



# Intra-operative Cell Salvage

## Competency Assessment Workbook

**Trainee:**

**Hospital:**

**Trainer/Supervisor:**

**Date Commenced:**

**Date Completed:**



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# Introduction

This training framework for intra-operative cell salvage (ICS) operators has been developed on behalf of the NHS Blood and Transplant Appropriate Use of Blood Group and the Clinical Advisory Group in Wales. It has been reviewed by the UK Cell Salvage Action Group.

To help address training concerns and the lack of competency assessments for operators in this specialist field, this workbook has been developed in consultation with cell salvage champions and other national groups with blood safety and conservation as an essential part of their remit. The competencies are linked to the National Occupational Standards for cell salvage, which are available on the Skills for Health website [www.skillsforhealth.org.uk](http://www.skillsforhealth.org.uk).

The competencies have been split into 5 sections to allow assessment to be tailored to the responsibilities of the individual learner. **Sections of the competency assessment inappropriate to the level of responsibility of an individual learner should be removed from the workbook by the trainer.**

Each section is then further divided into Knowledge and Understanding and Performance Criteria. Learners must complete all indicators for both Knowledge and Understanding and for Performance Criteria within a section in order to be signed off as competent for that section. Knowledge and Understanding need only be completed once, Performance Criteria should be completed for each device the learner will be using in clinical practice.

<b>Section 1</b>	General (To be completed by <u>all</u> learners)
<b>Section 2</b>	Prepare equipment for intra-operative blood salvage collection
<b>Section 3</b>	Operate equipment for intra-operative blood salvage Collection
<b>Section 4</b>	Prepare equipment for processing intra-operative salvaged blood
<b>Section 5</b>	Operate and monitor equipment for processing intra-operative salvaged blood and complete salvaged blood processing

It is essential that all staff involved in the operation of ICS machines are trained to the level at which they are expected to operate. **Training should include both theory and practice.** Operators need to develop a broad understanding of the appropriate use of ICS including the contra-indications and implications of administration and reinfusion of salvaged blood. It is recommended that along with practical training in a non-clinical environment learners complete the UK cell salvage e-learning package [www.learnbloodtransfusion.org.uk](http://www.learnbloodtransfusion.org.uk), the ICS Education Workbook (which can be downloaded from the Better Blood Transfusion Toolkit at [www.transfusionguidelines.org.uk](http://www.transfusionguidelines.org.uk)) and a period of supervised clinical training prior to commencing this workbook.

Hospitals involved in training staff in the use of ICS should adopt the following principles: -

- Identify a key trainer/s (it is suggested that these people should have a recognised teaching and assessing qualification).
- Theory training and assessment of knowledge should be completed prior to undertaking practical training.
- Staff should be allowed dedicated time for practical training which can be delivered by manufacturer and/or in-house trainers. (In-house training should be carried out by key trainers).

- In-house trainers should assess competency (it is suggested that in-house trainers have completed this workbook and that they hold a teaching and assessing qualification).
- Certificates of competence should be issued by the Organisation.
- Documented training records should be kept by the Organisation and the learner.

Procedural documents/policies should be available to staff giving clear guidance on: -

- Indications and contraindications
- Who can operate the machines and levels of independent operation
- How to operate the equipment
- Warnings regarding contamination of the surgical field
- Rules on labelling, expiry date and time of salvaged blood
- Reinfusion of salvaged red cells
- Recognising and reporting serious adverse events

### Maintaining competency

The Organisation should have a policy that clearly states the number of procedures a person should undertake in a designated period of time to maintain their competency. This policy should also include how often competency assessments should be performed. Where more than one type of ICS equipment is in use, the theory sections need only be completed once, however, the Performance Criteria sections should be completed for each type of device in use.

Learners should have a theory update and if necessary technical training when moving clinical speciality to ensure differences in practice have been covered.

### Links to KSF

It is envisaged that this workbook could be used to provide evidence of the knowledge and skills acquired by the learner with regards to ICS. It can also be used to identify any gaps between the skills and knowledge needed to do the job, and the current skills and knowledge of the individual member of staff as part of their KSF review.

### Audit

It is recommended that Organisations should undertake periodic audit to verify the principles outlined above are being adopted. It is suggested that a designated person is made responsible for this activity.

Karen Shreeve  
Welsh Blood Service  
[Karen.shreeve@wales.nhs.uk](mailto:Karen.shreeve@wales.nhs.uk)

Rebecca Gerrard  
NHS Blood and Transplant  
[Rebecca.gerrard@nhsbt.nhs.uk](mailto:Rebecca.gerrard@nhsbt.nhs.uk)

Pages from this workbook can be reproduced as required by the learner/trainer/supervisor and are available on the Better Blood Transfusion Toolkit at [www.transfusionguidelines.org.uk](http://www.transfusionguidelines.org.uk)

We would welcome feedback on the content of this workbook.

These competency assessments have been endorsed by: The Association for Perioperative Practice, The Association of Anaesthetists of Great Britain and Ireland, the British Blood Transfusion Society and the College of Operating Department Practitioners





## Record of Assessors Initials

All assessors should record their details on this sheet.

	Initials	Full Name (PRINT)	Job title	Signature	e-mail address	Telephone number
1						
2						
3						
4						
5						
6						
7						

## Confirmation of Required Pre-assessment Training

This page **must** be completed prior to competency assessment. Candidates should not be competency assessed before they have completed the pre-assessment training requirements.

Type of Training	Date Completed	Candidate's signature (sign and date)	Assessor's signature (sign and date)
<b>Theory (delivered through at least one of the following methods)</b>  Face to Face  Learn Cell Salvage <u>and</u> ICS Education Workbook			
<b>Practical (classroom)</b>  Set up of the ICS equipment in a non-clinical setting			
<b>Practical (clinical)</b>  Supervised clinical training (recommended minimum of 3 cases)			

## Supervised Clinical Training Record

A minimum of 3 supervised clinical cases should be completed by the candidate prior to competency assessment. Details of these cases should be entered into the table below.

Case	Date	Operation	Machine Type	Standard Completed (Tick all that apply)				Comments & supervisor's signature
				PCS19	PCS20	PCS21	PCS22	
1								
2								
3								
4								
5								
6								
7								
8								

**PCS19: Prepare equipment for intra-operative blood salvage collection**

**PCS20: Operate equipment for intra-operative blood salvage collection**

**PCS21: Prepare equipment for processing intra-operative salvaged blood**

**PCS22: Operate and monitor equipment for processing intra-operative salvage blood and complete the salvaged blood processing**

## Assessment Plan

This page should be completed at the end of the candidate's assessment and kept with the departments training records as evidence of staff competency.

Enter Candidate's Name: \_\_\_\_\_ has undergone assessment and has demonstrated competency in carrying out the following tasks:

	Pre-assessment Agreement			Competency Assessment	
	Proposed Date of Assessment (or N/A)	Training Lead's Signature	Trainee's Signature	Completed on (date)	Assessor's Signature
<i>General (Everyone)</i>					
<i>Prepare equipment for intra-operative blood salvage collection</i>					
<i>Operate equipment for intra-operative blood salvage collection</i>					
<i>Prepare equipment for processing intra-operative salvaged blood</i>					
<i>Operate and monitor equipment for processing intra-operative salvaged blood and complete the salvaged blood processing</i>					

# ICS Competency Assessment

Section 1							General		
Knowledge and Understanding	Assessment Method								
The trainee demonstrated knowledge and understanding of:	DO	S	EW	PL	WQ	OQ	Assessor's Initials	Trainee's Initials	Date
Current European and National legislation, national guidelines, organisational policies and protocols related to the Intraoperative Cell Salvage (ICS) process.									
Their responsibilities and accountability in relation to the ICS process.									
The importance of working within their own sphere of competence and limits of personal responsibility and accountability in relation to the ICS Process.									
Infection prevention and control in relation to the ICS process and the potential consequences of poor practice.									
The rationale behind the use of autologous blood transfusion.									
The dangers of re-using equipment designed for single use only.									
The applications of ICS in relation to patients who refuse allogeneic blood on religious or other grounds.									
The importance of recording all information, clearly and precisely in the appropriate documentation.									
The importance of immediately reporting any issues which are outside your own sphere of competence without delay to the relevant member of staff.									

DO Direct Observation	S Simulation	EW Expert Witness	PL Prior Learning (evidence required)	WQ Written Questions	OQ Oral Questions
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# ICS Competency Assessment

Section 1							General		
Performance Criteria	Assessment Method								
The trainee demonstrated, in a clinical setting, that they could:	DO	S	EW	PL	WQ	OQ	Assessor's Initials	Trainee's Initials	Date
Apply standard precautions for infection control and other necessary health and safety measures.									

Make and model of equipment assessment completed on	Assessor's Initials	Trainee's Initials	Date

DO Direct Observation	S Simulation	EW Expert Witness	PL Prior Learning (evidence required)	WQ Written Questions	OQ Oral Questions
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# ICS Competency Assessment

<b>Section 2 Prepare equipment for intra-operative blood salvage collection</b>									
Knowledge and Understanding	Assessment Method								
The trainee demonstrated knowledge and understanding of:	DO	S	EW	PL	WQ	OQ	Assessor's Initials	Trainee's Initials	Date
The role of the suction equipment in relation to Intraoperative Cell Salvage (ICS).									
The purpose of the collection set equipment.									
The rationale behind setting an appropriate vacuum level.									
The need for an appropriate anticoagulant and its correct preparation.									
The reason for setting up the collection equipment.									
The rationale for expiry time on the set up equipment.									
The role of the individual in preparing equipment for ICS and how this relates to other members of the theatre team.									
The importance of reporting all information to the relevant member of staff.									
How to recognise hazards, errors and malfunctions of equipment and the appropriate action to take.									

DO Direct Observation	S Simulation	EW Expert Witness	PL Prior Learning (evidence required)	WQ Written Questions	OQ Oral Questions
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# ICS Competency Assessment

<b>Section 2 Prepare equipment for intra-operative blood salvage collection</b>									
Performance Criteria	Assessment Method								
The trainee demonstrated, in a clinical setting, that they could:	DO	S	EW	PL	WQ	OQ	Assessor's Initials	Trainee's Initials	Date
Ensure all members of the theatre team are aware that intra-operative cell salvage is planned.									
Select and set up collection equipment correctly following manufacturer's instructions:									
a. ensuring the correct equipment is safe to use									
b. using aseptic technique									
c. prepare the anticoagulant in accordance with national guidelines and local policy									
Inform the relevant member of staff that the collection equipment is fully prepared as necessary.									

Make and model of equipment assessment completed on	Assessor's Initials	Trainee's Initials	Date

DO Direct Observation	S Simulation	EW Expert Witness	PL Prior Learning (evidence required)	WQ Written Questions	OQ Oral Questions
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# ICS Competency Assessment

<b>Section 3 Operate equipment for intra-operative blood salvage collection</b>									
<b>Knowledge and Understanding</b>	<b>Assessment Method</b>								
<b>The trainee demonstrated knowledge and understanding of:</b>	<b>DO</b>	<b>S</b>	<b>EW</b>	<b>PL</b>	<b>WQ</b>	<b>OQ</b>	<b>Assessor's Initials</b>	<b>Trainee's Initials</b>	<b>Date</b>
The indications and contraindications to the use of Intraoperative Cell Salvage (ICS).									
When and for whom collections for ICS could be started.									
The importance of labelling the collection equipment with unique patient identification.									
The importance of priming the collection equipment with anticoagulant to prevent blood clotting.									
The role of suction equipment in relation to ICS.									
The rationale behind setting an appropriate vacuum level.									
The components of whole blood.									
The functions of red cells in the delivery of oxygen to body tissues.									
The differences between salvaged red cells and whole blood.									
The effects of citrate or heparin anticoagulant on salvaged blood and the appropriate rate/ratio of anticoagulant.									
The possible contents of the collection reservoir during surgery, including potential contaminants.									

DO Direct Observation	S Simulation	EW Expert Witness	PL Prior Learning (evidence required)	WQ Written Questions	OQ Oral Questions
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# ICS Competency Assessment

<b>Section 3                      Operate equipment for intra-operative blood salvage collection</b>									
<b>Knowledge and Understanding Cont...</b>	<b>Assessment Method</b>								
<b>The trainee demonstrated knowledge and understanding of:</b>	<b>DO</b>	<b>S</b>	<b>EW</b>	<b>PL</b>	<b>WQ</b>	<b>OQ</b>	<b>Assessor's Initials</b>	<b>Trainee's Initials</b>	<b>Date</b>
The importance of immediately reporting sudden, unexpected increases in blood loss to the appropriate member of staff.									
The advantages and risks of swab washing.									
The process of salvaging blood from swabs.									
The rationale for weighing all swabs during ICS.									
How to estimate blood loss during ICS.									
The rationale for and calculation of expiry time of the salvaged blood.									
The role of the individual in collecting salvaged blood and how this relates to other members of the theatre team.									
How to recognise hazards, errors and malfunctions of equipment and the appropriate action to take.									

DO Direct Observation	S Simulation	EW Expert Witness	PL Prior Learning (evidence required)	WQ Written Questions	OQ Oral Questions
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# ICS Competency Assessment

<b>Section 3 Operate equipment for intra-operative blood salvage collection</b>									
Performance Criteria	Assessment Method								
The trainee demonstrated, in a clinical setting, that they could:	DO	S	EW	PL	WQ	OQ	Assessor's Initials	Trainee's Initials	Date
Confirm decision to collect blood with the relevant member of staff.									
Accurately label the collection reservoir with patient's details.									
Correctly prime the collection equipment with an appropriate volume of anticoagulant solution following manufacturer's instructions.									
Start the collection using an appropriate vacuum level.									
Deliver or regulate the correct volume of anticoagulant in relation to blood loss.									
Monitor the progress of the procedure and immediately report any problems to the appropriate member of staff.									
Monitor the volume of salvaged blood being collected and immediately report sudden, unexpected increases in the rate of blood loss to the appropriate member of staff.									
Estimate and record the volume of blood collected on completion of the collection procedure.									

DO Direct Observation	S Simulation	EW Expert Witness	PL Prior Learning (evidence required)	WQ Written Questions	OQ Oral Questions
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## Section 3 Operate equipment for intra-operative blood salvage collection

Performance Criteria Cont...	Assessment Method								
The trainee demonstrated, in a clinical setting, that they could:	DO	S	EW	PL	WQ	OQ	Assessor's Initials	Trainee's Initials	Date
Report completion of the collection to the appropriate member of staff.									
Clear and dispose of waste in accordance with local guidelines.									
Complete and sign all relevant documentation.									

Make and model of equipment assessment completed on	Assessor's Initials	Trainee's Initials	Date

DO Direct Observation	S Simulation	EW Expert Witness	PL Prior Learning (evidence required)	WQ Written Questions	OQ Oral Questions
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# ICS Competency Assessment

## Section 4 Prepare equipment for processing intra-operative salvage blood

Knowledge and Understanding	Assessment Method						Assessor's Initials	Trainee's Initials	Date
	DO	S	EW	PL	WQ	OQ			
The trainee demonstrated knowledge and understanding of:									
The indications and contraindications of the use of Intraoperative Cell Salvage (ICS).									
Factors to be considered in the decision to set up the processing equipment.									
The types, purpose and functions of the ICS machines used in your work area.									
The purpose of the processing set equipment.									
The rationale for expiry time on the set up equipment.									
The choice of intravenous normal saline 0.9% as the wash fluid.									
The possible contents of the collection reservoir during surgery, including potential contaminants, in relation to the decision to set up to process salvaged blood.									
The advantages or risks of swab washing.									
How to estimate blood loss ICS.									
The rationale for and calculation of expiry time of the salvaged blood.									
The role of the individual in preparing equipment for processing salvaged blood and how this relates to other members of the theatre team.									

DO Direct Observation	S Simulation	EW Expert Witness	PL Prior Learning (evidence required)	WQ Written Questions	OQ Oral Questions
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# ICS Competency Assessment

<b>Section 4 Prepare equipment for processing intra-operative salvage blood</b>									
<b>Knowledge and Understanding Cont...</b>	<b>Assessment Method</b>								
<b>The trainee demonstrated knowledge and understanding of:</b>	<b>DO</b>	<b>S</b>	<b>EW</b>	<b>PL</b>	<b>WQ</b>	<b>OQ</b>	<b>Assessor's Initials</b>	<b>Trainee's Initials</b>	<b>Date</b>
The importance of selecting the correct machine programme, where applicable, ready for use.									
How to recognise hazards, errors and malfunctions of equipment and the appropriate action to take.									

DO Direct Observation	S Simulation	EW Expert Witness	PL Prior Learning (evidence required)	WQ Written Questions	OQ Oral Questions
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# ICS Competency Assessment

<b>Section 4      Prepare equipment for processing intra-operative salvage blood</b>									
Performance Criteria	Assessment Method								
The trainee demonstrated, in a clinical setting, that they could:	DO	S	EW	PL	WQ	OQ	Assessor's Initials	Trainee's Initials	Date
Check and confirm with the relevant member of staff the suitability of the salvaged blood for processing.									
Maintain strict asepsis at all times.									
Check and confirm that the correct processing equipment is safe to use.									
Load the processing equipment into the machine and connect to the collection equipment.									
Check and confirm that the wash fluid is intravenous normal saline 0.9% before priming the system.									
Set the correct machine programme ready for use.									
Inform the relevant member of staff that processing equipment is fully prepared as necessary.									

Make and model of equipment assessment completed on	Assessor's Initials	Trainee's Initials	Date

DO Direct Observation	S Simulation	EW Expert Witness	PL Prior Learning (evidence required)	WQ Written Questions	OQ Oral Questions
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# ICS Competency Assessment

Section 5 Operate and monitor equipment for processing intra-operative salvage blood and complete salvaged blood processing									
Knowledge and Understanding	Assessment Method								
The trainee demonstrated knowledge and understanding of:	DO	S	EW	PL	WQ	OQ	Assessor's Initials	Trainee's Initials	Date
The indications and contraindications for the use of Intraoperative Cell Salvage (ICS).									
The role of the individual in operating and monitoring equipment for processing salvaged blood, completing salvaged blood processing and how this relates to other members of the theatre team.									
The components of whole blood and the basis of centrifugal separation.									
The functions of red cells in the delivery of oxygen to body tissues.									
The differences between salvaged red cells and whole blood.									
Factors to be considered in the decision to proceed with processing the reservoir contents.									
The types, purpose and function of ICS machines within your work area.									
The rationale behind the choices of machine programme for ICS machines in use in the work area.									
The purpose of the collection equipment and processing equipment.									
The effects of citrate or heparin anticoagulant on salvaged blood and the importance of documenting the amount of anticoagulant used.									
DO Direct Observation	S Simulation	EW Expert Witness	PL Prior Learning (evidence required)	WQ Written Questions	OQ Oral Questions				

# ICS Competency Assessment

## Section 5 Operate and monitor equipment for processing intra-operative salvage blood and complete salvaged blood processing

Knowledge and Understanding Cont...	Assessment Method						Assessor's Initials	Trainee's Initials	Date
The trainee demonstrated knowledge and understanding of:	DO	S	EW	PL	WQ	OQ			
The possible contents of the collection reservoir during surgery, including potential contaminants.									
The choice of intravenous normal saline 0.9% as the wash fluid.									
The importance of using an appropriate wash volume.									
The advantages and risks of swab washing.									
The process of salvaging blood from swabs.									
The rationale for weighing all swabs during ICS.									
How to estimate blood loss during ICS.									
The potential composition of the contents of the re-infusion bag.									
How the re-infusion bag should be labelled.									
The rationale for and calculation of expiry time of the salvaged blood.									
The types of filters used when re-infusing ICS blood and the potential limitations.									
The principles and methods of waste disposal related to the equipment.									
How to recognise hazards, errors and malfunctions of equipment and the appropriate action to take.									
DO Direct Observation	S Simulation	EW Expert Witness	PL Prior Learning (evidence required)	WQ Written Questions	OQ Oral Questions				

# ICS Competency Assessment

<b>Section 5                      Operate and monitor equipment for processing intra-operative salvage blood and complete salvaged blood processing</b>									
<b>Performance Criteria</b>	<b>Assessment Method</b>								
<b>The trainee demonstrated, in a clinical setting, that they could:</b>	<b>DO</b>	<b>S</b>	<b>EW</b>	<b>PL</b>	<b>WQ</b>	<b>OQ</b>	<b>Assessor's Initials</b>	<b>Trainee's Initials</b>	<b>Date</b>
Confirm decision to process salvaged blood with the relevant member of staff.									
Use intravenous normal saline 0.9% as the wash fluid as recommended by the manufacturer.									
Monitor the progress of the processing procedure and report any problems to the appropriate member of staff.									
Correctly record the volume of processed salvaged cells for re-infusion.									
Report completion of the processing procedure to the relevant member of staff.									
Clearly label salvaged blood re-infusion bags with patient's name, hospital number, date of birth, 'use by' time and the volume of salvaged cells.									

DO Direct Observation	S Simulation	EW Expert Witness	PL Prior Learning (evidence required)	WQ Written Questions	OQ Oral Questions
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## Section 5      Operate and monitor equipment for processing intra-operative salvage blood and complete salvaged blood processing

Performance Criteria Cont...	Assessment Method								
The trainee demonstrated, in a clinical setting, that they could:	DO	S	EW	PL	WQ	OQ	Assessor's Initials	Trainee's Initials	Date
Keep the processed blood with the patient.									
Clear and dispose of waste as appropriate in accordance with local guidelines.									
Complete and sign all relevant documentation.									

Make and model of equipment assessment completed on	Assessor's Initials	Trainee's Initials	Date

DO Direct Observation	S Simulation	EW Expert Witness	PL Prior Learning (evidence required)	WQ Written Questions	OQ Oral Questions
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# Reflective Learning Record

<b>Procedure:</b>	<b>Date:</b>	<b>Case Log Number:</b>
<b>Additional Information:</b>		

**What have I learnt from this procedure?**

**How can I apply this to my future work?**

<b>What went well?</b>	<b>What could I have done differently?</b>
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**Is there anything I didn't understand or need to explore further in order to consolidate my learning?**

**Signature of Learner.....**



## References

National Occupational Standards [www.skillsforhealth.org.uk](http://www.skillsforhealth.org.uk)

		<b>Sections</b>	<b>KSF Dimension</b>
PCS19:	Prepare equipment for intra-operative blood salvage collection	1 & 2	HWB10
PCS20:	Operate equipment for intra-operative blood salvage collection	1 & 3	HWB7
PCS21:	Prepare equipment for processing intra-operative salvaged blood	1 & 4	HWB10
PCS22:	Operate and monitor equipment for processing intra-operative salvage blood and complete the salvaged blood processing	1 & 5	HWB7