The Scandinavian School
of Cardiovascular Technology
Aarhus, Denmark

2024-26

LOGBOOK

The Scandinavian School of Cardiovascular Technology.

Instruction guide and checklists
for the training and education
of Perfusionists

Student: _____

Hospital: _____

INDEX

LOGBOOK Introduction

This logbook is a guide for training and education of Perfusionists with checklists and outlines for instruction at hospital.
It will form the background for the graduation as a Clinical Certified Perfusionist, in conjunction with the graduation as a Master of Cardiovascular Technology.
The logbook complies with the standards of the European Board of Cardiovascular Perfusion, EBCP.
The logbook sets norms for local training, education and practice, but it is also a controlling instrument for the school to ensure a certain level of practical education and local instruction.

The logbook consists of four parts:

Introduction
- Expectations of and demands made on the appointing institution.
- Certification
- Time schedule

Clinical Logbook
- Checklists for perfusion techniques.

Instruction Logbook 1.
- Local "internal" lessons in relevant subjects.
  Part one contains instructions for lessons to be given by the supervisor or other perfusionists.

Instruction Logbook 2
- Local "external" lessons in relevant subjects.
  The subjects in part two are primarily meant to be taught externally; - i.e. not by perfusionists, but carried out by seniors from other professions, in own or other departments.

Part of training and instruction may be undertaken at the mandatory stay at another hospital.

The completed logbook is a prerequisite for the confirmation by the Scandinavian School of Cardiovascular Technology to the effect that the student has graduated as a "Clinical Certified perfusionist" (CCP), in addition to graduating as a "Master of Cardiovascular Technique".
The completed logbook is also a prerequisite for the EBCP certification.
Upon completion of the logbook the "approval sheet" is filled in and signed by the student, the supervisor and the chief perfusionist/chief of department.
It must be submitted to the following address, - according to the instructions below.

The Scandinavian School of Cardiovascular Technology (SCANSCAT)
Att. Jette Breiner. T-Forskning
Palle Juul-Jensens Boulevard 99
DK-8200 Aarhus N

http://www.perfusionistskolen.au.dk
Phone: +45 7845 3080
Fax: +45 7845 3079

Expectations of, and demands made on the appointing institution

- The logbook should be used in the daily training, to structuralize the practical training, and set up a plan for the education.

- In between the four modules of the master education, the student is expected to work full-time as a perfusionist trainee. Deviation from this must be discussed with, and accepted by the school. An extensive practical training is a precondition for fulfilling the demands stated in the logbook, which are an absolute condition for passing all parts of the education as a perfusionist.

- Standards of the clinical perfusion should be up to date, following the standards on the following page in accordance with the European Guidelines, and preferably guided by written protocols. Whenever they exist, protocols and manuals for equipment and utensils, should be used in the training and the teaching - especially the instructions directed in "Instruction Logbook Part 1".

- Before first module, the student must at least have observed a number of perfusions, and preferably performed some supervised perfusions.

- The department/supervisor, and not the school, decide when the student can be allowed to perform a perfusion, and later when the student can be allowed to perform without backup, and be on call. See typical numbers at the following page on “Practice overview”

- Between the first and the second module, logbook focus should be on the “standard perfusion techniques”. The supervisors should carry out a major part of the instructions described in the “Instruction Logbook”. We expect the student to have performed some perfusions without aid (under supervision) when starting on the second module - preferably 30-50.

- Between the second and the third module focus should be on “special techniques”. At the end of this practical training period most logbook instructions, internal and external, must have been carried out. Before third module, we expect the student to have performed more than 50 independent* perfusions. preferably 80-100.

- Before the major workload of the master thesis in the fourth module, it is recommended to have fulfilled the logbook, including the performance of 100 independent perfusions. Also, to have done the exchange stay, before the master thesis.

** "Independent perfusion" that counts for the obligatory 100 cases, is defined as a perfusion performed without help from supervisor. It still might be supervised and advise can be given. It's just that the student is able to perform the perfusion without assistance.*

Standards of clinical practice, for training perfusionists in education

- prioritization by the Scandinavian school, according to selected guidelines.

Minimum monitoring in CPB: *(with feedback to pump-stop when appropriate)*

- Pre- and post-oxygenator pressure
- Cardioplegia line pressure
- In-line SaO2
- In-line SvO2
- Level detector on venous reservoir
- Bubble sensor on arterial line
- Temperature measurement at the oxygenator outlet and venous inlet

These standards are new as of 2024, and should be implemented before 2025

Routines and Techniques available:

- Use an institution approved pre-CPB checklist. *(for training, also a pre-weaning checklist)*
- Written protocol for standard perfusion. (*preferably also for the most common procedures and emergencies*)
- Oxygen Delivery, (DO2) for Goal Directed Perfusion - *calculated or continuously*
- Pre-calculated Pump flow rate, - adjusted according to the DO2, SvO2, and acid-base status
- Real-time registration of key data during CPB, - preferably automated
- Retrograde and antegrade autologous priming available, for selected cases
- VAVD *(at least one available)*
- Blood management techniques, sa Hemofiltration and Cell Salvage
- Individualized Heparin and Protamine management
- Arterial-line filter, external or integrated
- One-way valve in the vent line, and/or routine check of vent line suction
- Vital communication should be protocol driven / closed loop

Preparedness and precautions:

- Backups for vital systems of the HLM – as a minimum; hand crank, oxygenator and O_2 supply
- A stand-by perfusionist should be available for emergencies and support
- A set-up CPB circuit should always be available for emergency procedures
- HCU placed outside the OR, or enclosed in ventilated cupboard
- Validated decontamination and maintenance procedures for HCUs

Resources:

- EACTS, EACTA, EBCP Guidelines on CPB in Adult Cardiac Surgery. 2019
- AmSect, Standards and Guidelines for Perfusion Practice. 2023
- UK-Recommended Standards of Monitoring During CPB. 2016/23
- Hessel, Groome. Guidelines for Conduct of Cardiopulmonary Bypass. 2021

Practice overview and suggestions for logbook focus and targets

The education consists of altering periods of practice and theory at school.
The diagram below shows the practice periods, the approximate time, and the targets for the fulfilment of the different parts of the logbook:

- CPB target: Suggested aims for the number of perfusions carried out independently#
- Checklist Clin.log: Refers to the checklists in "Clinical Logbook"
- Internal Instructions: Refers to "Instruction Logbook" part one
- External Instructions: Refers to "Instruction Logbook" part two

The supervisor and the department have the responsibility for planning the practical training and instructions to fit the student's need and ability.

Suggested targets:

COURSE	Practice period	Time (approx)	CPB# target	Checklist Clin.log.	Internal Instructions	External Instructions
	1	Recommend 3 months	Intro	Basics of Stand.techn.		
Module 1	2	4 months	Some (30-50)	Standard techn.	Major part (1,2,3,5,6,8)	Basics (1,3)
Module 2	3	5 months	>50 (80-100)	Perf. complications	Most (4,7,9)	Major part (2,4,5,7,8)
Module 3	4	4 months	>100	All (spec.tech)	All (10,11,12)	Most (6, 9,10)
Thesis (4)	5	3 months				All

(The targets are suggestions only. References to numbers in internal and external instructions)

The target for number of perfusions carried out independently, although maybe supervised
Meaning without major intervention from the supervisor.

Targets for CPB performed very much depend on the time of appointment, the background of the student - and the department's policy. It is a realistic goal in most cases, that the student will reach around 30-50 perfusions before module 2, and 50-100 before module 3.
This decision of giving responsibility to the trainee is in the hand of the supervisors/department - not the school.

A survey of the heart centers typical practice for allowing the student/trainee to perform, revealed a great variety between centers. There are different ways to handle the training and giving responsibility to the trainee. Typical (median) values were:

- Observed perfusions before being allowed to perform a case: 20
- Performed perfusions, closely supervised, before counting "independent": 40
- "Independent" perfusions (lightly supervised), before being allowed work alone: 90

Supervising of the practical training

Supervisor

There must be one primary supervisor responsible for training the student, and for the logbook. The primary supervisor must be experienced and qualified, and should hold the European Certificate in Cardiovascular Perfusion, issued by the EBCP.
It is recommended to have two supervisors carrying out the training and the filling in of the logbook, but the primary supervisor is the on-site contact person to the school.

The contact to the school's staff member responsible for practical training, will primarily take place by e-mail. The school must be notified of a change of e-mail address.

The supervisor is responsible for setting clear objectives for the training and for arranging the lectures stipulated in the "Instruction logbook", as well as evaluation talks with regular intervals.

There must be a clear agreement between the department and the student, as to the period in which the student is a trainee assistant, when he/she is considered qualified, and when a possible start of on-call-duty can be expected. See above. The responsibility for this lies with the supervisor and chief of the clinic, not with the school.

The Department

The Department of Perfusion must live up to the international standards for quality and safety in perfusion. See, the above "Standards of clinical practice".
At the end of the logbook is an enclosure containing a list of the techniques employed by the clinic as well as general information about the clinic. This sheet must be submitted to the school at the beginning of the training period, - normally at the start of schools first module. The supervisor should help fill out this form.

Introduction Program

Before the training in perfusion techniques mentioned in the clinical logbook, and the on-site lectures described in the Instruction logbook an introduction training program should be outlined, starting with following elements:

- Introduction to the department / the operating theatres / the hospital
- Introduction talk, expectations, objectives and planning
- Administrative tools, working hours etc.
- Introduction to the Heart-Lung Machine / perfusion
- Sterility and conduct in the operating room
- Personal and patient safety in dealing with blood and medicines
- Going through the most important protocols and procedures

Objectives and Evaluations

A formal talk should take place between the supervisor and the student at least once every 3 months, to evaluate the student's progress.

At this meeting an evaluation takes place, and the objectives are fixed.
A suggested scheme for these talks is attached, meant only for internal use at the hospital.
In this context the logbook should be used as a tool for the evaluation of progress, the Clinical Logbook as a check list concerning the student's acquisition of the skills in perfusion technique, and the Instruction Logbook describing the instruction which must be planned.

In supplement to the assessment of the clinical abilities, the evaluation should also include the student's mental welfare, motivation, collaboration, coping, etc. as outlined in the attached form. Each meeting must be followed by a written objective for the next period of time, as has been agreed between student and supervisor. *This is only for internal use, and is not to be reported to the school.*

The forms in the "Clinical logbook" should be used at the "objectives conversation" as a tool for monitoring the progress. If necessary, the forms may be supplemented by a quantitative evaluation of the student's performance.
The EBCP Evaluation Sheet *may* be used for evaluation of the student's performance in the individual procedures (attachment). The same form is used for the practical examination.
See Appendix for the form.

GRADING:
< 4 The performance and knowledge of the candidate were below the minimum acceptable level.
4 The candidate attained the minimum standard with assistance from supervisor/examiner.
5 The candidate attained the minimum standard accepted.
6 The candidate realized a good performance/knowledge.
7 - 8 The candidate exceeded clinical standards and realized a very good performance/ knowledge.
9 - 10 The candidate exceeded clinical standards and realized an excellent performance/ knowledge.

Grade 5 is the passing grade, while grade 6 is a medium/standard performance.

Practice Exchange

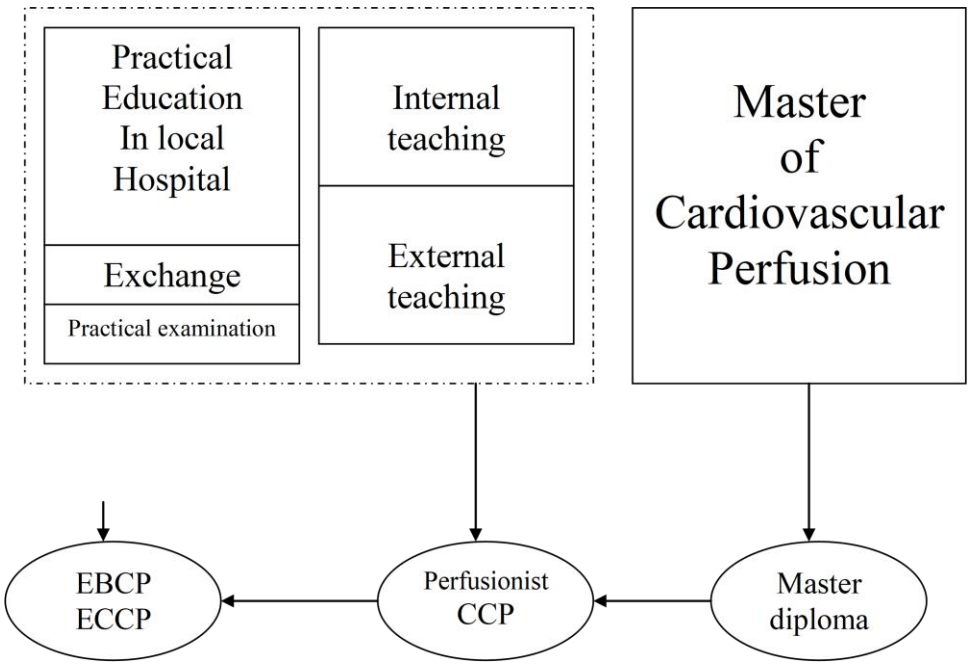
It is mandatory to stay at least 10 working-days at another center than the home hospital.

The student must have 2 weeks of practical training in another hospital/perfusion dept. This should be a European center, with EBCP certified perfusionists. Deviation from this, must be approved by the school.
Practice Exchange in more than one hospital is possible, but at least one of the exchanges should last no less than one week. At least 5 perfusions should be observed, as primary or secondary, during the stay at another hospital.
This in order to ensure comprehensiveness in the training and to ensure that the student performs the procedures, and receives the lectures listed in the logbook, when/if these are not possible at the home hospital. Therefore, choose an exchange hospital with special techniques that complements the home hospital. Especially with regards to pediatric perfusion and ECMO.
This must be planned in cooperation with the exchange hospital in advance.

The stay or stays should take place between module 2 and module 4 - before the student is counted in the departments work schedule.
The school must be notified as to when and where the exchange will take place.
The responsible perfusionist at the exchange hospital must sign for the stay on the enclosed "approval sheet".

Perfusion education overview

- *dotted rectangle illustrates logbook coverage*



The practical examination - is normally carried out in the local hospital.

The examination is performed by the school or EBCP representative, as an evaluation of the student's performance during a perfusion procedure, including some oral questioning.
The EBCP Forms (Appendix I and II) will be used, and relevant issues are evaluated by the EBCP 10-point scale. 6 is mean value for the expected performance. Normally grade 5, 6, 7 or 8 is given, unless there are strong argument otherwise. A mean value of 5.0 is needed to pass. The grade will not appear in any of the school certificates.
Evaluation and scoring for the practical exam are linked to the practical performance and not to theoretical/scientific knowledge that is not relevant for the case - however, after the case, an Oral Examination will take place. The student will be asked to explain actions with some theoretical arguments relevant to the case. Also, there can be asked questions regarding events that could happen. So, the nature of questions is: "why do you do that?", "what is the purpose of this?", "what if…?", etc. As directed from EBCP "Oral Examination" the following parameters will be evaluated: "Technical Skills", "Understanding and Reflection", Professional confidence", Responsibility".

In addition, the logbook will be discussed, and the level of completion will be checked.
The practical examination can be carried out once the student has performed at least 100 perfusions on his own and the supervisor approve, - and must take place before graduation.
The school should be notified when the student has performed 100 perfusions and are ready.

100 Perfusions

Records of all procedures in "case experience" ***should be kept on file***, and serve as documentation for CPB case experience.
The recorded perfusions must have been carried out <u>independently, without aid, although maybe supervised.</u> It is up to the supervisor to decide a date, from where the counts are made.
It will typically be when the supervisor can leave the room in periods, and generally only have to give advice, not intervene. Typically, after having done 30-40 closely supervised cases.
The record may be printouts from Perfusion data systems, or a written record like this:

#	Rec.number	Date	Procedure	Surgeon	Special techniques	Problems

The completed logbook and the perfusion record should be sent to the below mentioned address, as stated in the time schedule below.
Before submitting the original logbook, make sure you have made a copy for your own use.
If the logbook is not fully completed, i.e. issues which have not been dealt with, a written explanation must be provided! This should be exceptional and will only be accepted in a few, well-founded cases.
The school (and later the EBCP) will decide if the logbook is accepted, or whether a postponement may be granted in order to fulfil the objectives. There must be signatures for every point in the checklists and for instructions / lectures. Finally, the "approval sheet" must be signed.

Please send the logbook to:

Perfusionistskolen
T-forskning (att. Jette Breiner)
AUH. Skejby
Palle Juul-Jensens Boulevard 99
DK-8200 Aarhus N

CERTIFICATION

CCP certification

The perfusion education has been completed, and a Clinical Certified Perfusionist (CCP) diploma is issued upon the satisfactory completion of the following three issues:

THEORY: 1) The theoretical education has been completed
- all examinations in the three theory-blocs and the master project
PRACTICE: 2) Logbook completed satisfactorily
3) Documentation for 100 perfusions
4) Practical examination passed

The two last points have nothing to do with the Master education as such, but the logbook must be followed, completed and acknowledged, and the practical examination passed before the CCP diploma can be issued.

ECCP certification

After fulfilling the logbook and the 100 perfusions, the student can apply for EBCP certification, from the European Board of Cardiovascular Perfusion. Thereby getting the title ECCP.
The application form for certification may be obtained from the EBCP webpage, please note that it is the application form for harmonized schools.
It should be sent together with the documentation for the 100 perfusions to the school.
The school will then forward it to the Danish delegate will verify and forward the application to the central EBCP before June 30th. The charge for the EBCP certification is included in school tuition fee. Note that ECCP certification can only be given to students having been trained in Europe - except for some special approved centers.

CONTINUED PERFUSION EDUCATION

After graduating and receiving the EBCP certification, the perfusionist must follow the rules of the EBCP for re-certification every third year.
The requirements concern level of activity, post graduate education and scientific activity / participation in scientific meetings. Details of these requirements can be found at the EBCP homepage.
For forms and further information, please refer to the homepage of
The European Board of Cardiovascular Perfusion: www.ebcp.org

For application, please contact your national EBCP representative.
Email addresses can be found at the EBCP homepage.

TIME SCHEDULE

At appointment	Objectives conversation between the supervisor and the student - *To be repeated every 3 months*
September 2024	**Module 1**. School start. *Submission of student information*
February 2025	**Module 2**. The logbook must be presented for control at the school
March-Dec.2025	Practice exchange: 2 weeks. Remember to have it signed for.
Sept. 2025	**Module 3**. The logbook must be presented for control at the school
Oct. 2025 -May 2026	Practical examination, - including check of logbook
February 2026	**Module 4**. Master project. (deadline and examination in May) (see separate time plan for Master project)
June 2026	The logbook including documentation of 100 perfusions must be forwarded to the school for approval by the school
June 2026	Diploma for passed Master. (Graduation) Diploma for completed education as a perfusionist, CCP. Deadline for application for the EBCP certificate. Certification by the EBCP.
Whole period:	*Keep record of performed perfusions and procedures.* *Continuous logbook completion.*

Students and supervisors are welcome to contact the person responsible for the practical education at the school:

Peter Fast Nielsen, ECCP. MCT.
T-Perfusion. Aarhus University Hospital, Skejby

E-mail: fastnielsen@gmail.com

CLINICAL LOGBOOK

DIRECTIONS FOR THE CLINICAL LOGBOOK

The Clinical Logbook is a checklist for perfusion techniques and procedures.
Each subject must be evaluated at two levels, as described in the following, and the ***date*** of reaching each level must be stated in the forms below.
When the second level has been reached, the supervisor must validate it with his signature.

- The first level has been reached when the student has received adequate instruction in the study subject and demonstrates understanding of the subject,
  - or when the student has gained practical experience under supervision, pertaining to the study subject. E.g. as a ***secondary*** (=assisting/observing) perfusionist. Alternatively, but less ideal, experience may be attained by means of in-vitro laboratory simulations.
- The second level has been reached with the student's demonstration of adequate skills as a ***primary*** Perfusionist.

Of the 100 mandatory completed perfusions, some need to be specific procedures. This is stated "Case Experience" scheme, and must be signed for.
The sheets for "case experience" and "special techniques" present when the desired number has been reached as a primary perfusionist.
Internal subjects of instruction must be based on *local* procedure protocols, rules, and practice.

In some cases, it may not be possible to reach the second level, since not all techniques are being used locally. It should be attempted to fulfil this during exchange to another hospital. At least the first level should be reached by means of thorough instruction and discussion. In these cases, the reason should be stated, at the space meant for the signature.

The student and the supervisor must fill in the relevant spaces in the logbook as each step is reached. *It is not acceptable to sign everything at the end of the whole training period.*
Except for the "Case Experience" which can be filled out when the 100 perfusions are reached.

Every step should represent a new level of knowledge, and must be signed currently.
We encourage the student and the supervisor to use the charts as a tool to keep track of the student's progress.
Training must include instructions pertaining to local conditions and protocols in the home hospital and ward: organization, rules for sterility and aseptic techniques, rules for quality control and stock control, data handling, safety measures, etc.

The goal for the clinical training is expressed below in section " Fulfilment of goal for clinical perfusion training". The supervisor sign this, when the goal is considered to be reached.

STANDARD PERFUSION TECHNIQUE

State date of reaching the level:	Knowledge/ Experience (secondary)	Clinical ability (primary)	***Supervisor signature***
Aseptic technique			
Patient evaluation			
Equipment selection			
Circuit assembly			
Roller pump, -occlusion setting			
Circuit priming			
Heater-cooler unit. Functions.			
In-line monitoring and alarms			
Pre-bypass checklist			
Hemodynamic monitoring of patients			
Anti-coagulation monitoring			
Initiation of cardiopulmonary bypass			
Perfusion management			
Cardioplegia			
Perfusion record keeping			
Termination of bypass			
Circuit disassembly and disposal			
Decontamination of equipment			
Readiness for emergency procedures			
Patient transport to ICU			
Autologous blood salvage			
Autotransfusion			
Use clamps to control drainage			
Counteract chattering of venous line			

Comments:

_____

CASE EXPERIENCE (must be kept on record)

Of the 100 perfusions, at least:	*comments*	***Supervisor signature***
- 10 Coronary procedures		
- 10 Heart valve procedures		
- 4 Aortic procedures		
- 3 Pediatric procedures.		
- 1 Heart transplantation *- if possible*		

SPECIAL CASE TECHNIQUES

	Observed Experience (secondary)	Performed (primary)	***Supervisor Signature***
4 Haemo/ultra-filtration procedures			
2 Cell Saving/autologous blood salvage procedures.			
2 Vacuum Assisted Venous Drainage			
2 Hypothermic circulatory arrest			
1 Cerebral perfusion (selective)			
2 Blood Cardioplegia			
1 IABP or Impeller			
2 cases of ECMO			
Isolated Organ Perfusion *- if possible* - Limb perfusion - Liver perfusion - Ex vivo lung perfusion - Modified in vivo lung perfusion - Ex vivo heart perfusion			

Comments:

_____

PERFUSION COMPLICATIONS

In-vitro training of emergency procedures

State date of reaching the level:	First Level Knowledge/ simulations (as secondary)	Second Level "in-vitro" simulations (as primary)	***Supervisor signature***
Emergency oxygenator change-out			
Emergency pump and disposables change-out			
Pump failure / electrical failure			
Ventilating gas failure			
Gross air in circuit			
Burst boot: emergency prime/re-prime			
If using Centrifugal pump: air evacuation and re-prime			

These training exercises should be done with the types of equipment used in the department, such as different oxygenators or brands of HLM.
The definition of the levels in PERFUSION COMPLICATIONS are somewhat different from the above, since they can only be planned to be practiced "in vitro" e.g. in a wet-lab, or through simulations on dry or used setups.
The first level can be reached by means of a thorough instruction and discussion.
These subjects are vital to practice in a profound way; therefore, the second level should be simulated as realistically as possible. It can be accepted only to do first level in some, but not most, of the six scenarios. Especially oxygenator changeout much be performed.

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Fulfilment of goal for clinical perfusion training

By signing the "approval Sheet", the supervisor declares that the student has shown ability to independently perform safe cardiopulmonary bypass in routine and emergency cases, and is able to combine theory and practice to obtain an optimal perfusion.
The student has shown ability independently to identify and solve problems and most unforeseen events - and when uncertain, is able to judge when to call for assistance. In face of problems, the student will inform the team appropriately, and be able to act according to the situation.

INSTRUCTION LOGBOOK part 1 - "internal"

The Instruction Logbook contains guidelines for local instructions in relevant subjects, of which some are in a general way covered in the master education, but must be supplemented locally.

The *Instruction Logbook* is divided into two parts, and contains a description of certain topics from the Clinical logbook, meant for formal instruction or teaching.
Furthermore, it adds aspects which are more closely related to the theoretical education in the School of Cardiovascular Technology, and should be seen as a supplement, thereby connecting theory to local clinical practice. In some cases, it would be appropriate to arrange the instruction in continuation of the relevant teaching at the school.

Some of the clinically relevant subjects may be used as a basis for first level knowledge in the *Clinical Logbook*, whereas other subjects are meant for a broader understanding.
Some of the subjects are to be studied in other departments of the home hospital, or involving other professionals in the home department, some may be achieved during a stay at another hospital.

Subjects are to be taught in a formal way, not during practice. Typical duration is 1-3 hours. This is a supplement to the daily training, a séance of instruction, discussion, theoretical considerations, going through procedures, etc. It can supplement a period where focus has been on the subject in the daily practice. Focus on local procedures and principles - not giving a theoretical lecture. Use department instructions, if existing, regarding the subject.
There may be sub items of the instructions which cannot be taught for some reason - this is acceptable, but must be stated by crossing out the lines in question. Please add sub items if you find the need for supplements, and comment items that is not relevant. *(This also for future revision/improvement of the logbook)*

Part 1: the "internal" (inside the perfusion department) instructions, which normally *(but not necessarily)* should be carried out by the supervisor or other perfusionists.
Part 2: the "external" instructions are primarily meant to be taught externally, not by perfusionists, but carried out by seniors from other professions, in own or other departments.

Part one:

Use this as a checklist For keeping track at progress

1. Basic perfusion techniques
2. Advanced perfusion techniques
3. Oxygenators
4. Laboratory equipment
5. Heater/cooler
6. Priming, fluid balance and blood saving techniques
7. Cardioplegia
8. Temperature regulation during CPB
9. Monitoring in CPB
10. Pediatric Cardiopulmonary Bypass
11. Assist devices / ECMO
12. Non-cardiovascular applications of ECC

1. BASIC PERFUSION TECHNIQUES

In connection with the practical training in perfusion techniques and the handling of the heart-lung machine, focus has been on the following, - supplemented by a formal instruction/ discussion - on basis of local equipment and procedures.

- The electricity safety system, location of fuses, emergency power system, etc. of the heart-lung machine
- Gas supply system
- Build-in monitors: pressures, level, bubble...
- Location of: Hand cranks, emergency lights, bottled oxygen
- Mounting of components, with regards to:
  a) Mechanical stability
  b) Clearness of setup
  c) Emergency change-outs
- Pump types and function. Occlusion setting. Tubing inserts
- Selection of types of CPB equipment
- Sterility and infection control. Barrier of sterility when assembling circuits and when handling pre-assembled circuits
- Component placement with special consideration to priming volume
- Circuit assembly and disassembly
- Open vs. closed system (hardshell vs. soft-shell reservoir)
- Air handling, prevention, detection and elimination
- Measurement of pressure gradients, flow etc.
- Blood sampling, determination of acid-base-status, electrolyte content etc. and analysis / interpretation of results.
- Anti-coagulation treatment and -control.
- Administration of blood products.
- Pre-bypass checklist
- Re-priming possibilities
- Residual volume handling: bag, wash-in
- Perfusion record

Instructor name and title: _____

Date:_____ Instructor signature: _____

2. ADVANCED PERFUSION TECHNIQUES

In connection with the practical training in perfusion techniques and the handling of the heart-lung machine, focus has been on the following, - supplemented by a formal instruction/ discussion - on basis of local equipment and procedures.

- Selection of tubing dimensions and catheters/ cannulas according to patient size.
- Maintenance of equipment, including sufficient cleaning and tests for functionality.
- Product traceability
- Evaluation of oxygenator function and performance
- Most frequently used medicines before, during and after CPB.
- Effects and side-effects of drugs
- Administration and practical handling of medicine
- Absorption of drugs in the extra-corporeal circuit materials
- Coatings used in the CPB setup (biological or chemical)
- Drainage techniques, siphon, and in particular:
- VAVD
  - Purpose, advantages, disadvantages, risks
  - Cannula and tubing for VAVD
  - Equipment, Vacuum-controller
  - Techniques, and safe handling of applied vacuum
- Left heart bypass
- Precautions concerning protection of the CNS
- Circulatory arrest.
- Selective cerebral perfusion; antegrade and retrograde
- Monitoring of cerebral and neurological physiological conditions before, during and after CPB

- **Protocol for emergency procedures** *(how, and where are things?)*
  - Oxygenator change-out
  - Hand cranking
  - Burst boot: priorities in emergency prime

(see also “perfusion complications” in the *Clinical Logbook*)
(selected special techniques will be found in the following pages)

Instructor name and title: _____

*Date:*_____ *Instructor signature:* _____

3. OXYGENATORS

In connection with the practical training in perfusion techniques and the general handling of the heart-lung machine, focus has been on the following, supplemented by a formal instruction/ discussion - on basis of local equipment and procedures.

- A thorough reading/instruction in types of oxygenators used in the department, especially:
  a) Blood flow passage and distribution
  b) Gas flow passage and distribution
  c) Water passage in the heat exchanger
  d) Construction principles
  e) Performance characteristics

- Study of instruction manuals for:
  a) Oxygenator mounting
  b) Tubing connection.
  c) Priming procedure.
  d) Settings and limitations
  e) Emergency change-out
  f) Testing for leakage
  g) Limitations

- Practical application and operation.
  a) Local procedures
  b) Comparison of practical performance with specifications.
  c) Practical handling.
  d) Precautions.

The student is familiar with local routines and precautions for the practical use of the oxygenator, and the manufacturer's instructions for use, - of the type:

_____

Instructor name and title: _____

*Date:*_____ *Instructor signature:* _____

4. LABORATORY EQUIPMENT in OR.

The student has been instructed in the department's:

1. Equipment used for analysis of blood gasses

2. Equipment used for anticoagulation monitoring
    - ACT
    - APTT
    - Thromboelastometry

- Correct analysis techniques, and interpretation of results
- Control of the accuracy of the measurement device
- Calibration of the equipment in the ward
- General service and maintenance of automatic analysis device
- Quality Control

Along with the confirmation of the student's participation, the main types of devices (including manufacturer) to which the student has been presented, must be listed.

Equipment: Manufacturer:

Instructor name and title: _____

*Date:*_____ *Instructor signature:* _____

5. HEATER-COOLER

Regarding the practical education in perfusion techniques and work related to the heart-lung machine, focus has been on the following, supplemented by a formal instruction/discussion - on basis of local equipment and procedures.

- Connection to the heater/cooler unit:
  a) Connection to electric circuit, fuses, etc.
  b) Power demand *(in relation to fuses)*
  c) Water fill technique, de-airing, emptying

- Reading of manufacturers' instructions as to function and construction type.

- Water circuit:
  a) Internal, chambers, valves.
  b) External, valves, clutches, tubing.
  c) Temperature measurement
  d) Water quality, hardness.

- Pumping systems:
  a) Number and type
  b) Pressure/ suction
  c) De-airing
  d) Efficiency

- Hygiene:
  a) Cleaning/cooking the water circuit
  b) Changing water
  c) Adding disinfectants?

- Maintenance:
  d) Decalcification
  e) Air filter
  f) Water overflow

Instructor name and title: _____

*Date:*_____ *Instructor signature:* _____

6. PRIMING, FLUID BALANCE - and blood saving techniques

In connection with practical perfusion techniques and participation in CPB, focus has been on the following, - supplemented by a formal instruction/discussion - on basis of local equipment and procedures.

- Collection of preoperative patient data, relating to kidney function and state of hydration.
- Control and calculation of volume balance during CPB.

- Liquid composition for priming
  a) Influence of pH in prime composition
  b) Osmolarity, ion balance
  c) Buffer capacity
  d) Blood prime, calculations for predicting hematocrit
  e) Medication in prime
  f) Cleanness, filtration

- Influence of priming and supplement liquids during CPB.
- Hemofiltration and ultrafiltration during CPB
- CPB in patients with kidney failure
- Use of Cell-Saver
- Autologous blood salvage
- Specifications and liquid status calculations for CPB and the remaining peri-operative period.
- Consequences of hyper-hydration, and importance of its prevention.

The student has achieved a thorough understanding and knowledge of local routines concerning liquid administration and liquid status calculations.

Instructor name and title: _____

*Date:*_____ *Instructor signature:* _____

7. CARDIOPLEGIA

In connection with the practical training in perfusion techniques and the work related to the heart-lung machine, focus has been on the following, supplemented by a formal instruction/discussion - on basis of local equipment and procedures.

- **Blood or crystalloid**

- Local setup and monitoring used to obtain cardioplegic condition of the myocardium.

- General concept
  a) Types of liquid and additives
  b) Treatment of infusate (filtration, oxygenation etc.)
  c) Amount - time - flow – pressure
  d) Temperature gradients
  e) In blood-cardioplegia: mixing rate and importance of occlusion setting

- Surface cooling of the heart

- Protocol for cardioplegia
  a) Infusion sequence
  b) Pausing
  c) Clinical evaluation
  d) Control arrangements
  e) Liquid and potassium account

- Adverse effects of cardioplegia
- Dangers and pitfalls

Instructor name and title: _____

*Date:*_____ *Instructor signature:* _____

8. TEMPERATURE REGULATION in CPB

During the practical execution of CPB the student has been taught the local routines for the following, supplemented by a formal instruction on basis of local procedures.

- Temperature adjustments of perfusate in relation to the priming of the extra-corporeal circuit.
- Temperature measurement points: V-line, A-line, esophagus, bladder, skin...
- Patient warming-blanket (water-blanket or "Bair-Hugger")
- Maintaining patient temperature, in normothermic cases
- HCU settings for optimizing performance
- When cooling the patient, - the temperature gradient limits at:
  a) Onset of CPB
  b) During cooling
  c) During rewarming
- Acceptable temperature settings of HCU related to target (min, max, and gradient to target)

- Acid-base management in relation to cooling-heating (not a lecture, just the local approach)
  - Alpha stat
  - pH stat

- Temperature-flow conditions
- Temperature choice for different perfusion conditions
- Pressure variations in the extracorporeal circuit - and the patient, at different temperatures
- Medication during hypothermia.
- Variations in monitor parameters during hypothermia

Circulatory arrest

- Procedure for going into arrest: open v-line, empty how much? Clamp A-line?
- Safe arrest-time and flow during hypothermia
- Re-establish perfusion: temperature, flow,
- Target temperature and measurement points for a "warm patient", - after circulatory arrest

Instructor name and title: _____

*Date:*_____ *Instructor signature:* _____

9. MONITORING

In-line monitoring during CPB - on basis of local equipment and procedures.

Parameters to measure: in HLM and in patient.
Target values, - in particular pO_2 and pCO_2
Oxygen delivery (GDP): DO_2, VO_2, ER.

Monitor equipment

- Locally used types of monitoring, including:
  a) Sensor principles and placement in the circuit
  b) Precision and deviations of the measured results
  c) Alarm limits

- Monitoring equipment safety and control
  a) Control of pressure transducers; Level, Zero and remote-Zero
  b) Procedures for calibration, - in vitro, - in vivo
  c) Calibration errors
  d) Product replacement criteria
  e) Alarm reset vs Off

In particular, the student has become familiar with bubble-detectors, level detectors, and pressure sensors.

Electrocardiography

- Interpretation of ECG signals
- ECG lead types: importance for the synchronization of external equipment
- Types of equipment using ECG:
  - monitor
  - defibrillator
  - IABP
  - demand pacer

Invasive blood pressure monitoring:

- MAP, SAP, PA, CVP, etc.
- Curve waveforms

Instructor name and title: _____

*Date:*_____ *Instructor signature:* _____

10. PAEDIATRIC CARDIOPULMONARY BYPASS

By participation in pediatric perfusion, the student has achieved knowledge of the following, supplemented by a formal instruction - on basis of local equipment and procedures.

- Differences between infants and adults:
  - volume distribution
  - metabolism
  - pulmonary function
  - cardiac function
  - blood composition

- Most common congenital disorders

- Calculations of Estimated Blood Flow, cannulas and catheter size

- Pediatric setup:
  - selection of components and tubing according to size and procedure
  - adequate equipment

- Pediatric prime

- Conduct of CPB in pediatrics

- Modified Ultra-Filtration, MUF.

- Cooling and arrest

- Special considerations

As stated in the "Clinical Logbook" this subject may have to be taught in another center/hospital, if pediatric procedures are not performed locally.

Instructor name and title: _____

*Date:*_____ *Instructor signature:* _____

11. ASSIST DEVICES (ECLS) - including ECMO (ECLA)

The student has achieved knowledge of devices assisting the circulatory or respiratory function - on basis of local equipment and procedures.

ECLS: Extra Corporeal Life Support

- IABP, Intra-Aortic Balloon Pumping
- Impeller pump
- VV-ECMO, ExtraCorporeal Membrane Oxygenation. For respiratory support
- Assist devices:
    - VA-ECMO. (CPS), for cardiac support
    - ECPR (VA-ECMO in Cardiac Arrest
    - VAD, Ventricular Assist Devices
    - Implantable artificial hearts
    - Right and left heart assist
    - Biventricular assist
- Rescue CPB (CPB outside operation ward, for the purpose of resuscitation)

If not all treatments are available, at least IABP, CPS and ECMO should be discussed.

As stated in the "Clinical Logbook" this subject may have to be taught in another center/hospital, if assist devices are not used locally.

Instructor name and title: _____

*Date:*_____ *Instructor signature:* _____

12. NON-CARDIOVASCULAR APPLICATIONS OF ECC

In relation to the practical training in perfusion techniques and the general work with the heart-lung machine, the following issues have been discussed - on basis of local equipment and procedures.

- Local types of non-cardiovascular procedures in which ECC is being used (if so)
  - Limb perfusion
  - Liver perfusion
  - LHBP. Left Heart Bypass in THAA.
  - PTEA (Pulmonary thrombendarteriectomy in patients with chronic lung embolism)
  - Accidental hypothermia

- Cannulation techniques

- Concept of organ perfusion

The student has been thoroughly informed about the basic principles concerning the above mentioned.
Later, special training will be demanded if any independent implementing of such perfusions is to take place.

If none of these treatments are available, the subjects should be treated and discussed theoretically with a perfusionist or a surgeon.

*Instructor name and title:*_____

*Date:*_____ *Instructor signature:*_____

INSTRUCTION LOGBOOK part 2 – "external"

The subjects in this part of the Instruction Logbook are meant to be taught externally from the perfusion departments.
Instructions should be performed by senior professionals from other departments in the home hospital, - or in other hospitals. They should take the form of a lesson, combined with a visit to the department of interest, - with a typical duration ranging from a couple of hours to a day.

The student should visit the department concerned, in order to get an impression of the work done there, supplemented by a formal instruction/lecture following the guideline below.
The supervisor is responsible for arranging the visit/ the lessons in collaboration with the department in question.
The instruction should be performed by the below mentioned specialists.
It is not sufficient that a perfusionist teaches these subjects.

Some of the lectures, especially the last mentioned on the list below, could be arranged as a general session with other staff from the hospital attending.

In case the student knows the subject exceptionally well beforehand, it might be excused to carry through the lesson. The reason must be stated at the relevant page, and signed for.

The two subjects in surgery must each consist of an informal lecture and a session scrubbed in and next to the operating surgeon during surgery. The first relative early in the training period, and the second preferably late, - like after one year.
Local conditions may make it acceptable to carry out the instruction in other ways than described here, in which case an explicatory comment must be made on the sheet.

Use this as a checklist For keeping track at progress

Subject	**Instructor**	**Department**
1.Heart surgery I	Heart surgeon	**Cardiac surgery**
2.Heart surgery II	Heart surgeon	**Cardiac surgery**
3.Hygiene and sterilization	Scrub nurse	**OR / Dept. of sterilization**
4.Clinical Biochemistry	Lab technician/chemist	**Dept. of Clinical Biochemistry**
5.Haematology	Lab technician/hematologist	**Blood bank /** Clinical Immunology
6.Medical equipment and electronics	Biomedical engineer	**Dept. of Biomedical Engineering**
7.Intensive care and treatment	Anesthetist /ICU-nurse	**ICU.**
8.Anaesthesia	Anesthetist / nurse-anaest.	**OR**
9.Invasive cardiology	Cardiologist	**Cardiology interventional lab.**
10.Law and documentation	Clinical/administrative chief	**Administration**

1. HEART SURGERY I – Coronary procedures, and heart surgery in general

Surgeon / OR.

The student has been informed about local routines for the surgical treatment of ischemic heart diseases and other operations on the myocardial wall, including the following:

- Preoperative examinations/ tests
- Preoperative medication
- Diagnostics and preoperative assessment of potential procedures
- The surgical procedure when using grafts from veins and arteries
- Surgery on the ventricle, for instance ventricular aneurisms
- Operations for arrhythmia (MAZE)
- Standards for cannulation, venting etc.
- Cardioplegia techniques, cannulation and administration
- Perfusion from the surgeon's point of view
- OPCAB procedure and perfusion emergency preparedness
- Perioperative control and diagnostics
- Use of antibiotics pre-, peri-, and post-operatively, and in connection with surgery in patients with a known previous or active infection
- Patients with immune depletion

Furthermore, the student has received information about related afflictions which influence the performance of CPB during emergency surgery, i.e. acute infarction and aneurism.
Focus should be kept on the aspects of highest importance to the conduct of perfusion.

The student has been taught the above mentioned by a senior surgeon, supplemented by **watching at least one coronary surgery procedure,** "scrubbed in" - next to, and under the guidance of the operating surgeon.

Procedure watched: _____

*Instructor name and title:*_____

*Date:*_____ *Instructor signature:*_____

2. HEART SURGERY II – valves, central vessels

Surgeon / OR

The student has been informed of local routines for the surgical treatment of heart valve diseases, including:

- Diagnostics and preoperative assessment of potential procedures
- The surgical routines for valve implantation, mechanical-, biological valve or homograft
- The surgical routines for valve preservation procedures
- Variations of surgical techniques concerning valve position – mitral, aortic, pulmonary and tricuspid
- Standard cannulation for different procedures, venting etc.
- Cardioplegia techniques for different procedures
- Perioperative control and diagnosis
- Postoperative medical treatment following valve implantation
- Special cases, e.g. endocarditis, embolism and re-do.

The student has been informed of local routines in the surgical treatment of diseases in the great central vessels, including:

- Thoracic aortic aneurisms
- Aneurisms of the descending aorta. Need for circulatory arrest
- Aneurisms of the ascending aorta (composite graft)
- Surgery on the v. cava
- Heart transplantation
- Acute lung embolism
- Chronic lung embolism (PTEA procedure)

The student has been taught the above mentioned by a senior surgeon, supplemented by watching **one valve operation**, "scrubbed in", next to and under the guidance of the operating surgeon.
It can be accepted that the student only participate in one case, including the above, #1. Still the local procedures must be teached as stated for both #1 and #2.

Procedure watched: _____

*Instructor name and title:*_____

*Date:*_____ *Instructor signature:*_____

3. HYGIENE AND STERILISATION

Sterility and behavior at the OR

Information about local rules and conditions concerning cleaning and hygiene:

- Rules for traffic of persons and equipment in and out of treatment rooms
- Handling of utensils
- Surgical hand scrub. Rules for use of gloves, face mask and cap.
- Disinfectants
- Protection against risks of infection for patients; rules and consequences

Handling of potentially infected patients

- Steps which may prevent the spreading of bacteria, fungi and vira in relation to other patients and to the staff
- How to handle potential and actual infections from patient to staff
- Patients with active infections, low and high-risk conditions

Practical training surgical hand scrub, and use of coat, gloves, face mask and cap.

Information about local possibilities of sterilization and their procedures, including:

- Local types of sterilization
- Logistics in connection with central sterilization units
- Validation and control – routines locally
- Re-sterilization, general rules and procedures
- Local rules of marking
- Entry control and delivery of sterile products
- Overall handling of, and responsibility concerning sterile utensils

This subject may be supplemented with a short visit to the central sterilization units, and/or demonstration of sterilization equipment.

Waste handling

- Logistics in waste handling
- Security and environment

*The instruction has taken place in department:*_____

*Instructor name and title:*_____

*Date:*_____ *Instructor signature:*_____

4. CLINICAL BIOCHEMISTRY

Clinical Biochemical Laboratory

It is optional if this instruction is arranged as a visit to the laboratory.
An alternative could be a talk to a lab technician, that is related to the department

Practical and theoretical relations concerning the following, have been discussed:

- Organization of the laboratory. Routines and emergency preparedness.
- Main methods of blood analysis
- Blood sampling from patients via catheters and by puncture, arterial and venous
- Logistic Routines in connection with blood sampling, analysis and general result announcement, especially to operation rooms and intensive care units
- Types of analysis and the extent of their use, especially concerning heart patients. Examples: TEG, Coagulation status etc.
- Information about analysis- and quality assurance of accuracy of measurement, especially concerning analysis of acid-base status and electrolytes

*The instruction has taken place in department:*_____

*Instructor name and title:*_____

*Date:*_____ *Instructor signature:*_____

5. HAEMATOLOGY

Visit to the Blood Bank

By following the path of banked blood, during **a visit to the local blood bank** /department of Clinical Immunology or hematological laboratory, the student has received information about and has obtained practical insight into the following subjects:

- Types of blood products available
- Logistics concerning drawing, labelling, storage, and delivery of different types of blood products
- Practical considerations concerning donors
- Testing of blood
- Treatment of blood
- Procedure for administering blood products

It should in particular be discussed how blood products should be treated and stored in the treatment wards, along with safety precautions and id-control.

Furthermore, security and quality control with regards to autologous pre-donation should be discussed.

*The instruction has taken place in department:*_____

*Instructor name and title:*_____

*Date:*_____ *Instructor signature:*_____

6. Medical equipment and electronics

Visit to the Department of Biomedical Engineering

Information on local safety control routines with regards to purchase, testing, service and use of equipment, including the following:

The power supply systems of the hospital:

- Power supply at the hospital in general
- Emergency power-supply
- Super emergency power supply (battery back-up) UPS.
- Marking of plug-and-socket connections

Safety in medical equipment/devices:

- Classification and electric specifications of medico-technical equipment
- Requirements from national authorities and the EU
- Marking of equipment. CE and others
- Instruction requirements. Manuals and directions for use
- Electrical overload. fuses, etc.

Maintenance of HLM and other perfusion equipment

- Scheduled service and safety testing
- If possible, a part of HLM service should be seen. Including disassembly of pumps etc.

Logistics:

- Day-to-day contact to the Department of Biomedical Engineering
- Procedures for service, repair and fault finding

*The instruction has taken place in department:*_____

*Instructor name and title:*_____

*Date:*_____ *Instructor signature:*_____

7. INTENSIVE CARE AND TREATMENT

ICU. Visit to the Thoracic Intensive Care Unit

The student has received insight into this part of the patient treatment course by observing the work routines regarding the post-operative monitoring, care, and treatment of heart-surgery patients in the intensive care unit.

The information has included the following:

- Standard monitoring, post-operatively
- Post-operative nursing and hygiene
- Prophylactic treatment
- Liquid and volume therapy
- Pharmacological therapy
- Mechanical ventilation / respirator treatment
- Temperature regulation /monitoring (temperature afterdrop)
- Monitoring and treatment of post-operative complications

- ECG-monitoring and interpretation

- Hemodialysis in the pre- and postoperative patient
  - indications and procedure
- Peritoneal dialysis in the postoperative patient
- Postoperative hemodialysis, e.g. CVVHD
- Ethics in the intensive care unit
- Patient course in the ward and after discharge

*The instruction has taken place in department:*_____

*Instructor name and title:*_____

*Date:*_____ *Instructor signature:*_____

8. ANAESTHESIA

The student has been informed, of an anesthetic nurse or doctor, about the anesthesiologic routines in regard to treatment of heart surgery patients, preferably **by following the anesthesia procedures in the OR:**

- Pre-operative parameters with relation to anesthesia, ventilation and CPB
- Monitoring level, related to the type of procedure and patient status
- Choice of anesthesia procedure and combination of anesthetics
- Interplay of extra-corporeal circulation and anesthesiologic procedures
- The meaning of pre- and afterload in relation to the patient's heart disease
- Pace-maker / ICD with regards to heart surgery
- Epidural analgesia for heart surgery
- Dosage of medicine and liquids
- Types of medicine and their effect, especially in the regulation of:
  a) Arterial pressure
  b) Volume and flow distribution
  c) Coagulation status
- Treatment possibilities for patients with circulatory failure
  a) Before CPB
  b) During CPB (e.g. lack of tonus)
  c) In regard to weaning from bypass
- Supply connections and settings of the mechanical ventilator
- Mechanical ventilation therapy before, during, and after CPB
- Haemo-dynamic influences of mechanical ventilation
- Choice of combination of ventilation gases in regard to CPB
- Anesthesia administered via the CPB circuit (gaseous or IV)

*The instruction has taken place in department:*_____

*Instructor name and title:*_____

*Date:*_____ *Instructor signature:*_____

9. INVASIVE CARDIOLOGY – treatment and diagnostics

Cardiology interventional lab.

During a visit to the **laboratory of interventional cardiology** (preferably), cardiology ward, or outpatient department alternatively, the student should receive information about relevant cardiological issues, principally in patients with potential need for surgical treatment.

- Introduction to typical diagnoses and medical treatments
- Non-invasive diagnostics (image making techniques, stress tests etc.)
- Invasive diagnostics, and Interpretation of:
    - Angiography
    - Left heart catheterization: CAG, pressure and flow
    - Right heart catheterization: pressure and flow
- Invasive treatments (PCI, stents)
- Structural interventions (if possible) such as TAVI, Mitraclip, Tendyne, Triclip
- Closure devices (both arterial and venous)
- Pericardiocentesis (both apical and xiphoideus punction)
- DAPT in cathlab (intravenous options)
- Emergency procedures (rescue/primary PCI)
- Patients with Cardiogenic Shock

Echocardiography and ultrasound techniques should be discussed systematically.
The student should watch the in-vivo use of the technique and interpretation of images

Preferably, the student should witness a coronary angiography and stenting.

- Local routines for the treatment of peri-operative arrhythmias, including:
    a) Pharmacological approach
    b) DC conversion
    c) Temporary pacemaker treatment
    d) Myocardial electrodes

*The instruction has taken place in department:*_____

*Instructor name and title:*_____

*Date:*_____ *Instructor signature:*_____

10. LAW, RESEARCH AND DOCUMENTATION

The administrative leader has instructed the student in the formal rules for general practice, including rules of professional secrecy, accidents, errors and complaints.

The scientific leader has instructed the student in the rules for documentation and research

Generally:

- National and local laws and regulations for the clinical practice
- Local distribution of responsibility between the hospital, the administration, scientific chief, chief of department, medical doctor and the perfusionist

Accidents and errors:

- Patient complaint system.
- Legal situation in case of accidents and patient complaints.
- Obligation to report accidents and near-accidents
- Procedures and chain-of-command for reporting own errors, - or errors made by third persons

Information and documentation:

- Professional secrecy – confidentiality and limitations in freedom of speech.
- Handling of the public and the media
- Demands and rules for documentation and record keeping
- Rules for databases

Research:

- Local and national regulations regarding research, storage of research data and publication.
- Ethical committee - rules. Who decide if it's necessary to apply?
- Identification of persons responsible for clinical and experimental research.
- Financial and human resources for research/documentation purposes at the hospital and at the university. Including database/library resources.
- Rules for seeking external financial support for research and scientific meetings.

*The instruction has taken place in department:*_____

*Instructor name and title:*_____

*Date:*_____ *Instructor signature:*_____

EBCP scoring sheet for practical examination

The European Board of Cardiovascular Perfusion

Practical Examination for
EUROPEAN CERTIFICATE IN CARDIOVASCULAR PERFUSION (ECCP)

Name of Examination Candidate: _____Date:

Name of Examiner: _____

Sub-skill	*Score*	*Comments*
Patient Evaluation		
1) Review of patient chart		
2) Check lab/Cath. lab results		
Equipment Selection		
3) Hardware		
4) Disposable		
5) Ancillary		
Set Up and priming		
6) Sterility		
7) Speed		
8) Adherence in-house protocol		
9) Check list		
Management during Procedure		
10) Initiation of bypass		
11) Awareness of patient parameters		
12) Response to changes in patient parameters		
13) Special technics		
- Hemofiltration/MUF/dialysis		
- Myocardial Protection		
- Cerebral perfusion		
- DHCA		
14) Response to changing technical parameters		
15) Contingency Planning		
16) Termination of procedure		
17) Record keeping		
Post Procedure		
18) Awareness		
19) Disassembly		
20) Prepare for next case		
21) Equipment failure and urgent conditions management		
Personal		
22) Demonstrates communicative skills		
23) Demonstrates team skills		
Final Practical Mean Score: **(total of scores)** / **(number of scored activities)**		Any activities receiving grades lower than 5,0 must be commented upon. The Final Mean Practical Score is to be entered on Final Scoring.

Evaluation form *Checklist for evaluation and planning.*

This form is not a part of the logbook to be delivered to the school. It is to be used as a suggestive outline for evaluation and planning, - for internal use in hospital

Clinical performance - periodical evaluation

- Progress in Clinical log
- Progress in Instruction log
- Student's view of own capabilities
- Supervisor's view

Mental welfare and performance - periodical evaluation

- Level of interest, motivation, confidence, reliability and sense of responsibility
- Collaboration, attitude, appearance, team working abilities, and stress coping
- Communication: verbal and in writing
- Job satisfaction and work climate. Coping with work conditions, working hours etc.

Checklist for planning and setting of objectives

- Priorities in clinical training
- Planning of internal and external instruction and visits to other departments *(instruction log)*
- Who is responsible for what?

The form below is meant as a guideline for the conversations and should be supplemented by separate sheets for each conversation.

Nº	date	clinically	mentally	objectives
1				
2				
3				
4				
5				
6				
7				

Approval sheet

(to be submitted with the logbook at the end of the education)
Please fill out the data in the first 3 lines of the sheet

Name of student: _____

Name of principal supervisor: _____

Chief perfusionist/chief of department:_____

Exchange Hospital: _____number of days:_____

Time:_____Signature: _____
I hereby certify that 10 days of exchange of practical training have taken place

Supplementary exchange: _____

Supervisor signature: _____
I hereby consider this logbook fulfilled, and the training completed as stated in p.15

▽▽▽▽▽▽▽▽▽▽▽▽▽▽▽▽▽▽▽ ***From here to be filled out by the school*** ▽▽▽▽▽▽▽▽▽▽▽▽▽▽▽▽▽▽▽

Approval from the SCANSCAT:

First status check (Module 2): _____
date

Second status check (M-3): _____
date

Third status check (practical examination): _____
date

Final approval SCANSCAT: _____
date

Documentation for 100 perfusions accepted:_____

Department and student data

To be delivered at first module of the master education. First part to be filled out by the student ∇∇∇

Student:_____Age:_____

Home hospital:_____

e-mail:_____ Second e-mail:_____

Date of appointment:_____ Number of CPB witnessed before starting school:_____

Background Education/employment: _____

Supervisor:_____Mail:_____

Chief Perfusionist:_____Mail:_____
(Perfusionist-leader of dept, if any. If not, please state a secondary supervisor)

Medical Chief of Dept:_____Mail:_____

DEPARTMENT DATA *(approx.numbers, Brand - or Yes/No)*

Number of adult CPB/year:_____ Number of pediatric cases:_____

ECMO/ECLA/CPS/ECLS:_____ Number of IABPs:____ VAD:_____

Blood Cardioplegia? _____ VAVD?_____ Electronic Data sampling?_____

Centrifugal pump in HLM? _____ In-line Bloodgas monitor?_____

∇∇∇∇∇∇∇∇∇∇∇∇∇∇∇∇∇∇ ***From here to be filled out by the school*** ∇∇∇∇∇∇∇∇∇∇∇∇∇∇∇∇∇∇

Logbook Status.

Employed full time? Supervisors?

	Clinical Logbook				**Instruction Logbook**			**# Perf.**
Module	Std.tech.	Cases	Complic.		Part 1	Part 2		performed
M1								
M2								
M3								
P.Examn								

Exchange hospital: _____ From:_____ Until:_____

Preferred time for practical exam:_____