Larissa Dangel

The European Public Health Microbiology Training Programme (EUPHEM), Cohort 2021

State Health Office Baden-Württemberg, Germany

Background

The ECDC Fellowship Programme is a two-year competency-based training with two paths: the field epidemiology path (EPIET) and the public health microbiology path (EUPHEM). After the two-year training, EPIET and EUPHEM graduates are considered experts in applying epidemiological or microbiological methods to provide evidence to guide public health interventions for communicable disease prevention and control. The Administrative Decisions ECDC/AD/2022/16 Rev.01 and ECDC/AD/2023/06 govern the European Union (EU)-track and Member State (MS)-track, respectively, of the ECDC Fellowship Programme, field epidemiology path (EPIET) and public health microbiology path (EUPHEM), Cohort 2021.

Both curriculum paths provide training and practical experience using the 'learning-by-doing' approach at acknowledged training sites across the European Union/European Economic Area (EU/EEA). This final report describes the experiences and competencies the fellow acquired by working on various projects, activities, theoretical fellowship training modules, other modules or trainings, and international assignments or exchanges during the fellowship.

Pre-fellowship short biography

Larissa Dangel holds a bachelor's degree in biology from the Karlsruhe Institute of Technology and a master's degree in biomedical sciences from the Johannes Gutenberg University Mainz. Her doctoral research focused on neuroprotection in traumatic brain injury using a mouse model at the University Medical Center Mainz, during which she developed valuable skills in experimental design, data analysis, and laboratory techniques.

After completing her PhD, Larissa worked at the State Health Office in Baden-Württemberg (Landesgesundheitsamt Baden-Württemberg – LGA) with a focus on Q fever, contributing to diagnostics, research, and gaining her first experience in epidemiological studies. During the COVID-19 pandemic, she became the head of the molecular laboratory at the State Health Office. In this position, Larissa assumed various responsibilities which included overseeing laboratory operations, managing a team, ensuring compliance with health regulations, and optimising laboratory procedures for infectious disease diagnostics. This role also involved significant collaboration with various public health stakeholders.

Stockholm, 2025

Results

The objectives of the core competency domains were achieved partly through project and activity work, and partly by participating in the training modules. Results are presented in accordance with the EPIET/EUPHEM core competencies, as set out in the ECDC Fellowship Manual[1].

1. Epidemiological investigations

1.1. Outbreak investigations

1.1.1. Outbreak of COVID-19 in a nursing home, Germany, 2022

Supervisor: Christiane Wagner-Wiening (LGA)

Category: Vaccine-preventable diseases

Aim: The investigation aimed to determine if the COVID-19 outbreak was still active, assess the severity of the cases, and identify the transmission routes. In particular, the investigation focused on the vaccination status of residents and staff, as well as the implementation of hygiene measures to determine if these factors influenced the spread of the virus.

Methods: The analysis of the outbreak was descriptive and can be classified as a retrospective cohort study.

Results: An initial screening of 266 residents in a nursing home identified 32 COVID-19-positive cases; a follow-up five days later revealed further eight. The outbreak investigation revealed an attack rate of 16% among residents and 9% among staff, with mild symptoms. Among the 290 residents, 85% were triple vaccinated, while only 32% of the 409 staff members had received three doses. This lower vaccination rate among staff correlated with a higher incidence of symptoms, while the residents experienced milder symptoms or none at all. No deaths or hospitalisations were reported. Next-generation sequencing (NGS) confirmed that the outbreak was caused by the Omicron variant (subtype BA.1). The sequencing results indicated that the outbreak had two separate sources of infection: one from a staff member and the other from an area for residents.

Public health implications/Conclusions: The investigation highlighted the importance of strict control measures, including isolation of infected individuals, quarantine of affected areas, and the suspension of visitor access, as well as wearing masks for staff and visitors. These measures, combined with high vaccination rates, helped mitigate the severity of the outbreak, despite its rapid spread.

Role: The fellow was the lead investigator involved in all the steps of the outbreak investigation. She was on site at the nursing home and helped with swabbing as well as preparations for the laboratory tests. The samples were examined in the laboratory under the guidance of the fellow. The sequencing component was outsourced to a colleague. Furthermore, the fellow conducted data collection in the local health department and created the line list. This required several on-site visits. The data analyses were done by the fellow in collaboration with the resident epidemiologists.

1.2. Surveillance

1.2.1. Setting up a surveillance system for acute respiratory diseases in Baden-Württemberg, Germany, 2021–2022

Supervisors: Silke Fischer (LGA), Christiane Wagner-Wiening (LGA)

Type of project: Setting up a surveillance system

Aim: Establish a new surveillance system to monitor the seasonal and geographic patterns of respiratory illnesses in Baden-Württemberg, Germany.

Methods: This active surveillance system follows a sentinel-based, repeated cross-sectional design, providing continuous monitoring of respiratory pathogen circulation over time. The system collects data from actively recruiting sentinel practices across all 44 districts of Baden-Württemberg. Samples are analysed using multiplex polymerase chain reaction (PCR), enabling the detection of up to 23 respiratory pathogens.

Results: Since November 2021, laboratory diagnostic surveillance has been done at the State Health Office Baden-Württemberg. For the first time, a total of 23 respiratory pathogens were detected using multiplex PCR, including human seasonal coronaviruses, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), respiratory syncytial virus (RSV), and rhinoviruses. During the reporting period (calendar week 44, 2021 to week 4, 2022), 232 specimens were submitted from 24 sentinel practices, including 113 from children aged 14 years and younger.

[1] European Centre for Disease Prevention and Control (ECDC). Manual for the ECDC Fellowship Programme EPIET and EUPHEM paths. Stockholm: ECDC; 2025. Available at: https://www.ecdc.europa.eu/en/publications-data/ecdc-fellowship-programme-manual

Respiratory viruses were detected in 169 specimens (73%), with rhinoviruses (26%) and RSV (21%) being the most common, followed by human seasonal coronaviruses (9%), SARS-CoV-2 (7%), and influenza viruses (1%) in January. A total of 21 multiple infections were detected, underscoring the presence of co-circulating pathogens.

Public health implications/Conclusions: The data provided essential insights into the seasonal distribution of respiratory diseases, informing public health recommendations, including vaccination strategies, and helped identify the pathogens circulating in the community.

Role: The fellow played a central role in building up the acute respiratory disease surveillance system, working closely with epidemiologists. This involved not only laboratory aspects, such as implementing multiplex PCR, but also selecting and recruiting medical practices, preparing and sending invitation letters, and managing communication processes. In addition, the fellow delivered a presentation to local health offices to inform them about the new surveillance system. This system laid the foundation for institutionalising respiratory surveillance at the State Health Office, which continues to operate successfully to this day.

Addendum 2025: The surveillance of acute respiratory diseases has now been institutionalised and expanded, with around 3 000 samples analysed each season from over 80 practices. It has been well received by general practitioners, who actively contribute to the surveillance efforts. The new surveillance system is now part of Baden-Württemberg's federal pandemic plan. Furthermore, close collaboration between federal surveillance systems should be established, and the systems should be aligned so that data are comparable both in 'normal' situations and during epidemics or pandemics.

2. Applied public health microbiology and laboratory investigations

2.1. Evaluation of the new enterohaemorrhagic Escherichia coli (EHEC) re-admission criteria introduced in 2019, Baden-Württemberg, Germany, 2014–2024

Supervisors: Christiane Wagner-Wiening (LGA), Florian Burckhardt (LGA), Maja Adam (LGA), Daila Denapaite (LGA)

Aim: The aim of this project was to evaluate the effectiveness of the updated re-admission criteria for persons infected with EHEC, introduced in 2019 in Baden-Württemberg, which determine when affected individuals may return to community facilities.

Methods: This was assessed by comparing clinical symptoms, hospitalisation rates and haemolytic–uremic syndrome (HUS) occurrence between haemolytic–uremic syndrome *E. coli* (HUSEC) and non-HUSEC cases, using routine surveillance and laboratory data collected from 2014 to 2024. Relative risks (RR) with 95% confidence intervals were calculated to compare outcomes between HUSEC and non-HUSEC groups, and logistic regression was applied to assess the association between HUSEC status and hospitalisation while adjusting for age, sex, and year. The study was conducted as a retrospective cohort study.

Results: The results showed that individuals infected with HUSEC strains present more severe clinical outcomes, including higher rates of hospitalisation and bloody diarrhoea, particularly among children under five years. HUS was detected only in individuals infected with a HUSEC strain and occurred almost exclusively in young age groups, with the highest risk observed among children aged 0–4 years. Despite reduced testing frequency, the newly introduced criteria did not result in an increase in outbreaks or outbreak-related cases, while the total number of tests – and thus the burden on laboratories – was significantly reduced.

Public health implications/Conclusions: The newly introduced criteria represented an appropriate adjustment for EHEC testing in community facilities. However, the duration of absence from daycare or school – an important parameter for the final evaluation was missing, as the relevant data were not available. Future analyses should assess whether these absence periods have been shortened by the new criteria and by how many days. Furthermore, efforts should be made to accelerate diagnosis to enable early classification as HUSEC to further reduce these absence periods in the future.

Role: The fellow was responsible for all aspects of the study, including data extraction, cleaning, linkage of laboratory and sequencing data, statistical analysis, and interpretation of results.

3. Biorisk management

3.1. Cultivation of SARS-CoV-2 and establishment of a neutralisation test, Baden-Württemberg, Germany, 2022

Supervisor: Maja Adam (LGA)

Aim: This project had two aims: a) to establish cell cultures for the cultivation of SARS-CoV-2, which also enabled the development of cell cultures for other pathogens; b) to establish a SARS-CoV-2 neutralisation test.

Methods: This was an experimental laboratory study. SARS-CoV-2 was cultivated using Vero E6 cells, and infection was monitored through cytopathic effects and PCR. SARS-CoV-2 virus cultures from nasopharyngeal swabs were performed on Vero E6 cells and maintained for up to seven days. The cytopathic effect, indicating viral growth, was usually observed on day four or five using crystal violet staining, which correlated with PCR cycle threshold (CT) values. A neutralisation test was performed to check whether patients produced neutralising antibodies against SARS-CoV-2, and to determine antibody titres, i.e. the amount of neutralising antibodies. To validate the test, 19 patient samples were analysed both in our laboratory and the Bundeswehr Institute of Microbiology in Munich. In parallel, a commercial surrogate neutralisation test kit was also used for analysis. Results were compared across these methods.

Results: Out of the 19 patient samples, three showed variation in titre, but only in one titre level. Since a one-dilution difference is acceptable, the overall agreement was 100%.

Public health implications/Conclusions: This project demonstrated the feasibility of rapidly setting up reliable neutralisation tests in public health laboratories when commercial kits are unavailable or delayed, which is especially relevant for emerging pathogens.

Role: The fellow was responsible for all the laboratory work under biosafety level-3 (BSL-3) conditions, organising virus cultivation and neutralisation test setup together with Maja Adam, and managing communication with both external laboratories and the commercial test manufacturer. Together with colleagues, the fellow visited the Bundeswehr laboratory in Munich to learn the methodology and implement it at the laboratory at the State Health Office Baden-Württemberg.

4. Quality management

4.1. Verification of **Coxiella burnetti** *PCR, State Health Office Baden-Württemberg, Germany, 2022*

Supervisor: Christiane Wagner-Wiening (LGA)

Aim: In May 2022, a new in vitro diagnostics regulation (IVDR) – (EU) 2017/746 – came into force, placing strict requirements on laboratory tests used for human diagnostics. Under this regulation, in-house PCRs can no longer be used. Consequently, the laboratory at the State Health Office Baden-Württemberg introduced a commercial CE-marked kit, replacing the previously used in-house PCR for *Coxiella burnetii*. The new kit also contained an internal control, which was missing in the previous in-house PCR.

Methods: A repeatable laboratory precision analysis for qualitative tests was conducted. Three samples were used: a positive routine sample, a positive and a negative sample from the current inter-laboratory test provided by INSTAND e.V. (multiplex test for *Coxiella burnetti* and *Bacillus anthracis*, #542). Each sample was tested in triplicate on day one, and once on two consecutive days by two different technicians.

Results: Both methods achieved 100% qualitative agreement across five repetitions, and the CT values were also comparable. Evaluation of the samples was exclusively qualitative. The introduction of the new CE-marked PCR ensures that the laboratory consistently uses a kit adhering to high quality standards.

Public health implications/Conclusions: Although *Coxiella burnetii* PCR detection is mainly used in veterinary medicine, it is also important for diagnosing acute or chronic Q fever in humans. As the reference laboratory for *C. burnetii* in Germany, it is essential that the laboratory at the State Health Office Baden-Württemberg remains up to date and provides a validated PCR method.

Role: The fellow conducted the research to find a suitable kit, organised the samples and testing schedule. She also evaluated the results, and created the standard operating procedure (SOP) and the verification protocol for quality management.

4.2. Verification of mpox PCR, State Health Office Baden-Württemberg, Germany, 2022

Supervisor: Christiane Wagner-Wiening (LGA)

Aim: To introduce a new PCR for mpox virus in the laboratory, because of an increase in mpox cases since May 2022, across Europe and in Germany. It had to meet the laboratory quality standards (ISO 15189) and be incorporated into the laboratory quality management system.

Methods: Five positive and five negative routine samples and four samples from the current inter-laboratory testing programme by INSTAND e.V. (RV-Group 418) were used. Samples were tested once and compared with the previously used method. All PCR test kits available on the market were labelled 'research use only' (RUO) and lacked the CE-mark. According to various manufacturers, this was due to low demand in Germany and insufficient number of positive samples to validate the kits for a CE-mark certification.

Results: The results of both methods were compared qualitatively, showing a 100% agreement. The laboratory also passed the EQA using the new method.

Public health implications/Conclusions: Since May 2022, mpox cases have increased across Europe. Prior to the outbreak, only PCRs targeting non-variola orthopoxviruses had been established. The increase in cases prompted the availability of various 'RUO'-PCRs on the market, and one was quickly established in our laboratory. This allowed timely and reliable mpox detection at a time of urgent public health need.

Addendum 2025: The kit remains in use. According to the manufacturer, a CE marking is still not planned, as the demand for test kits and the number of positive mpox detections in Germany remain too low. However, a typing PCR has now been established, which allows differentiation between mpox Clade I (Central African type) and Clade II (West African type). This assay was also established and verified by the fellow.

Role: The fellow conducted the research to find a suitable kit, organised the samples and testing schedule. She also evaluated the results, and created the SOP and the verification protocol for quality management.

4.3. Internal audit of the 'Pipette calibration' laboratory department, State Health Office Baden-Württemberg, Germany, 11 October 2022

Supervisor: Christiane Wagner-Wiening (LGA)

Aim: To conduct an internal audit of the pipette calibration laboratory department. Internal audits are an important component of the State Health Office's quality management process. Participants included technicians, the head of the laboratory, quality management staff, and the head of another laboratory unit (acting as the 'specialist or external auditor'). For the pipette calibration laboratory department, the fellow served as the external auditor.

Methods: The pipette calibration department ensures that all pipettes across the entire laboratory are checked annually. Two technicians are responsible for coordinating the checks, assigning staff from different laboratory areas to perform the checks, providing training, and confirming their suitability. The department maintains SOPs and other pertinent documentation, which were reviewed in advance by the fellow and compared against corresponding DIN EN ISO 15189 requirements. Any ambiguities were noted as questions and discussed with the responsible staff during the audit. To better understand the calibration processes and identify any errors, a pipette calibration was performed during the audit.

Results: A major issue discussed during the audit was the necessary upgrade of the IT system. The computer used for calibration was still running Windows 7, but needed to be upgraded to Windows 10 due to in-house specifications. As the calibration software was incompatible with Windows 10, the entire IT system had to be transitioned. New software and the compatible scales were purchased, and the system was fully updated in 2023. All staff members were subsequently retrained. The protocol for the internal audit was written by the Quality Manager.

Public health implications/Conclusions: Pipettes play an important role in daily laboratory operations; especially in the field of molecular biology, where very small volumes are pipetted, it is essential that pipettes are accurate. Regular calibration is the only way to determine and rectify the performance of pipettes. Additionally, ensuring the processes of calibration are carried out correctly requires regular checks by the quality management team and external auditors.

Role: This was the fellow's first experience of serving as an external auditor for an internal audit process. In preparation for the audit, the fellow held meetings with the quality management team and based on that prepared questions and notes on the ISO 15189 requirements. During the audit, the fellow observed a live calibration procedure and learnt how it is performed in practice.

4.4. Accreditation of the Quality Management System (QMS) of the State Health Office Baden-Württemberg, Germany, 2023

Supervisor: Christiane Wagner-Wiening (LGA)

Aim: To prepare for an external quality assurance visit by the German Accreditation Body (Die Deutsche Akkreditierungsstelle – DAkkS) which accredits the laboratory of the State Health Office every two years.

Methods: For this purpose, laboratory processes and documents according to ISO 15189 standards had to be reviewed and updated. All laboratory managers received a to-do list from the quality manager, and the required updates were implemented in each laboratory before the accreditation visit.

Results: This was the second accreditation visit in which the fellow participated, but it was the first in which she was responsible as Head of laboratory. Two external auditors conducted the assessment: one for laboratories accredited under DIN EN ISO 15189, the second for laboratories operating according to DIN EN ISO(IEC) 17025. The audit covered not only laboratory procedures, but also the QMS itself. Following the visit, DAkkS issued a list of recommendations and deviations, which the quality manager forwarded to the relevant laboratory managers for follow-up. The accreditation process was completed successfully, and the laboratory was accredited for the next two years.

Public health implications/Conclusions: Accreditation ensures that a laboratory provides reliable and accurate results, which are crucial for public health decisions. It builds trust with authorities and the public, and guarantees standardised, comparable testing. This supports effective health protection and disease control.

Role: The fellow supported the accreditation process of the QMS. In close collaboration with the Quality Manager, the fellow contributed to the preparation of required documentation, reviewed existing procedures, and assisted in internal audits and the implementation of corrective actions. This experience provided the fellow practical insight into quality assurance and laboratory accreditation within a public health setting.

5. Public health microbiology management

5.1. Project management and daily responsibilities as Head of molecular laboratory

The fellow's competences in management and communication were strengthened through the execution and handling of the various projects undertaken during her fellowship, as well as through the daily responsibilities as the Head of a molecular laboratory. Below, the key projects requiring the highest level of management skills and communication have been listed individually.

5.2. Outbreak investigation, State Health Office Baden-Württemberg, Germany, 2022

During the outbreak investigation, the fellow was part of a multidisciplinary team comprising epidemiologists, physicians and nurses from the nursing home, as well as staff and management from the local health department. Empathetic yet targeted communication was necessary to effectively conduct the outbreak investigation. The fellow presented the results of the investigation to the team in an oral presentation. Additionally, she prepared an abstract for the European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE) 2022.

5.3. Respiratory surveillance, State Health Office Baden-Württemberg, Germany, 2021–2022

The establishment of the respiratory surveillance system was carried out by the fellow in close collaboration with the epidemiological department of the State Health Office. For this project, she prepared numerous documents, including invitation letters for recruiting medical practices, questionnaires, and an ethics approval request for the State Medical Association, which is required to authorise the surveillance. The fellow also coordinated with local health departments and participating physicians via phone to clarify any remaining questions. Furthermore, the fellow presented the project to the local health departments in two oral presentations and prepared an abstract for ESCAIDE 2022.

5.4. Research project, State Health Office Baden-Württemberg, Germany, 2023 and 2025

Through the research project, the fellow engaged with a wide range of disciplines. Laboratory work was conducted across multiple departments within the State Health Office laboratory, requiring coordination with the technical staff and the Heads of the bacteriology and sequencing laboratories. The project was also presented in an oral presentation to the local health authorities, whose support was essential. A report will be prepared upon completion of the project, and the results may contribute to evidence-based adjustments of prevention strategies, exclusion policies, and public health recommendations. Throughout all the steps of the project, the fellow maintained frequent communication with epidemiological experts at the State Health Office.

5.5. Daily duties as Head of molecular laboratory, State Health Office Baden-Württemberg, Germany, 2021–2025

During the fellowship, the fellow undertook extensive managerial and organisational duties as Head of the molecular laboratory. Key responsibilities included communicating with local health authorities, providing advice to medical practices and other laboratories – primarily in the context of routine diagnostics. The fellow also led weekly meeting with technicians, ensured efficient workflows, validated laboratory results, participated in audits, and managed troubleshooting and workflow optimisation.

6. Teaching and pedagogy

Training course: Providing disinfectors basic knowledge of microbiological diagnostics and environmental sampling, State Health Office Baden-Württemberg, Germany, 2023

This training was provided to 35 disinfectors from local health authorities, responsible for controlling disinfection in hospitals, medical practices, and food processing facilities to prevent healthcare-associated infections. The course was part of a multi-day programme, culminating in an exam. The goal was to equip participants with basic knowledge of microbiological diagnostics and environmental sampling.

By the end of the course, disinfectors were expected to correctly collect and interpret environmental samples. The training combined theoretical lessons with practical exercises to ensure effective learning and application of disinfection control measures, as well as enhance knowledge of environmental germs and sampling methods. This was the fellow's first experience as an instructor, teaching microbiological diagnostics and environmental sampling. The practical sessions were interactive, and the fellow is well-prepared to refine future courses by providing additional support during sampling and result evaluation.

7. Communications related to the EPIET/EUPHEM fellowship

7.1. Manuscripts published in peer-reviewed journals

- **Dangel L**, Hummel D, Kempf VAJ, Faber M, Hourfar K, Brockmann S, Eichner M, Fischer SF. A serological survey of *Coxiella burnetii* in blood donors from Baden-Württemberg and Hesse, Germany. *Zoonoses and Public Health.* [Submitted]

7.2. Conference presentations

- **Dangel L**, Meincke M, Schoneberg C, Winter F, Campe A, Fischer S. Occurrence of Q-fever fatigue syndrome after acute Q fever illness in Germany – results from an outbreak investigation in Baden-Württemberg, Germany, 2019–2022 (poster presentation). Presented at: Congress of the European Society of Clinical Microbiology and Infectious Diseases (ESCMID); 16 April 2025; Copenhagen, Denmark.

7.3. Other presentations

- **Dangel L**. Respiratory surveillance season 2021/2022 (oral presentation). Presented at: Fachaustausch Gesundheitsämter; 10 November 2021; Stuttgart, Germany
- **Dangel L**. Investigation of a SARS-CoV-2 outbreak in the Wartenberg nursing home in Geisingen (oral presentation). Presented at: Outbreak Team (local health department, nursing home; 31 January 2023; Tuttlingen, Germany
- **Dangel L**. Results from the surveillance of acute respiratory diseases (ARE) and outlook (oral presentation). Presented at: IfSG-Dienstbesprechung; 24 February 2023; Stuttgart, Germany
- **Dangel L**. Introduction of a project for intensified surveillance of EHEC diseases (oral presentation). Presented at: IfSG-Dienstbesprechung; 24 February 2023; Stuttgart, Germany

5. EPIET/EUPHEM modules attended

- Introductory Course, 20 September–8 October 2021, virtual
- Inject day: Phylogeny, 20 October 2021, virtual
- Inject days: Operational Research, 27–28 October 2021, virtual
- Inject days: Data Collection and Management, 10–11 November 2021, virtual
- European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE) 2021, 16–19 November 2021, virtual
- Outbreak Investigation Module, 6–10 December 2021, virtual
- Outbreak Investigation Module – Review Homework, 13 January 2022, virtual
- Inject days: Biorisk and quality management, 17–18 January 2022, virtual
- Multivariate analyses module, 14–18 March 2022, virtual
- Inject days: Cox regression, 30 March 2022, Virtual
- Introductory Course Part II, 20–29 April 2022, virtual
- Rapid assessment survey module, 6–10 June 2022, virtual
- Project review module, 29 August–2 September 2022, Lisbon, Portugal
- Time Series Analyses module, 7–11 November 2022, virtual
- European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE) 2022, 23–25 November 2021, Stockholm, Sweden
- Vaccinology module, 13–17 March 2023, virtual

- Congress of the European Society of Clinical Microbiology and Infectious Diseases (ESCMID) 2023, 15–18 April 2023, Copenhagen, Denmark

6. Other training

Training for the diagnosis and result validation of sexually transmitted infections (STIs), Stuttgart, Germany, 2 February–30 August 2022

Supervisor: Silke Fischer

During the fellowship, the fellow was appointed as deputy for the virology-STI laboratory to ensure a smooth workflow in the absence of the laboratory leader, such as during illness or vacation. To authorise the fellow to sign laboratory findings, she had to undergo a training under medical supervision. The goal of the training was to familiarise the fellow with the diagnostic algorithms for syphilis, HIV, hepatitis B and C, *Chlamydia trachomatis*, and *Neisseria gonorrhoeae*. The diagnoses of STIs and hepatitis B and C are crucial, as results often indicate whether a patient is acutely or chronically infected, if they are contagious, and if treatment is required. These diagnoses have significant consequences for the patient and are notifiable under the German Infection Protection Act (Infektionsschutzgesetz – IfSG). Therefore, the validation of results must be performed with great care. Given the complexity of STI and hepatitis diagnostics, which involves different diagnostic algorithms for each pathogen, the fellow was required to complete a minimum of six months of training under medical supervision. Throughout this period, the fellow accompanied the laboratory leader during the validation of laboratory findings. She was provided with all necessary SOPs to understand the diagnostic processes and algorithms for each disease. In addition to theoretical training, the fellow also observed practical work in the laboratory alongside the technicians, which deepened her understanding of the process.

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