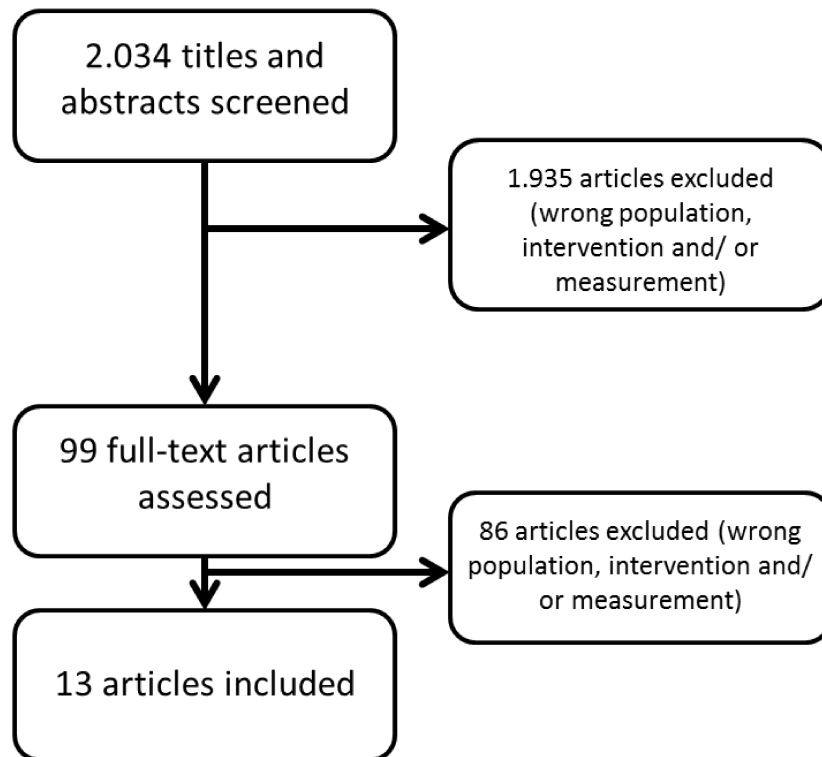


Supplementary file S1**Box 1. MEDLINE search strategy**

1. exp Education, Medical, Graduate/
2. Postgraduate\$.tw.
3. Postdoc\$.tw.
4. (Intern or interns or internship\$).tw.
5. residen\$.tw.
6. Graduat\$.tw.
7. fellow\$.tw.
8. doctor\$.tw.
9. (physician\$ or clinician\$).tw.
10. Alumn\$.tw.
11. or/1-10
12. Documentation/
13. Self-Assessment/
14. Portfolio\$.tw.
15. (case adj (folder\$ or note\$)).tw.
16. (learn\$ adj5 (record\$ or diar\$ or journal\$)).tw.
17. (log?book\$ or log book\$).tw.
18. (self adj (reflect\$ or assess\$)).tw.
19. or/12-18
20. Education, Medical/
21. Clinical Competence/
22. (clinical adj (teach\$ or skill\$ or train\$ or educat\$ or competenc\$)).tw.
23. (Entrustable Professional Activit\$ or epa).tw.
24. or/20-23
25. and/11,19,24

Supplementary file S2

Flow chart, selection of studies



Supplementary file S3. Characteristics of included studies.

Author, year	Country	Intervention / type study	Target population	Type portfolio	Content portfolio	Other relevant information	MERSQI
Cheung CR, 2011 [19]	UK	Personal opinion about use of portfolios and what should be included	NA	NA	Reflections, DOPS, other results of procedures and assignments, case-based discussions, multisource feedback, learning goals	No additional relevant information	NA
Clay AS, 2007 [8]	USA	Description portfolio development and implementation	Trainees working in the critical care field	Electronic	Reflections, DOPS, other results of procedures and assignments, case-based discussions, multisource feedback	Portfolio was supported by a website with additional learning tools.	NA
Donato AA, 2012 [9]	USA	Description portfolio development and implementation	Internal Medicine trainees	Electronic	Reflections, DOPS, other results of procedures and assignments, case-based discussions, multisource feedback, learning goals, curriculum vitae	Portfolio was developed according to 6 core competencies: Patient care, Medical knowledge, Practical based improvement, Interpersonal communication, System-based practice, Professionalism	NA
Frank A, 2017 [10]	USA	Questionnaire for program directors about portfolios in general (n = 82)	Pediatric trainees	NA	NA, questionnaire about important aspects portfolios	DOPS, other results of procedures and assignments are especially useful, portfolio for reflections less frequently used	NA
Fung M, 2000 [4]	Canada	One-year portfolio intervention study (n = 41)	Gynaecology trainees	Electronic	Reflections, DOPS, other results of procedures and assignments, case-based discussions, multisource feedback	Portfolio had significant effect on trainees perception of their self-directed learning	11

						abilities	
Hrisos S, 2008 [11]	UK	Questionnaires for trainees and supervisors about locally developed portfolio (n = 233)	Foundation doctors	Electronic and paper-based	Reflections, DOPS, other results of procedures and assignments, case-based discussions	Feedback from supervisors and colleagues is essential to stimulate development	6.5
Jenkins L, 2013 [12]	South Africa	Questionnaires for trainees and supervisors about locally developed portfolio (n = 101)	Family medicine trainees	Electronic and paper-based	Reflections, DOPS, other results of procedures and assignments, case-based discussions, learning goals	Flexible format portfolio is important	6.5
Kjaer NK, 2008 [13]	Denmark	Description portfolio development and implementation (n = 65)	Family medicine trainees	Electronic	Reflections, DOPS, other results of procedures and assignments, case-based discussions	Portfolio supported monitoring progress of trainee. Lack of feedback was important barrier	7.5
Lewis CE, 2010 [14]	USA	End-of-rotation global evaluations were compared before (n = 1448) and after (n = 697) implementation portfolio, questionnaire also administered	Surgery trainees	Electronic	DOPS, other results of procedures and assignments	The majority of residents concluded that the portfolio was a useful tool	6
McEwen LA, 2015 [15]	Canada	Description portfolio development and implementation, questionnaire also administered (n = 32)	Family medicine trainees	Electronic	DOPS, other results of procedures and assignments, case-based discussions, multisource feedback, learning goals	Majority trainees indicated that they were confident in their ability to identify personal learning goals	6
Peeraer G,	Belgium	Description	Surgery	Electronic	Other results of procedures and	Only description of	NA

2015 [16]		portfolio development	trainees		assignments, case-based discussions	development portfolio	
Webb TP, 2012 [17]	USA	Semi-structured interviews and questionnaire after implementation portfolio (n = 23)	Surgery trainees	Electronic	Reflections and learning goals	No additional relevant information	6.5
Zundel S, 2015 [18]	Germany	Questionnaires for trainees before and after implementation portfolio (230 questionnaires)	Surgery trainees	Paper-based	Other results of procedures and assignments	Implementation portfolio did enhance clinical activity for surgery trainees	6.5

Abbreviations. USA, United States of America; UK, United Kingdom; DOPS, Direct Observation of Procedural Skills; NA, not applicable.

MERSQI, Medical Education Research Study Quality Instrument (score range 5-18), cut-off points: <10 high risk of bias; 10 to 11 moderate risk of bias, ≥ 12 low risk of bias.

Supplementary file S4**Contents****Links, templates and assessment forms for:**

Curriculum vitae (CV)

Personal development plan (PDP)

Clinical work

Examples logbooks

Assessment forms

- Mini-Clinical Evaluation Exercise (mini-CEX)
- Direct Observation of Procedural Skills (DOPS)
- Case-Based Discussion (CbD)

Template personal reflection

Professional behaviour

- Multisource feedback form

Curriculum vitae (CV)**Links to websites that discuss what is important in an medical CV**

<https://www.bma.org.uk/advice-and-support/career-progression/applying-for-a-job/writing-your-medical-cv>

<https://www.thebalancecareers.com/medical-curriculum-vitae-example-2060325>

<https://www.bmj.com/content/328/7452/s225>

Personal development plan (PDP)

Template for PDP, including two examples

Learning goal	Current knowledge or skills level	Goal	Action plan			Completed
			Action 1	By when	Agreed with supervisor	
Learn how to perform and interpret a capillaroscopy	Seen supervisor perform one	Perform and interpret a capillaroscopy independently	Follow EULAR Course on Capillaroscopy and Rheumatic Diseases	March 2021	Yes	Yes
			Follow practical skills sessions capillaroscopy I and II at EULAR 2021	June 2021	Yes	No
			Perform and interpret 15 capillaroscopies under strict supervision	August 2021	Yes	No
			Perform and interpret 10 capillaroscopies with supervision on call	September 2021	Yes	No
Learn how to chair a multidisciplinary team meeting (rheumatology - radiology)	Attended this meeting and actively participated as team member	Prepare the agenda of the meeting, ensure all relevant team members participate in the discussion, ensure relevant clinical data are recorded and recommendations are summarized	Contact current chair and ask whether I can chair three meetings under her supervision. Ask for her feedback after every meeting	January 2021	Yes	Yes
			Ask four team members to fill out multisource feedback form after third meeting	February 2021	Yes	Yes

Clinical work**Logbook****Example, patient categories included in the Dutch national portfolio (translated).**

Section “management of a patient on the outpatient clinic with a chronic rheumatological disease”.

- Patient with rheumatoid arthritis;
- Patient with spondyloarthritis;
- Patient with crystal arthropathy;
- Patient with systemic auto-immune disease;
- Patient with polymyalgia rheumatica / giant-cell arteritis;
- Patient with osteoarthritis;
- Patient with pain syndrome;
- Patient with osteoporosis;
- Patient with a rare diagnosis.

Example, part of the German logbook (translated).

Diagnostic and treatment methods	Target No.	Feedback from authorized supervisors					Knowledge, experiences and skills acquired
		Date	Date	Date	Date	Date	Date / signature authorized supervisor
Ultrasound of the musculoskeletal system, including joint ultrasound	300						
Intra-articular injections (diagnostic and therapeutic)	100						
Synovial fluid analysis	BK						
Rheumatological and immunological laboratory diagnostics, including: <ul style="list-style-type: none"> - Immunogenetic testing, especially testing HLA-B27 - Testing anti-bodies in case of a suspicion on a rheumatological disease 	ND						
Capillaroscopy	50						
Bone Densitometry	50						

BK = Basic knowledge. ND = not defined.

Assessment forms

- Mini-Clinical Evaluation Exercise (mini-CEX)
- Direct Observation of Procedural Skills (DOPS)
- Case-Based Discussion (CbD)

MINI-CLINICAL EVALUATION EXERCISE

Name of trainee:	Year of training:
Date:	Assessor, role: <ul style="list-style-type: none"> • Supervisor / trainer • Trainee (self-assessment) • Nurse • Other health professional (e.g. nurse, physiotherapist) • Other, specify:
Assessor, name:	
Setting <ul style="list-style-type: none"> • In-patient • Out-patient • Emergency • Other, please specify: 	Case complexity <ul style="list-style-type: none"> • Low • Moderate • High

Brief summary of case (to be filled out by trainee)

Please score against what you would reasonably expect of a trainee at their stage of training.							
	Performance level						
	Below expectations		At expected level		Above expectations		Not observed
History taking	1	2	3	4	5	6	n/o
Physical examination	1	2	3	4	5	6	n/o
Communication	1	2	3	4	5	6	n/o
Clinical reasoning	1	2	3	4	5	6	n/o
Professionalism*	1	2	3	4	5	6	n/o
Documentation / proper record keeping	1	2	3	4	5	6	n/o
Time management	1	2	3	4	5	6	n/o
Overall clinical competence	1	2	3	4	5	6	n/o

*Professionalism refers to the commitment to carry out professional responsibilities (respect, compassion, and integrity), adherence to ethical principles, good communication with other team members and being sensitive to the needs of diverse patient populations.

Areas of strength (To be completed by assessor and trainee after observation and discussion)

Areas for improvement (<i>To be completed by assessor and trainee after observation and discussion</i>)
Learning goals and action plan (<i>To be completed by assessor and trainee after observation and discussion</i>)

Time observation: (...) mins.

About the form

The mini-clinical evaluation exercise (mini-CEX), is a workplace-based assessment method. It is used to score a direct observation of a doctor/patient clinical encounter by one or more assessor(s). **This form should only be used if the assessor has directly observed the clinical encounter being rated.** Management of care of patients with acute and chronic, common and complex rheumatologic diseases across multiple care settings can be assessed. The instrument can also be used for self-assessment by the trainee. Cases should be chosen jointly by the trainee and assessor to address specific learning needs appropriate to the stage of training. The assessor can choose to fill out only 1-2 items, for instance: a nurse only provides feedback on the communication skills of the trainee.

Scope of the mini-CEX in the rheumatology setting

Mini-CEX are especially useful to assess common practical and clinical competences that should be acquired by all rheumatology trainees during their training period.

A mini-CEX is especially recommended for the evaluation of general communication skills, history taking, physical examination, professional behaviour, clinical reasoning and formulating a differential diagnosis, development of plans for clinical investigations and for management, good record keeping, providing a rheumatology consultation to other specialties and providers and participating in a multidisciplinary team meeting. The national curriculum or alternatively available European curricula can be used as a reference.

The same assessment method can be used to evaluate different competences depending on the selected case and focus. On the other hand, the same competences can be assessed using different methods (e.g. clinical reasoning through mini-CEX or Cbd). The choice of cases, settings and assessment methods should be planned to allow a comprehensive and systematic cover of the educational needs of the trainee according to the stage of professional development.

DIRECT OBSERVATION OF PROCEDURAL SKILLS (DOPS)

Name of trainee:	Year of training:
Date:	
Assessor, name:	Assessor, role: <ul style="list-style-type: none"> • Supervisor / trainer • Trainee (self-assessment) • Other health professional (e.g. nurse, physiotherapist) • Other, specify:
Setting: <ul style="list-style-type: none"> • In-patient • Out-patient • Emergency • Other, please specify: 	
Procedure:	Procedure complexity <ul style="list-style-type: none"> • Low • Moderate • High

After observing the procedure, please score against what you would reasonably expect of a trainee at his/her stage of training.							
Domains	Performance level						
	Below expectations		At expected level		Above expectations		Not applicable
Before procedure							
Demonstrates understanding of indications, anatomy and technique	1	2	3	4	5	6	n/a
Obtains informed consent	1	2	3	4	5	6	n/a
Prepares procedure appropriately	1	2	3	4	5	6	n/a
During procedure							
Uses safe analgesia	1	2	3	4	5	6	n/a
Shows good technical ability	1	2	3	4	5	6	n/a
Uses an aseptic technique	1	2	3	4	5	6	n/a
After procedure							
Demonstrates good post-procedure management abilities	1	2	3	4	5	6	n/a
General							
Seeks help where appropriate	1	2	3	4	5	6	n/a
Demonstrates good record keeping	1	2	3	4	5	6	n/a
Communicates appropriately with the patient	1	2	3	4	5	6	n/a
Communicates appropriately with other members of team	1	2	3	4	5	6	n/a
After observing the procedure, how would you rate the overall performance (select one)	The trainee: <ul style="list-style-type: none"> • Further training is required in order to perform the procedure 						

	<ul style="list-style-type: none"> • May perform the procedure under direct supervision • May perform this procedure independently, under limited supervision* <p>*Only use this option when you have a longitudinal view of the trainees' performance</p>
<i>Areas of strength (To be completed by assessor and trainee after procedure and discussion)</i>	
<i>Areas for improvement (To be completed by assessor and trainee after procedure and discussion)</i>	
<i>Learning goals and action plan (To be completed by assessor and trainee after procedure and discussion)</i>	

Time observation: (...) mins.

About the form

The main goal of Direct observation of procedural skills (DOPS) is to provide structured feedback on the performance of a practical procedure, covering both the technical and the communication aspects. **This form should only be used if the assessor has directly observed the procedure to be rated.** If the assessor has not observed the procedure directly, consider postponing the assessment until an opportunity to do so. The assessor can choose to fill out only 1-2 items, for instance: a nurse only provides feedback on the communication skills of the trainee. The instrument can also be used for self-assessment by the trainee.

Scope of the DOPS in the rheumatology setting

DOPS is designed to assess common practical competences that should be acquired by rheumatology trainees during their training period, as defined by their national curriculum or alternatively available European curricula. Rheumatology-specific practical competences include, but are not limited to, joint aspiration, joint and soft tissue local injections, compensated polarized microscopy of synovial fluid, ultrasound examination.

CASE-BASED DISCUSSION

Name of trainee:		Year of training:
Date:		
Assessor, name:	Assessor, role: <ul style="list-style-type: none"> • Supervisor / trainer • Trainee (self-assessment) • Other health professional (e.g. nurse, physiotherapist) • Other, specify: 	
Setting: <ul style="list-style-type: none"> • In-patient • Out-patient • Emergency • Other, please specify 	Basis for discussion: <ul style="list-style-type: none"> • Outpatient record or letter • Inpatient record or discharge letter • Other, specify 	

Brief description of case:	Case complexity: <ul style="list-style-type: none"> • Low • Moderate • High
----------------------------	--

Please score against what you would reasonably expect of a trainee at his/her stage of training.							
Domains to consider for discussion and feedback*	Performance level**						
	Below expectations		At expected level		Above expectations		Not applicable
Clinical assessment	1	2	3	4	5	6	n/a
Clinical reasoning	1	2	3	4	5	6	n/a
Investigation plan	1	2	3	4	5	6	n/a
Treatment plan and follow-up	1	2	3	4	5	6	n/a
Adherence to recommendations and guidelines, where appropriate	1	2	3	4	5	6	n/a
Clarity and completeness of medical record	1	2	3	4	5	6	n/a

**Preferably focus on 1-2 domains per feedback opportunity.*

What have you learnt from this case? <i>(To be completed by trainee after discussion)</i>
Areas of strength <i>(To be completed by assessor and trainee after discussion)</i>

Areas for improvement <i>(To be completed by assessor and trainee after discussion)</i>
Learning goals and action plan <i>(To be completed by assessor and trainee after discussion)</i>

About the form

A case-based discussion (CbD), is a retrospective workplace-based assessment method. Essentially, it consists of a structured interview between a supervisor / trainer and a trainee. The CbD focuses on exploring the professional judgement of the trainee in a clinical case that (s)he has encountered and managed autonomously. The CbD is based on clinical documentation produced during that encounter. Feedback may include: recognising uncertainty with regard to the diagnosis and treatment plan or the ability to consider implications of certain management decisions. Topics should be chosen jointly by the trainee and assessor to address specific learning needs. The assessor can choose to focus on only 1-2 items in order to facilitate appropriate and effective feedback. For instance, a nurse only provides feedback on the follow-up plan of the trainee.

The trainee fills out the first open text box and critically revises the case and the documentation. A face-to-face discussion follows with the assessor and the last 3 sections are filled out in consensus. The self-appraisal performed by the trainee is also the object of discussion and feedback.

Scope of the CbD in the rheumatology setting

CbDs are especially useful to evaluate practical and clinical competences reflected in clinical documentation.

Rheumatology-specific competences that can be assessed in this way include, but are not limited to, correct collection, summarization and prioritizing of symptoms and signs of rheumatological diseases, good record keeping, empathic and professional behaviour, development of plans for clinical investigations and management, providing a rheumatology consultation to other specialties and providers and participating in a multidisciplinary team meeting. The national curriculum or alternatively available European curricula can be used as a reference.

The same assessment method can be used to evaluate different competences depending on the selected case and focus. On the other hand, the same competences can be assessed using different methods (e.g. clinical reasoning through CbD or mini-CEX). The choice of cases, settings and assessment methods should be planned to allow a comprehensive and systematic cover of the educational needs of the trainee according to the stage of professional development.

Template personal reflection**Template for personal reflection form, including two examples.**

Personal reflection	
What happened? <i>Describe concrete situation.</i>	Analysis. <i>What went well?</i> <i>What can be improved?</i>
	Make learning goals.
<i>Example 1.</i> I performed a joint aspiration of the right knee in a patient who was really nervous about this procedure. Because I have only performed 4 aspirations of the knee without direct supervision, this also made me nervous. I think the aspiration itself went well, but the patient found it quite uncomfortable. After performing the aspiration, I realized that not all materials (band-aid, extra gauze swabs) were in my reach. This meant I had to walk to a nearby room while the patient was alone.	<i>What went well:</i> the aspiration itself went well and I was able to reassure the patient to some extent. <i>What can be improved:</i> before starting the aspiration, I need to pause and check whether all necessary materials are there. I think I should have asked a nurse for assistance beforehand. She could have reassured the patient while I was performing the aspiration and provide me extra materials, if necessary.
	Learning goals: (1) pause and reflect before I start a procedure; (2) don't be afraid to ask for assistance when I think it will improve the outcome.
<i>Example 2.</i> I had to deliver bad news to a patient who was admitted because a recent diagnosis of dermatomyositis and pulmonary complaints. The chest computed tomography scan revealed a high suspicion on a neoplasm located in the right lower lobe. A bronchoscopy will follow.	<i>What went well:</i> I was able to deliver the bad news in a honest and compassionate way. I left room for silence. <i>What can be improved:</i> after I left, I was not sure, whether I provided all information in understandable amounts. I asked whether he understood everything, he said 'yes', but I did not really check it.
	Learning goal: have the patient tell me his or her understanding of what I have just said.

Professional behaviour

- Multisource feedback form.

MULTISOURCE FEEDBACK

Name of trainee:	Year of training:
Date:	
Feedback during a multisource feedback review is anonymous	Assessor, role: <ul style="list-style-type: none"> • Supervisor / trainer • Trainee (self-assessment) • Patient • Medical student • Other health professional (e.g. nurse, physiotherapist) • Other, specify:

Having observed the professional performance of the trainee during regular duties, please score against what you would reasonably expect at their stage of training:

Domains	Performance level						
	Below expectations		At expected level		Above expectations		Not applicable
Communicates effectively with patients and families	1	2	3	4	5	6	n/a
Communicates effectively with other health professionals	1	2	3	4	5	6	n/a
Demonstrates good professional attitude towards patients, i.e. respects rights, opinion and perspectives of patients	1	2	3	4	5	6	n/a
Participates effectively and appropriately in a multiprofessional healthcare team	1	2	3	4	5	6	n/a
Exhibits appropriate professional behaviours, such as honesty, integrity, commitment, punctuality and respect	1	2	3	4	5	6	n/a
Respects patient confidentiality*	1	2	3	4	5	6	n/a
Takes responsibility for own actions and seeks help from supervisors when required	1	2	3	4	5	6	n/a

*Physician–patient privilege, i.e. not sharing confidential conversations between doctors and patients.

Areas of strength <i>(To be completed by trainee and supervisor after discussion of results)</i>
Areas for improvement <i>(To be completed by trainee and supervisor after discussion of results)</i>

Learning goals and action plan (<i>To be completed by trainee and supervisor after discussion of results</i>)

About the form

Multisource feedback (MSF), or 360-degree feedback, is a survey designed to provide trainees with feedback on how supervisors / trainers, peers (co-workers) and patients rate their performance on key domains of performance behaviours. These domains include: performance on a day to day basis, teamwork behaviours, interpersonal and communication skills, ethical and professional attitudes.

The goal is to get (anonymous) feedback from different sources. All who interact with the trainee on a regular basis in a professional setting can be asked to contribute. The instrument can also be used for self-assessment by the trainee: this self-assessment may be used to address the ability of the trainee to predict how his/her behaviour is seen by others.

The MSF is an extremely important opportunity to identify and potentially rectify significant concerns related to the performance of the trainee, which would not be captured by the more clinically focused assessments.

The assessor can choose or be instructed to fill out only 1-2 items, for instance: a patient only provides feedback on communication skills and attitude of the trainee.