoral), CD4 T-cell exhaustion, | |

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| | lymph node fibrosis, immunosenescence and immune exhaustion)<br>• Host factors associated with rapid progressors, elite controllers and long-term non progressors<br>• Inflammation and ageing | |
| 1.4 HIV 1 and HIV 2 | • Differences in viral structural differences, virus transmission, replication capacity and natural history between HIV-1 and HIV2<br>• Differences in epidemiology between HIV-1 and HIV-2 | |

**Section 2 – HIV Epidemiology, Classification and Natural History**

| Sub-Topic | Essential knowledge | Desirable/ Advanced knowledge |
|---|---|---|
| 2.1 HIV epidemiology | • HIV global and European epidemiology<br>- WHO updates on global epidemiology and distribution<br>- Incidence, prevalence, common risk groups<br>- Gender / age differences<br>- Mortality<br>- Access to antiretroviral therapy in Europe<br>- UNAIDS "95 – 95 – 95" 2025 targets<br>- Regional "care cascades" for HIV | • Differences in epidemiology within Europe (Western vs Eastern European) |
| 2.2 Natural history – clinical presentations associated with HIV infection, including acute HIV infection | • Primary HIV infection<br>- Symptoms and differential diagnosis of seroconversion illness<br>• Natural course of HIV infection (primary HIV, early asymptomatic, latency, elite controllers and long term non-progressors, late disease, including AIDS defining diagnoses, life expectancy)<br>• Indicator conditions for HIV testing according to natural history | • Role of reservoirs<br>• Initial evaluation of the patients with newly diagnosed HIV<br>• Pre-test likelihood of HIV for specific indicator conditions<br>• Influence of PrEP-use on natural history of HIV (symptoms, set-point viral load, seroconversion) |

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| | • Late presentation<br>- Classification (WHO ADH classification, CDC classification)<br>- Epidemiology<br>- Consequences and outcomes (morbidity / mortality, polypharmacy)<br>• Impact of ART on HIV disease progression,<br>- CD4, VL and disease progression<br>- Impact of ART on life expectancy<br>- Impact of ART-start on other events (e.g. lymphoma, cancer)<br>- Responses to ART – immune responses (CD4 response and CD4:CD8 ratio)<br>• Immune reconstitution inflammatory syndrome (IRIS)<br>- Risk factors<br>- Diagnosis and treatment<br>• Consequences of chronic HIV replication<br>- Common non-AIDS illnesses and co-morbidities<br>- Association with ageing and inflammation (including the concept of epigenetic ageing) | |
| 2.3 Clinical classifications of HIV (WHO, CDC) and opportunistic infections | • HIV infection stages – WHO, CDC<br>• Opportunistic infections (OI) (see section 6.2)<br>- Classifications (viral / bacterial / fungal, mycobacterial, protozoal, malignancy)<br>- Association of specific OI with CD4 count<br>- Impact of exposures (travel / geographical location) on type of OI<br>- OI prophylaxis | |
| 2.4 HIV2 | • Natural history: differences with HIV-1 infection (see section 14) | |

## Section 3 – HIV Diagnostics

| Sub-Topic | Essential knowledge | Desirable/ Advanced knowledge |
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| 3.1 Virological and immunological tests for diagnosis and monitoring HIV infection | • Understanding diagnostic techniques<br>- Required sample<br>- Basic laboratory methods<br>• ELISA and immunoblot technique<br>- Different generations of tests<br>- Combined antibody / antigen testing<br>- Indication for immunoblotting/western blot<br>- Risk factors for false positive and false negative tests<br>- Use and limitations of confirmatory tests<br>• HIV PCR<br>- Interpretation in diagnosis and management<br>- Relevant cut-offs<br>- Interpretation in HIV2<br>• T-cell subsets<br>- CD4, CD8 (absolute and percentage)<br>- Thresholds of CD4 counts relevant to clinical progression<br>- CD4 variation associated with ageing<br>- Interpretation in infants / children<br>- CD4:CD8 ratio and relevance to disease outcome<br>• HLA testing<br>- HLA B*5701 and abacavir hypersensitivity<br>• Rapid and 'point of care' (POC) testing<br>- Risk factors for false negative/positive<br>- Types of rapid test<br>- Indication for use | HLA B57 testing<br>Western blot to differentiate between HIV1 and HIV2 |

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| | • Tropism<br>- Interpretation of HIV tropism test results (CCCR5, CXCR4, mixed, genotypic vs phenotypic tropism tests) and use of CCR5 blockade<br>- Indication for testing | |
| 3.2 Indication and interpretation of HIV testing (including in children) | • Clinical indications for testing<br>- National testing strategies / guidelines (including at-risk groups, STI screening, pregnancy screening)<br>- HIV indicator conditions<br>- Understanding the concept of 'missed opportunities' to test for HIV<br>• HIV risk factors (sexual orientation, drug use, sex work, origin, DV, education level, poverty)<br>• Fiebig stages HIV<br>- Diagnostic accuracy of HIV tests (ELISA, blot, PCR) at each Fiebig stage<br>• Diagnostic test interpretation after risk exposure, acute HIV and during PrEP<br>- Interpretation of the seronegative 'window period'<br>• Screening for HIV in children born from mothers at risk of or with confirmed HIV infection<br>- Postpartum HIV testing | • Opt-in versus opt-out testing strategies:<br>- Advantages / disadvantages<br>- Contexts: antenatal testing, testing people of higher risk, in non-traditional settings, other acute care hospital settings and outreach services |
| 3.3 Use and interpretation of genotypic resistance testing (GRT) | • Methodology behind genotyping<br>• Recommendation for resistance testing<br>- Choice / timing of specimen (e.g. first presentation / last sample taken on failing regimen)<br>• Sequence analysis of RT/PROT/INT and interpretation<br>• Knowledge of key resistance associated mutations<br>- Common nucleoside resistance associated mutations (RAMs); TAMs, M184V, K65R, K103N | Awareness of next generation and pro-viral DNA sequencing applications for HIV resistance testing |

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| | - Protease RAMS and concept of resistance 'scores'<br>- Common InSTI RAMS<br>- Common polymorphic mutations and interpretation V179D, G333E etc<br>- Genetic barrier to resistance<br>• Role of antiviral drug selection pressure on detection of drug-resistance mutations<br>• Knowledge of resources to aid GRT interpretation<br>- IAS guidelines<br>- Stanford HIV Drug Resistance Database | |
| 3.4 Implementing HIV testing | • Pre-test and post-test counselling<br>- Informed consent<br>- Opt-in and opt-out testing<br>- Interpreting test results<br>• HIV-positive status verification | Tests used for screening<br>Tests used for confirmation |

**Section 4 – HIV Care Models and Patient Education**

| Sub-Topic | Essential knowledge | Desirable/ Advanced knowledge |
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| 4.1 Earlier diagnosis of HIV | • Early diagnosis to reduce late presentation<br>• Role of other specialists / community setting in HIV screening and diagnosis<br>- Screening in pregnancy<br>- Testing in HIV indicator conditions (e.g. malignancy)<br>• Testing strategies (see section 3.4)<br>- Types of HIV tests<br>- Principles of confidentiality and informed consent<br>- HIV testing methods (rapid, anonymous, home testing, clinic, GP, NGO)<br>- Targeting specific at-risk groups | Recognising HIV indicator conditions in the routine care (#aware.hiv Europe) |

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| | - Types of screening (e.g. opt-out, universal, risk-based)<br>• Linkage to care | |
| 4.2 Engagement in care | • Estimates of engagement and retention in HIV medical care<br>• Factors associated with retention in care and missed visits<br>- Universal health care vs paid for care<br>- Administrative<br>- Socioeconomic (women and childcare)<br>- Psychological (mental health)<br>- Lifestyle / behavioural (substance misuse, sex work)<br>- Ethnicity (language / cultural barriers)<br>- Age (younger age / adolescence)<br>- Travel or migration as a factor | IAPAC – Fast Track Cities |
| 4.3 Concept of continuum of care | • Models of linkage to care, engagement in care and retention in care<br>- Community-based testing and counselling<br>• Cascades of care<br>- Testing and diagnosis<br>- Understand concepts of 'Test and Treat' to reduce incidence and mortality<br>- Knowledge of 90-90-90 and 95-95-95 goals including barriers to attaining care continuum goals<br>• Strategies to reduce AIDS and non-AIDS-related mortality<br>- High-risk populations: substance misuse, sex work<br>- Risk reduction for substance misuse<br>- Testing for co-infections (TB / viral hepatitis) | Applying the cascade to your own service<br>UNAIDS – stigma / quality of life as the '4th 90' |
| 4.4 Treatment and support for people with HIV | • Management of ART initiation and follow-up<br>- Adherence support<br>• Stigma and discrimination<br>• Psychological aspects of HIV care<br>• Misinformation, HIV denying | |

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| | • Role for key-population-led organisations<br>- LGBTQ, adolescents, sex workers, prisoners, people with haemophilia, HCWs, migrants and asylum seekers, older people, people who use drugs.<br>- On-line resources and techniques supporting adherence | |
| 4.5 Models of specialist care | • To summarise models currently adopted in different countries<br>- Specialist clinics versus primary care versus mixed care<br>- Mobile units<br>- Frequency of visits<br>- Telemedicine | |

**Section 5 – Antiretroviral Therapy**

| Sub-Topic | Essential knowledge | Desirable/ Advanced knowledge |
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| 5.1 Principles of antiretroviral therapy (ART) for treatment of HIV | • Indications for treatment<br>- Aims to suppress viremia and treat HIV-related conditions<br>- Prevention of disease progression<br>- Treatment as prevention (including vertical transmission)<br>- U=U<br>• Combination antiretroviral therapy<br>- First and second line of ART (EACS Guidelines)<br>- Two-drug and three-drug regimens<br>- Oral and injectable treatments<br>- Single tablet regimens (STR)<br>• Timing of antiretroviral therapy<br>- Initiation of ART during opportunistic infections | • Indications, contraindications and relative merits in antiretroviral therapy<br>• Pharmacokinetics, mechanisms of action<br>• Mechanisms and relevance of resistance and cross-resistance<br>• Engage patients to support adherence and facilitate treatment decisions<br>• Adherence reinforcing strategies<br>• Antiretroviral use in elite controllers<br>• Toxicity of long-term ART and treatment of an ageing HIV population (see section 8) |

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| | - When to start and when not to start (eg cryptococcal meningitis, tuberculosis)<br>• Principles of adherence to ART<br>- Importance of adherence<br>- Levels of required adherence<br>- Thresholds for resistance of specific antiretrovirals with non-adherence (including 'forgiveness')<br>- Factors impacting on ART adherence (side effects, pill burden, substance use, patient knowledge, mental health, access, stigma)<br>• Monitoring of ART<br>- Viral and host response<br>- Monitoring for resistance<br>- Monitoring for drug-drug interactions<br>• Define the indications for prophylactic antimicrobials and vaccinations | |
| 5.2 Principles of antiretroviral therapy for prevention of HIV | • Indications for post-exposure (PEP) and pre-exposure (PrEP) prophylaxis<br>• Commonly used regimens in PEP and PrEP<br>- Oral, injectable, novel / future options (implants / rings)<br>• Monitoring of PrEP and PEP<br>- Window periods<br>- Frequency of review and safety monitoring (renal / bone / STI / acute HIV) | Medical prevention for STIs (doxycycline, HPV vaccine) as PrEP and PEP adjuvants in people at high risk for sexually transmitted HIV |
| 5.3 Antiretroviral therapy (ART) | - Recommended ART for naïve and experienced patients<br>- EACS Guidelines<br>- ART initiation<br>- Treatment failure and resistance<br>- Recommended ART in special populations | • Adapt ART regimen to the patient and its needs/behaviour<br>• Risk factors and clinical/laboratory parameters for ART non-response<br>• Clinical presentation and management of ABC hypersensitivity reaction |

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| | - Conception, pregnancy and post-partum<br>- Hepatitis viral co-infection<br>- TB co-infection<br>- ART in populations with suboptimal adherence<br>- Laboratory tests used in monitoring response and in informing use of certain drugs<br>- Baseline GRT<br>- HLAB*5701 testing and abacavir<br>- HIV subtyping<br>- Tropism testing and CCR5 blockade<br>- CD4 / HIV RNA responses<br>- Implementing ART<br>- Involving patients in treatment decisions<br>- Patient evaluation when choosing ART<br>  ○ HIV disease stage<br>  ○ AIDS defining illnesses<br>  ○ Adherence<br>  ○ Age / Co-morbidities<br>  ○ Co-medication<br>  ○ Mental health<br>  ○ GRT<br>- Management of treatment failure<br>- Knowledge of common mutations that impact on recommended first-line INSTI, PI, NRTI and NNRTI based regimens<br>- Knowledge of tools used to interpret genotypic mutations (e.g. Stanford Database / IAS Guidelines – see section 3.3)<br>- Understand the concept of management of highly treatment experienced / complex (multidrug) resistant | • Knowledge on study populations and mutation profiles from landmark studies on ART in acquired drug resistance following treatment failure (e.g. DAWNING, NADIA) |

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| | HIV, including understanding the interpretation of complex genotypic resistance mutation profiles | |
| 5.4 Drug-drug interactions | • Common drug-drug interactions within antiretrovirals<br>- EACS Guidelines<br>• Common drug-drug interactions between antiretrovirals and other commonly used drugs<br>- EACS Guidelines<br>- Liverpool drug interaction checker | • Indications for and interpretation of plasma ART levels<br>• Modifications of antiretroviral therapy and / or medications used in treatment of common co-morbidities |

**Section 6 – Complex Management Issues**

| Sub-Topic | Essential knowledge | Desirable/ Advanced knowledge |
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| 6.1 Virological failure and drug resistance | • Prevalence and epidemiology of virological failure and resistance<br>• Recognition of virological failure<br>• Genotypic resistance test (GRT) analysis<br>- Interpretation of key resistance associated mutations (RAM)<br>- Common RAM associated with:<br>o transmitted resistance<br>o first-line ART in RT/PROT/INT genes<br>• Second-line therapy after first-line failure<br>• Third-line and salvage therapy<br>- Current / novel therapies for salvage (e.g. ibalizumab, fostemsavir)<br>• Risk factors for virological failure<br>- Relationship of pharmacokinetic profile of ART and risk of resistance<br>• Interpretation of GRT in HIV2 | • Specific resistance patterns<br>• Future perspectives |

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| | - Knowledge that HIV2 has intrinsic NNRTI resistance | |
| 6.2 Opportunistic infections (OI) and AIDS defining conditions diagnosis, management, prophylaxis | • Clinical presentation and classification of OI and AIDS defining illnesses (ADI) including AIDS-related cancers<br>- Candidiasis<br>- Cryptococcosis<br>- Cryptosporidiosis<br>- Cytomegalovirus<br>- HSV/VZV<br>- Pneumocystis<br>- Toxoplasma encephalitis<br>- Progressive multifocal leukoencephalopathy<br>- Other CNS manifestations (e.g., HIV encephalitis)<br>- Bacillary angiomatosis<br>- Leishmaniasis<br>- Tuberculosis (see section 6.3)<br>- Histoplamosis (and other dimorphic funghi)<br>- Non tuberculosis mycobacteria (NTM)<br>- AIDS-related malignancies<br>○ Kaposi's sarcoma<br>○ Lymphoma (high grade B-cell)<br>○ Cervical cancer<br>• Diagnosis of OI and ADI<br>- Clinical investigations<br>- Laboratory diagnosis<br>○ test characteristics (sensitivity/specificity)<br>• Management of OI<br>• First and second-line treatments of OI and ADI<br>- Common regimens<br>- Optimal choice, timing of initiation of ART with OI treatment | • Prognosis of OI and ADI<br>• Epidemiological aspects of OI and ADI<br>• Management of prophylaxis/treatment failure or resistance (e.g., PCP)<br>• Management of haemophagocytic syndrome secondary to OI<br>• COVID-19 and Mpox in severe immunosuppressed persons with HIV<br>• Other re-emerging pathogens (e.g. measles) |

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| | ○ CNS infections<br>○ TB and NTM<br>- Diagnosis and management of Immune Reconstitution Inflammatory Syndrome (IRIS) (see section 6.5)<br>- Monitoring for side effects and drug-drug interactions<br>• Prophylaxis for OI/ADI<br>- Indications<br>- First and second line prophylactic regimens | |
| 6.3 HIV and tuberculosis | • Epidemiology<br>- Risk factors and prevalence of MDR/XDR TB<br>• Clinical definitions and presentation<br>- Latent TB<br>- Pulmonary and extrapulmonary<br>- TB meningitis<br>• Diagnosis<br>- Screening<br>- Clinical assessment<br>- Laboratory diagnostics including use of Xpert<br>• Resistance in TB<br>- Definitions and epidemiology of isoniazid resistance, MDR/XDR TB<br>• Management<br>- Pharmacology of common antituberculous therapies<br>- Treatment regimens for latent TB and pan sensitive TB<br>- Drugs used in MDR, XDR treatment<br>- Duration and dosing of TB treatment<br>- ART considerations in TB treatment<br>- Timing of ART initiation<br>- Drug-drug interactions<br>- Common side effects and safety monitoring | • TB drug shortening trials in HIV including<br>-latent TB (PREVENT TB, DOLPHIN, BRIEF-TB)<br>-drug sensitive (Study 31/A5349, NC-005, SHINE (paediatric))<br>-drug resistant (Nix TB, TB PRACTECAL)<br>• TB re-infections |

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| 6.4 HIV and viral hepatitis co-infection | • Epidemiology<br>- Risk factors by global location<br>• Clinical presentation<br>- Hepatitis A, B, C, D, E<br>- Risk factors for transmission / acquisition<br>• Diagnosis<br>- Screening<br>- Clinical assessment<br>- Laboratory diagnostics<br>• Management<br>- Indications for therapy in hepatitis B (HBV)<br>- Indications for therapy in hepatitis C (HCV)<br>- Pharmacology of common antivirals used in treatment of HBV and HCV<br>- Management of liver cirrhosis due to viral hepatitis co-infection (including HCC screening, variceal screening)<br>- ART considerations in treatment of viral hepatitis<br>- Common drug-drug interactions | • Resistance patterns in hepatitis B and C<br>• Salvage therapies<br>• Direct acting antivirals for HCV in patients with cirrhosis<br>• Management of co-infection with HDV<br>• Treatment of HCV reinfection |
| 6.5 Immune reconstitution inflammatory syndrome (IRIS) | • Definition and classification of IRIS<br>- Include differential between paradoxical versus unmasking<br>• Epidemiology and clinical presentation<br>- Prevalence<br>- Risk factors<br>- Common presentations<br>• Management<br>- Prevention in specific settings (e.g., cryptococcal disease and TB / NTM)<br>- Management / treatment approaches | |

## Section 7 – HIV Care in Special Populations

| Sub-Topic | Essential knowledge | Desirable/ Advanced knowledge |
|---|---|---|
| 7.1 HIV in pregnancy | • HIV diagnosis before and during pregnancy<br>- Screening (opt-in / opt-out; testing in both early and late pregnancy according to the risk setting)<br>• Vertical transmission (VT) of HIV<br>- Epidemiology including VT rates and risk factors<br>- Pathogenesis and mechanisms of transmission<br>- Indications for PrEP during pregnancy<br>- Management<br>○ Pre-pregnancy care and planning (e.g. undetectable VL before trying to conceive); essential vaccination before pregnancy (Rubella, Varicella); supplementation (folic acid)<br>○ Pregnancy, mode of delivery, infant feeding<br>○ Use of ART in pregnancy and PEP in baby, including stage of pregnancy (trimester / labour) and prophylaxis post-delivery in breast/chestfeeding<br>○ Adherence, especially post-partum<br>○ Management of co-infections (hepatitis, or STIs) during pregnancy<br>• Family planning in the context of HIV and sero-different couples<br>- Indications for PrEP (including concept of U=U)<br>- Assisted reproduction techniques (if available, should not be needed in U=U)<br>- STI testing (Chlamydia) | • Vaginal delivery versus caesarean section<br>• Breastfeeding – pros and cons |

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| | - Contraceptive methods<br>  ○ Drug-drug interactions with ART<br>  ○ Long-acting, reversible<br>• ART at conception, in pregnancy and breast/chestfeeding<br>- Efficacy<br>- Pharmacology<br>- Adverse pregnancy outcomes | |
| 7.2 HIV in newborns and infants | • HIV screening and diagnosis in newborns<br>- Interpretation of serology tests in newborns<br>- Interpretation of virological tests in newborns<br>• ART prophylaxis in newborns<br>• ART in newborns diagnosed with HIV<br>• Linkage to care<br>• Vaccinations in newborns diagnosed with HIV<br>• Infant screening for seroreversion | • ARV regimens available for post-exposure prophylaxis<br>• ARV regimens available for HIV treatment<br>• HIV and treatment factors affecting birth weight and gestational age<br>• Congenital malformations associated with HIV<br>• Childhood vaccination and immunosuppression<br>• Viral hepatitis and genito-urinary infections transmitted in utero and in neonates<br>• Parental drug use and management of newborn |
| 7.3 HIV in children and adolescents | • HIV diagnosis in children and adolescents<br>- Screening and diagnosis<br>• ARV treatment<br>• Clinical signs and symptoms<br>• Linkage to care<br>• Talking to children about their HIV<br>• Transitioning to adult care | • CDC classification<br>• Opportunistic infections in children and adolescents<br>• PCP/Toxo prophylaxis<br>• Integration in society<br>• ART available regimens<br>• ARV switch strategies |
| 7.4 HIV in transgender populations | • Epidemiology and prevalence of HIV in transgender populations<br>- Risk factors for HIV acquisition / transmission<br>- Adverse health outcomes in transgender populations<br>• ARV treatment and interactions with hormone therapy<br>• Management of HIV in transgender populations<br>- Non-discriminatory medical care | • Inclusion in studies of HIV-affected communities<br>• PrEP<br>• Access to competent, affirming, sex-positive, safer-sex information<br>• Transgender-specific health services (hormone therapy) |

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| | - Mental health<br>- Risk reduction from substance misuse<br>- Sexual health and STI | |
| 7.5 Management of HIV in older populations | • Epidemiology<br>- Late presentation<br>• HIV screening and diagnosis<br>- Risk factors for acquisition and transmission<br>• Screening, prevention and management of non-AIDS co-morbidities (see section 8)<br>• ARV therapy in older patients<br>• Drug-drug interactions<br>- Pharmacokinetics and ageing<br>- Menopause: HRT, cardiovascular risk, bone mineral density (refer to section 8.10) | |
| 7.6 HIV in incarcerated persons | • Epidemiology<br>- Prevalence across Europe<br>- Risk factors of HIV acquisition in prisons<br>- Late presentation<br>• Co-infections<br>- Viral hepatitis<br>- TB (including drug resistance)<br>• Diagnosis and management<br>- Screening for HIV, viral hepatitis and TB<br>- Harm-reduction strategies (see section 7.8) | Harm reduction; needle and syringe programmes, opioid replacement<br>Test/counselling (information and stigma reduction) |
| 7.7 HIV in migrants | • Epidemiology including:<br>- HIV acquisition risk<br>- Delay in HIV diagnosis<br>- Barriers / enablers to access to healthcare<br>- Treatment outcomes<br>• Risk factors affecting adherence | Strategies for linkage and retention in care of migrants<br>Criminalisation of migration |

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| | - Restricted access to healthcare<br>- Poverty<br>- Language / cultural barriers<br>- Stigma | |
| 7.8 HIV and drug misuse | • Epidemiology and classification of drug misuse<br>- Injecting drug use<br>o Prevalence among people with HIV<br>o Common drugs used<br>- Inhalation drug use<br>- 'Chemsex'<br>o Prevalence among people with HIV and types of chemsex<br>o Risk factors<br>o Common drugs used<br>o STI (including Mpox) and hepatitis risk in chemsex populations<br>o Chemsex and mental health issues<br>• Diagnosis and management<br>- Testing (including point of care)<br>- Harm reduction strategies<br>o Needle exchange<br>o Safe injecting rooms<br>o PrEP and treatment as prevention (TAsP) (see section 9)<br>- Opioid substitution therapies<br>o Drug-drug interactions with ART and other common medications used in HIV<br>- Behavioural interventions<br>• Drug-drug interactions with ART<br>• Diagnosis and management of common complications<br>- Overdose | |

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| | - Hepatitis co-infections<br>- STI (see section 9)<br>- Skin and soft tissue infections<br>- Endocarditis<br>- Mental health<br>- Social disadvantage (including homelessness)<br>- End organ disease (liver / renal / heart) (see section 8) | |

**Section 8 – Non-HIV Care for People Living with HIV**

| Sub-Topic | Essential knowledge | Desirable/ Advanced knowledge |
|---|---|---|
| 8.1 Cardiovascular disease (including dyslipidaemia and hypertension) | • Cardiovascular disease<br>- Prevalence and impact (morbidity / mortality)<br>- Risk factors<br>- Role of HIV in CVD<br>o Direct and indirect effects<br>o Impact from ART<br>- Assessment<br>o CVD risk equations<br>o Investigations, including imaging<br>• Dyslipidaemia<br>- Classification<br>- Role of HIV and ART<br>- Role of statins in primary prevention of CVD among people with HIV (REPRIEVE study)<br>• Hypertension<br>- Classification and risk factors<br>- Assessment and treatment<br>• Management of metabolic complications<br>- Approach to treatment for dyslipidaemia, hypertension | - Choice/switch of ART in order to reduce the risk of CVD |

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| | - Lifestyle interventions (smoking cessation, diet)<br>- Common drug-drug interactions with ART | |
| 8.2 Diabetes | • Epidemiology and risk factors<br>• Classification and diagnosis<br>• Screening for complications<br>- Renal / vascular / ocular<br>• Management<br>- Pharmacotherapy<br>- Important drug-drug interactions<br>- Lifestyle | Choice of ART in diabetes |
| 8.3 Weight gain, obesity and lipodystrophy | • Definition and classification<br>- Weight gain and obesity<br>• Risk factors<br>- ART<br>- Lifestyle<br>- Return to health effect<br>• Assessment<br>- Clinical and radiological<br>- Complications<br>• Complications<br>- Diabetes / dyslipidaemia<br>- Non-alcoholic steatohepatitis<br>• Management<br>- Lifestyle factors<br>- Pharmacological / surgical approaches | - Lipoatrophy and lipohypertrophy |
| 8.4 Renal disease | • Epidemiology, classification and risk factors<br>• HIV-associated nephropathy (HIVAN)<br>- Risk factors<br>- Definition, diagnosis, treatment<br>• Renal tubulopathy | • HIV-related glomerulonephritis<br>• HIV-associated thrombotic microangiopathy definition |

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| | - Definition, diagnosis and risk factors<br>- ART adjustment strategies<br>• Nephrolithiasis<br>- Diagnosis and risk factors (including role of ART)<br>• Tubulointerstitial nephritis<br>definition, risk factors (including role of ART)<br>• Chronic renal failure<br>- Classification and risk factors<br>- Management<br>ART adjustment in renal dysfunction / haemodialysis | |
| 8.5 Bone disease | • Low bone mineral density and osteoporosis<br>- Definition, classification, diagnosis and risk factors<br>- Role of ART<br>- Complications<br>o Fractures<br>- Management<br>o Therapeutic interventions<br>o ART modification to prevent bone loss<br>o Hormone replacement therapy to prevent bone loss in women (refer to section 8.10)<br>• Low vitamin D and osteomalacia<br>- Definition, classification, diagnosis and risk factors<br>- Management (replacement versus supplementation of vitamin D) | |
| 8.6 Liver disease | • Approach to assessment and management of abnormal liver function in people with HIV<br>• Liver cirrhosis and hepatocellular carcinoma<br>o Definition, classification and diagnosis<br>o Risk factors | Important drug-drug interactions with ART (see section 5.4) |

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| | ○ Screening for hepatocellular carcinoma and other complications of portal hypertension<br>○ Role of HIV / ART<br>○ Management approach<br>• Metabolic associated fatty liver disease (MAFLD)<br>- Definition, classification and diagnosis<br>- Role of HIV/ART | |
| 8.7 Mental health | • Depression, anxiety<br>- Definition, classification prevalence and diagnosis<br>- Risk factors<br>- Tools for screening and diagnosis<br>- Role of HIV / ART<br>- Management approach<br>- Important drug-drug interactions with ART | • Psychosis<br>• Personality disorders<br>• Addiction<br>• Eating disorders |
| 8.8 Cognitive impairment | • Definition, classification, epidemiology and risk factors<br>• Clinical presentations<br>• Diagnosis<br>- Clinical, diagnostics, including imaging and VL quantification in CSF<br>• Management<br>- ART modification<br>- Specialist assessment | • Evaluation tools to measure cognitive function (including domains tested)<br>• HIV genotype in CSF in case of CSF viral escape<br>• Knowledge of CSF penetration of common antiretrovirals |
| 8.9 Non-AIDS malignancies | • Epidemiology, classification and risk factors associated with common non-HIV related neoplasia<br>- Lung cancer, liver cancer, and anal cancer<br>- Screening for cancer in people living with HIV<br>- Common drug-drug interactions between chemotherapy and ART | • Breast, colon, prostate and vaginal neoplasia in people living with HIV<br>• ART in patients with non-HIV related neoplasia. |
| 8.9 Frailty | • Epidemiology, classification and definition of frailty<br>• Concept of multimorbidity | • Concept of ageing in HIV: impact of virus, ART, multimorbidity |

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| | • Management approaches<br>- Polypharmacy<br>- Multidisciplinary approach | • Considerations for choice of ART in older people with HIV<br>• Global geriatric assessment<br>• Common approaches / tools to assess frailty |
| 8.10 Menopause | • Routine care (e.g. mammography, gynaecological examination, assessment of bone mineral density, assessment of cardiovascular risk)<br>• Assessment of menopausal symptoms and indications for treatment<br>• Indications, contraindications and types of hormone replacement therapy<br>• Perimenopausal osteoporosis - prevention and treatment<br>- FRAX vs DXA in people living with HIV | • Knowledge of common drug-drug interactions between antiretrovirals and hormone replacement therapy (see section 5.4) |
| 8.11 Solid Organ Transplantation in HIV | • Criteria for solid organ transplantation in people with HIV<br>• Common organ transplants in people with HIV<br>- Kidney, bone marrow, heart, liver<br>- Common immunosuppressant drugs used in transplant recipients<br>• Outcomes of solid organ transplantation in people with HIV<br>• OI prophylaxis and treatment in solid organ transplant in people with HIV<br>- Common drug-drug interactions with ART | • Choice of ART in organ transplantation<br>• HIV to HIV transplantation and discordant hepatitis status in organ transplant |
| 8.12 Vaccination in HIV | • Recommended vaccinations and vaccine schedules<br>- See EACS Guidelines | Type and timing |
| 8.13 Other co-morbidities | • Sexual and reproductive health<br>• Sleep disorders<br>• Respiratory disease | |

## Section 9 – HIV Prevention and Sexual Health

| Sub-Topic | Essential knowledge | Desirable/ Advanced knowledge |
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| 9.1 Treatment in prevention of HIV (PEP and PrEP) | • Pre-exposure prophylaxis (PrEP)<br>- Rationale and indications for PrEP<br>- Risk groups for whom PrEP is recommended<br>- Regimens appropriate for different populations<br>- PrEP regimens<br>o Oral, topical, injectable<br>- Assessment and monitoring<br>o Safety and efficacy (including renal and bone health)<br>• Post-exposure prophylaxis (PEP)<br>- Indications for PEP<br>- Assessment of risk of exposure<br>o Sexual and non-sexual (occupational, injecting drug use, etc.)<br>o Window period<br>- Common PEP regimens<br>o Common drug interactions<br>- Monitoring and post-PEP follow-up<br>- Indication for other prophylaxis<br>o Vaccination / immunisation / PrEP<br>• Treatment as prevention in people with HIV<br>- Undetectable = untransmissible (U=U)<br>• Vertical transmission (see section 7.1 and 7.2)<br>• Non-medical interventions and interdisciplinary teams<br>- social workers, psychologists, health advisors | • Sentinel PrEP and U=U trials<br>• |
| 9.2 Sexually transmitted infections | • Clinical presentation, transmission risk, diagnosis (including laboratory test interpretation) and treatment (including primary prophylaxis and immunisations) for common sexually transmitted infections:<br>- Syphilis | • Management of STI in pregnancy<br>• Common serotypes of HPV associated with malignancy<br>• Prevalence of drug resistance<br>• Common genital dermatoses |

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| | ○ Serological diagnosis<br>○ Treatment of different stages<br>- HPV<br>○ Cervical / anal / oropharyngeal dysplasia and cancer<br>▪ Screening and prevention (e.g. cytology, colposcopy, anoscopy, vaccinations)<br>○ Treatment<br>- Gonorrhoea<br>- Chlamydia<br>- NGU nongonococcal urethritis<br>- Lymphogranuloma venereum LGV<br>- Mycoplasma genitalium<br>- HSV 1 and 2 treatment and suppressive treatment<br>- Mpox | |
| 9.3 Other prevention strategies | • Vaccination to prevent other STI / common infections (see EACS Guidelines on vaccinations)<br>• Harm reduction strategies in drug misuse (see section 7.8)<br>• DoxyPrEP | |
| 9.4 Preventive services | • Key roles within prevention services<br>• Participation of key populations (community involvement)<br>- MSM, sex workers, transgender, those at risk of human trafficking | |

**Section 10 – Past Perspectives**

| Sub-Topic | Essential knowledge | Desirable/ Advanced knowledge |
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| 10.1 Historic context of HIV | • MMWR report of first cluster of PCP in five gay men in Los Angeles, and creation of the CDC Taskforce “KS/OI” | • First epidemic likely in Congo 1970s |

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| | • Concurrent Isolation of HIV in 1983 by 2 groups, which were called lymphadenopathy-associated virus (LAV) and human-T-lymphotropic virus type III (HTLV-III), both renamed to HIV in 1986<br>• Occurrence of HIV in Africa, initially called 'slim disease' | • First simian-to-human transmission probably in the beginning of the 20th century<br>• 1983 – The Denver Declaration (or principles)<br>• 1994 – GIPA Principles |
| 10.2 Lessons learnt | • Lack of prevention due to stigma/taboo as drivers of the epidemic in Sub-Saharan Africa<br>• Use of term 'gay-related immune deficiency' as driver of stigmatisation | • Misinformation related to use of oral polio vaccine in Africa as a source of HIV<br>• Incorrect use of 'patient zero'<br>• Patient advocacy and treatment distribution through "buyer's clubs" bypassing regulators |
| 10.3 Drug development, treatment and prevention concepts | • AZT as the first drug<br>• Toxicity of the initial regimens<br>• Initial regimens based on mono and dual therapy<br>• Concept of HAART<br>• Timing of ART (CD4 based vs. immediate)<br>• U=U<br>• PrEP | • Impact of circumcision on protection against HIV<br>• Pregnancy (birth modes, ARVs initially not permitted)<br>• Breastfeeding<br>• ARVs withdrawn due to toxicity<br>• Introduction of generics |
| 10.4 HIV and stigma | • HIV and criminalisation<br>- People who inject drugs<br>- Men who have sex with men<br>- Sex workers<br>• Transgender people | • Use of the term 4H<br>• Patients with haemophilia<br>• Virgin cleansing myth |
| 10.5 Health promotion to reach key populations | • HIV screening among key populations<br>• Harm reduction strategies<br>• Campaigns to promote health services for key populations<br>• Integration of key populations in society<br>• Engagement of key populations in research | • ABC programme<br>• Role of civil society<br>• Opioid substitution therapy<br>• Needles/syringes exchange programmes<br>• Drug consumption rooms |

**Section 11 – Future Perspectives**

| Sub-Topic | Essential knowledge | Desirable/ Advanced knowledge |
|---|---|---|
| 11.1 HIV Vaccines | • Challenges in the development of safe and effective HIV-1 vaccines<br>• Different HIV vaccine strategies including broadly neutralising antibodies<br>• Vaccine for HIV cure<br>• Vaccine for HIV prevention | • Data on safety and efficacy<br>• Principle HIV vaccine studies with main results<br>• HIV vaccine ongoing studies |
| 11.2 HIV Cure | • Different HIV cure strategies and challenges<br>• Principle HIV cure studies with main results<br>• Elite controllers / long-term non-progressors<br>• Bone marrow transplant and HIV cure (Berlin / London patients) | • People cured of HIV<br>• HIV reservoirs<br>• HIV cure ongoing studies |
| 11.3 Novel therapies | • Antiretroviral therapies recently approved (i.e. fostemsavir, ibalizumab, lenacapavir …)<br>• New antiretroviral classes: capsid inhibitor (lenacapavir), nucleoside reverse transcriptase translocation inhibitor (islatravir)<br>• Long-acting therapy for HIV treatment and prevention (including guideline recommendations) | • Data on safety and efficacy<br>• General knowledge of studies on new drugs/regimens<br>• Ongoing studies |

## Section 12 – HIV and Stigma and Discrimination and Policy

| Sub-Topic | Essential knowledge | Desirable/ Advanced knowledge |
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| 12.1 Reducing stigma and discrimination | • Definition of key populations<br>- MSM<br>- Migrants<br>- Transgender<br>- Sex workers<br>- Drug users<br>- People in prisons | • Awareness of major social determinants of health |

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| | - (Pregnant) women<br>- Older populations<br>• Stigma definition<br>- Causes / contributors<br>- Mechanisms of stigmatisation<br>- Impact of stigma<br>• HIV and disclosure (family, friends, authorities and healthcare providers)<br>• Role of interdisciplinary teams (community and voluntary organisations)<br>• HIV and criminalisation | |

**Section 13 – HIV and Health Systems**

| Sub-Topic | Essential knowledge | Desirable/ Advanced knowledge |
|---|---|---|
| 13.1 Sustainable epidemiological surveillance, monitoring and evaluation systems | • European and global epidemiological and surveillance systems<br>- ECDC<br>- CDC<br>- WHO<br>- UNAIDS (90-90-90)<br>• How surveillance contributes to policy planning<br>- prevention, diagnosis, treatment, and support programmes | • HIV Fast-Track City<br>• PEPFAR<br>• UNAIDS eg Universal Health Coverage, Sustainable Development Goals |
| 13.2 Health promotion and illness prevention (strategic level) | • Strategies to reach the key populations<br>• Tools used to reduce HIV prevalence and transmission:<br>- Testing, TAsP, PMTCT, PEP/PrEP, condoms, STI diagnosis and treatment, circumcision, harm reduction programmes e.g. methadone programmes, needle exchange | • Fast-Track Cities<br>• Behavioural factors – Sex education, stigma and discrimination, psychosocial supports<br>• Structural – inequity, education, poverty, women's rights, reproductive rights, LGBT rights, decriminalisation. |

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## Section 14 - HIV-2 Infection

| Sub-Topic | Essential knowledge | Desirable/ Advanced knowledge |
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| 14.1 Epidemiology, natural history, diagnosis and clinical presentation | • Origins of HIV 2<br>• Epidemiology, including global and European distribution<br>• Clinical characteristics<br>- Transmission<br>- Longer asymptomatic stage<br>• Diagnosis<br>- Clinical and laboratory<br>- Interpretation of diagnostic tests (e.g. HIV RNA levels)<br>- Monitoring of disease / therapy<br>• Morbidity and mortality relative to HIV-1 | • Sub-types and clades<br>• Useful resources:<br>- BHIVA HIV2 Treatment Guidelines<br>- CDC guidelines<br>- DHHS guidelines<br>- https://clinicalinfo.hiv.gov/en/guidelines/adult-and-adolescent-arv/hiv-2-infection) |
| 14.2 Treatment | • Common treatment regimens<br>- 2 NRTIs + integrase/PIs<br>- Common guidelines (CDC, BHIVA)<br>• Resistance patterns<br>• Intrinsic NNRTI resistance<br>• Dual infection (with HIV1)<br>• Co-infection (hepatitis B) | • Indications for treatment (i.e. CD4 T-cell count, viraemia)<br>• Virological failure<br>• Algorithms for interpreting genotypic resistance to HIV-2 (Stanford HIV drug resistance database)<br>• Compilation of drug resistance mutations by a European consortium (HIV-2EU HIV-GRADE internet too)<br>• https://www.hiv-grade.de/HIV2EU/deployed/grade.pl?program=hivalg |