Specialisation title	**Clinical Cytology**
Title conferred upon passing the specialist exam	Specialist in Clinical Cytology
Sub-Specialties	Gynaecologic Cytology Haematologic Cytology Pulmonologic Cytology Cytogenetics and Molecular Diagnostics
Specialist training duration	60 months (5 years)
Specialist training programme	**1. Basic Training – 28 months** *1. A. Common trunk training – 22 months* 1. A. a) General and autopsy pathology – 8 months 1. Autopsy technique and preparation of final autopsy reports – 4 months 2. Sampling and labelling protocol, tissue preparation protocol, histologic and cytological sample preparation – 2 months 3. Examination of histological and cytological preparations – 2 months 1. A. b) Special and bioptic pathology – 14 months 1. Surgical pathology – 6 months 2. Gyanecologic pathology and perinatal pathology - 3 months 3. Endoscopic and fine-needle aspiration pathology – 4 months 4. Diagnostic methods in pathology – 1 month *1. B. Pathology for clinical cytologists – 6 months* 1. Surgical, endoscopic, and fine-needle aspiration pathology – 4 months 2. Elective pathology course – 2 months **2. Specialty Training – 27 months** *2. A. Cytology of the organ systems – 22 months* 1. Gyanecologic cytology – 5 months 2. Haematologic cytology – 5 months 3. Pulmonologic cytology – 4 months 4. Cytology of the breast – 1 month and 15 days 5. Cytology of the thyroid and parathyroid glands – 1 month

	6. Cytology of the male gonads and ejaculate – 15 days 7. Urologic cytology - 1 month 8. Gastroenterologic cytology – 1 month 9. Cerebrospinal fluid cytology – 1 month 10. Cytology in paediatrics – 15 days 11. Cytology of the soft tissues and bones - 15 days 12. Ancillary procedures – 1 month 2. *B. Elective Part – 5 months* Leave or Vacation – 5 months The Postgraduate Professional Study in Clinical Cytology – 3 months As an integral part of the specialist training in clinical cytology, the resident should complete a postgraduate professional study in Clinical Cytology. During his/her residency the trainee is expected to attend continuing medical education courses.
Competencies acquired upon completion of the program	The level of competencies: **1**.The trainee has acquired the basic knowledge and skills in a thematic area anticipated by the curriculum and needs assistance and professional supervision in his/her work and solving problems within the thematic area **2.** The trainee has partially acquired the knowledge and skills in a thematic area anticipated by the curriculum and under a partial professional supervision is able to work and solve problems within the thematic area **3**. The trainee has completely mastered the knowledge and skills in a thematic area anticipated by the curriculum, he/she makes appropriate reference to textbooks/journals and is competent for unsupervised professional practice and solving problems within the thematic area **1.Core competencies** Upon completion of the specialist training, the trainee in pathology shall have acquired core competencies for the acquisition of which the head supervisor, ie. supervisor, shall be accountable. Special attention shall be centered on acquisition of core competencies important for a particular branch of the specialist training.

	Upon completion of the specialist training, the pathology trainee shall have acquired and be able to demonstrate: • the ability to practice informed by the principles of medical ethics and deontology (3) • the acquisition of professional, humane and ethical attitudes and commitment to the principles pertaining to the protection of the patient's privacy and dignity (3) • skills and attitudes to act in a professional manner towards the patients, colleagues, and other professionals at all times – communication skills (3) • the ability to transmit relevant information and explanations in a clear, meaningful and effective fashion (face-to-face or in writing) to the patient, patient's family, colleagues and other professionals with the objective of partnership in health care planning and delivery (3) • competencies for identification, selection, and valid documentation of relevant data on the patient, and the awareness and acknowledgment of the point of view of the patient, patient's family, other colleagues and other health care professionals (3) • through continuing education and self-evaluation potential to improve the competencies and attitudes indispensable for improving the quality of own professional performance (3) • mastered principles of managing own practice and career with the goal of professional development (3) • the acquisition of the advanced skills of transferring knowledge (3) • un understanding of the importance of the scientific approach to the profession (3) • participation in scientific and research acitivities in compliance with the ethical principles of scientific research and clinical trials (3) • capability to contribute to the production, usage and transferring of new knowledge and experiences in medicine and to take participance in the implementation of the specialist and subspecialist training programme (3) • knowledge of the principles of evidence-based medicine and application thereof in his /her work practices (3) • knowledge of the importance and means of efficient and detailed record keeping and application thereof in his/her work in compliance with the relevant regulations (3) • the ability to coordinate and determine priorities in team work, ie. participate effectively in the multidisciplinary team work between health care providers and allied professionals (3) • the ability to recognize the need for inclusion of other professionals in the proces of health care delivery (3)

	• an understanding of the importance of cooperation between health care providers and public health care services and other institutions included in the health care system and active participation in this activity (3) • an awareness of the organisation of the health care delivery system and competencies for responsible participation in the management of activities pertinent to need assessment, planning of measures for enhancement and increment in effectiveness of the health care quality system, and fostering and promotion thereof (3) • a knowledge of legislation in the field of health care, particularly in the area of patient's rights protection (3) • be conversant with the course, schedule and control of the working processes and the fundamentals of resources management (3) • a knowledge of resources available for health care services and practicing critical resource allocation guided by the interests of patients and the community (3) • competence for assessment of and proper response to individual patient's health care needs and problems (3) • capability to identify community health care needs and in keeping with them take appropriate measures aimed at health protection and promotion, and prevention of disease (3) • participation in education activities on health promotion and healthy lifestyles of patients, community and the general population (3) **2. Special competencies** **1. Basic Training** 1.A. Common Trunk Training 1.A. a) General and autopsy pathology During the training programme in general and autopsy pathology, the trainee must independently perform at least 50 autopsies and obtain the competencies as follows: - skills in autopsy technique and final reporting - working knowledge of health and safety measures in the post-mortem room including high risk autopsies - familiarity with the current legislation related to the deceased in hospitals - awareness of regulations and current policy relating to determination of the time and cause of death - the ability to interpret autopsy findings in the light of clinical information available - the ability to write a final gross and microscopic report

	- the ability to present an autopsy finding at clinico-pathological meetings - be conversant with and be able to apply the sample receipt and labelling procedure, the protocol for tissue preparation and histologic and cytological sample processing and preparation of blocks and slides, including basic, special staining techniques - working knowledge of all safety measures towards health protection during retention and receipt of materials obtained during a post-mortem, and the receipt and preparation of blocks and slides - proficiency in fixation and all haematoxylin and eosin (H&E) and standard preparation and staining techniques, and ability to recognize technical pitfalls - awareness of procedures to avoid confusion or incorrect labelling of samples at any point of sample processing - gross description of tissue samples - retention of material (selection of appropriate tissue blocks from the sample for demonstration of pathological lesions, resection margins, relation of the mass to the surrounding tissue, etc.) - collection of material for frozen sections - retention material for special techniques - competency in the technique of cytology sample collection and processing, and preparation of the patient for the procedure - the ability to determine sampling types for cytological analysis (fine needle aspirates, body fluids, swabs, touch preparations (tissue imprints)) - preparing the sample for cytological analysis (smear, sediment, imprint, suspension; fixation and standard staining for cytomorphological analysis) - preliminary examination of a histological sample - preliminary analysis of normal and pathologically changed cells in a cytological smear - making diagnosis in typical cases of the most common pathological processes - the ability to write standard reports applying diganostic coding systems - acquisition of at least a basic level of knowledge of mechanisms of disease processes - the ability to recognise morphological features of normal and pathologically altered cells in smears obtained from different organ systems. Interpretation and final opinion or recommendatons for further diagnostic procedures - proficiency in using standard staining fixation methods for cytomorphological analysis (May-Grünwald Giemsa, Papanicolaou), and for cytochemical, immunocytochemical and molecular analyses - understanding of the organisation of a histological and cytological laboratory

	1.A. b) Special pathology During the training programme in Special pathology, the trainee must independently perform a minimum of 30 autopsies (including10 fetal autopsies), examine 1600 biopsies and 500 cytologic smears, and master competencies as follows: <u>Surgical pathology</u> – 6 months (the breast 2 months) During the course of the training programme in Surgical pathology, the trainee must independently perform at least 20 autopsies, examine 600 biopsies/surgical specimens (200 breast, 100 haematology, 50 gastroenterology) and 50 cytologic smears and demonstrate the development of the following competencies: - skills to basically identify presence of inflammatory, degenerative, tumorous and other pathological changes in tissue samples - the ability to recognise borderline changes (the principles of differential diagnosis of particular lesions) - the ability to produce standard histopathological reports including all available information relevant to clinical uses - participation in discussing interesting cases at the clinico-pathological meetings - proficiency in the procedure of retention and preparation of intraoperative frozen sections and the principal knowledge of interpretation thereof - familiarity with the principles of triage for ancillary staining or immunohistochemical techniques and application thereof in controversial cases - the ability to recognise which cases require consultation with a more experienced pathologist - knowledge of, and the ability to perform, unsupervised autopsies, comprehensive reporting, microscopic analysis of material obtained at autopsy and presentation of the finding at the clinico-pathological meetings - knowledge of cytology- histology correlation of surgical specimen material („imprint cytology“) <u>Gynaecologic pathology and perinatal pathology</u> – 3 months During the course of the programme in Gynaecologic pathology, the trainee must independently perform at least 10 fetal/perinatal autopsies, examine 400 biopsies and 350 cytologic smears and achieve the competencies as follows: - approach a fetal/perinatal post-mortem examination considering a possible presence of malformations - possess knowledge of the most common malformation syndromes

	- be able to diagnose the most common heart defects - know how to examine the placenta and to recognise the most usual changes - attend at least 1 meeting with perinatal morbidity and mortality as the topic of discussion - receive gynaecological material and recognise the basic inflammatory and tumorous alterations of the genital system - knowledge and skills in methods used in the receipt and preparation of intra-operative frozen sections as applied within gynaecologic pathology and principal knowledge of their interpretation - provide intra-operative interpretation of the gross finding and the value of frozen sections in particular cases - participate in clinico-pathological meetings - evaluate material adequacy, indicate and monitor sample processing (fixation and staining) in cytomorphological diagnostics - recognise normal cells of the female genital system in smears obtained from women of different ages - identify presence of inflammatory, degenerative and metaplastic changes, reparation, intraepithelial lesions and invasive lesions in a smear <u>Endoscopic and fine-needle aspiration pathology</u> – 4 months During the course of the programme in Endoscopic and fine-needle aspiration pathology, the trainee must independently examine a minimum of 600 specimens obtained by the endoscopic methods (biopsy of the oesophageal, gastric, duodenal, small and large intestinal mucosa) and 100 cytologic smears and achieve the competencies as follows: - recognise typical inflammatory and tumorous changes of gastrointestinal mucosa and be able to distinguish between them - recognise borderline changes (grading of epithelial dysplasia) and their clinical implications - describe the basics of the needle biopsy procedure (of the liver, kidneys, and pancreas) and characteristics of the samples obtained by aspiration biopsy - distinguish the morphological features of normal hepatic and renal elements from those seen in basic inflammatory and chronic degenerative changes and primary and secondary tumours - to evaluate the adequacy of the sample material, indicate and monitor sample processing (fixation and staining) in the cytomorphological diagnostics of the

	gastrointestinal tract - to distinguish between normal and inflammatory, metaplastic, dysplastic and tumorous alterations of the gastrointestinal tract cells in the swab. <u>Diagnostic methods in pathology</u> – 1 month - select and use basic special and histochemistry methods - select and use of basic immunohistochemical methods - introduction to the methods of sample collection for electron microscopy (fixation and preparation) and basic indications - introduction to the basic principles of interpretation of the findings and the principles of information contained in the findings provided by special diagnostic methods in making the diagnosis - introduction to the principles of making indications, the material sampling technique and interpretation of histochemistry, immunohistochemistry and electron microscopy findings - introduction to the basic cell culture methods and their value in clinical practice - introduction to the basics of flow cytometry methods - introduction to the fundamentals of cytogenetics - introduction to the merits of different molecular pathologic and other advanced diagnostic modalities in clinical practice 1.B. Pathology for clinical cytologists – 6 months Upon completion of the common trunk training, the candidate shall: a) have examined at least 800 surgical, gynaecologic and endoscopic biopsies b) use adjunctive diagnostic methods appropriately c) be able to generate independent histopathological reports of the biopsies examined including all information relevant to clinical practice supervised by a training supervisor d) attend joint meetings with pathologists and have developed skills for presentation of interesting biopsy cases citing relevant medical literature e) participate in clinico-pathological meetings and actively contribute to the discussion and presentation of cases of special interest for the clinical use

	2.Specialty Training Basic areas of competence for clinical cytologists: 1. to recognise indications for cytological analysis (3). 2. independent collection of samples from all areas of cytodiagnostics: swab, aspirate with/without imaging methods (ultrasonography, CT, MR imaging), liquid samples, imprint, etc.) (3). 3. selection of the most appropriate methods for solution of a clinical problem and implementation of the procedures for quality assurance and quality control (3). 4. proficiency in other techniques utilising cytological samples (flow cytometry phenotyping, cytogenetics, hybridisation and amplification molecular methods, etc. (3) 5. interpretation of the findings – including the diagnosis and differential diagnosis; assessment of sample adequacy with regard to sampling and sample processing, fixation and staining, and follow-up of particular therapeutic effects (3). 6. providing useful medical opinion on diseases, the diagnosis of which belongs to the domain of the cytologist, based on the clinical experience gained and participation in professional meetings with clinicians, pathologists and other diagnostic professionals (radiologists, immunologists, specialists in cytogenetics, etc.) (3) 7. knowledge of the limitations of cytology in individual medical disciplines, specificity, sensitivity and diagnostic accuracy and differential diagnostic possibilities of various types of cytological analyses (3). 8. data processing aimed at evaluation of information on relevant population obtained by the use of laboratory procedures, knowledge of informatics technology and the use of data bases, programmes for statistic data processing, etc. (3) 9. familiarity with the screening methods (3). 10. to conduct quality control programmes within a cytological laboratory (3) 11. to provide scientific backgrounds for the cytological diagnosis and treatment; to draw up protocols and maintain the standards in a cytological laboratory (3). 12. to take communication and management responsibility, to plan the provision of laboratory services (in the event of emergency, for the running of a laboratory) (3) 13. to possess a working knowledge of the measures for maintaining a healthy working environement and safety in a laboratory (3). 14. to participate in the specialist training programmes for cytologists, other physicians and experts within whose fields cytological diagnostics is used (3).

	A list of specific competencies mastered upon completion of the specialist training in clinical cytology: 1.Scientific foundations of clinical cytology The trainee must acquire an understanding of the following principles together with the pathways of their integration in solving clinical and research problems: a) anatomy, histology, physiology, pathology and pathophysiology of the systems within the domain of cytodiagnostics (3) b) understanding physiological conditions (3) c) classification and subclassification of various neoplasms (3) d) morphological background of development of the disease (3) e) influence of pathogens on cell and tissue morphology (3) f) sample processing techniques, potential procedural and interpretation errors(3) g) permanent habits of reading, literature searching, consultation with the colleagues at scientific meetings and presentation of research papers within the continuing medical education training (3) h) original ideas and critical reviewing of the published professional papers indispensable for a trainee to be able to contribute, either as an individual or as a member of a team, to the advancement of the specialty i) current awareness of the latest developments in the field of cytodiagnostics (3) j) participation in research activities and development in the field of cytology (3) 2.Safety measures in the laboratory Prior to commencing his/her practice in a laboratory, the trainee shall have demonstrated a knowledge of standard health and safety requlations as applied to the work of a laboratory (protective clothing and hygiene), proper handling of samples and contaminated objects in the laboratory, and hazards intrinsic in the procedures used in cases of spills and accidents resulting in potential over exposure to infectious materials. Upon completion of the specialist training, the clinical cytologist shall have acquired and be able to demonstrate: a) the knowledge of implementation of standard safety measures, according to the risk and stage of biological safety b) the ability to apply safety procedures for transport of samples within a health care

	facility, as well as the procedures for packaging and national and international shipment for the purpose of quality control, consultations and/or revision c) an awareness of the current measures and recommendations for safe working practices in a cytological laboratory d) the ability to work at safety cabinets and utilise the operational technique in compliance with the requirements for the assurance of air-flow and decontamination and control thereof <u>3.Disinfection of cytology fine-needle aspiration biopsy equipment</u> Upon completion of his/her residency, the cytologist must display proficiency in the use of principles and procedures for laboratory equipment sterilisation and disinfection, and disposal of infectious waste after an aspiration biopsy procedure or processing of the received material. The trainee must know how to use disinfection methods and disinfectants appropriate for a laboratory, health care facility, and manual hygiene of the health care staff. <u>4.Sample handling</u> Upon completion of the specialist training, the clinical cytologist shall have acquired and be able to demonstrate: a) the knowlege of an optimal way of collection, receipt, identification and documentation of all specimen types b) un understanding of the need to use continuity intrinsic to sample processing from sample collection to issuing a final report. New specialists must also be aware of the weak points during sample processing, ie. where this continuity can be expected to be interrupted, and how to reduce the risk to minimum c) proficiency in triaging samples for emergency processing, including arrangement of off-hours services, and reporting preliminary results of the sample analysis provided that they are applicable given the further patient treatment course d) competencies to request further ancillary investigations and sample analysis where necessary e) an awareness of existing reference centers and national reference laboratories, and ability to correctly use their services <u>5.Microscopy</u> Upon completion of his/her specialist training, the clinical cytologist shall have obtained and be able to demonstrate: a) an understanding of the principles of microscopy using a light field, dark field, phase

	contrast and fluorescence microscope, and electronic microscopy technique b) proficiency in routine staining techniques, including those with fluorescent stains c) the ability to examine stained preparations and recognise potential errors and artefacts of preparation and their sources <u>6.Gynaecologic cytology</u> Upon completion of the specialist training, the clinical cytologist shall have acquired and be able to demonstrate: 1. an understanding of the basics of anatomy, histology and physiology of the female genital system; 2. the basic clinical knowledge of conduction of gynaecological examination, clinical and laboratory tests and the symptomatology of the disease in making the differential diagnosis; 3. the knowledge of the types of sampling techniques (swab, aspiration biopsy without and with US guidance, tissue fragment, etc.) from different sites: vulva, vagina, uterine cervix (cervix, endocervix), endometrium, parametrium, adnexes (ovaries), amniotic cavity, buccal mucosa, as well as other sites involved by the spread of the disease (lymph node, abdominal and pleural cavity, urological tract, etc.) for cytological, cytochemical and immunocytochemical analyses; 4. competency in sample processing techniques (smear, sediment, imprint), fixing and staining methods for cytological (Papanicolaou (PAP), May-Grünwald-Giemsa (MGG)), cytochemical and immunocytochemical investigations; 5. proficiency in microscopic cytological, cytochemical and immunocytochemical analysis and interpretation – including the diagnosis and differential diagnosis; assessment of sample adequacy in relation to sample collection, processing, fixation and staining; the knowledge of cytological appearance of normal cells of the female genital system in a smear obtained from women of different ages, as well as of the abdominal and amniotic cavity, uropoietic system, etc.; familiarity with cytohormonal picture in normal and pathological conditions; proficiency in determining the stage of purity relating to the white blood cell and Döderlein bacilli count: the ability to recognise the cytomorphologic picture of inflammation, degeneration, metaplasia, reparation, and causative agents of sexually transmitted diseases; tumour-like masses, benign proliferative lesions and metastatic malignant tumours, irradiation and/or chemotherapy-induced changes in benign and malignant cells, competence for intraoperative cytological analysis; gender determination; fetal maturitiy assessment; evaluation of suspected premature amniotic sac rupture; awareness of problems in

	differential diagnosis in gynaecologic cytodiagnostics. 6. knowledge of diagnostic and therapeutic procedures in gynaecology and perinatology 7. knowledge of the screening methods with special focus on uterine cervical cancer 8. to be conversant with quality control procedures, with particular focus on cervical cytology. 9. awareness of the place of cytology in relation to the clinical, colposcopic, histopathological, microbiological, immunological and other parameters. 10. current awarenes of recent developments in the field of gynaecological cytology (liquid-based cytology, HPV testing, etc.) and gynaecology and obstetrics, including the most recent classifications and innovative diagnostic and therapeutic procedures. 11. during the residency of a 2-, 3-, 4- or 5-month duration, the candidate must have performed an analysis of 1000-25000 specimens, of which 800-2000 analyses of vaginal-cervical-endocervical (VCE) smears, 100-250 endometrial aspirates, and 100-250 other samples. <u>7. Haematologic cytology</u> Upon completion of the specialist training, the clinical cytologist shall have gained and be able to demonstrate: 1. an understanding of the basics of anatomy, histology and physiology of the haematologic system; 2. a basic clinical knowledge of examination of the haematologic patient, clinical and laboratory tests and the symptomatology of the disease in making the differential diagnosis; 3. experience in independent sampling of materials for cytological analysis in the haematologic patient (bone marrow bopsy – the sternum, anterior and posterior iliac crest, techniques of peripheral blood smear, lymph node biopsy, also biopsy of the spleen with computed tomographic (CT) or ultrasound (UTZ) guidance); correct sample collection for cytogenetic analysis, fluorescent in-situ hybridisation (FISH) analysis, phenotypisation and cell culture (to perform at least: 100 bone marrow biopsies from various sites, 100 lymph node biopsies, attend procedures of ultrasound- and CT-guided biopsies of the spleen) 4. a thorough understanding of the material processing and staining procedures: standard staining (May-Grünwald-Giemsa, Papanicolaou); cytochemical staining (alkaline phosphatase in the white blood cells, extrahemoglobin iron, periodic acid-Shiff (PAS), peroxidase (POX) staining, Sudan Black, alpha naphthyl acetate esterase (ANE), acid phosphatase, etc.) and immunocytochemical staining, as well as an

	awareness of potential errors in their performance 5. proficiency in independent cytological sample analysis: to have a knowledge of morphology of cellular components in normal haematopoiesis; to have a knowledge of the morphology and relations between cellular elements of peripheral blood and bone marrow during childhood and adulthood; the ability to perform qualitative and quantitative analysis of peripheral blood and bone marrow smears (haemogram and myelogram). To have performed an analysis of at least 50 samples of paediatric bone marrow, 1500 samples of adult bone marrow, and 200 samples of peripheral blood smears with normal findings 6. an understanding of the principles of interpretative reporting of the cytomorphological characteristics of various diseases including: disorders of erythropoiesis (anaemias, polyglobulias); myelopoietic stem cell disorders (chronic and acute myeloproliferative diseases, myelodysplasias); granulocyte line cell disorders; disorders of the monocytic-macrophageal system; lymphocyte and plasma cell disorders (benign-reactive changes of the lymph nodes – infectious and noninfectious, lymphopenias and lymphocytoses, neoplastic disorders of the lymphatic system – acute and chronic leukaemias, Hodgkin and non-Hodgkin lymphoma); splenic disorder (hypersplenism); thrombopoietic disorders; influence of different therapeutic modalities on the bone marrow and lymph node morphology and the dynamics of the changes (chemotherapy and other medication therapy, irradiation, etc.); morphological changes after bone marrow transplantation; presence of foreign cells in the bone marrow (metastatic tumours); detection of parasites in haematologic samples and hereditary haematologic disorders (anaemias, histiocytoses). During the residency to have performed an analysis of a minimum of 1000 pathological bone marrow samples (stained with standard, cytochemistry and immunocytochemistry methods), at least 800 aspirates from lymph nodes and 50 aspirates from the spleen. 7. current awareness of the latest developments in haematology and haematologic cytology, including the most recent classifications of haematologic diseases, novel diagnostic and therapeutic procedures in haematology 8. the ability to interpret the results of flow cytometry, cytogenetic and molecular (fluorescent in-situ hybridisation (FISH), polymerase chain reaction (PCR)) diagnostic methods, to critically assess a need for the most advanced methods taking in consideration cost-benefit of additional tests 9. attendance at consultation joint meetings with haematologists, cytologists and pathologists and interdisciplinary meetings with professionals of other specialties (microbiologists, oncologists, radiologists, etc.)

	8. Pulmonologic cytology Upon completion of the specialist training, the clinical cytologist shall have acquired and be able to demonstrate: 1. an understanding of the basics of anatomy, histology and physiology of the pulmonary system, 2. a basic clinical knowledge of examination of the pulmonary patient, clinical and laboratory tests and the symptomatology of the disease in making the differential diagnosis 3. familiarity with the cytological sampling procedures performed by other specialists: bronchoscopic collection of aspirates, bronchial secretions, bronchial „brushing“, bronchoalveolar lavage (BAL), punch biopsy of the mucosa or pathological changes of the bronchial wall, transbronchial lung biopsy, transbronchial and transtracheal fine-needle aspiration, pleural aspiration and biopsy, transthoracic fine-needle aspiration with evaluation of sample adequacy, 4. experience and competency in independent sample collection for cytological analysis of cutanous and subcutaneous changes, lymph nodes and other palpable lesions secondary to the expansion of a primary process, as well as fine-needle aspiration of nonpalpable lesions with radiological guidance; to have performed at least 50 fine-needle aspirates of different lesions; attend pleural and transthoracic aspiration procedures under radiological guidance. 5. the ability to give instructions for correct collection of cough sputum, nasal swab and nasopharingeal swab specimens; 6. skills in cytological sample processing techniques, and indications for their application: sample preparation in standard staining fashion (May-Grünwald-Giemsa, Papanicolaou and their variants – Quik-Diff), cytochemical staining (extrahaemoglobin iron, periodic acid-Shiff (PAS), PAS-diastasis, Black Sudan), immunocytochemical staining of cytological smear preparations, cytological specimen preparation for morphometry and staining by the Feulgen technique, flow cytometry, fluorescent-in-situ hybridisation (FISH), 7. competency in independent analysis of cytological samples, adequate description of cytomorphological features of the following: organ cells, systems and tissue of the entire thoracic region (lungs, pleura, mediastinum), cellular changes (irritative and degenerative lesions, atypies, metaplastic changes, proliferations), cells suggestive of a particular pathological process, recognise pathological causatives (pneumocistis carinii, echinococcus, fungi, bacteria, etc.), adequate morphological description of

	characteristics seen in granulomatous inflammations with or without necrosis, in primary benign and malignant tumours, the most common and rare ones; in metastatic lesions of the lungs, mediastinum and pleura; alterations in normal and tumour cells after therapy (irradiation, cytostatic), 8. competency in inedependent intraoperative cytodiagnostics of intrathoracic pathological lesions. To have performed an analysis of a minimum of 1000 cough sputum, bronchoscopy specimens, pleural effusions, transthoracic aspirates and specimens of intrathoracic lesions obtained at surgery stained with standard, cytochemistry and immunocytochemistry methods. 9. current awareness of the latest developments in pulmology and pulmologic cytology, including the most recent classifications and innovative diagnostic and therapeutic procedures, 10. participation in consultation meetings with pulmologists, surgeons, cytologists and pathologists and interdisciplinary meetings with the professionals of other specialties (microbiologists, oncologists, radiologists) <u>9.Cytology of the breast</u> Upon completion of the specialist training, the clinical cytologist shall have obtained and be able to demonstrate: 1. an understanding of the basics of anatomy, histology and physiology of the breast, 2. a basic clinical knowledge of examination of the pulmonary patient, clinical and laboratory tests and the symptomatology of the disease in making the differential diagnosis; 3. experience in independent material sampling for exfoliative testing (discharge/expressate, scarificate), image-guided breast biopsy (ultrasonography, mammography-stereotactic, MR, etc.); 4. skills in exfoliative breast examination procedures – problem and implications of discharge occurrence unilateral or bilateral, amount, colour, with a special focus on the role of blood stained discharge 5. competence for analysis of discharge with the presence of inflammatory changes (subareolar abscess, inflammation of Montgomery's gland) 6. proficiency in the fine-needle aspiration and analysis of lymph nodes upon breast-sparing surgery for carcinoma, and (interpretation in terms of implications) morphological appearance of irradiated malignant and irradiated benign cells of the breast glandular epithelium; interperation of needle aspirates from the changes around scarificate upon surgery

	7. familiarity with analysis of breast needle biopsy samples –morphological picture of the breast tissue, inflammatory changes, adipose tissue necrosis, fibrocystic breast diseases; particular focus on morphology of cystic lesions, fibroadenomas and proliferative lesions with and without epithelial atypia 8. knowledge of the clinical and microscopic features of breast carcinoma and the possibility of subclassificaton of particular carcinomas 9. proficiency in the fine-needle aspiration procedure and analysis of lymph nodes upon breast-sparing surgery for carcinoma and interpret in terms of implications irradiated malignant and benign cells of the breast glandular epithelium 10. cytological-histological correlation in case of open breast biopsy 11. work in the team for the management of breast diseases 12. knowledge of the role of determination of estrogen and progesterone receptors in general, and of other tumour markers in serum and/or breast biopsy; 13. familiarity with breast alterations in puberty and pregnancy and with male breast diseases (gynaecomastia, carcinoma) 14. to have performed a morhological analysis of at least 500 breast fine-needle aspirates and discharge samples and carried out 50 fine-needle aspiration procedures during the residency <u>10.Cytology of the thyroid and parathyroid glands</u> Upon completion of the specialist training, the clinical cytologist shall have acquired and be able to demonstrate: 1. an understanding of the fundamentals of topographical-anatomical relations of the neck structures, histology and physiology of the thyroid and parathyroid glands, 2. knowledge of the fundamentals of ultrasound diagnosis and echographic features of normally appearing thyroid and parathyroid glands and other neck structures and various thyroid and parathyroid gland lesions 3. a basic clinical knowledge in endocrinology of the thyroid and parathyroid glands, 4. proficiency in independent cytological material sampling using the technique of ultrasound guided target biopsy of lesions of the thyroid and parathyroid glands and the neck. To have performed at least 30 independent US-guided aspiration biopsies, 5. a basic understanding of cytological sample preparation and staining procedures: standard staining, ancillary cytochemical and immunohistochemical specimen staining. Ability to make indications for their use and understanding of potential source of error in their performance and interpretation, 6. experience in independent analysis of cytological samples, including knowledge of the

	following: components of intact thyroid and parathyroid gland tissue and the criteria to diagnose adequate and inadequate biopsy specimens; appearance of inflammatory, degenerative and functional changes; benign and malignant (primary and secondary) tumours of the thyroid and parathyroid glands, 7. competence for independent interpretation of cytological findings, providing a final opinion and making indications for follow-up cytological aspiration biopsy, 8. current awareness of the latest developments in the thyroid and parathyroid gland cytology, including the most recent classifications and novel diagnostic and therapeutic procedures, 9. attendance at interdisciplinary meetings (team for management of the thyroid and parathyroid gland diseases), 10. to have performed an analysis of minimum of 300-400 needle aspirate samples from the thyroid and parathyroid glands (routine needle aspirate samples) and have examined archived aspirate samples / educational sets (normal elements of the thyroid and parathyroid gland tissue and samples of all pathological changes which can be seen in the thyroid and parathyroid glands). <u>11.Cytology of the male gonads and ejaculate</u> Upon completion of the specialist training, the clinical cytologist shall have developed and be able to demonstrate: 1. an understanding of the basics of anatomy, histology and physiology of the male gonads; 2. a basic clinical knowledge of examination of the patient with male gonadal diseases, clinical and laboratory tests and the symptomatology of the disease in making the differential diagnosis; 3. knowledge of how to prepare the patient, process and quantitatively and morphologically analyse the ejaculate 4. a sufficient knowledge to evaluate oligo- and azospermia and evaluate motility and vitality of spermatozoa 5. skills in cytodiagnostic testicular needle biopsy, sample processing and staining; 6. familiarity with interpretation of morphological features of spermiogenesis, Sertoli and Leydig's cells in the stained smear and alterations in spermatogenic functional disorders and inflammations; 7. familiarity with morphological and phenotypic characteristics of tumours of the testicles; 8. use educational preparation sets.

	9. during the residency, the candidate must have performed an analysis of 50 specimen preparations. 12.Urologic cytology a) *Cytology of the kidneys and urinary tract* Upon completion of the specialist training, the clinical cytologist shall have acquired and be able to demonstrate: 1. an understanding of the basics of anatomy, histology and physiology of the kidneys and urinary tract 2. a basic clinical knowledge of examination of the patient with renal and urinary disorders, clinical and laboratory tests and the symptomatology of the disease in making the differential diagnosis; 3. familiarity with cytodiagnostic renal biopsy (under CT or US guidance), sample processing technique and cytological analysis of the smear (cytomorphological properties of normal kidney cells and the cells present in different pathological processes) 4. to be conversant with cytological evaluation of spontaneously voided urine specimens (technique of sample material processing, smear analysis – normal cellular components and the cells present in various pathological conditions) 5. proficiency in cytological examinations of other types of material as applied to this field (catheter urine, bladder lavage, urethral swab, imprint of material obtained at surgery) b) *Cytology of the prostate* Upon completion of the specialist training, the clinical cytologist shall have obtained and be able to demonstrate: 1. an understanding of the basics of anatomy, histology and physiology of the prostate 2. a basic clinical knowledge of examination of the patient with diseases of the prostate, clinical and laboratory tests and the symptomatology of the disease in making the differential diagnosis 3. proficiency in skills in cytodiagnostic needle biopsy of the prostate (attendance at biopsy procedure, sample material processing), cytological analysis of the smear (cytomorphological properties of normal prostatic cells and the cells present in particular pathological conditions) 4. knowledge of prostatic exprimate cytodiagnosis (specimen collection and technical

	processing) and cytological analyisis of the smear 5. proficiency in technical processing and analysis of smears from the daily laboratory work 6. practice urological cytodiagnosis on smears prepared for education, and special focus should be on cytological analysis of urine and prostatic needle biopsies 7. to have performed an analysis of 600 cytological preparations of urine and 20 preparations of prostate and kidney needle biopsy samples. <u>13.Gastroenterologic cytology</u> Upon completion of the specialist training, the clinical cytologist shall have developed and be able to demonstrate: 1. an understanding of the basics of anatomy, histology and physiology of the gastrointestinal system 2. a basic clinical knowledge of internistic examination of the patient, clinical and laboratory tests and the symptomatology of the disease in making the differential diagnosis 3. familiarity with sampling types (biopsy, swab, lavage, imprints) and proficiency in the methods of collection and analysis of sample materials obtained from different sites (oral cavity, salivary glands, oesophagus, stomach, colon, rectum, anus, liver, pancreas, peritoneal cavity) in inflammatory and degenerative lesions, as well as in benign and malignant tumours; taking swabs during endoscopic retrograde cholangiopancreatography (ERCP) and endoscopy (esophago-, gastro-, colono- and rectoscopy); the techniques of intraoperative sampling; preparation of tumour and node imprints 4. in case of doubtful cytologic finding to be able to offer a possible differential diagnosis in consultation with the clinician who will present the cytologist with the clinical picture and findings of the patient 5. proficiency in the cytological techniques of „blind“ and US-, endoscopic ultrasound (EUS)- and CT-guided needle aspiration biopsy of superficial organs such as salivary glands, knowledge of clinical indications 6. familiarity with complications and contraindications for cytological needle biopsy of the liver and pancreas 7. skills in cytological analysis of needle aspirate samples which should include the following: morphologic properties of normal cellular components of the gastrointestinal system; morphologic lesions in oral cavity inflammations and tumours; morphologic lesions in salivary gland inflammations (acute, chronic and granulomatous

	sialoadenitis, hyperplasia of intraglandular lymph nodes, autoimmune diseases of salivary glands, sialolithiasis), and benign and malignant salivary gland tumours; morphologic lesions in Barrett's esophagus, inflammations (fungi) and tumours of the oesphagus; gastric morphological changes (hyperplasia, intestinal metaplasia, dysplasia, inflammation, peptic ulcer disease, polypous changes, banign and malignant tumours); morphological lesions in diffuse inflammatory and chronic-degenerative lesions of the liver (cyrrhosis, hepatitis, metabolic alterations) and pancreas (acute, subacute and chronic pancreatitis); morphological characteristics of benign cystic (echinococcus) and solid lesions of liver and malignant and secondary hepatic tumours; morphological lesions in benign and malignant tumours of the endocrine and exocrine segment of the pancreas; morphological lesions in inflammation and tumour of the gallbladder and bile ducts; morphlogical lesions in benign and malignant tumours of small and large intestine 8. knowledge of limitations of cytology within this medical field and comparison of cytology specificity, sensitivity and diagnostic accuracy, as well as possible errors in morphological diagnosis of gastrointestinal system lesions 9. experience in work at the Division of Gastroenterology and Radiology Department in addition to the Department of Clinical Cytology 10. to have performed an analysis of at least 150 preparations of cytological specimens obtained from oral cavity and salivary glands; at least 50 endoscopic swabs and 70 cytological preparations of liver and pancreas samples. <u>14.Cerebrospinal fluid cytology</u> Upon completion of the specialist training, the clinical cytologist shall have acquired and be able to demonstrate: 1. an understanding of the basics of anatomy, histology and physiology of the central nervous system (CNS) 2. a basic clinical knowledge of examination of the patient with CNS diseases, clinical and laboratory tests and the symptomatology of the disease in making the differential diagnosis 3. knowledge of the techniques for collection of the cerebrospinal fluid (liquor cerebrospinalis) from the spinal, suboccipital, ventricular space, or from the vascular or peritoneal cavity liquor drainage system 4. familiarity with the procedures for collection of biopsy material from the CNS which are performed by a neurosurgeon 5. an in-depth understanding of the liquor processing methods: native cell staining in the

	Fuchs Rosenthal chamber; sedimentation in a cytocentrifuge; sediment staining using various methods, as indicated; sample preparation for flow cytometry; sample preparation for molecular analysis; fundamentals of the biochemical analysis of the liquor; basics of the microbiological diagnosis of the liquor 6. independent cytomorphologic analysis of the liquor; the ability to recognise normal cells in the liquor; knowledge of physiological variations in the liquor in the newborns, infants of nursing age and adults; knowledge of cytomorphological characteristics of inflammatory processes of different aetiology and pathogenesis, knowledge of the cytomorphological characteristics of secondary (metastatic) tumours in the CNS; cytomorphological characteristics of subarachnoidal and intracerebral haemorrhage; eosinophilic meningitis syndrome; reactive pleocitosis; possible artificial pleocytosis (bone marrow cells, cartillage cells, etc.); analysis of imprint of biopsy material; the ability to give a final opinion on a possible process 7. participation in clinico-pathological meetings or in interdisciplinary meetings discussing differential diagnostic problems of the CNS processes. 8. to have stayed at the ward for CNS inflammatory diseases for 4 days to get familiar with the basics of neurologic examination and techniques of liquor collection 9. at least one day-stay in the flow cytometry and molecular diagnostics laboratory and one day in the microbiological diagnostics laboratory and the laboratory for biochemical liquor processing each 10. attendance at 5 clinical rounds, observing diagnostic liquor biopsies 11. in a cytological laboratory, to have performed at least 20 primary analyses of the liquor, 30 native cell counting and rough distinguishing of nucleated cells from erythrocytes, and cytological analysis of these, and provide final opinions in minimum 60 liquor samples of different etiopathogenetic diagnoses 12. upon completion of the residency, the clinical cytologist must have acquired all knowledge and skills anticipated by the specialist training curriculum in clinical cytology of the liquor, and be able to give competent opinion on cytomorphological changes in the liquor and possible differential diagnosis of the processes in the CNS. <u>15.Paediatric cytology</u> Upon comopletion of specialist training, the clinical cytologist shall have developed and be able to demonstrate: 1. skills to approach the child in an appropriate manner 2. experience in aspiration biopsy from superficial sites (lymph nodes, thyroid gland, etc.), bone marrow biopsy (sternum, posterior and anterior iliac crest, tibia), aspiration

	biopsy of the spleen and liver in children with/without an anaesthetic, and collection of exfoliative material adjusted for the particular child age 3. a thorough understanding of sample material processing and staining procedures: standard staining (May-Grünwald Giemsa (MGG), Papanicolaou); cytochemical staining (alcaline phosphatase in the white blood cells, extrahaemoglobine iron, phosphatase acid Schiff (PAS), peroxidase (POX), Sudan Black, alpha naphthyl acetate esterase (ANE), acid phosphatase, etc.) and immunocytochemical staining as well as potential sources of errors in the procedure 4. the knowledge of normal morphology of developing organs, which is different from that of adults 5. the ability to analyse smears with a special focus on diseases occurring in infants and children: histiocytoses (histiocytosis X, eosinophilic granuloma, Hand-Schüller-Christian and Letterer –Siwe disease), thesaurismoses (Gauche, Niemann –Pick disease, etc.), malignant reticulohistiocytoses, embrional and other paediatric tumours (neuroblastoma, Ewing sarcoma, Wilms tumour, teratoma and teratocarcinoma), parasitoses (Leishmaniosis and Babesiosis), thyroid lesions (lymphocytic thyreoiditis and hyperthyreosis are common, in some morphological characteristics different from those in adulthood) 6. experience in vaginal smear analysis (delayed or premature puberty and inflammatory lesions) 7. familiarity with urine prepration for analysis of cytomegalic cells, as well as staining and testing of urine for metachromatic bodies (important in leukodystrophia) 8. during the residency, the candidate must have performed an analysis of 100 cytological samples and carried out 30 different aspiration biopsies <u>16.Cytology of the soft tissues and bones</u> Upon completion of the specialist training, the clinical cytologist shall have acquired and be able to demonstrate: 1. an understanding of the basics of anatomy, histology and physiology of bones, soft tissues and skin 2. knowledge of basic clinical features, symptoms and treatment of diseases, interpretation of the results of a range of laboratory investigations and their application: immunological, biochemical, microbiological, etc. as applied to the musculoskeletal system and the skin 3. proficiency in the basics of radiological and CT imaging interpretation 4. familiarity with cytological sampling procedures performed during other specialistic

	examinations and attend procedures of “blind” as well as US-guided joint fluid needle biopsy, material collection at arthroscopy, biopsy of bone lesions with CT-guidance 5. experience in independent cytological sampling of pathologic lesions of soft tissues, bones, joints and skin (through “blind” needle biopsy and with US-, radiology- and CT-guidance; scarificate sampling from skin lesions, swabs from lesions and intraoperative imprints of tumours and sentinel lymph nodes). To have performed an analysis of at least 20 various material sampling procedures. 6. an understanding of cytological sample processing: joint fluid preparation for cytological analysis (counting of native cells in the Fuchs Rosenthal chamber, sediment preparation in a cytocentrifuge, macroscopic and native analysis), and knowledge of the standard and emergency methods of staining needle biopsy specimens, sediment, swabs, scarificates and imprints (May-Grunwald-Giemsa, Papanicolaou, Hemacolor, Diff-Quick). 7. experience in independent cytological sample analysis under the light microscope: knowledge of cellular cytomorphologic characteristics of the skin and skin adnexes, soft tissues, bones, cartillage and joint fluids; knowledge of how to qualitatively evaluate cell lesions in degenerative and inflammatory diseases, mechanical damage, benign and malignant tumours of soft tissues, bones, cartillage and skin, and in metastatic tumours, as well as changes in benign and tumour cells after therapy (irradiation, chemotherapy, hormones, corticosteroids); knowledge of the procedure of joint fluid semiquantitative analysis. 8. to have performed an analysis of a minimum of 100 samples of different types during the residency. 9. knowledge of how to make a proper selection of methods to supplement the subclassification of mesenchymal tumours and lesions, as well as pathological skin lesions; analysis of cytochemical preparations (acid phosphatase, periodic acid-Schiff (PAS), PAS-diastasis, Sudan, etc.) and immunocytochemical preparations, and the ability to interpret the results of flow cytometry and morphometry (DNK), electron mycroscopy and cytogenetic and molecular diagnostic procedures (fluorescent in-situ hybridisation (FISH), polymerase chain reaction (PCR), et al.) 10. knowledge of the limitations of clinical cytology within this medical branch and an understanding of potential errors in morphologic diagnostics of mesenchymal tumours and lesions as well as skin growths, and thereby differential-diagnostic possibilities 11. current awareness of the latest developments in the science of the musculoskeletal system and skin from the aspects of different medical branches, including the most recent classifications and innovative diagnostic and therapeutic procedures

	17. Ancillary Procedures Upon completion of the specialist training, the clinical cytologist shall have acquired and be able to demonstrate: - knowledge of the principles and techniques of immunocytochemistry and cytogenetics (standard, fluorescent in-situ hybridisation (FISH), chromogenic in-situ hybridisation (CISH), silver-enhanced hybridisation (SISH), molecular techniques (hybridisation and amplification methods), computer-assisted „image“ analysis (morphometry of different cell components, AgNOR, DNA cytometry); - un understanding of the principles of operation of a flow cytometer
Requirements for training institutions	Institutions must meet the requirements provided under the Article 4 or 5 of the Medical Doctor Specialist Training Regulations.

LOGBOOK OF COMPETENCE DEVELOPMENT

CLINICAL CYTOLOGY

SUBJECT	**DEGREE OF DEVELOPMENT**			**MAIN SUPERVISOR**
	1	**2**	**3**	
GENERAL COMPETENCIES	Date and supervisor's signature			Date and signature
Master information integral to the basic principles of medical ethics and deontology and apply them in work practices				
Possess professional, humane and ethical attitudes and commitment to the principles pertaining to the protection of patient's privacy and dignity				
Acquire appropriate communication and interpersonal skills with patients, patients' families, colleagues and other health care professionals				
Be able to presentat relevant information and explanations (face-to-face and in writing) in an clear, meaningful and effective fashion to the patient, patient's family, colleagues and other health professionals with an objective of partnership in planning and delivering health care services				
Be conversant with identification, selection and valid documentation of relevant data on the patient and eliciting information both on the patient's point of view and that of his/her family, other colleagues and other health care professionals and observation thereof				
Through permanent education and and self-assessment develop competencies and attitudes necessary for improving the quality of own professional work				

Be familiar with the principles of managment of own working practices and career with a goal of professional development				
Develop the skill in transferring knowledge				
Understand the importance of scientific approach to the profession				
Participate in scientific and research activities and abide by the ethical principles of scientific and clinical research				
Be able to contribute to the production, application and sharing of new medical knowledge and experiences and participate in implementation of specialty and subspecialty training programmes				
Possess knowledge of the principles of evidence-based medicine and be able to apply them				
Know the importance of and methods of efficient and detailed medical record keeping and apply them in own practice in compliance with the current regulations				
Be able to coordinate and determine priorities in team work, ie. effectively participate in the work of multidisciplinary team of health care and allied professionals				
Assess the need of inclusion of other professionals in the process of health care delivery				
Understand the importance of cooperation between health care providers and public health services and other institutions included in the health care system and participate in this activity				
Be conversant with organisation of the health care system and competent for responsible participation in managing need assessment activities, and planning measures for enhancement and increment in effectiveness of the health care quality system and fostering and promotion thereof				

Be conversant with current legislation in the field of health care, particularly in the area of patient's right protection				
Be conversant with the course, schedule and control of working processes and the basics of resurce management				
Understand and critically use health care resources available guided by interests of patients and the community				
Be able to recognise and adequately respond to patients' individual health needs and problems				
Can identify the health needs of the community and accordingly take appropriate measures for protection and promotion of health and disease prevention				
Promote health and healthy lifestyles of the patients, the community and general population				
SPECIAL COMPETENCIES				
1.BASIC TRAINING **1.A. Common trunk programme**				
1.A.a. General and autopsy pathology				
Proficiency in the autopsy technique and final reporting				
Have a working knowledge of health and safety measures in the post-mortem room including high risk autopsies				
Be conversant with current legislation relating to the deceased in hospitals				
Be familiar with the guidelines and policies relating to determination of the time and cause of death				
Interpret the autopsy finding in the light of clinical information available				

Write a final gross and microscopic report				
Present the autopsy finding at clinico-pathological meetings				
Proficiency in the sample retention and labeling procedure, tissue preparation protocol, and processing of histological and cytological specimens and preparation of blocks and slides, including basic, special staining techniques				
Have a working knowledge of all safety measures towards health protection during material collection and retention, and receipt and preparation of blocks and slides				
Be proficient in techniques for fixation, preparation of blocks and slides and staining of tissue sections by means of H&E and standard methods, and recognition of technical pitfalls				
Establish procedures to avoid confusion or inaccurate labelling of samples at any point of sample processing				
Describe macroscopic histological appearance of tissue samples				
Retain material (selection of tissue blocks from the specimen appropriate for demonstration of a pathological lesion, resection margins, relation of the mass to the surrounding tissue, etc.)				
Be proficient the technique for preparation of frozen sections				
Retain material for special methods				
Be proficient in the technique of cytology sample collection and processing and prepare the patient for the procedure				

Determine sampling types for cytology analysis (aspirates, body fluids, swabs, tissue imprints)				
Be conversant with the organisation of a histological and cytological laboratory				
Know how to apply methods of standard staining fixation for cytomorphological analysis (May-Grünwald-Giemsa (MGG), Papanicolaou) and for cytochemical, immunocytochemical and molecular analyses				
Analyse normal and pathologically altered cells in the swab from a wide range of organ systems. Interpretation and provision of a final opinion and recommendations for a further diagnostic procedure				
1.A.b. Special and bioptic pathology				
1. Surgical pathology				
Develop skills to basically identify presence of inflammatory, degenerative, tumour and other pathological changes in tissue samples				
Recognise borderline changes (principles of differential diagnosis of particular lesions)				
Write a standard histopathological report including all available data relevant to clinical uses				
Take part in discussions at the clinico-pathological meetings				
Acquire skills in the retention, processing and principal interpretation of intraoperative frozen sections				
Develop familiarity with the principles of indication and application of ancillary staining or immunohistochemical techniques in doubtful cases				
Recognise which cases require consultation with a more experienced pathologist/assess one's own knowledge				
Independently perform an autopsy with comprehensive reporting, microscopical analysis of material obtained at				

autopsy with presentation of the finding at the clinico-pathological meetings				
Correlate cytological and histological finding of surgical material („imprint cytology“)				
2. **Gynecologic pathology**				
Approach a fetal/perinatal autopsy considering a possible presence of malformations				
Know the most common malformation syndromes				
Diagnose the most common heart defects				
Examine the placenta and recognise the most usual changes				
Attend at least 1 meeting with perinatal morbidity and mortality as the topic of discussion				
Be familiar with gynaecological material receipt procedure and identify the presence of basic inflammatory and tumour changes of the genital system				
Have a knowledge and skills in methods used in the receipt and preparation of intraoperative frozen sections from the area of gynaecologic pathology and a principal knowledge of their interpretation				
Provide intraoperative interpretation of the gross finding and assess the merits of frozen sections in particular cases				
Participate in the clinico-pathological meetings				
Evaluate material adequacy, indicate the technique and monitor material processing (fixation and staining) in the cytomorphological diagnosis				
Recognise normal cells of the female genital system in smears obtained from women of different ages				
Distinguish between inflammatory, degenerative and metaplastic lesions, reparation, intraepithelial and invasive lesions in the smear				

3. **Endoscopic and fine-needle aspiration biopsy**				
Recognise typical inflammatory and tumorous changes of gastrointestinal mucosa and be able to distinguish between them				
Recognise borderline changes in a smear (grading of epithelial dysplasia) and know their clinical importance				
Describe the basics of needle biopsy (of the liver, kidneys, and pancreas) and characteristics of the samples obtained by aspiration biopsy				
Distinguish the morphological features of normal hepatic and renal components from those seen in basic inflammatory and chronic changes as well as primary and secondary tumours				
Evaluate sample material adequacy, indicate and monitor sample processing (fixation and staining) in the cytomorphological diagnostics of the gastrointestinal tract				
Distinguish normal cells from those with inflammatory, metaplastic and dysplastic changes and tumorous lesions of gastrointestinal cells in the swab.				
4. **Fundamentals of special diagnostic methods**				
Selection and use of basic special and histochemistry methods				
Selection and use of basic immunohistochemistry methods				
Be familiar with the methods of sample collection for electronic microscopy (fixation and preparation) and basic indications				
Be familiar with the basics of interpretation of finding and the principles of information contained in the findings provided by special diagnostic methods in making the diagnosis				
Know the principles of making indications, the material sampling technique and interpretation of histochemistry,				

immunohistochemistry and electronic-microscopy findings				
Be aware of the basic methods of cell culture and their value in clinical practice				
Understand the basics of flow cytometry methods				
Understand the fundamentals of cytogenetics				
Understand the basical value of different molecular pathologic and other advanced diagnostic modalities in clinical practice				
2. SPECIALTY TRAINING **2.A. Cytology of the organ systems**				
Gynaecologic cytology				
Types of sampling methods (swab, aspiration biopsy without and with US guidance, tissue fragment, etc.) from different sites (vulva, vagina, uterine cervix (cervix, endocervix), endometrium, parametrium, adnexes (ovaries), abdominal cavity, amniotic cavity, buccal mucosa for cytological, cytochemical and immunocytochemical analyses				
Samples from other sites related to the spreading of the disease: lymph node, abdominal and pleural cavity, urological tract for cytological, citochemical and immunocytochemical analyses				
Sample processing techniques (smear, sediment, imprint), fixation and staining methods for cytological, cytochemical and immunocytochemical investigations				
Microscopic cytological, cytochemical and immunocytochemical analysis and interpretation – including the diagnosis and differential diagnosis				
Assessment of sample adequacy in relation to sample collection, processing, fixation and staining				
Normal cells of the female genital system from women of different ages, and of the abdominal and amniotic cavity, etc.				

Cytohormonal analysis in normal and pathological conditions				
Stages of purity relating to the white blood cell and Döderlein bacilli count in vaginal-cervical-endocervical (VCE) smears				
Inflammation, degeneration, metaplasia, reparation, causatives of sexually transmitted diseases in VCE smears				
Tumour-like masses, benign tumours, premalignant and malignant intraepithelial lesions, invasive malignant tumours, metastases and malignant metastatic tumours the the female genital system				
Irradiation and/or chemoherapy-induced lesions of benign and malignant cells				
Intraoperative cytological analysis				
Cytological gender determination				
Fetal maturity assessment; evaluation of suspected premature amniotic sac ruputure				
Dproblems in differential diagnosis in gynaecologic cytodiagnostics				
Diagnostic and therapeutic procedures in gynaecology and perinatology				
Haematologic cytology				
Sample for cytological analysis in haematologic patients (bone marrow biopsy – the sternum, anterior and posterior iliac crest, peripheral blood smear, CT- or ultrasound (UTZ)-guided aspiration biopsy of lymph nodes, liver and spleen, material for cytogenetic analysis, FISH, phenotypisation and cell culture, bone biopsy).				
Standard material processing procedures (MGG, Papanicolaou)				
Cytochemical staining methods (WBC alcaline phosphatase, extrahaemoglobin iron, PAS, POX, Sudan Black, ANE, acid phosphatase, etc.)				

Immunocytochemical techniques for staining cytological smears; flow cytometry, FISH				
Morphology of cellular elements in normal haematopoiesis; morphology and relations between the peripheral blood and bone marrow cellular elements in childhood and adulthood; qualitative and quantitative analysis of peripheral smears and bone marrow (haemogram and myelogram)				
Morphological aspects of erythropoietic disorders (anaemias, polyglobulias)				
Morphologyical characteristics of myelopoietic stem cell disorders (chronic and acute myeloproliferative disorders, myelodysplasias)				
Morphological features of granulocyte line disorders and disorders of the monocytic-macrophageal system				
Morphological characteristics of lymphocyte and plasma cell disorders (benign-reactive changes of lymph nodes – infectious and noninfectious, lymphopenias and lymphocytoses, neoplastic disorders of the lymphatic system – acute and chronic leukaemias, Hodgkin and non-Hodgkin lymphoma and splenic disorder (hypersplenism)				
Morphological features of thrombopoietic disorders				
Influence of different therapeutic modalities on the bone marrow and lymph node morphology and dynamics of the changes (chemotherapy and other medication therapy, irradiation)				
Morphological changes after bone marrow transplantation; recognition of foreign cells in the bone marrow (metastatic tumours)				
Parasites in haematologic samples				
Morphological features of harediatary haematologic disorders (anaemias, histiocytoses)				
Latest developments in haematology and haematologic cytology, including the most recent classifications of haematologic diseases, novel diagnostic and therapeutic				

procedures in haematology				
Attendance at consultation joint meetings with haematologists, cytologists and pathologists, and interdisciplinary meetings with other specialists (microbiologists, oncologists, radiologists, etc.)				
Pulmonologic cytology				
Cough sputum - spontaneous or induced. Techniques of sampling and sample processing for cytological analysis				
Bronchoscopic sampling – techniques (stay in a bronchoscopy cabinet) Sample types and preparation for cytological analysis				
Exfoliative samples collected at bronchoscopy (catheter, fine-needle biopsy, brush swab, imprint of excised mucosa, lungs, tumours, bronchoalveolar lavage (BAL))				
Bronchoscopic aspirate samples (fiberoptic aspirates, transtracheal/bronchial aspirates) On site evaluation of specimen adequacy – the role of the clinical cytologist				
Radiology-guided transthoracic needle aspiration Determination of specimen adequacy – the role of the clinical cytologist				
Evaluation of adequacy, normal cellular composition in exfoliative and aspiration samples. Inadequate, negative, positive, diganostic samples				
Inflammatory and other non-tumorous lesions. Cellular composition and specific inflammatory causatives, granulomatoses				
Bronchoalveolar lavage (BAL). Adequacy, normal cellular composition, alveolitises				
Metaplasia, atypia, reactive epithelial lesions in a range of cytological samples				

Tumour-like lesions and rare benign tumours				
Posttherapy cell alterations				
Squamous cell carcinoma in different cytological samples				
Adenocarcinoma in different cytological samples				
Small cell carcinoma and spectrum of neuroendocrine epithelial tumours in a range of cytological specimens				
Other primary tumours of the lungs				
Secondary tumours (and endobronchial metastases)				
Pleural effusions and cytology of the disease of the pleura (nonmalignant cellular elements, mesothelial proliferation, mesothelioma)				
Pathological lesions and tumours of the mediastinum				
Cytochemistry, immunocytochemistry, morphometry – application in pulmological cytodiagnosis				
Intraoperative cytology of different pathological states				
Cytological-clinical-pathological correlation				
Perform analysis of 2000 different samples (of these 500 normal, standard stained and 200 with ancillary cytochemistry and immunocytochemistry, as appropriate depending on pathology): 400 cough sputum samples, 950 various bronchoscopy samples, 50 transthoracic aspirates, 200 pleural aspirates, 300 intraoperative samples of various tumours of intrathoracic sites, 100 aspirates of lymph nodes and peripheral masses				

Cytology of the breast				
Material for exfoliative testing (discharge/expressate, scarificate), image-guided breast biopsy (ultrasound, mammography-stereotactic biopsy, magnetic resonance, etc.)				
Exfoliative breast examination – problem and role of discharge occurrence, unilateral and bilateral, amount, colour, with a particular focus on the role of blood stained discharge				
Analysis of discharge with inflammatory alterations (subareolar abscess, inflammation of Montgomery's gland				
Changes in the appearance of the nipple in terms of eczema and Paget's disease				
Analysis of samples obtained at needle biopsy – morphological picture of breast tissue, inflammatory lesions, adipose tissue necrosis and fibrocystic lesions; particular focus on morphology of the cysts, fibroadenomas and proliperative lesions with and without epithelial atypia				
Clinical and microscopic picture of breast cancer and possibility of subclassification of particular carcinomas				
Breast biopsy and lymph node analysis upon breast-sparing surgery for carcinoma. Morphological appearance and role of irradiated malignant and benign cells of the breast glandular epithelium. Cytology-histology comparison in case of open breast biopsy				
Work in the team for the management of breast diseases				
Breast alterations in puberty and pregnancy. Male breast diseases (gynaecomastia, carcinoma)				
Cytology fo the thyroid and parathyroid glands				
Basics of ultrasound diagnosis and echographic appearance of intact thyroid and parathyroid glands and other neck structures and various thyroid and parathyroid gland lesions				

Material sampling for cytological analysis (ultrasound-guided target biopsy of thyroid and parathyroid glands, fine-needle aspirates of palpatory changes in the neck)				
Standard cytological methods of material processing and staining				
Cytochemistry and immunocytochemistry staining methods and appropriate use thereof				
Morphological characteristics of intact thyroid and parathyroid gland tissue				
Evaluation of sample adequacy, criteria of distinguishing adequate from inadequate aspirate samples				
Morphological characteristics of inflammatory, degenerative and functional thyroid and parathyroid gland lesions				
Morphological characteristics of benign and malignant (primary and secondary) tumours of the thyroid and parathyroid glands				
Independent interpretation of the finding, final opinion and indications for follow-up cytological fine-needle aspiration				
Interdisciplinary meetings (the team for management of the thyroid and parathyroid gland diseases)				
Latest developments in the thyroid and parathyroid gland cytology, including the most recent classifications and innovative diagnostic and therapeutic procedures				
Cytology of the male gonads and ejaculate				
Cytodiagnostics of ejaculate – preparation of the patient, processing and quantitiative and morphological analysis of ejaculate. Detarmination of oligo- and azospermia. Evaluation of motility and vitality of spermatozoa				
Needle aspiration cytodiagnosis of the testes, sample preparation and staining. Spermatogenesis. Sertoli and Leydig's cells in the stained smear and recognition of changes in spermatogenic functional disorders and inflamations				

Tumours of the testicles				
Educational preparation sets				
Urologic cytology *Clinical cytology of the kidneys and urinary tract*				
Cytodiagnostic kidney biopsy (with CT or US guidance), sample processing technique and cytological analysis of the smear (morphological description of features seen in normal cells and the cells present in differing pathological states)				
Cytological examination of spontaneously voided urine (technique of sample material processing, analysis of the smear - normal urine cell picture and the cells present in different pathological conditions)				
Cytological examination of other types of material in this field (catheter urine, bladder lavage, urethral swab, imprint of material collected on surgery)				
Clinical cytology of the prostate				
Cytodiagnostic needle biopsy of the prostate (attendance at biopsy procedure, sample processing technique), cytological analysis of the smear (cytomorphological properties of normal prostatic cells and the cells present in particular pathological conditions)				
Cytodiagnostics of prostatic exprimate (specimen collection and technical processing), cytological analysis of the smear				
Sample collection, familiarity with technical processing and analysis of smears from everyday laboratory work				
Cytodiagnosis on the smears prepared for education, in order for the trainee to gain a knowledge of all pathological processes within this field during his/her residency				
Cytological urinalysis and cytology of prostatic aspirate				

Gastroenterologic cytology				
Fundamentals of anatomy, pathology and physiology of the GI system, basic methods of clinical examination and history taking in the GI patient, symptoms and laboratory tests in the GI patient				
Technique of „blind“ and UTZ-guided fine-needle aspiration biopsy of the salivary glands				
Cytological biopsies of internal organs with guidance of US, endoscopic ultrasound (EUS) and CT, knowledge of indications and contraindications for cytological biopsies of internal organs				
Swab collection during EGDS, ERCP, colonoscopy and rectoscopy, and cytological preparation of these samples				
Technique of intraoperative cytological sampling, tumour and lymph node imprints and lavation of body cavities				
Technique of sample processing, fixation and staining for standard cytomorphologic analysis and ancillary cytochemistry and immunocytochemistry, and flow cytometry				
Interdisciplinary team joint meetings (gastroenterologists, abdominal surgeons, oncologists, cytologists, radiologists, pathologists, etc.)				
Normal cellular elements in all sample types of GI tract				
Morphologic changes in inflammations and tumours of the oral cavity				
Morphologic changes in inflammations of the salivary glands (acute, chronic and granulomatous sialoadenitis, hyperplasia of intraglandular lymph nodes, autoimmune diseases of the salivary glands, sialolithiasis), and benign and malignant tumours of the salivary glands				
Morphologic alterations in Barett's esophagus, inflammations (fungi) and tumours of the esophagus				
Morphologic changes in diffuse inflammatory and chronic-degenerative changes of the liver (cyrrhosis, hepatitis,				

metabolic alterations) and pancreas (acute, subacute and chronic pancreatitis)				
Morphologic characteristics of benign cystic (echinococcus) and solid hepatic lesions and malignant primary and secondary hepatic tumours				
Morphologic changes in benign and malignant tumours of the endocrine and exocrine part of the pancreas				
Morphological alterations in inflammation and tumours of the gallbladder and bile ducts				
Morphological changes in benign and malignant tumours of small and large intestine				
Criteria, scope and limitations of cytological diagnostics in diseases of the alimentary tract, and awareness of potential errors in morphologic diagnostics of alimentary tract lesions				
Cerebrospinal fluid cytology				
Clinical round at the ward for inflammatory CNS diseases, introduction to the procedure of liquor collection				
Laboratory for molecular diagnostics and flow cytometry, laboratory for biochemistry (basics of biochemical findings in the liquor)				
Cytological preparation of liquor cells: counting of native cells; sedimentation in a cytocentrifuge apparatus; sediment staining using a range of methods				
Cytological analysis of the liquor: normal cells and physiologic variations				
Cytomorphologic features of serous inflammations in meningitis and meningoencephalitis of different aetiology				
Cytomorphologic characteristics of purulent inflammations of different aetiology				
Cytomorphologic characteristics of primary tumours of the CNS				
Cytomorphologic features of secondary tumours of the CNS				

Cytomorphologic characteristics of haemorrhage in the CNS				
Eosinophilic meningitis syndrome				
Reactive pleocytosis				
Artificial pleocytosis				
Paediatric cytology				
Approach to the child, and various techniques of aspiration biopsy (specially important for immature fetus), bone marrow aspirate and biopsy (sternum, posterior and anterior iliac crest, tibia), techniques of fine-needle aspiration biopsy of the spleen and liver in children with/without an anaesthetic				
Material for exfoliative cytology adjusted for the particular child age				
Sample material processing (standard, cytochemical and immunocytochemical)				
Normal morphology of developing organs, which is different from that of adults				
Analysis of the smear with special focus on diseases characteristic for childhood: histiocytoses (histiocytosis X, eosinophilic granuloma, Hand-Schuller-Christian and Letterer – Siwe disease), thesaurismoses (Gauche, Niemann-Pick disease, etc.)				
Parasitoses (Leishmaniosis and Babesiosis)				
Thyroid lesions (lymphocytic thyreoiditis and hyperthyreosis are common, in their particular morphologic characteristics different from those in adulthood)				
Malignant reticulohistiocytoses, embrional and other paediatric tumours (neuroblastoma, Ewing sarcoma, Wilms tumour, teratoma and teratocarcinoma)				

Analysis of the testes (changes during development, alterations in the cryptorhic testicle)				
Analysis of the vaginal smear for diagnosis of delayed or premature puberty and inflammatory changes				
Urine preparation for analysis of cytomegalic cells, as well as staining and testing for metachromatic bodies in urine (important in leukodystrophia)				
Cytology of the soft tissues and bones				
Lesions and tumours of the skin and skin adnexes: swabs, scarificates and „blind“ needle biopsy, and processing for cytological analysis				
„Blind“ and ultrasound-, radiology-, CT-guided needle biopsy of lesions and tumours of the soft tissue, bones and jonts with interpretation of radiologic images (Department of Radiology) On site evaluation of sample adequacy – the role of the clinical cytologist. Processing for cytological analysis.				
„Blind“ needle biopsy of lesions and tumours of the soft tissues, bones and joints. On site assessment of sample adequacy – the role of the clinical cytologist. Preparation for cytological evaluation.				
Intraoperative sampling and imprints of tumours and sentinel lymph nodes (the operating room)				
Joint fluid preparation methodology: native cell counting, sedimentation in a cytocentrifuge, macroscopic analysis				
Adequacy evaluation, normal cellular elements of exfoliative and aspiration samples and imprints. Inadequate, negative, positive, diagnostic samples				
Cytological analysis of inflammatory and other non-tumorous lesions of the skin				
Cytological analysis of benign tumours of the skin and skin adnexes				
Cytological analysis of malignant tumours of the skin and skin adnexes				

Cytological analysis of lesions and benign tumours of the soft tissues				
Cytological analysis of malignant tumours of the soft tissues				
Cytological analysis of inflammatory and degenerative bone lesions				
Cytological analysis of benign tumours of the bone and cartillage				
Cytological analysis of malignant tumours of the bone and cartillage				
Cytological analysis of metastatic tumours in bone/soft tissue and skin				
Quantitative and qualitative analysis of the joint fluids in inflammations, degenerative changes and injury				
Cytological analysis of tumours of the joints				
Cytological analysis of posttherapy changes in benign and malignant cells				
Cytochemistry, immunocytochemistry, DNK analysis, cytogenetics, electron microscopy – utility in the diagnosis of masses and lesions of the musculoskeletal system, soft tissue and skin				
Differential diagnosis of lesions of the musculoskeletal system, soft tissues and skin				
Cytological-clinical-pathological correlation. Specificity, sensitivity and diagnostic accuracy of cytomorphologic diagnostics of mesenchymal lesions and skin				
Cytological analysis of rare skin lesions.				
Cytological analysis of rare bone lesions.				
Cytological analysis of rare soft tissue lesions				
Cytological analysis of rare changes in joint fluid				

Ancillary procedures				
Immunocytochemistry principles and techniques				
Cytogenetics (standard, fluorescent in-situ hibridisation (FISH), chromogenic in-situ hybridisation (CISH), silver-enhanced hybridisation (SISH))				
Molecular techniques (hybridisation and amplification methods)				
Computer-assissted image analysis (morphometry of different cell components, AgNOR, DNA cytometry)				
Principles of operation of a flow cytometer				

LOG-BOOK OF PROCEDURES PERFORMED

CLINICAL CYTOLOGY

Title of the part of the specialist training programme **Procedure**	Number of procedures	**DEGREE OF DEVELOPMENT** **2**	**3**	**MAIN SUPERVISOR / SUPERVISOR** Date and signiture
		Date and specialist's signiture		
Basic specialist training **Common trunk**				
General pathology and autopsy pathology				
Independently performed autopsies	50			
Special pathology				
Surgical pathology				
Independent conduction of autopsies with complete reporting, microscopic analysis of samples retained at autopsy and presentation of the findings at clinico-pathological meetings	20			
Examination of surgical biopsies/operative	600			

specimens				
Examination of surgical biopsies/operative specimens – pathology of the breast	200			
Examination of surgical biopsies/operative specimens - haematopathology	100			
Examination of surgical biopsies/operative specimens – pathology of the gastrointestinal system	50			
Examination of cytological smears	50			
Gynaecological pathology				
Examination of biopsies/operative specimens of the female genital system	400			
Fetal and neonatal autopsies	10			
Cytological smears	350			
Endoscopic and fine-needle aspiration pathology				
Examination of tissue samples obtained by endoscopic methods (mucosal biopsy of the esophagus, stomach, duodenum, small and large intestine) and needle biopsy (liver, kidney, pancreas, etc.)	600			
Cytological smears	100			
Diagnostic methods in pathology				
Special / histochemistry methods	50			

Immunohistochemistry methods	30			
Other methods (electron microscopy (EM), molecular pathology, etc.)	20			
1. Higher specialist training **2.A. Cytology of the organ systems**				
Gynaecologic cytology				
Analysis of samples from different sites (vulva, vagina, uterine cervix, endometrium, ovary, ovarian tube, abdominal cavity, amniotic fluid, buccal mucosa) stained with standard cytological, cytochemical and immunocytochemical stains in total	2000			
Analysis of vulvar, vaginal, cervical samples	1600			
Analysis of direct endometrial samples	200			
Analysis of samples collected from other sites (abdominal cavity, ovary, ovarian tube, amniotic fluid, buccal mucosa) and sites involved by the spread of disease: lymph node, pleural cavity, urinary tract	200			
Observation of sample processing procedures (smear, sediment, imprint, fixation), staining procedures for cytological, cytochemical and immunocytochemical investigations	10			
Microscopic cytology, cytochemistry and immunocytochemistry analysis and interpretation –	50			

including diagnosis and differential diagnosis				
Evaluation of sample adequacy in relation to collection, processing, fixation and staining	100			
Analysis of normal cell samples of the female genital system obtained from women of different ages and abdominal and amniotic cavity	100			
Cytohormonal analysis of normal and pathological states	100			
Degree of purity in relation to white blood cell and Döderlein bacilli count in vaginal-cervical-endocervical (VCE) smears	50			
Inflammation, degeneration, metaplasia, reparation, causatives of sexually transmitted diseases in vaginal-cervical-endocervical (VCE) smears	100			
Tumour-like masses, benign tumours, intraepithelial premalignant and malignant lesions, invasive malignant tumours, metastases and metastatic malignant tumours of the genital tract	50			
Changes in bening and malignant cells induced by irradiation therapy and/or chemotherapeutic drugs	50			
Intraoperative cytological analysis	50			
Cytological gender determination	10			
Fetal maturity assessment; evaluation of suspected premature amniotic sac rupture	20			

Differential-diagnostic pitfalls in gynaecologic cytodiagnosis	20			
Diagnostic and therapeutic procedures in gynaecology and perinatology with attendance at daily and weekly clinical interdisciplinary consultation meetings	40			
Haematologic cytology				
Independently perform fine-needle aspiration biopsies – the sternum, anterior and posterior iliac crest	150			
Independently perform fine-needle aspiration biopsies of lymh nodes	250			
To have attended needle biopsy procedures of the liver or spleen with CT or ultrasound (UTZ) guidance as an observer and/or assisstant	20			
Independently collect samples for cytogenetic analysis, FISH, phenotypisaton, molecular analysis, cell culture, etc.	50			
Perform analysis of normal peripheral blood and bone marrow smears: qualitative and quantitative analysis of peripheral blood and bone marrow smears (leukogram and myelogram)	200			
Performe analysis of pathological peripheral blood and bone marrow smears: qualitative and quantitative analysis of peripheral and bone marrow smears (leukogram and myelogram) stained with	2000			

standard, cytochemical and immunocytochemical staining				
Perform analysis of benign and pathological smears of lymph node biopsies stained with standard, cytochemical and immunocytochemical staining	1000			
Perform analysis of benign and pathological smears of the spleen stained with standard, cytochemical and immunocytochemical staining	100			
Pulmonologic cytology				
Perform analysis of benign and pathological cough sputum samples stained with standard and cytochemical staining	400			
Perform analysis of benign and pathological exfoliative samples obtained at bronchocopy stained with standard, cytochemical and immunocytochemical staining (catheter, aspirate, brush swab, imprint of excised mucosa, lungs, tumour, broncho-alveolar lavage (BAL))	950			
Observe transthoracic needle aspiration under radiologic guidance with independent assessment of sample adequacy and analysis of aspirates stained with standard, cytochemical and immunocytochemical staining	50			
Perform analysis of benign and pathological pleural effusion samples stained with standard, cytochemical and immunocytochemical staining	200			

Perform analysis of aspiration smears of peripheral masses and lymph nodes stained with standard, cytochemical and immunocytochemical staining	100			
Observe intraoperative sampling procedures and perform analysis of cytological samples of a wide range of pathological conditions of the lungs, pleura and mediastinum	300			
Cytology of the breast				
Independently perform ultrasound (UTZ)-guided breast biopsy procedures	50			
Perform analysis of aspirate smears in benign and malignant conditions of the breast	450			
Perform analysis of breast discharge	50			
Work in the team for management of breast diseases	20			
Cytology of the thyroid and parathyroid glands				
Independently perform UTZ-guided aspiration biopsy procedures of the thyroid and parathyroid glands	30			
Perform analysis of aspirate smears of the parathyroid glands (in daily, routine biopsy specimens, educational sets)	30			
Perform analysis of aspirate smears of the thyroid gland (in daily, routine biopsy specimens, educational sets)	300			
Cytology of the male gonads and ejaculate				

Attend preparation of the patient for quantitative and morphologic analysis of ejaculate	10			
Recognise oligo- and azospermia by evaluation of spermatozoa motility and vitality	25			
Perform analysis of testicle biopsy specimens: spermatogenesis, Sertoli and Leydig's cells in the stained smear, changes in spermatogenic functional disorders and inflammations, tumours of the testicles, etc.	50			
Urologic cytology *Clinical cytology of the kidneys and urinary tract*				
Independently perform and/or attended CT- or ultrasonography-guided kidney biopsy procedures as an assistant	5			
Perform analysis of sediments of spontaneously voided urine	600			
Perform analysis of smears from other types of material within this area (catheter urine, urinary bladder lavage, urethral swab, imprint of material obtained at surgery).	10			
Clinical cytology of the prostate				
Independently perform and/or attend the prostatic needle biopsy procedures as an assistant	10			
Perform analysis of prostatic needle biopsy and exprimate	30			
Gastroenterologic cytology				
Independently perform “blind” and ultrasound (UTZ)-guided needle biopsy of the salivary glands	30			
Independently perform and/or attend hepatic and	15			

pancreatic biopsy procedures as an assistant				
Perform analysis of smears from fine-needle aspiration biopsy samples from oral cavity and salivary glands	150			
Perform smear analysis of endoscopic needle aspirate	50			
Perform analysis of smears from hepatic and pancreatic fine-needle aspiration biopsies in benign and malignant lesions	70			
Perform smear analysis in inflammations and tumours of gallbladder and bile ducts	10			
Perform smear analysis of benign and malignant tumours of small and large intestine	10			
Cerebrospinal fluid cytology				
Attend clinical rounds at the ward for central nervous system (CNS) diseases	5			
Observe diagnostic fine-needle aspiration of the cerebrospinal fluid (liquor)	5			
Participate in liquor processing	20			
Perform native counting of the cells in the liquor	30			
Perform cytological analysis of liquor samples in serous and purulent inflammations, primary and secondary tumours, bleeding into the CNS, reactive	60			

and artificial pleocytoses, etc.				
Paediatric cytology				
Independently perform bone marrow biopsy procedures (sternum, posterior and anterior iliac crest, tibia), lymph nodes, tumour masses and other changes	30			
Observed and/or attend as an assistant fine needle aspiration biopsy procedures of the spleen, liver and other deep tissue masses in children with/without an anaesthetic	5			
Observe material processing procedures (standard, cytochemical and immunocytochemical)	20			
Perform cytological analyses of smears with special focus on diseases characteristic for childhood: histiocytoses (histiocytosis X, eosynophylic granuloma, Hand-Schuller-Christian and Letterer-Siwe disease), thesaurismoses (Gauche, Niemann-Pick disease), embrionic and other paediatric tumours and other conditions	100			
Cytology of the soft tissues and bones				
Sampling of swabs, scarificates and “blind” needle biopsy	10			
Independently perform needle biopsy of tumorous lesions of soft tissues, bones and joints through “blind” biopsy and with ultrasonographic, radiological and CT guidance	10			
Intraoperative sampling and imprints of tumours and sentinel lymph nodes (in the operating room)	10			

Preparation of joint fluid: counting of native cells, sedimentation in the cytocentrifuge apparatus, macroscopic analysis	10			
Analysis of smears from inflammatory and other non-tumorous skin lesions, benign and malignant tumours of the skin, skin adnexes, soft tissues, bones, cartilage and joints	50			
Cytological analysis of posttherapy changes in benign and malignant cells	10			
Ancillary Procedures				
Immunocytochemistry	50			
Cytogenetics (standard, fluorescent in-situ hibridisation (FISH), chromogenic in-situ hybridisation (CISH), silver-enhanced hybridisation (SISH))	20			
Molecular techniques (hybridisation and amplification methods)	20			
Computer-assisted image analysis (morphometry of different cell components, AgNOR, DNA, cytometry)	20			
Flow cytometry	30			