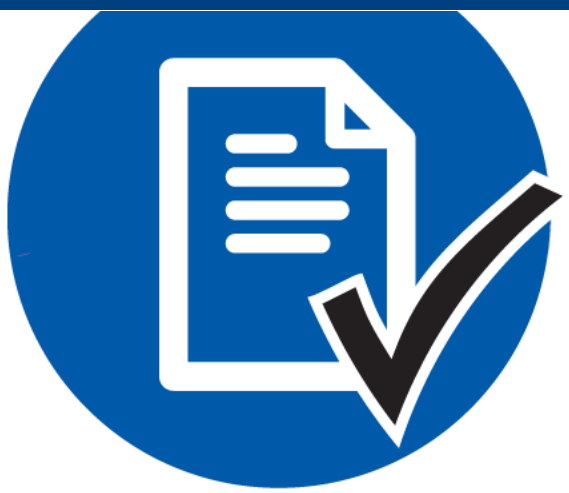
COLLEGE of AMERICAN PATHOLOGISTS

Master

Reproductive Laboratory Checklist

CAP Accreditation Program



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Reproductive Laboratory Checklist

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ON-LINE CHECKLIST AVAILABILITY AND RESOURCES

Participants of the CAP accreditation programs may download the checklists from the CAP website (cap.org) by logging into e-*LAB* Solutions Suite. They are available in different checklist types and formatting options, including:

- Master — contains ALL of the requirements and instructions available in PDF, Word/XML or Excel formats
- Custom — customized based on the laboratory's activity (test) menu; available in PDF, Word/XML or Excel formats
- Changes Only — contains only those requirements with significant changes since the previous checklist edition in a track changes format to show the differences; in PDF version only. Requirements that have been moved or merged appear in a table at the end of the file.

A repository of questions and answers and other resources is also available in e-LAB Solutions Suite under Accreditation Resources, Checklist Requirement Q & A.

SUMMARY OF CHECKLIST EDITION CHANGES
Reproductive Laboratory Checklist
09/22/2021 Edition

The information below includes a listing of checklist requirements with significant changes in the current edition and previous edition of this checklist. The list is separated into three categories:

1. New
2. Revised:
   - Modifications that may require a change in policy, procedure, or process for continued compliance; or
   - A change to the Phase
3. Deleted/Moved/Merged:
   - Deleted
   - Moved — Relocation of a requirement into a different checklist (requirements that have been resequenced within the same checklist are not listed)
   - Merged — The combining of similar requirements

NOTE: The requirements listed below are from the Master version of the checklist. The customized checklist version created for on-site inspections and self-evaluations may not list all of these requirements.

NEW Checklist Requirements

Requirement	Effective Date
RLM.00950	06/04/2020
RLM.03952	09/22/2021
RLM.03953	09/22/2021

REVISED Checklist Requirements

Requirement	Effective Date
RLM.03915	06/04/2020
RLM.03935	09/22/2021
RLM.03940	09/22/2021
RLM.03944	09/22/2021
RLM.03950	09/22/2021
RLM.08700	06/04/2020
RLM.10254	09/22/2021

RLM.10255	09/22/2021
RLM.10832	09/22/2021

DELETED/MOVED/MERGED Checklist Requirements

Requirement	Effective Date
RLM.06450	06/03/2020

INTRODUCTION

This checklist is used in conjunction with the All Common and Laboratory General Checklists to inspect a reproductive laboratory.

Laboratories not subject to US regulations: *Checklist requirements apply to all laboratories unless a specific disclaimer of exclusion is stated in the checklist. When the phrase "FDA-cleared/approved test (or assay)" is used within the checklist, it also applies to tests approved by an internationally recognized regulatory authority (eg, CE-marking).*

Checklist requirements for laboratory director, supervisory personnel, and testing personnel vary depending on the type of testing or services performed. The following table includes information to identify appropriate requirements for inspecting personnel qualifications.

Checklist Requirements for Personnel Qualifications

Position	Checklist Requirement	Type of Testing/Services
Andrology and other CLIA-related Testing		
Laboratory Director	DRA.10100	All Andrology and CLIA-related Testing
Section Director/Technical Supervisor	GEN.53400	High Complexity Testing
General Supervisor	GEN.53600	High Complexity Testing
Technical Consultant	GEN.53625	Moderate Complexity Testing
Clinical Consultant	GEN.53650	Moderate & High Complexity Testing
Testing Personnel	GEN.54750	Moderate & High Complexity Testing
Embryology		
Embryology Laboratory Director	RLM.10166	Assisted Reproductive Technology Procedures
Embryology Supervisor	RLM.10265	Assisted Reproductive Technology Procedures
Embryology Laboratory Personnel	RLM.10250	Assisted Reproductive Technology Procedures

ANDROLOGY AND EMBRYOLOGY

QUALITY MANAGEMENT

GENERAL ISSUES

Inspector Instructions:

	• Records for the monitoring of the misidentification risk for gametes and embryos
	• Processes used to reduce the risk of misidentification of gametes and embryos
	• How does your laboratory monitor embryology clinical outcomes? • Describe the processes your laboratory uses to reduce the risk of gamete and embryo misidentification.

*****NEW** 06/04/2020***

RLM.00950 Misidentification Risk **Phase II**

The facility has a system to reduce the risk of misidentification of gametes and embryos during all critical procedural steps and monitors the effectiveness of the system implemented.

NOTE: Misidentification can occur at the time of collection, receipt, processing, insemination, storage, thawing, and transfer of gametes and embryos.

The laboratory is expected to have implemented a plan to reduce these risks using a risk-reduction system. Laboratories may consider the following options to mitigate risk:

- *Use of a second person verification step or an electronic identification verification system to confirm proper identification at all critical stages in the process*
- *Other approaches (eg, color coding systems) defined by the laboratory capable of reducing the risk of misidentification*

The laboratory may also consider improvements in procedures and/or educational efforts as part of its program to reduce the risk of misidentification.

REFERENCES

1) Glew AM, Hoha K, Graves J, et al. Radio frequency identity tags 'RFID' for electronic witnessing of IVF laboratory procedures. *Fertil Steril.* 2006;86(3):S170.
2) Thornhill AR, Brunetti XO, Bird S, et al. Reducing human error in IVF with electronic witnessing. *Fertil Steril.* 2011;96(3):S179.
3) Kennedy C, Mortimer D (2007) Risk management in IVF. *Best Pract Res Clin Obstet Gynaecol.* 2007;21(4):691-712.
4) Rienzi L, Bariani F, Dalla Zorza M, et al. Italian Society of Embryology, Reproduction and Research (SIERR), Italy, Comprehensive protocol of traceability during IVF: the result of a multicentre failure mode and effect analysis. *Human Reproduction.* 2017;32(8):1612-20.
5) Reinzi L, Bariani F, Dalla Zorza M, et. al. Failure mode and effects analysis of witnessing protocols for ensuring traceability during IVF. Reproductive Biomedicine Online; 2015;31(4):516-22.

6) de los Santos MJ, Ruiz A. Protocols for tracking and witnessing samples and patients in assisted reproductive technology. *Fertil Steril.* 2013;100(6):1499-502.

RLM.01000 Unusual Laboratory Events — Phase I

There is a written policy for reporting unusual or abnormal events to the supervisor, laboratory director, or physician.

REFERENCES
1) Quality and Risk Management in the IVF Laboratory, David Mortimer and Sharon T. Mortimer, Cambridge University Press, 2005.

RLM.01200 Monthly QC Review — Phase II

Quality control data are reviewed and assessed at least monthly by the laboratory director or designee.

NOTE: The review of quality control data must be recorded and include follow-up for outliers, trends, or omissions that were not previously addressed.

The QC data for tests performed less frequently than once per month should be reviewed when the tests are performed.

Evidence of Compliance:

- ✓ Records of QC review with follow-up for outliers, trends, or omissions

REFERENCES
1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59
2) Department of Health and Human Services, Centers for Medicare and Medicaid Services. Clinical laboratory improvement amendments of 1988; final rule. *Fed Register*. 2003(Jan 24):7166 [42CFR493.1254]
3) Mortimer D. Practical laboratory andrology. New York, NY: Oxford University Press. 1992

RLM.01250 Clinical Outcome Review — Phase II

The laboratory at least annually reviews embryology clinical outcome in relation to all data collected.

NOTE: The laboratory must keep statistical records and review the clinical outcome in relation to this data. The frequency of these reviews should be appropriate to the size of the laboratory and the number of patient cycles, but must be recorded at least annually.

Evidence of Compliance:

- ✓ Records of statistical data **AND**
- ✓ Records of data review by the laboratory director, designee or QM committee

REFERENCES
1) Gerrity M. Quality control and laboratory monitoring. In: Human in vitro fertilization and embryo transfer. DP Wolf (ed). New York, NY: Plenum Press, 1988;25-45
2) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59

REQUISITIONS, SPECIMEN RECEIPT, AND RESULTS REPORTING

Inspector Instructions:

	• Sampling of specimen collection and handling policies and procedures • Sampling of patient records for all necessary collection information • Patient instructions • Sampling of patient reports
	• Posted collection instructions
	• What is your course of action when you receive unacceptable specimens?

RLM.01800 Specimen Collection/Handling **Phase I**

There are written patient instructions for collection and prompt delivery of a semen sample to the laboratory.

NOTE: Patients must be provided with specific instructions for collection and prompt delivery of a semen sample to the laboratory. This should be written in simple terms in a language readily understood by the patient. Elements should include the need to abstain from ejaculation for 2-7 days before collection of the specimen, avoidance of lubricants and other contamination, completeness of collection, use of the supplied container, maintenance of sample temperature, and prompt delivery. Instructions must be posted in the collection room. Collection instructions should be distributed to off-site physician offices that refer specimens.

RLM.02000 Specimen Collection/Handling **Phase I**

Semen specimens are accompanied by the following collection information, and records are retained on the following.

1. **Method of collection**
2. **Type of specimen container**
3. **Days of abstinence**
4. **Collection or transport problems (eg, incomplete specimen, exposure to temperature extremes)**
5. **Time of specimen receipt and analysis**
6. **Identity of patient was confirmed and by whom**

REFERENCES
1) WHO laboratory manual for the examination and processing of human semen, most recent editions (ie, fourth edition 1999 and fifth edition 2010). New York, NY: Cambridge University Press
2) Mortimer D. Practical laboratory andrology. New York, NY: Oxford University Press, 1994

RLM.02100 Liquefaction **Phase I**

All semen specimens are given sufficient time for liquefaction before testing.

Evidence of Compliance:

✓ Written policy defining criteria for liquefaction

REFERENCES
1) WHO laboratory manual for the examination and processing of human semen, most recent editions (ie, fourth edition 1999 and fifth edition 2010). New York, NY: Cambridge University Press
2) Mortimer D. Practical laboratory andrology. New York, NY: Oxford University Press, 1994

RLM.02200 Specimen Handling - Pre-analytic **Phase I**

Semen specimens are mixed thoroughly before testing.

REFERENCES
1) WHO laboratory manual for the examination and processing of human semen, most recent editions (ie, fourth edition 1999 and fifth edition 2010). New York, NY: Cambridge University Press
2) Mortimer D. Practical laboratory andrology. New York, NY: Oxford University Press, 1994

RLM.02300 Specimen Characteristics - Analytic **Phase I**

All characteristics of the semen specimens are noted and reported (eg, gelatinous clumps, viscosity, contaminants, erythrocytes, abnormalities of liquefaction).

NOTE: Macroscopic and microscopic characteristics of the semen specimens must be noted and reported, in accordance with the WHO laboratory manual for the examination and processing of human semen (ie, fourth or fifth edition).

Evidence of Compliance:

✓ Written policy defining characteristics to be included in the report

REFERENCES
1) WHO laboratory manual for the examination and processing of human semen, most recent editions (ie, fourth edition 1999 and fifth edition 2010). New York, NY: Cambridge University Press
2) Mortimer D. Practical laboratory andrology. New York, NY: Oxford University Press, 1994

RLM.02400 Reporting **Phase II**

Patient results are reported in a legible, easy-to-interpret format that clearly delineates the clinical significance of the results.

GENERAL QUALITY CONTROL

Inspector Instructions:

	• Sampling of quality control policies and procedures • Sampling of QC records
	• How do you determine when quality control is unacceptable and when corrective actions are needed?

- Review a sampling of QC data over the previous two-year period. Select several occurrences in which QC is out of range and follow records to determine if the steps taken follow the laboratory procedure for corrective action

RLM.02800 QC **Phase II**

For qualitative tests, a positive and negative control is included with each run of patient specimens.

Evidence of Compliance:

✓ QC records showing positive and negative control results

REFERENCES

1) Department of Health and Human Services, Centers for Medicare and Medicaid Services. Clinical laboratory improvement amendments of 1988; final rule. *Fed Register.* 2003(Jan 24):7166 [42CFR493. 1256(d)(3)(ii)]

RLM.02900 QC Handling **Phase II**

Control specimens are tested in the same manner and by the same personnel as patient samples.

NOTE: QC specimens must be analyzed by personnel who routinely perform patient/client testing - this does not imply that each operator must perform QC daily, so long as each instrument and/ or test system has QC performed at required frequencies, and all analysts participate in QC on a regular basis. To the extent possible, all steps of the testing process must be controlled.

Evidence of Compliance:

✓ Records reflecting that QC is run by the same personnel performing patient testing

REFERENCES

1) Department of Health and Human Services, Centers for Medicare and Medicaid Services. Clinical laboratory improvement amendments of 1988; final rule. *Fed Register.* 2003(Jan 24):7166 [42CFR493. 1256(d)(8)]

RLM.02950 Alternative Control Procedures **Phase II**

If the laboratory performs test procedures for which control materials are not commercially available, there are written procedures for an alternative mechanism to detect immediate errors and monitor test system performance over time. The performance of alternative control procedures must be recorded.

NOTE: "Performance" includes elements of accuracy, precision, and clinical discriminating power. Examples of alternative procedures may include split sample testing with another method or with another laboratory, the testing of previously tested patient specimens in duplicate, testing of patient specimens in duplicate, or other defined processes approved by the laboratory director.

Evidence of Compliance:

✓ Written procedures for alternative quality control **AND**

✓ Records of alternative control procedures

REFERENCES

1) Department of Health and Human Services, Centers for Medicare and Medicaid Services. Clinical laboratory improvement amendments of 1988; final rule. *Fed Register*. 2003(Jan 24): [42CFR493.1256(h)].

RLM.03000 QC Confirmation of Acceptability **Phase II**

The results of controls are reviewed for acceptability before reporting results.

Evidence of Compliance:

- ✓ Written policy stating that controls are reviewed and acceptable prior to reporting patient results **AND**
- ✓ Records of control result approval

REFERENCES

1) Department of Health and Human Services, Centers for Medicare and Medicaid Services. Clinical laboratory improvement amendments of 1988; final rule. *Fed Register.* 2003(Jan 24):7166 [42CFR493. 1256(f)]

RLM.03100 QC Data **Phase II**

Quality control data are organized and presented so they can be evaluated daily by the technical staff to detect problems, trends, etc.

REFERENCES

1) Clinical and Laboratory Standards Institute (CLSI). *Statistical Quality Control for Quantitative Measurement Procedures: Principles and Definitions; Approved Guideline.* 4th ed. CLSI document C24-ED4. Clinical and Laboratory Standards Institute, Wayne, PA, 2016.

RLM.03125 QC Corrective Action **Phase II**

There is a record of corrective action when control results exceed defined acceptability limits.

NOTE: Patient test results obtained in an analytically unacceptable test run or since the last acceptable test run must be re-evaluated to determine if there is a significant clinical difference in patient/client results. Re-evaluation may or may not include re-testing samples, depending on the circumstances.

REFERENCES

1) Department of Health and Human Services, Centers for Medicare and Medicaid Services. Clinical laboratory improvement amendments of 1988; final rule. *Fed Register.* 2003(Oct 1):1046[42CFR493.1282(b)(2)]

REAGENTS AND SUPPLIES

Additional requirements are found in the REAGENTS section of the All Common Checklist.

Inspector Instructions:

	• Sampling of test procedures for reagent and supply handling (including media and supplement preparation/modification) • Sampling of in-house media and supplement QC records and manufacturer's QC records
	• Sampling of media and supplements (expiration date, condition, contamination) • Appropriate environment for media preparation
	• How does your laboratory evaluate the quality of contact material? • What is your course of action when media does not meet QC requirements?
	• Follow a shipment of new media from receipt, examination and QC (if applicable). Determine if practice follows laboratory procedure.

RLM.03480 FDA-Cleared/Approved Reagents and Supplies **Phase II**

Whenever available, reagents and supplies used in the collection, processing and cryopreservation of gametes and/or embryos are cleared/approved by FDA for human use.

NOTE: The use of reagents or supplies that are not FDA-cleared/approved must be either approved by the institution's Institutional Review Board as part of a trial, covered under an investigational new drug or device exemption, or previously validated in the scientific literature.

Evidence of Compliance:

- ✓ Written procedure for the internal review and approval of non-FDA-cleared/approved reagents and supplies **AND**
- ✓ Records showing FDA approval of reagents and supplies, as applicable **AND**
- ✓ Records for the internal review of non-FDA-cleared/approved reagents and supplies, as applicable

REFERENCES

1) U.S Department of Health and Human Services, Food and Drug Administration https://www.fda.gov/vaccines-blood-biologics/tissue-tissue-products

RLM.03500 Media and Supplement Preparation/Modification **Phase II**

There are written procedures for media and supplement preparation and modification.

NOTE: Preparation and modification must be performed with sterile technique, in a location and environment appropriate for media preparation. The laboratory has a responsibility for ensuring that any media purchased, prepared or modified is sterile and capable of supporting culture of gametes and embryos.

REFERENCES

1) Jones HW, *et al.* In vitro fertilization. Baltimore, MD: Williams and Wilkins, 1986;178

RLM.03600 Media and Supplement Storage **Phase II**

There are written criteria for media and supplement storage conditions and expiration.

REFERENCES
1) Jones HW, *et al.* In vitro fertilization. Baltimore, MD: Williams and Wilkins, 1986;178

RLM.03700 Media and Supplement QC **Phase II**

The laboratory has a written procedure for quality control of media and supplements, with records of quality control testing for each lot and shipment.

NOTE: Media and supplements must be sterile and able to support the viability of gametes and/ or the growth of embryos. They must be evaluated using a bioassay system such as the one or two cell mouse embryo culture assay or a sperm motility assay and be used within the expiration date.

The laboratory must have records of on-site quality control testing for media and supplements prepared by the laboratory.

For purchased media and supplements, laboratories may retain records of quality control testing using an appropriate bioassay system provided by the manufacturer in lieu of on-site testing. The quality control procedure must include a process to evaluate the acceptability of the media upon receipt in the laboratory (eg, temperature, visual inspection).

The combining of two pre-tested ingredients does not require additional quality control testing by the laboratory, as long as the materials are being used as defined by the manufacturer.

REFERENCES
1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59

RLM.03800 Contact Material QC **Phase II**

The laboratory has a written procedure for quality control of contact materials using a bioassay, with records of the quality control testing for each type of contact material prior to use by the laboratory.

NOTE: Contact material that is not tested by the manufacturer must be initially tested and then re-tested:

1. *When the manufacturer makes a change in the product or its manufacturing process and*
2. *Annually if there have been no known changes.*

Laboratories may retain records of quality control testing with an appropriate bioassay system provided by the manufacturer in lieu of on-site testing.

REFERENCES
1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59

RLM.03900 Reagent and Supply QC Corrective Action **Phase II**

There is evidence of corrective action when quality control of reagents and supplies do not meet defined criteria for acceptability.

REFERENCES
1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59

INSTRUMENTS AND EQUIPMENT

The checklist requirements in this section must be used in conjunction with the requirements in the All Common Checklist relating to instruments and equipment.

Inspector Instructions:

	• Sampling of written procedures for monitoring liquid nitrogen storage and responding to alarms • Sampling of records for liquid nitrogen monitoring • Sampling of alarm monitoring records • Sampling of incubator monitoring records for gas concentration • Records of staff training on alarm response
	• Liquid nitrogen storage unit visual inspection (condensation, frost, cracks, rusting, damage to the outer layer) and process to monitor LN2 level • Functionality of active alarm system(s) for all storage units • LN2 supply tanks stored securely • Incubator for system to protect from gas failure
	• What is your laboratory's course of action when equipment failure occurs? • What back-up options are available in the event of an electrical power outage? • How does your laboratory monitor sterilizing devices? • How is the alarm system monitored when the laboratory is closed?

RLM.03910 Gas Mixtures **Phase II**

There are written criteria for use of gas mixtures.

REFERENCES
1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59
2) Veeck LL, Maloney M. Insemination and fertilization. In: In vitro fertilization. Norfolk HW, et al (eds). Baltimore, MD: Williams and Wilkins, 1986;178-200

*****REVISED** 06/04/2020***

RLM.03915 Incubator Gas Concentrations **Phase II**

Incubator gas concentrations are checked and recorded using one of the following processes as defined in the written procedure:

- **Measurement of gas concentrations each day of use**
- **Monitoring and recording pH checks each day of use**
- **Retention of the manufacturer's certificate of analysis for laboratories purchasing premixed gas.**

NOTE: It is acceptable to monitor and record gas concentrations from digital readouts; however, the laboratory must verify that the readout is accurate initially, at least monthly, and as recommended by the manufacturer. Laboratories using media with phenol may also wish to monitor media for changes in color as an additional process to confirm continued accuracy of the digital readout.

For monitoring of gas concentrations each day of use, gas concentrations may be recorded either manually or using a recording device or system by: 1) recording the numerical value, or

2) placing a mark on a graph that corresponds to a numerical value. If gas concentrations are recorded manually, the identity of the individual recording the value must be recorded (initials of the individual are adequate).

If an automated (including remote) gas concentration monitoring system is used instead of manual monitoring, laboratory personnel must have ongoing immediate access to the monitoring data so that appropriate corrective action can be taken if gas concentrations are outside of the acceptable range. System records must demonstrate daily functionality of the system.

REFERENCES
1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59
2) Swan, JE. Decisions for the IVF laboratory: comparative analysis of embryo culture incubators. Reproductive BioMedicine Online. 2014;28(5):535-47.
3) Palmer GA, Kratka C, Szvetecz S, et al. Comparison of 36 assisted reproduction laboratories monitoring environmental conditions and instrument parameters using the same quality-control application. Reproductive BioMedicine Online. 2019;39(1):63-74.

RLM.03920 Incubator Acceptable Limits **Phase II**

Acceptable limits of humidity, gas content, and/or pH are defined for incubators.

REFERENCES
1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59
2) Abramczyk JW, Lopata A. Incubator performance in the clinical in vitro fertilization program: importance of temperature conditions for the fertilization and cleavage of human embryos. *Fertil Steril.* 1986;46:132-134

RLM.03930 Incubator Gas Failure **Phase II**

The laboratory has written procedures to detect and prevent incubator gas failure.

Evidence of Compliance:
- ✓ Written procedure for detecting and preventing gas failure (eg, alarms or automated monitoring systems)

REFERENCES
1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59

*****REVISED** 09/22/2021***
RLM.03935 Emergency Power Back-up **Phase II**

The laboratory's incubator for embryos and gametes has emergency backup power sufficient to stabilize specimens, and it is tested at least quarterly.

Evidence of Compliance:
- ✓ Record of generator or other backup power supply testing

REFERENCES
1) Revised minimum standards for in vitro fertilization, gamete intrafallopian transfer, and related procedures. Fertil Steril. 1998;70(suppl 2):1S-5S

*****REVISED** 09/22/2021***
RLM.03940 Liquid Nitrogen Levels **Phase II**

The laboratory monitors and maintains adequate liquid nitrogen (LN2) levels and temperatures for all critical storage containers as defined in written procedure.

NOTE: The monitoring process must ensure that the level of LN2 is never below the laboratory's established minimum level. If temperature alarms are used instead of level or weight-based alarms, minimum monitoring must include recording of the following at least three times per week:
- *Visual inspection of storage tanks (condensation or water pooling, frost or ice, cracks about the neck and welded seams, rusting, damage to the outer layer of the tank) **AND***
- *Measurement of the level of liquid nitrogen*

Autofill devices are not acceptable as the sole mechanism to ensure that the tank is full. If used, the written procedure must define how they are monitored.

Evidence of Compliance:

- ✓ Written procedure for monitoring LN2 levels **AND**
- ✓ Records of visual inspection and measurement of LN2 levels at defined frequency **OR**
- ✓ Records of continuous monitoring of liquid nitrogen levels or weight

REFERENCES

1) Practice Committees of the American Society for Reproductive Medicine, Society for Reproductive Biologists and Technologists, and Society for Assisted Reproductive Technology. Cryostorage of reproductive tissues in the in vitro fertilization laboratory: a committee opinion. *Fertil Steril.* 2020; 114(3): 486-91.

*****REVISED** 09/22/2021***

RLM.03944 Liquid Nitrogen Supplies **Phase II**

Adequate liquid nitrogen (LN2) supplies are maintained securely onsite.

NOTE: The laboratory must have sufficient LN2 supply to fill a spare storage vessel and/or to allow for freezing of specimens in an emergency.

Access to supply tanks stored outside of the laboratory must be limited to trained personnel and authorized individuals (eg, vendors).

Evidence of Compliance:

- ✓ LN2 supply storage within the restricted area of the laboratory OR locked supply storage area outside of the laboratory with limited key access

REFERENCES

1) Practice Committees of the American Society for Reproductive Medicine, Society for Reproductive Biologists and Technologists, and Society for Assisted Reproductive Technology. Cryostorage of reproductive tissues in the in vitro fertilization laboratory: a committee opinion. *Fertil Steril.* 2020; 114(3): 486-91.

*****REVISED** 09/22/2021***

RLM.03950 Alarm System Continuous Monitoring **Phase II**

All incubators and liquid nitrogen storage tanks in use for storage of reproductive cells and tissues are monitored continuously (24 hours/day) using an alarm system (either remote or in the laboratory).

NOTE: The laboratory must be able to demonstrate how the alarm system works.

Alarm systems may electronically detect rises in temperature or a decrease in liquid nitrogen levels. If the laboratory is not staffed 24 hours/day, a remote alarm system that notifies personnel (eg, via phone call or text) must be used to ensure timely response to the alarm.

The CAP recommends that alarm level sensors and settings be set in consideration of anticipated response time for action to be taken before contents are compromised.

Evidence of Compliance:

- ✓ Written procedure for monitoring alarms

REFERENCES

1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59
2) Practice Committees of the American Society for Reproductive Medicine, Society for Reproductive Biologists and Technologists, and Society for Assisted Reproductive Technology. Cryostorage of reproductive tissues in the in vitro fertilization laboratory: a committee opinion. *Fertil Steril.* 2020; 114(3): 486-91.

*****NEW** 09/22/2021***

RLM.03952 Alarm Systems Functionality **Phase II**

Alarm systems are checked for functionality initially and at least quarterly.

NOTE: Alarm systems must be able to function in case of a power failure, such as through the use of a back-up generator, uninterruptible power supply, or cloud-based system. Alarm testing must include the evaluation of the full functionality of the system.

Evidence of Compliance:

- ✓ Written procedure for alarm testing **AND**
- ✓ Records of alarm testing

REFERENCES

1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59
2) Practice Committees of the American Society for Reproductive Medicine, Society for Reproductive Biologists and Technologists, and Society for Assisted Reproductive Technology. Cryostorage of reproductive tissues in the in vitro fertilization laboratory: a committee opinion. *Fertil Steril.* 2020; 114(3): 486-91.

*****NEW** 09/22/2021***

RLM.03953 Alarm Response Plan and Records **Phase II**

The laboratory follows a well-defined, written plan for responding to alarms during work and non-work hours and retains records of alarm responses.

NOTE: The laboratory must be able to demonstrate that the response plan ensures timely response to both audible (in laboratory) and remote alarms.

Personal responsible for responding to alarms must be trained to follow written procedures to correct the problem or take alternative measures.

Records retained for alarm response must include:

- *Name of the individual responding to the alarm*
- *Description of the problem encountered*
- *Actions taken to correct the problem*
- *Timing of the response and the notification.*

If an alarm response involves the loss of reproductive cells or tissues due to a failure in storage conditions, the laboratory must conduct a root cause analysis (refer to GEN.20310) and implement appropriate risk-reduction strategies.

Evidence of Compliance:

- ✓ Written procedure for monitoring alarms **AND**
- ✓ Records of response to the alarm

REFERENCES

1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59
2) Practice Committees of the American Society for Reproductive Medicine, Society for Reproductive Biologists and Technologists, and Society for Assisted Reproductive Technology. Cryostorage of reproductive tissues in the in vitro fertilization laboratory: a committee opinion. *Fertil Steril.* 2020; 114(3): 486-91.

RLM.03955 Equipment Back-up **Phase II**

The laboratory has a written procedure for implementing back-up capability (refrigerators, freezers, incubators, etc.).

NOTE: If any unit begins to fail, a repair or replacement would probably not be able to be purchased and delivered soon enough to avoid loss of contents. It is therefore necessary to have an emergency procedure to provide backup units with adequate storage capacity to allow complete transfer of contents. The backup units must be tested at least annually to ensure their functionality if needed.

Procedures for use of backup equipment, location, and contact personnel must be part of the procedure manual. If the backup plan involves using equipment at another laboratory or transferring specimens to another laboratory, there must be a written agreement between the laboratories.

RLM.03960 Sterilizing Device Monitoring **Phase II**

All sterilizing devices are routinely monitored with a biologic indicator (or chemical equivalent) for effectiveness of sterility under conditions that simulate actual use with results recorded.

NOTE: Chemical indicators that reflect sporicidal conditions may be used. One recommended method is to wrap the Bacillus stearothermophilus spore indicator strip in packaging identical to that used for a production run, and to include the test package with an actual sterilization procedure. This must be monitored with each sterilization cycle.

RECORDS

Inspector Instructions:

READ	• Sampling of patients' treatment cycle records for completeness • Sampling of tracking records from source to final disposition • Policies and procedures for shipping reproductive cells and tissues
DISCOVER	• Select a representative patient record and track progression through collection, processing, and administration of gametes and/or embryos. Confirm that the identity of the individual performing each step is recorded.

RLM.03965 Cycle Records **Phase II**

Laboratory records are generated for each individual patient's treatment cycle and a copy is retained in the laboratory to include the following as applicable.

1. **Results of oocyte retrieval**
2. **Semen analysis before and after processing, as applicable**
3. **Outcome of insemination (eg, fertilization)**
4. **Outcome of any culture (eg, cleavage)**
5. **Relative timing of protocol events (incubation hours, etc.)**
6. **Cryopreservation**
7. **Genetic testing of embryos**

REFERENCES

1) Sharma V, *et al*. An analysis of factors influencing the establishment of a clinical program in an ultrasound-based ambulatory in vitro fertilization program. *Fertil Steril.* 1988;49:468-478
2) Byrd W, Wolf DP. Oogenesis, fertilization and early development. In: Human in vitro fertilization and embryo transfer. Wolf DP, Quigley MM, eds. New York, NY: Plenum Press, 1984;213-273
3) Veeck LL, *et al.* Maturation and fertilization of morphologically immature human oocytes in a program of in vitro fertilization. *Fertil Steril.* 1983;39:594-602
4) Gerrity M. Quality control and laboratory monitoring. In: Human in vitro fertilization and embryo transfer. DP Wolf (ed). New York, NY: Plenum Press, 1988;25-45
5) Tarkowski AK. Recent studies in parthenogenesis in the mouse. *Reprod Fert* suppl. 1971;14:31-39
6) Quigley MM. Data management in an in vitro fertilization and embryo transfer program. In: Human in vitro fertilization and embryo transfer. Wolf DP, Quigley, MM, eds. New York, NY: Plenum Press, 1984;383-402

RLM.03970 Specimen Handling and Disposition **Phase II**

Laboratory records identify the person performing each step in the collection, processing and administration of gametes and/or embryos.

Evidence of Compliance:

✓ Patient records or worksheet identifying the person performing each step of the process

REFERENCES
1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59

RLM.03975 Specimen Handling and Disposition — Phase II

Records allow for the tracking of the disposition for gametes or embryos handled or stored.

NOTE: Records must allow for the tracking of tissues to their disposition to allow withdrawals/ recalls to be directed appropriately and to allow problems in reproductive tissue recipients to be tracked to their source.

REFERENCES
1) Linden JV, Favreau TJ. Professional standards in cell and tissue processing. *Cell Transplant.* 1995;4:441-446
2) Haimowitz MD. Practical issues in tissue banking. *Am J Clin Pathol.* 1997;107(suppl 1):S75-S81
3) U.S Department of Health and Human Services, Food and Drug Administration https://www.fda.gov/vaccines-blood-biologics/tissue-tissue-products

RLM.03980 Reagent Records — Phase II

Records of all critical reagents, supplies and equipment used in collection and processing of gametes and embryos, including lot numbers and expiration dates, are retained and traceable for each product.

REFERENCES
1) U.S Department of Health and Human Services, Food and Drug Administration https://www.fda.gov/vaccines-blood-biologics/tissue-tissue-products
2) Gerrity M. Quality control and laboratory monitoring. In: Human in vitro fertilization and embryo transfer. DP Wolf (ed). New York, NY: Plenum Press, 1988;25-45

RLM.03981 Reproductive Cells/Tissue Shipping — Phase II

If reproductive cells/tissues are shipped to another laboratory, detailed information is provided for the following:

- **Statement on the total number of specimens shipped, the number of specimens in each storage device (straw, vial, etc.), and the quality of each specimen**
- **Freezing/vitrification protocol originally used in the cryopreservation procedure and the thawing/warming technique recommended for each specimen**
- **For donor cells/tissue:**
  - **Unique identification ID code on the storage device (not including the donor's name, social security number, or medical record number unless the tissue/cells are designated for directed donation)**
  - **Copy of the "Summary of Records" indicating the testing and screening results, the name and address of the laboratory making the eligibility determination, statement of donor status as eligible or ineligible, and the reasons for ineligibility, if applicable.**

NOTE: For cryopreserved embryos created for a patient/couple labeled with identifying information that are subsequently made available for "anonymous embryo donation," it may not be possible to remove the patient identifiers from the cryostorage device without risking harm to the embryo(s). In this situation, the laboratory must take steps to ensure that the identity of the donating patient remains anonymous.

REFERENCES
1) U.S Department of Health and Human Services, Food and Drug Administration https://www.fda.gov/vaccines-blood-biologics/tissue-tissue-products

ANDROLOGY PROCEDURES AND TESTS

SEMEN ANALYSIS GENERAL

Inspector Instructions:

	• Sampling of manual and automated semen analysis policies and procedures • Sampling of patient records or worksheets • Sampling of patient reports
	• What is your laboratory's course of action when specimens yield a low percent motility?
	• Follow a semen analysis from requisition, collection information, testing, reporting and recording of result. Determine if practice follows laboratory procedure.

The following five checklist requirements are applicable to both automated and manual semen analysis.

RLM.03982 Report Disclaimer **Phase I**

If cell clumps or debris are observed during semen analysis, the laboratory indicates on the report that results may be inaccurate.

RLM.03984 Azoospermic Specimen Result Reporting **Phase I**

For azoospermic and post-vasectomy seminal fluid specimens, the laboratory clearly communicates the findings of the assay and either employs a concentrating technique on seminal fluid or includes a comment in the patient report indicating that a concentrating technique was not performed.

NOTE: Without a concentration technique, the presence of both motile and non-motile sperm may not be detected. The method for detection of motile and non-motile sperm and the laboratory findings must be clearly communicated on the patient report so that the clinician can interpret the results in context to the method performed. The decision on the method used and extent of testing to be performed should be made in consultation with the medical staff served.

The American Urological Association (AUA) Vasectomy Guideline recommends a careful evaluation of an uncentrifuged specimen and does not recommend centrifugation of the specimen for further assessment. The AUA Guideline also recommends reporting both the presence and absence of sperm and presence or absence of sperm motility on the patient report. If no sperm are seen in the uncentrifuged specimen, the guideline recommends reporting that the presence of sperm is below the limit of detection.

Evidence of Compliance:

- ✓ Patient report with concentration findings or appropriate comment indicating that concentration was not performed

REFERENCES

1) Evaluation of the Azoospermic Male. *Fertil Steril.* 2008; 90 (S74-7)
2) Diagnostic Evaluation of the Infertile Male: A Committee Opinion. *Fertil Steril.* 2012; 98:294-301
3) American Urological Association (AUA) Guideline. American Urological Association Education and Research, Inc. 2012; amended 2015. https://www.auanet.org/guidelines/vasectomy-(2012-amended-2015)
4) Vasectomy Update 2010. *Can Urol Assoc J.* 2010 October; 4(5):306-309

RLM.03986 Motility/Progression Evaluation — Phase II

Sperm motility percent and progression are routinely evaluated within one hour of collection.

NOTE: Exceptions must be noted on the final report.

Evidence of Compliance:

- ✓ Written procedure with requirement for motility evaluation **AND**
- ✓ Records indicating time of collection and evaluation **AND**
- ✓ Patient reports noting exceptions, when appropriate

REFERENCES

1) WHO laboratory manual for the examination and processing of human semen, most recent editions (ie, fourth edition 1999 and fifth edition 2010). New York, NY: Cambridge University Press
2) Mortimer D. Practical laboratory andrology. New York, NY: Oxford University Press, 1994

RLM.03988 Viability Testing Criteria — Phase I

The laboratory performs viability testing on specimens with low percent motility (eg, less than 30%), or includes a comment that the decreased motility may be the result of non-viable or non-motile sperm.

NOTE: Non-motile sperm may represent forms that were originally non-viable in the ejaculate, or previously motile forms that have subsequently lost motility. Thus, viability assessment is useful in making the distinction, and is commonly performed with a dye-exclusion method such as eosin-nigrosin.

Evidence of Compliance:

- ✓ Written procedure for viability testing **AND**
- ✓ Patient records or worksheet with results of viability testing **OR** patient report with cautionary verbiage

REFERENCES

1) WHO laboratory manual for the examination and processing of human semen, most recent editions (ie, fourth edition 1999 and fifth edition 2010). New York, NY: Cambridge University Press
2) Gunalp S, *et al.* A study of semen parameters with emphasis on sperm morphology in a fertile population: an attempt to develop clinical thresholds. *Hum Repro.* 2001;16:110-114

RLM.03990 Standard Temperature Range — Phase II

The laboratory has established a standard temperature range for semen analysis assessment, and deviations from this temperature are noted on the report.

NOTE: Specimen motility is temperature-dependent. Temperature ranges must be defined.

Evidence of Compliance:

- ✓ Written procedure with acceptable temperature range defined **AND**
- ✓ Records showing monitoring of temperatures

REFERENCES

1) WHO laboratory manual for the examination and processing of human semen, most recent editions (ie, fourth edition 1999 and fifth edition 2010). New York, NY: Cambridge University Press

AUTOMATED SEMEN ANALYSIS INSTRUMENTS

Varieties of systems are in use and some requirements may not apply to every system. The requirements are intended to check factors common to all automated systems. Inspectors should use individual judgment in applying the requirements to the particular type of system being used.

Inspector Instructions:

	• Sampling of automated semen analysis policies and procedures • Sampling of calibration/calibration verification records • Sampling of QC records
	• What is your course of action when the concentration of the specimen is outside of the instrument measurement range?
	• Further evaluate the responses, corrective actions, and resolutions for unacceptable calibration and/or calibration verification • Review a sampling of QC data over the previous two-year period. Select several occurrences in which QC is out of range and follow records to determine if the steps taken follow the laboratory procedure for corrective action

CALIBRATION AND QUALITY CONTROL

Several different methods may be used for calibration and quality control in the automated analysis of semen characteristics. "Calibration" techniques include use of:

1. *Multiple analyzed sperm specimens,*
2. *Stabilized preparations of sperm cells (eg, fixed or preserved),*
3. *Sperm surrogates (eg, latex particles),*
4. *Digital images/videotaped sperm specimens.*

NOTE: If stabilized control materials are used, they must represent different analytic levels (eg, normal and high). Similarly, retained patient specimens must be of differing counts and/or motility, as applicable.

RLM.04100 Calibration Materials **Phase II**

Calibration is verified with materials appropriate to the reportable range of the instrument, and verification is recorded.

NOTE: The quality control procedure for the automated instrument must include calibration and evaluation using defined limits of agreement with manually counted semen smears or stored digital images, as appropriate for the particular system. Laboratories must verify at least every six months that instruments are functioning correctly and are in control.

REFERENCES
1) Department of Health and Human Services, Centers for Medicare and Medicaid Services. Clinical laboratory improvement amendments of 1988; final rule. *Fed Register*. 2003(Jan 24): [42CFR493.1255]
2) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59

RLM.04200 Daily QC **Phase II**

The laboratory performs and records quality control for the automated instrument during each day of use, following the manufacturer's instructions or using at least two levels of control at different concentrations.

REFERENCES
1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59

RLM.04300 Recalibration **Phase II**

The test system is recalibrated when calibration verification fails to meet the established criteria of the laboratory.

REFERENCES
1) Department of Health and Human Services, Centers for Medicare and Medicaid Services. Clinical laboratory improvement amendments of 1988; final rule. *Fed Register*. 2003(Jan 24): [42CFR493.1255(a)(3)]
2) WHO laboratory manual for the examination and processing of human semen, most recent editions (ie, fourth edition 1999 and fifth edition 2010). New York, NY: Cambridge University Press

RLM.04400 Calibration Material Validation **Phase II**

The material used for calibration is validated using primary reference procedures (eg, manual counts).

Evidence of Compliance:
- ✓ Written procedure identifying calibration materials and validation of materials used **AND**
- ✓ Records showing accuracy of calibration materials used to include manufacturer's certification/validation of commercial products **OR** in-house validation data

REFERENCES
1) WHO laboratory manual for the examination and processing of human semen, most recent editions (ie, fourth edition 1999 and fifth edition 2010). New York, NY: Cambridge University Press
2) Krause W. [Value of computer-assisted sperm analysis (CASA). reproducibility--online documentation--prognostic value]. [Article in German]. *Fortschr Med.* 1996;114:470-473
3) Tsuji T, *et al.* Automated sperm concentration analysis with a new flow cytometry-based device, S_FCM. *Am J Clin Pathol.* 2002;117:401-408

RLM.04500 System Control **Phase II**

If a manual method is used as the system control for automated sperm counts, its accuracy is verified and recorded at intervals appropriate for laboratory volume.

REFERENCES
1) Mortimer D. Practical laboratory andrology. New York, NY: Oxford University Press. 1994
2) Lenzi A. Computer-aided semen analysis (CASA) 10 years later: a test-bed for the European scientific andrological community. *Int J Androl.* 1997;20:1-2
3) Mahmoud AM, *et al*. Performance of the sperm quality analyzer in predicting the outcome of assisted reproduction. *Int J Androl*. 1998;21:41-46
4) Tsuji T, *et al.* Automated sperm concentration analysis with a new flow cytometry-based device, S_FCM. *Am J Clin Pathol.* 2002;117:401-408

RLM.04600 Acceptable Limits - Controls **Phase II**

Acceptable limits are established for the value of each quality control sample.

Evidence of Compliance:
- ✓ Records of defined acceptable limits for control range of each lot

RLM.04700 Sperm Concentration Range **Phase II**

For automated sperm counts and motility, there is a written procedure to confirm that the concentration of the specimen is within the range appropriate for automated analysis.

REFERENCES

1) Vantman DD, *et al*. Computer assisted semen analysis: evaluation of method and assessment of the influence of sperm concentration on linear velocity determination. *Fertil Steril.* 1988;49:510-515
2) Yeung CH, *et al.* A technique for standardization and quality control of subjective sperm motility assessments in semen analysis. *Fertil Steril*. 1997;67:1156-1158
3) Sidhu RS, *et al.* accuracy of computer-assisted semen analysis in prefreeze and post-thaw specimens with high and low sperm counts and motility. *Urology*. 1998;51:306-312
4) Tsuji T, *et al.* Automated sperm concentration analysis with a new flow cytometry-based device, S_FCM. *Am J Clin Pathol.* 2002;117:401-408

RLM.04900 Reportable Range — Phase II

Upper and lower limits of all reportable parameters on instruments are defined, and results that fall outside these limits are reported properly.

NOTE: Results that fall outside of these limits may be verified by repeating the test, using an alternative method or diluting/concentrating the specimen, as appropriate.

Evidence of Compliance:

- ✓ Written procedure defining the upper and lower reporting limits and verification of results **AND**
- ✓ Patient test verification records

REFERENCES

1) Mortimer D. Practical laboratory andrology. New York, NY: Oxford University Press. 1994

RLM.05000 Calibration Verification Criteria — Phase II

There are written criteria for method calibration verification.

NOTE: Laboratories must either recalibrate or perform calibration verification at least every six months and if any of the following occur:

1. *At complete changes of reagents, unless the laboratory can demonstrate that changing reagent lots does not affect either the range used to report patient results or the control values*
2. *If QC shows an unusual trend or shift or is outside acceptable limits, and the system cannot be corrected to bring control values into the acceptable range*
3. *After major preventive maintenance or change of a critical instrument component*
4. *When recommended by the manufacturer*

For automated semen analysis instruments, requirements for calibration verification may be considered met if the laboratory follows the manufacturer's instructions for instrument operation and tests two levels of control materials each day of testing. The control results must meet the laboratory's criteria for acceptability.

Evidence of Compliance:

- ✓ Written policy defining the method, frequency, and limits of acceptability of calibration verification for each instrument/test system **AND**
- ✓ Records of calibration verification at defined frequency

REFERENCES

1) Department of Health and Human Services, Centers for Medicare and Medicaid Services. Clinical laboratory improvement amendments of 1988; final rule. *Fed Register*. 2003(Jan 24):7165 [42 CFR 493.1255]

MANUAL SEMEN ANALYSIS

Inspector Instructions:

	• Sampling of manual semen analysis policies and procedures • Sampling of manual semen analysis QC records • Sampling of stain QC records • Sampling of patient reports (classification system noted) • Sampling of patient records/worksheets
	• Stained smear (uniquely identified, properly stained, free of precipitate, uniform cell distribution, recognition of reportable cell types) • File of unusual slides • Counting chamber condition
	• What do you do if there is difficulty distinguishing leukocytes from other round cells when performing sperm counts using bright-field microscopy? • How is the sperm motility method in use verified? • How do you ensure that morphologic observations are consistent among all personnel who report sperm differential results? • How long does your laboratory retain slides?

SPERM CONCENTRATION

RLM.05100 Counting Chamber and Optical Grid Quality **Phase I**

The lines in all counting or motility chambers, ocular micrometers, and optical grids are bright and free from scratches, dirt, or debris.

RLM.05150 Manual Cell Count Controls **Phase II**

For manual sperm counts, at least one cell count control specimen is analyzed in duplicate, or a procedural control used, for each eight hours of patient testing.

NOTE: This requirement can be met with assayed liquid control material, a previously assayed patient sample, or a procedural control. An example of a procedural control is correlation of the cell count with the cellularity of a stained slide prepared by a standard, validated method. Liquid controls materials must be tested in duplicate.

Evidence of Compliance:

✓ Written procedure for quality control of manual sperm counts **AND**
✓ Records of cell count or procedural controls at defined frequency

REFERENCES

1) Department of Health and Human Services, Centers for Medicare and Medicaid Services. Clinical laboratory improvement amendments of 1988; final rule. *Fed Register.* 2004(Oct 1):1041 [42CFR493.1269(a)].

RLM.05200 Semen Analysis Procedure **Phase II**

For manual sperm counts, each sperm sample is counted in duplicate.

NOTE: Testing records must reflect the performance of the counts in duplicate for all counting chambers. Limits of agreement between replicate counts must be defined.

Evidence of Compliance:

- ✓ Written procedure requiring duplicate counts to include limits of agreement **AND**
- ✓ Records or worksheets reflecting duplicate counts and corrective action when limits of agreement are exceeded

REFERENCES

1) Department of Health and Human Services, Centers for Medicare and Medicaid Services. Clinical laboratory improvement amendments of 1988; final rule. *Fed Register.* 2004(Oct 1):1041 [42CFR493.1269(a)(2)].

SPERM MOTILITY

RLM.05900 Motility Microscopic Examination — Phase II

The laboratory has written instructions for evaluating a sufficient number of separate and randomly chosen microscopic fields and sperm cells.

REFERENCES

1) WHO laboratory manual for the examination and processing of human semen, most recent editions (ie, fourth edition 1999 and fifth edition 2010). New York, NY: Cambridge University Press

RLM.06000 Motility Quantification — Phase II

Manual measures of percent sperm motility are quantified in a standardized manner.

NOTE: The laboratory must have a written method for determining and reporting sperm motility in its procedure manual that describes how sperm are assessed and counted (percent motility) and is based on a reference method, such as the World Health Organization (WHO) Standards (ie, fourth or fifth edition).

REFERENCES

1) WHO laboratory manual for the examination and processing of human semen, most recent editions (ie, fourth edition 1999 and fifth edition 2010). New York, NY: Cambridge University Press
2) Yeung CH, *et al*. A technique for standardization and quality control of subjective sperm motility assessments in semen analysis. *Fertil Steril.* 1997;67:1156-1158

RLM.06100 Forward Progression — Phase II

Forward progression of sperm is evaluated.

Evidence of Compliance:

- ✓ Written procedure for evaluation of forward progression **AND**
- ✓ Patient reports or worksheets with results of forward progression

REFERENCES

1) WHO laboratory manual for the examination and processing of human semen, most recent editions (ie, fourth edition 1999 and fifth edition 2010). New York, NY: Cambridge University Press
2) Vulcano GJ, *et al*. A lineal equation for the classification of progressive and hyperactive spermatozoa. *Math Biosci.* 1998;149:77-93

RLM.06200 Motility Method Verification — Phase II

The sperm motility method is verified at least every six months (eg, video tapes/digital images of specimens with known percent motility and/or specific motion quality).

Evidence of Compliance:

- ✓ Records of method verification

REFERENCES

1) Mortimer D. Practical laboratory andrology. New York, NY: Oxford University Press, 1994
2) Yeung CH, *et al*. A technique for standardization and quality control of subjective sperm motility assessments in semen analysis. *Fertil Steril.* 1997;67:1156-1158

SEMEN STAINED SMEAR - SPERM DIFFERENTIAL

RLM.06300 Stain Usage **Phase II**

Stains are used to facilitate morphologic classification of cell types in semen (as opposed to performing differentials of unstained preparations).

Evidence of Compliance:

- ✓ Written procedure for the use of stains for cell classification

REFERENCES

1) Coetzee K, *et al.* Predictive value of normal sperm morphology: a structured literature review. *Hum Reprod Update*. 1998;4:73-82

RLM.06350 Leukocyte Confirmation Techniques **Phase I**

There is an additional procedure beyond unstained bright-field microscopy to ensure the accurate distinction of leukocytes from other round cells (eg, Wright's, leukocyte alkaline phosphatase, or myeloperoxidase stains).

NOTE: This requirement only applies to laboratories that differentiate leukocytes from other round cells on the patient report,

Evidence of Compliance:

- ✓ Written procedure for confirmation for cell differentiation

REFERENCES

1) WHO laboratory manual for the examination and processing of human semen, most recent editions (ie, fourth edition 1999 and fifth edition 2010). New York, NY: Cambridge University Press
2) Fishel TJ, *et al*. Increased polymorphonuclear granulocytes in seminal plasma in relation to sperm morphology. *Hum Reprod.* 1997;12:2418-2421
3) Zimmermann BS, *et al*. Relationship of bacteriological characteristics to semen indices and its influence on fertilization and pregnancy rates after IVF. *Acta Obstet Gynecol Scand*. 1997;76:964-968
4) Trum JW, *et al*. Value of detecting leukocytospermia in the diagnosis of genital tract infection in subfertile men. *Fertil Steril.* 1998;70:315-319
5) Schlegel PN, Sigman M, Collura B, et al. Diagnosis and Treatment of Infertility in Men: AUA/ASRM Guideline Part 1. *J Urol.* 2021;205(1):36-43.

RLM.06400 Stain QC **Phase II**

Quality control of all stains is performed and recorded to check for contamination and intended reactivity each day of use.

Evidence of Compliance:

- ✓ Written procedures for stain QC **AND**
- ✓ Records of stain QC

REFERENCES

1) Department of Health and Human Services, Centers for Medicare and Medicaid Services. Clinical laboratory improvement amendments of 1988; final rule. *Fed Register.* 2003(Jan 24):7166 [42CFR493.1256(e)(2)]

RLM.06700 Morphology Classification **Phase I**

The sperm morphology classification method used is indicated on the report.

NOTE: Different classification systems have different reference intervals for normality. To improve the consistency and usefulness of reporting, CAP recommends the use of the WHO Standards (ie, fourth or fifth edition) and the Kruger classification system, and discontinuing the use of older classification systems.

REFERENCES

1) Kruger, T.F., *et al*. Sperm morphology features as a prognostic factor in vitro fertilization. *Fertility and Sterility* 46:1118-1123, 1986

2) WHO laboratory manual for the examination and processing of human semen, most recent editions (ie, fourth edition 1999 and fifth edition 2010). New York, NY: Cambridge University Press
3) Gunalp S, *et al.* A study of semen parameters with emphasis on sperm morphology in a fertile population: an attempt to develop clinical thresholds. *Hum Repro.* 2001;16:110-114
4) Behnke EJ, Mayer JF, Ball GD, et al. *Semen Analysis Benchtop Reference Guide: An Illustrated Guide with Emphasis on Sperm Morphology.* CAP Press; 2018.

RLM.06800 Slide Retention - Sperm Differential — Phase II

Sperm differential slides are retained for at least seven days for future reference.

RLM.06900 Morphologic Observation Evaluation — Phase II

The laboratory evaluates consistency of morphologic observation among personnel performing morphologic classification of sperm and other cells at least annually.

NOTE: The laboratory must ensure the identification of sperm and other cells is reported consistently amongst all personnel performing the microscopic analysis.

Suggested methods to accomplish this include:

1. *Circulation of a pre-graded set of stained semen smears with defined specific qualitative abnormalities of sperm*
2. *Multi-headed microscopy*
3. *Use of published references*
4. *Digital images*

Acceptability criteria for agreement must be determined by the laboratory director or designee. The laboratory must maintain records of performance and record corrective actions taken for personnel demonstrating significant discrepancies from the group consensus.

Evidence of Compliance:

- ✓ Written procedure defining the method and criteria used for evaluation of consistency **AND**
- ✓ Records of evaluation

REFERENCES

1) WHO laboratory manual for the examination and processing of human semen, most recent editions (ie, fourth edition 1999 and fifth edition 2010). New York, NY: Cambridge University Press
2) Souter VL, *et al.* Laboratory techniques for semen analysis; a Scottish survey. *Health Bull (Edinb).* 1997;55:140-149
3) Baker DJ, Witmyer J. Semen analysis training tool. Chicago, IL: American Society of Clinical Pathology, 1998
4) Kruger T, Frenken, D. Atlas of Human Sperm Morphology Evaluation, Taylor & Frances, 2004
5) Glassy E. CAP Color Atlas of Hematology, 1998
6) Behnke EJ, Mayer JF, Ball GD, et al. *Semen Analysis Benchtop Reference Guide: An Illustrated Guide with Emphasis on Sperm Morphology.* CAP Press; 2018.

RLM.07000 Sperm Morphology Reference — Phase I

There is a file of unusual slides or current atlas of sperm morphology available for training and reference.

REFERENCES

1) WHO laboratory manual for the examination and processing of human semen, most recent editions (ie, fourth edition 1999 and fifth edition 2010). New York, NY: Cambridge University Press
2) Kruger T, Frenken, D. Atlas of Human Sperm Morphology Evaluation, 2004
3) Behnke EJ, Mayer JF, Ball GD, et al. *Semen Analysis Benchtop Reference Guide: An Illustrated Guide with Emphasis on Sperm Morphology.* CAP Press; 2018.

RLM.07100 Stain Quality — Phase II

The stains used (Wright's, Papanicolaou, eosin-nigrosin, peroxidase, etc.) and slide preparations are of sufficient quality to demonstrate the cellular characteristics for which they are designed.

NOTE: The stains used for semen analysis must be defined in the laboratory's procedure manual.

Evidence of Compliance:
- ✓ Examples of each type of stained slide available for microscopic review by inspector, as applicable

BIOCHEMICAL TESTS

RLM.07400 Biochemical Tests - Daily QC **Phase II**

For biochemical tests such as fructose, positive and negative controls are run with each assay, with results recorded and reviewed for acceptability.

Evidence of Compliance:
- ✓ Written procedure for QC **AND**
- ✓ QC records

REFERENCES
1) Mortimer D. Practical laboratory andrology. New York, NY: Oxford University Press, 1994

ANTI-SPERM ANTIBODY (ASA) TESTS

Inspector Instructions:

- Sampling of ASA policies and procedures
- Sampling of ASA QC records

RLM.07500 Heat Inactivation **Phase II**

Serum and follicular fluid specimens used for indirect ASA testing are heat-inactivated before use.

NOTE: Serum and follicular fluid specimens used for indirect ASA testing must be treated to inactivate complement.

Evidence of Compliance:
- ✓ Written procedure for pre-analytic treatment of specimens

REFERENCES
1) Keel BA, Webster BW. CRC handbook of the laboratory diagnosis and treatment of infertility. Boca Raton, FL: CRC Press, 19RLM.185

RLM.07600 Motility Testing **Phase I**

If the testing for ASA requires motile sperm, specimens are assayed with minimal delay and the motility assessed and recorded.

Evidence of Compliance:
- ✓ Patient records and worksheets showing time of collection and evaluation of motility

REFERENCES
1) Mortimer D. Practical laboratory andrology. New York, NY: Oxford University Press, 1994

RLM.07700 ASA Controls **Phase II**

For indirect antibody testing, positive and negative controls are run with each assay, with results recorded and reviewed for acceptability.

Evidence of Compliance:
- ✓ Written procedure for QC **AND**
- ✓ QC records

REFERENCES
1) Keel BA, Webster BW. CRC handbook of the laboratory diagnosis and treatment of infertility. Boca Raton, FL: CRC Press, 19RLM.185
2) Department of Health and Human Services, Centers for Medicare and Medicaid Services. Clinical laboratory improvement amendments of 1988; final rule. *Fed Register.* 2003(Jan 24):7166 [42CFR493. 1256(d)(iii)]
3) Evans ML, *et al.* A convenient mixed immunobeads screen for antisperm antibodies during routine semen analysis. *Fertil Steril.* 1998;70:344-349

SPERM PROCESSING FOR THERAPEUTIC INSEMINATION

Inspector Instructions:

	• Sampling of therapeutic insemination policies and procedures (includes maintaining specimen identity)
	• How does your laboratory ensure specimen identity and integrity of the specimen from receipt to final disposition?

RLM.07800 Specimen Handling - Therapeutic Insemination **Phase II**

Special handling requirements for insemination specimens are defined and followed (eg, aseptic technique, processing with minimum delay), as necessary.

REFERENCES
1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59

RLM.07900 Sperm Preparation **Phase II**

There are written procedures for preparing sperm for insemination (eg, gradient, swim-up techniques).

REFERENCES
1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59

RLM.08000 Specimen Handling **Phase II**

There is a system to verify and maintain the identity of the specimen throughout receipt, storage, processing, and disposition.

NOTE: All specimens must be labeled with a minimum of two identifiers.

Evidence of Compliance:
- ✓ Written procedure for maintaining specimen identity

REFERENCES
1) Byrd W. Quality assurance in the reproductive biology laboratory. *Arch Pathol Lab Med*. 1992;116:418-422

EMBRYOLOGY

Embryology laboratories may have separate andrology facilities that are not accredited by the College of American Pathologists. However, if the embryology laboratory either processes sperm for therapeutic insemination, oocyte insemination, or performs any form of a semen analysis, it must complete requirements in the preceding SPERM PROCESSING FOR THERAPEUTIC INSEMINATION section and/or the ANDROLOGY section.

***Genetic testing on embryo biopsy specimens** must be performed by a CAP accredited laboratory or other laboratory meeting the referral laboratory selection criteria defined in the Laboratory General Checklist (GEN.41350).*

If no embryology procedures are performed in the laboratory continue with the Cryopreservation of Sperm, Oocytes, and Embryos section.

OOCYTE AND EMBRYO HANDLING

Inspector Instructions:

	• Sampling of policies and procedures for oocyte/embryo handling and embryo transfer • Sampling of embryology records (time-out verification, embryo development stage, chain-of custody documentation, catheter checks) • Sampling of training and competency records
	• Sterile technique environment
	• How does your laboratory verify proficiency in its ability to assess the quality of embryos?
	• Follow a patient procedure from handling, assessment, culturing and transfer of human sperm, oocytes and embryos. Determine if procedures and records are adequate.

CULTURE OF SPERM, OOCYTES, AND EMBRYOS

NOTE: If a sperm count and/or motility are performed as part of the sperm processing procedure, the laboratory must comply with the pertinent checklist items for sperm count, motility, and proficiency testing listed in the other sections of this checklist.

RLM.08290 Time-Out **Phase II**

A "time-out" is called and the following information recorded prior to initiation of each egg retrieval or embryo transfer procedure.

1. **Patient's two identifiers**
2. **Planned procedure (eg, egg retrieval or embryo transfer)**
3. **Written physician's order**
4. **Number of embryos to be transferred**

NOTE: The "time out," or immediate preoperative pause, must occur in the location where the procedure is to be done with active participation of the appropriate members of the team. The time-out is an opportunity to confirm agreement of all team members present and to resolve any discrepancies prior to initiation of the procedure.

The procedures for egg retrieval and embryo transfer must explain the laboratory's role, the elements to be confirmed, and the method used for recording the time-out. The record of the time-out must demonstrate that all required elements have been verified.

Evidence of Compliance:

- ✓ Written procedure with steps to verify information **AND**
- ✓ Records of time-out verification for each procedure

REFERENCES

1) WHO Surgical Safety Checklist 2009 ed. and Checklist Implementation manual 2009 ed. http://whqlibdoc.who.int/publications/2009/9789241598590_eng.pdf

RLM.08300 Sterile Techniques **Phase II**

Sterile techniques are employed in the handling, assessment, culturing, and transfer of human sperm, oocytes and embryos.

Evidence of Compliance:

- ✓ Written procedure detailing use of appropriate sterile techniques at each step

RLM.08400 Oocyte Maturity/Embryo Quality **Phase II**

There are written criteria for evaluation/assessment of oocyte maturity and embryo quality prior to insemination and embryo transfer respectively.

NOTE: Procedures should include description of oocyte and embryo quality and maturity. The stage of embryo development at transfer must be recorded.

REFERENCES

1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59

RLM.08450 Embryo Quality Assessment Verification **Phase II**

The procedure of embryo transfer includes verification of the laboratory's proficiency to assess the quality of embryos (eg, participation in a commercial proficiency testing or inter-laboratory comparison program).

RLM.08500 Insemination - Oocyte Maturity **Phase II**

There are written criteria for insemination relative to oocyte maturity.

NOTE: Procedures must be defined for instances of immature and/or atretic oocytes.

REFERENCES

1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59

RLM.08600 Sperm Number/Volume **Phase II**

There are defined criteria for volume and number of sperm used for insemination of each egg.

NOTE: There are written procedures for estimation of sample parameters for concentration, motility and morphology along with techniques for insemination with respect to count and motility for both normal and male factor patients.

REFERENCES
1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59

*****REVISED** 06/04/2020***

RLM.08700 Disposition of Oocytes **Phase II**

The laboratory has a written policy for the disposition of fertilized embryos (zygotes) with an abnormal number of pronuclei.

RLM.08800 Oocyte Examination **Phase II**

There is a defined period for examination of oocytes for fertilization.

REFERENCES
1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59

RLM.08900 Re-Insemination Criteria **Phase II**

The laboratory has written procedures for re-insemination, using either in vitro fertilization or intracytoplasmic sperm injection.

NOTE: Procedures for re-insemination of oocyte and/or micromanipulation should include time frame for re-insemination, criteria for use of initial sample, time frame for re-examination of these oocytes, and the hierarchy for their use at embryo transfer.

REFERENCES
1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59

RLM.09100 Micromanipulation **Phase II**

The laboratory has a program to ensure that micromanipulation procedures are performed at an acceptable level.

NOTE: This would include fertilization of oocytes, survival following zona hatching and pregnancy rates using micromanipulated embryos.

Evidence of Compliance:

- ✓ Written procedure to assess ongoing performance, including criteria defining the acceptable levels of performance **AND**
- ✓ Records of evaluation of individuals performance **OR** evaluation of fertilization rate statistics for each embryologist **OR** records of another documented method approved by the laboratory director **AND**
- ✓ Records of corrective action when acceptable level of performance are not achieved

EMBRYO TRANSFER PROCEDURES

RLM.09200 Embryo Culture Timeline **Phase II**

There are written procedures for the length of time that embryos are cultured before transfer.

REFERENCES
1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59

RLM.09300 Embryo Quality/Status **Phase II**

The laboratory records the status and quality of embryos before transfer.

NOTE: It is suggested that, whenever possible, photographic records be retained.

REFERENCES
1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59

RLM.09400 Chain-of-Custody **Phase II**

The identity of the patient specimen (sperm or embryos) is checked against the identity of the patient prior to transfer or insemination and this identification is recorded.

NOTE: There must be an established chain-of-custody for all reproductive gametes or embryos that are transferred back to a patient. This includes records of the patient specimen identification (ID), as well as the patient's ID. When it is not possible for the laboratory staff to check the patient's ID, then this check should be performed and recorded by a nurse, physician, or other health care provider before transfer.

Evidence of Compliance:
- ✓ Written procedure defining chain-of-custody for patient and patient specimen ID prior to transfer or insemination

RLM.09500 Catheter Check **Phase II**

The laboratory records a check of the catheter for any embryos left after transfer.

REFERENCES
1) Poindexter AN, *et al*. Residual embryos in failed embryo transfer. *Fertil Steril.* 1986;46:262-267

EMBRYOLOGY PERSONNEL

The requirements in this section apply to embryology services only. Personnel requirements for andrology and other CLIA-related testing are found in the Laboratory General Checklist and Director Assessment Checklist. A table with information for identifying the applicable checklist requirements based on tests or services performed is found in the Introduction section of this checklist.

Inspector Instructions:

- Sampling of personnel files for educational qualifications (diplomas, transcripts, primary source verification reports) and training for the embryology laboratory director, embryologists, and embryology supervisors
- Sampling of training and competency assessment records
- Back-up personnel policy

EMBRYOLOGY LABORATORY DIRECTOR

RLM.10166 Embryology Laboratory Director Qualifications **Phase II**

The embryology laboratory director has proper qualifications through education and experience to provide direction and administration of the laboratory.

NOTE: The embryology laboratory director must have at least two years of experience in a laboratory performing in vitro fertilization or assisted reproductive technologies-related procedures and meet the following requirements:

- *MD or DO licensed (if required) in the jurisdiction where the laboratory is located;* ***or***
- *Doctoral degree in a chemical, physical, biological, or clinical laboratory science from an accredited institution;* ***or***
- *Individual functioning as an embryology director on or before July 20, 1999.*

Effective January 1, 2006*, all new laboratory directors in laboratories located in the US and its territories must hold* ***current*** *HCLD (High Complexity Laboratory Director), ABB-ELD (American Board of Bioanalysis Embryology Laboratory Director), or equivalent certification. For laboratories located outside of the US, embryology laboratory directors must be an MD or DO licensed (if required) in the jurisdiction where the laboratory is located or have a doctoral degree in a chemical, physical, biological, or clinical laboratory science,* ***and*** *have at least two years of appropriate laboratory training and experience. Board certification is strongly encouraged.*

If the laboratory is also performing testing for the purpose of diagnosis (eg, semen analysis, hormone assays), the laboratory director must meet the personnel requirements defined in the Director Assessment Checklist.

If more stringent state or local regulations are in place for supervisory qualifications, including requirements for state licensure, they must be followed.

For laboratories located in the US (including its territories), the training and qualifications of embryology laboratory directors trained outside of the US, newly employed on or after January 1, 2018, must be evaluated to determine equivalency to an education obtained in the US, with records of the evaluation available in the personnel file. Equivalency evaluations must be performed by a nationally recognized organization, such as the National Association Credential Evaluation Services, Inc. (NACES) (http://naces.org) and the Association of International Credential Evaluators, Inc. (AICE) (http://www.aice-eval.org). The following types of records may also be used to show equivalency: 1) license to practice medicine issued by the state in which the laboratory is located; or 2) laboratory personnel license in states where laboratory personnel licensure is required. Department of Defense laboratories must evaluate equivalency using a process approved by the Center for Laboratory Medicine Services.

Evidence of Compliance:

- ✓ Records of qualifications including diploma, transcript, current certification (if required), primary source verification report, current license (if required), or equivalency evaluation **AND**
- ✓ Records of work history in related field

REFERENCES

1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59
2) College of American Pathologists. Standards for accreditation, reproductive laboratory accreditation program. Northfield, IL: CAP, current edition
3) Practice Committee of the American Society for Reproductive Medicine; Practice Committee of the Society for Assisted Reproductive Technology; Practice Committee of the Society of Reproductive Biologists and Technologists. Minimum standards for practices offering assisted reproductive technologies: a committee opinion. *Fertil Steril* 2020;113(3):536-41.

RLM.10250 Assisted Reproductive Technology (ART) - Personnel Qualifications **Phase II**

All embryology laboratory personnel performing assisted reproductive technology (ART) procedures meet the following minimum requirements:

- **Bachelor's degree in a chemical, physical, biological, medical technology, clinical, or reproductive laboratory science from an accredited institution*; or**
- **Individuals performing ART laboratory procedures prior to January 1, 2012, meet laboratory-defined personnel qualifications and have records of training for the ART laboratory procedures performed.**

NOTE: If more stringent state or local regulations are in place for personnel qualifications, including requirements for state licensure, they must be followed.

Embryology personnel who perform testing for the purpose of diagnosis (eg, diagnostic semen analysis, hormone analysis) must also qualify under the testing personnel requirements defined in the Laboratory General Checklist (GEN.54750).

For laboratories located in the US (including its territories), the training and qualifications of personnel trained outside of the US, newly employed on or after January 1, 2018, must be evaluated to determine equivalency to an education obtained in the US, with records of the evaluation available in the personnel file. Equivalency evaluations must be performed by a nationally recognized organization, such as the National Association Credential Evaluation Services, Inc. (NACES) (http://naces.org) and the Association of International Credential Evaluators, Inc. (AICE) (http://www.aice-eval.org).

Evidence of Compliance:

✓ Records of qualifications including degree or transcript, current license (if required), equivalency evaluation, and work history in related field, as applicable

REFERENCES

1) Revised guidelines for human embryology laboratories. *Fertil Steril*. 2008:90 (suppl 3):S45-S59
2) Practice Committee of the American Society for Reproductive Medicine; Practice Committee of the Society for Assisted Reproductive Technology; Practice Committee of the Society of Reproductive Biologists and Technologists. Minimum standards for practices offering assisted reproductive technologies: a committee opinion. *Fertil Steril* 2020;113(3):536-41.

RLM.10253 Embryology Training **Phase II**

There are records that all embryology laboratory personnel have satisfactorily completed initial training for each assisted reproductive technology (ART) technique performed.

NOTE: There must be a training program for personnel, using animal model systems or discarded human materials. The training must include all techniques performed by each individual, such as gamete collection, preparation, fertilization, micromanipulation, embryo biopsy, and cryopreservation. It must also include the process for identifying and labeling individual reproductive tissues (gametes, embryos, and biopsy specimens) to maintain the identity of the specimen throughout receipt, storage, processing, and disposition and to ensure that records of genetic testing performed on biopsy specimens can be correlated to the native embryo.

Retraining must occur when problems are identified with personnel performance.

If the laboratory contracts with an agency or individual to perform embryology procedures on a temporary or per diem basis, the laboratory must have the following records:

- *Site-specific orientation **AND***
- *Training performed on site, by the contracting agency, or at another laboratory on each embryology procedure to be performed*

Evidence of Compliance:

✓ Records of training **AND**

- ✓ Records of competency assessment for embryology personnel reflecting the specific skills assessed and the method of evaluation **AND**
- ✓ Written procedure defining the method and frequency for assessing competency

REFERENCES
1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59
2) Clinical and Laboratory Standards Institute. *Training and Competence Assessment; Approved Guideline*. 3rd ed. CLSI Document QMS03-A3. Clinical and Laboratory Standards Institute, Wayne, PA, 2009.
3) Practice Committee of the American Society for Reproductive Medicine; Practice Committee of the Society for Assisted Reproductive Technology; Practice Committee of the Society of Reproductive Biologists and Technologists. Minimum standards for practices offering assisted reproductive technologies: a committee opinion. *Fertil Steril* 2020;113(3):536-41.

***REVISED** 09/22/2021*

RLM.10254 Competency Assessment of Embryology Personnel **Phase II**

The competency of each person performing embryology procedures, including micromanipulation and other assisted reproductive technology techniques is assessed.

NOTE: Competency assessment evaluates an individual's ongoing ability to apply knowledge and skills to achieve intended results.

Competency must be assessed at the following frequency:

- *At least semiannually (first assessment within seven months from initiation of embryology duties and second assessment no later than 12 months from the start of duties) during the first year of an individual's duties (new employee).*
- *At least annually after an individual has performed assigned duties for one year*.*
- *When problems are identified with an individual's performance.*

**The annual assessment of competency can be performed throughout the entire year to minimize impact on workload.*

For each embryologist, competency assessment must include all applicable elements described below for each procedure performed. Elements of competency assessment include, but are not limited to:

1. *Direct observations of routine embryology procedures, including, as applicable, patient identification, specimen collection, handling, and processing*
2. *Monitoring the recording and reporting of embryology cycle events*
3. *Review of intermediate test results or worksheets quality control records, proficiency testing results, and preventive maintenance records*
4. *Direct observation of performance of equipment maintenance and function checks*
5. *Evaluation of problem-solving skills*

The competency assessment procedure must outline the practices and procedures used to evaluate competency. Assessment of the elements of competency may be coordinated with routine practices and procedures. Laboratories often use a checklist to record and track elements assessed. Records supporting the assessment must be retained (copies of worksheets, maintenance logs, etc. or information traceable to the original record).

The following includes examples of how competency assessment can be coordinated with routine practices and procedures:

- *Assessment of the recording of quality control results and instrument maintenance data in element #3 during the monthly supervisory review process of these records.*
- *Assessment of problem-solving skills in element #5 from monthly reviews of corrective action logs where problems with an embryology procedure, quality control, or instrument function were investigated.*

For embryologists performing embryology procedures at multiple laboratories within a health care system (different CAP numbers), the laboratory director may determine how competency will be assessed for each site. If there are variations on how procedures are performed at the different

laboratories, those variations must be included in the competency assessment specific to the laboratory.

If the laboratory contracts with an agency or individual to perform embryology procedures on a temporary or per diem basis, the laboratory must have records of competency assessment on each embryology procedure to be performed. The laboratory may either perform on-site competency assessment or obtain records of competency assessment performed by the contracting agency or at another laboratory within the last 12 months. The competency records must show that all five elements of competency were assessed, as applicable.

The CAP provides example competency assessment templates, which can be downloaded from cap.org in e-Lab Solutions Suites - Accreditation Resources - Templates.

Evidence of Compliance:

- ✓ Records of competency assessment for new and existing embryology personnel reflecting the specific skills assessed and the method of evaluation at the required frequency **AND**
- ✓ Written procedure defining the method and frequency for assessing competency

REFERENCES

1) Clinical and Laboratory Standards Institute. *Training and Competence Assessment; Approved Guideline*. 3rd ed. CLSI Document QMS03-A3. Clinical and Laboratory Standards Institute, Wayne, PA, 2009.

*****REVISED** 09/22/2021***

RLM.10255 Embryology Laboratory Director Visits **Phase II**

For laboratories that do not have an on-site embryology laboratory director, there must be records of visits from the embryology laboratory director at a minimum of once per quarter.

NOTE: If the laboratory performs andrology testing, national, federal, state (or provincial), and local requirements for director visits must be followed, which may be more stringent.

The embryology laboratory director must be available (eg, on-site or virtual) during CAP inspections to participate in an interview and answer questions.

REFERENCES

1) Revised guidelines for embryology laboratories. *Fertil Steril.* 2008:90 (suppl 3):S45-S59
2) Practice Committee of the American Society for Reproductive Medicine; Practice Committee of the Society for Assisted Reproductive Technology; Practice Committee of the Society of Reproductive Biologists and Technologists. Minimum standards for practices offering assisted reproductive technologies: a committee opinion. *Fertil Steril* 2020;113(3):536-41.

RLM.10260 Oversight Responsibility **Phase II**

For laboratories that do not have an on-site, full time embryology laboratory director, or the medical director is also the embryology laboratory director, there is a designated on-site individual qualified as an embryology supervisor, to provide oversight of daily activities and assist with troubleshooting or other unusual situations.

NOTE: The intent is to ensure that the laboratory continues to function properly in the embryology laboratory director's absence and to ensure that resources are available to quickly assist with unusual problems to minimize any adverse impact on patient care.

REFERENCES

1) Revised guidelines for human embryology laboratories. *Fertil Steril*. 2008:90 (suppl 3):S45-S59
2) Practice Committee of the American Society for Reproductive Medicine; Practice Committee of the Society for Assisted Reproductive Technology; Practice Committee of the Society of Reproductive Biologists and Technologists. Minimum standards for practices offering assisted reproductive technologies: a committee opinion. *Fertil Steril* 2020;113(3):536-41.

RLM.10265 Embryology Supervisor **Phase II**

Embryology supervisors must have at least one year of supervisory experience in all aspects of embryology performed by the laboratory or a minimum of 60 cycles over a period of not less than six months.

NOTE: Technical supervisor certification is highly recommended. If the laboratory performs andrology testing, personnel requirements defined in the Laboratory General Checklist must be followed.

REFERENCES
1) Practice Committee of the American Society for Reproductive Medicine; Practice Committee of the Society for Assisted Reproductive Technology; Practice Committee of the Society of Reproductive Biologists and Technologists. Minimum standards for practices offering assisted reproductive technologies: a committee opinion. *Fertil Steril* 2020;113(3):536-41.

*****REVISED** 09/22/2021***

RLM.10832 Back-up Personnel **Phase II**

The laboratory has a well-defined written plan for providing back-up laboratory personnel as needed, to ensure timely embryology services.

NOTE: Staffing levels must be appropriate for the size and volume of the program. If routine staffing of the laboratory does not provide sufficient back up for laboratory personnel, the laboratory must have a written plan describing how patient care needs will be met for its laboratory services in the event of a staffing shortage or emergency.

The plan may include alternative protocols for handling workload, reassignment of internal personnel to complete duties, and written agreements with outside individuals or services to provide the necessary staffing. The laboratory director is responsible to ensure that the qualifications and training of each individual are adequate for the duties to be performed.

For laboratories that are not staffed full-time, appropriately trained personnel are available to routinely monitor storage conditions for cryopreserved specimens

REFERENCES
1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59
2) Practice Committee of the American Society for Reproductive Medicine; Practice Committee of the Society for Assisted Reproductive Technology; Practice Committee of the Society of Reproductive Biologists and Technologists. Minimum standards for practices offering assisted reproductive technologies: a committee opinion. *Fertil Steril* 2020;113(3):536-41.

CRYOPRESERVATION OF SPERM, OOCYTES, AND EMBRYOS

Inspector Instructions:

READ	• Sampling of cryopreservation policies and procedures (includes labeling and tracking of specimens) • Current inventory records • Sampling of specimen storage, retention, retrieval and disposition policies and procedures • Sampling of record storage and retention policies and procedures
ASK	• How does your laboratory ensure specimen identity and integrity? • How does your laboratory ensure viability and measure recovery rates?

DISCOVER

- If responses to the above questions indicate problems or concerns, further evaluate the laboratory's corrective actions and resolutions
- Follow the records of randomly selected cryopreserved sperm and embryos from receipt, preparation, storage and use. Determine if inventory procedures are functioning correctly.

RLM.11500 Cryopreservation **Phase II**

The laboratory has a written procedure(s) for cryopreservation of sperm, oocytes, and/or embryos.

REFERENCES
1) Fehilly CB, *et al.* cryopreservation of cleaving embryos and expanded blastocysts in the human: a comparative study. *Fertil Steril.* 1985;44:638
2) Lasalle B, Testart J. Human embryo features that influence the success of cryopreservation with the use of 1,2 propanediol. *Fertil Steril.* 1985;44:645-651

RLM.11525 Specimen Handling **Phase II**

Procedures are adequate to verify specimen identity and integrity throughout the entire cryopreservation process.

NOTE: All specimens must be labeled with a minimum of two identifiers.

Evidence of Compliance:
✓ Written procedure for maintenance of specimen integrity/identity throughout the process

REFERENCES
1) Department of Health and Human Services, Centers for Medicare and Medicaid Services. Clinical laboratory improvement amendments of 1988; final rule. *Fed Register.* 2003(Jan 24):7173 [42CFR493. 1232, 42CFR493.1242(a)(3)]

RLM.11600 Specimen Labeling/Tracking **Phase II**

The laboratory has a reliable method for labeling and tracking of cryopreserved specimens.

Evidence of Compliance:
✓ Written procedure for specimen labeling and tracking requirements

REFERENCES
1) American Association of Tissue Banks. Standards for tissue banking, 1997

RLM.11700 Record Retention - Patients and Donors **Phase II**

Records of all patient specimens, donor specimens, and patient/donor matches are retained and easily accessible.

Evidence of Compliance:
✓ Written record retention policy

REFERENCES
1) American Association of Tissue Banks. Standards for tissue banking, 1997

RLM.11800 Duplicate Record Storage **Phase II**

Duplicate records are retained in a separate area from the originals, and there is evidence that all copies of the records are reconciled at least annually.

NOTE: Laboratories that use computer-based record systems must demonstrate that the records are backed up when changes are made to the inventory database. The back-up media must be

stored in a location separate from the primary records. In this context, "separate" means that in case of fire or other disaster in the laboratory, the back-up records would be preserved (or readily taken to safety).

REFERENCES
1) Revised guidelines for human embryology and andrology laboratories. *Fertil Steril.* 2008;90 (suppl 3):S45-S59

RLM.11900 Specimen Retrieval — Phase II

Procedures are adequate to ensure that cryopreserved patient specimens can be easily retrieved.

RLM.12000 Inventory — Phase II

Records are available for the current inventory of all specimens that have been stored in its cryobanks.

REFERENCES
1) American Association of Tissue Banks. Standards for tissue banking, 1997
2) Practice Committee of the American Society for Reproductive Medicine; Practice Committee of the Society for Assisted Reproductive Technology; Practice Committee of the Society of Reproductive Biologists and Technologists. Minimum standards for practices offering assisted reproductive technologies: a committee opinion. *Fertil Steril* 2020;113(3):536-41.

RLM.12100 Lost Inventory — Phase II

There is a procedure to investigate inventoried samples that cannot be located in the bank.

RLM.12300 Viable Recovery Rate — Phase II

The laboratory has a program to ensure that cryopreservation is capable of providing viable recovery rates.

Evidence of Compliance:

- ✓ Written procedure or written quality indicator detailing process to verify viable recovery rates, including thresholds for acceptable performance **AND**
- ✓ Records including data and evaluation of post-thaw recovery rates **AND**
- ✓ Records of corrective action when thresholds are not achieved

REFERENCES
1) American Association of Tissue Banks. Standards for tissue banking, 1997

RLM.12400 Specimen Storage/Long-Term Disposition — Phase II

There is a written procedure regarding the length of storage, informed consent and long-term disposition of cryopreserved gametes or embryos.

NOTE: Good practice dictates that the consent form for all procedures is on file and readily available to the laboratory staff.

REFERENCES
1) Trounson A, *et al*. Ultrarapid freezing: a new low-cost and effective method of embryo cryopreservation. *Fertil Steril.* 1987;48:843-50
2) Harrison KL, *et al.* The optimal concentration of albumin as embryo cryoprotectant. *J In Vitro Embryo Transfer*. 1987;4:288-291
3) American Association of Tissue Banks. Standards for tissue banking, 1997
4) The Ethics Committee of the American Society of Reproductive Medicine. Disposition of abandoned embryos. *Fertil Steril.* 2004: 82 (suppl 1): 253.

DONOR REPRODUCTIVE CELLS/TISSUES

This section applies to laboratories that are collecting, processing, storing, or transplanting donor tissues and cells, including donor sperm, donor eggs, gestational surrogacy, and/or embryo donation.

Inspector Instructions:

	• Sampling of reproductive cells/tissues policies and procedures (includes labeling, tracking, quarantine, storage) • Applicable FDA registration • Sampling of cells/tissue storage records • Sampling of donor eligibility determination records
	• Quarantined donor cells/tissues
	• How are you informed of an adverse reaction to implanted cells/tissue?
	• Follow the records of donor cell/tissue identification through receipt, preparation, storage, issuing, acceptance and disposition. Determine that procedures and records ensure adequate tracking of all cells/tissues.

RLM.12411 Reproductive Donor Cell/Tissue Program **Phase II**

The authority, responsibility and accountability of the reproductive donor cell/tissue program are clearly defined.

NOTE: This includes donor testing and reproduction-related medical procedures.

Evidence of Compliance:

✓ Written policy defining authority, responsibility and accountability for program

REFERENCES

1) U.S Department of Health and Human Services, Food and Drug Administration https://www.fda.gov/vaccines-blood-biologics/tissue-tissue-products

RLM.12444 Regulatory Document Availability **Phase II**

For US laboratories, the following documents are readily available:

1. **Applicable sections of 21CFR**
2. **FDA guidelines.**

REFERENCES

1) U.S Department of Health and Human Services, Food and Drug Administration https://www.fda.gov/vaccines-blood-biologics/biologics-establishment-registration/tissue-establishment-registration

RLM.12455 FDA Registration **Phase II**

The laboratory is registered with the FDA for all appropriate human cells, tissues, and cellular and tissue-based products (HCT/P).

NOTE: Laboratories that recover, process, store, label, package, or distribute any reproductive cells/tissues, or screen or test the donor must register with the FDA annually and update their current product listing.

REFERENCES

1) Department of Health and Human Services, Food and Drug Administration. Human cells, tissues, and cellular and tissue-based products; final rule. *Fed Register*. 2007(April 1):718 [21CFR1271.21]
2) U.S Department of Health and Human Services, Food and Drug Administration https://www.fda.gov/vaccines-blood-biologics/tissue-tissue-products

RLM.12466 Record Retention - Donor Reproductive Cells/Tissues **Phase II**

Donor records are retained at least 10 years after the date of transfer or distribution, disposition or expiration, whichever is latest.

Evidence of Compliance:

✓ Written record retention policy

REFERENCES

1) Department of Health and Human Services, Food and Drug Administration. Human cells, tissues, and cellular and tissue-based products; final rule. *Fed Register*. 2007(April 1):720-21 [21CFR1271.55(d)(4)]
2) U.S Department of Health and Human Services, Food and Drug Administration https://www.fda.gov/vaccines-blood-biologics/tissue-tissue-products

RLM.12499 Donor Cells/Tissues Tracking **Phase II**

Each donor cell/tissue product is assigned a unique identification code that relates to the donor and to all records pertaining to that product, with maintenance and tracking of this identifier throughout receipt, storage, issuing of the product, and disposition.

NOTE: Unless the donor cells/tissue is for directed donation, the labeling number and information may not contain the donor's name, social security number, or medical record number. An institution may choose to use a unique identification code for cells/tissues intended for sexually intimate partners and directed donations.

For cryopreserved embryos created for a patient/couple labeled with identifying information that are subsequently made available for "anonymous embryo donation," it may not be possible to remove the patient identifiers from the cryostorage device without risking harm to the embryo(s). In this situation, the laboratory must take steps to ensure that the identity of the donating patient/couple remains anonymous.

REFERENCES

1) U.S Department of Health and Human Services, Food and Drug Administration https://www.fda.gov/vaccines-blood-biologics/tissue-tissue-products

RLM.12510 Donor Cells/Tissues Labeling **Phase II**

Donor cells/tissues are labeled with the following information in accordance with the intended use:

- **Unique identification code**
- **Description of the type of cells/tissue(s)**
- **Expiration date (if any)**
- **Warnings (if any)**
- **Name and address of the establishment that made the eligibility determination and made the cells/tissue(s) available for distribution**

NOTE: The information may either appear on the label or in the accompanying documentation; however, the unique identifier must be on the storage device.

For laboratories subject to US regulations, the warnings are those required by FDA regulation Title 21; 1271.60(d), 1271.65(b)(2) or 1271.90(b) and include the following types of statements, as applicable:

- *Tissues not evaluated for infectious substances*
- *Warning: Advise recipients of communicable disease risks*
- *Warning: Reactive test results for (name of disease agent or disease)*
- *Advise recipients that screening and testing of donor(s) were not performed at the time of cryopreservation of the reproductive tissue, but have been performed subsequently*

REFERENCES

1) U.S Department of Health and Human Services, Food and Drug Administration https://www.fda.gov/vaccines-blood-biologics/tissue-tissue-products

RLM.12521 Donor Cells/Tissues Quarantine — Phase II

For facilities involved in donor sperm banking and/or donor egg banking, reproductive donor cells/tissues are placed in quarantine until completion of the donor eligibility determination.

NOTE: Cells/tissue in quarantine status must be easily distinguishable from cells/tissues available for release and distribution. If cells/tissues in quarantined status are shipped outside of the laboratory, the quarantined status must be clearly indicated.

Evidence of Compliance:

- ✓ Written procedure for quarantine of tissues including storage, release and distribution **AND**
- ✓ Records of quarantined cells/tissues

REFERENCES

1) Department of Health and Human Services, Food and Drug Administration. Human cells, tissues, and cellular and tissue-based products; final rule. *Fed Register*. 2007(April 1):721-22 [21CFR1271.60]
2) U.S Department of Health and Human Services, Food and Drug Administration https://www.fda.gov/vaccines-blood-biologics/tissue-tissue-products

RLM.12532 Donor Record Statement/Summary — Phase II

Donor records include a statement of eligibility or ineligibility and a summary of the records used to make the donor-eligibility determination.

NOTE: The summary must include the following:

- *Results of all communicable disease testing and screening performed*
- *Name and address of the establishment making the donor eligibility determination*
- *Statement noting the reason for determinations of ineligibility.*

REFERENCES

1) U.S Department of Health and Human Services, Food and Drug Administration https://www.fda.gov/vaccines-blood-biologics/tissue-tissue-products

RLM.12543 Release From Quarantine — Phase II

For facilities involved in donor sperm banking and/or donor egg banking, there is a written procedure to release reproductive cells/tissues from quarantine that includes a review of records by a supervisor or other designated individual.

NOTE: There must be a mechanism to ensure that quarantined cells/tissues, cells/tissues from deferred donors, and cells/tissues for which testing is incomplete are not inappropriately released. The disposition of these cells/tissues must be controlled and recorded. Records must allow for an audit for compliance with the release from quarantine.

REFERENCES

1) U.S Department of Health and Human Services, Food and Drug Administration https://www.fda.gov/vaccines-blood-biologics/tissue-tissue-products

RLM.12554 Reproductive Cells/Tissues - Ineligible Donors **Phase II**

For reproductive cells/tissues from donors determined to be ineligible, cells/tissues are stored in a separate area and specifically labeled as a biohazard, and/or subject to other procedures to prevent improper release.

NOTE: Donor cells/tissues may be used only under limited circumstances when results of any screening or testing performed indicate the presence of relevant communicable disease agents and/or risk factors or clinical evidence of disease agents. If these products are stored for use, they must be labeled as a biohazard, and the physician must be notified of the results. Physically separate does not necessarily indicate that a separate dewar (LN2 storage tank) is needed. Storage may be maintained in a separate basket or section of the dewar.

Evidence of Compliance:

- ✓ Written procedure for storage and labeling of ineligible donor cells/tissues

REFERENCES

1) U.S Department of Health and Human Services, Food and Drug Administration https://www.fda.gov/vaccines-blood-biologics/tissue-tissue-products

RLM.12587 Donor Infection/Adverse Events Investigation **Phase II**

There are written procedures for investigating donor infections or adverse events after reproductive donor cells/tissues are received or implanted.

NOTE: Possible cell/tissue-transmitted infections and other adverse events must be investigated and reported to the reproductive cells/tissue source facility when appropriate. If the source facility notifies the user facility about a donor's infection or reactive infectious-disease test, procedures are required for quarantining tissue or notifying the cell/tissue recipient when appropriate.

Evidence of Compliance:

- ✓ Records of investigation of cell/tissue-transmitted infections or adverse events **AND**
- ✓ Records from source facility recalls indicating action taken

REFERENCES

1) U.S Department of Health and Human Services, Food and Drug Administration https://www.fda.gov/vaccines-blood-biologics/tissue-tissue-products