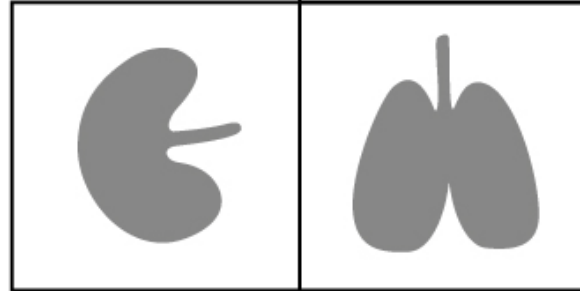


*Cardiac Surgery
Innovations Lab*



**Engineering Organ
Support Technologies**



**THORAX
CENTRUM
TWENTE**

Making My Full Scientific Career FAIR Sharing Clinical, Technical, and Educational Data

Dr. Frank R. Halfwerk

DISCLOSURE

Disclosure of speaker's interests	
(Potential) conflicts of interest	Potential
Potentially relevant company relationships in connection with event	No
Research Funding	Yes, FAIR Data Fund
Fee or other payment	No
Shareholder	No
Other relationship	No



OPEN ACCESS

- Open Access publishing
 - Public/developing countries can access findings
 - More exposure to your work
 - (Higher citation rates)
 - Article processing charge by researchers



C-BY Danny Kingsley & Sarah Brown

Data often not shared



OPEN ACCESS VS OPEN DATA

- Publishing data improves
 - Reproducibility
 - Reliability
 - Visibility
 - Accelerates innovation

FAIR DATA Fund Spring Call 2021



FRANK HALFWERK

Assistant Professor in **Biomechanical Engineering** at the **University of Twente**

Frank is a Technical Physician in cardio-thoracic surgery and the Director of the Cardiac Surgery Innovations Lab. He applied for the FAIR Data Fund with the aim of making this his full scientific career FAIR. Using the fund, he will make all of his data underlying peer-reviewed publications available according to the FAIR principles.

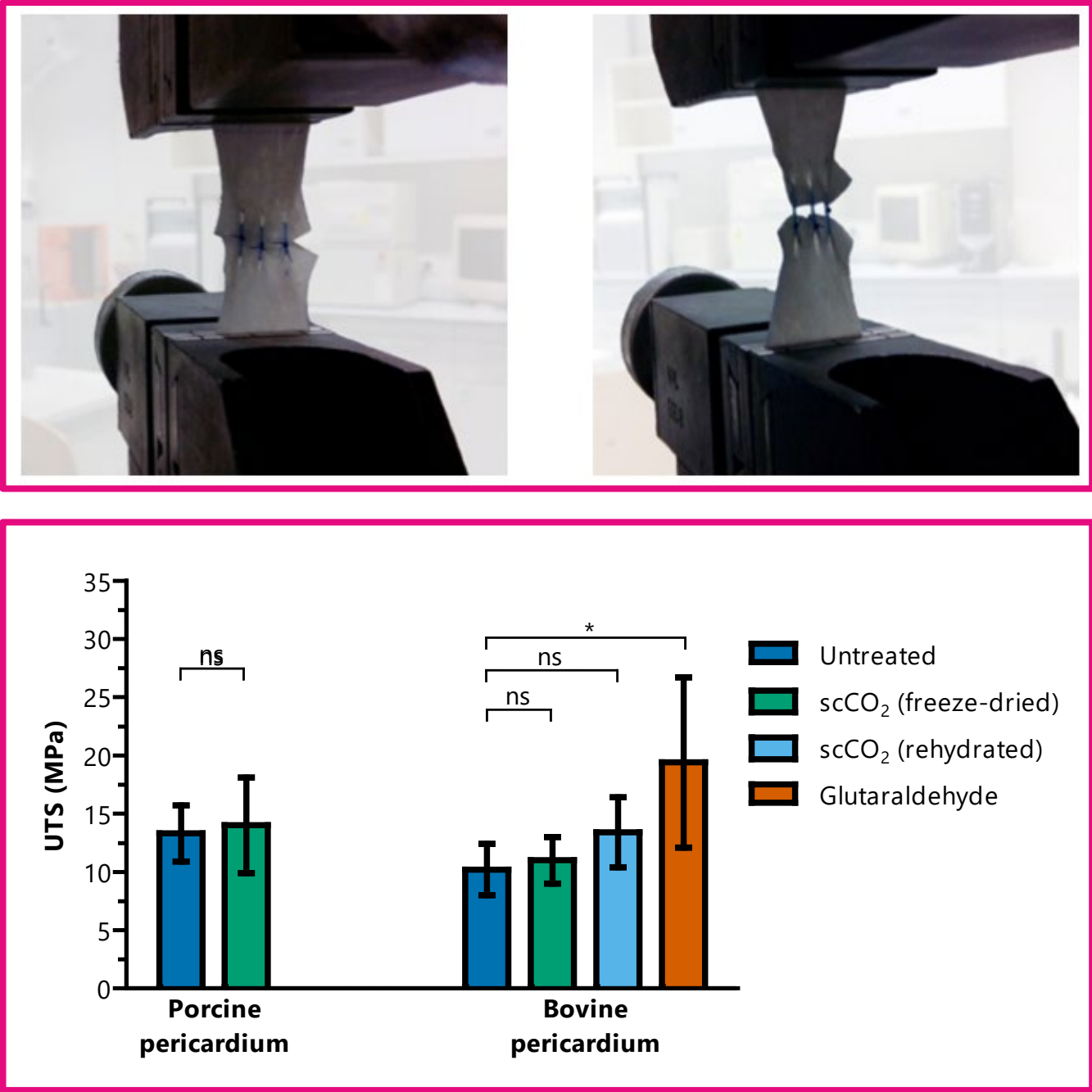
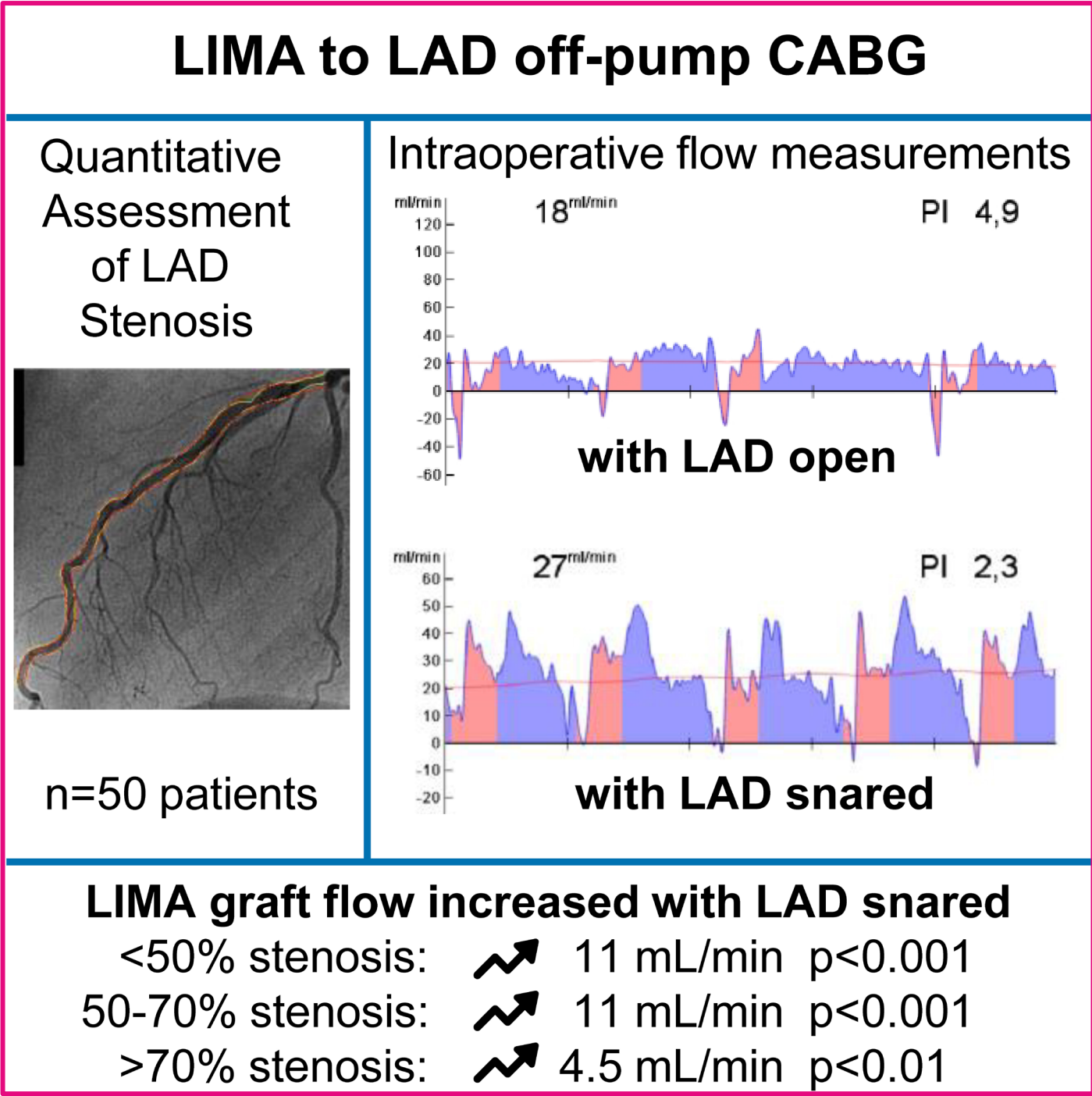


FAIR DATA Fund Spring Call 2021

MEDICAL

TECHNICAL

EDUCATION



Received: 2 September 2021 | Accepted: 15 October 2021

DOI: 10.1111/jocs.16103

ORIGINAL ARTICLE

JOURNAL OF
CARDIAC SURGERY WILEY

Intraoperative transit time flow measurements during off-pump coronary artery bypass surgery: The impact of coronary stenosis on competitive flow

Frank R. Halfwerk MD, PhD^{1,2} | Pien Spoor MSc¹ | Silvia Mariani MD^{1,3} | Rob Hagmeijer PhD⁴ | Jan G. Grandjean MD, PhD, FECTS^{1,2}

Journal of the Mechanical Behavior of Biomedical Materials 77 (2018) 400–407



Contents lists available at ScienceDirect
Journal of the Mechanical Behavior of Biomedical Materials
journal homepage: www.elsevier.com/locate/jmbbm



Supercritical carbon dioxide decellularised pericardium: Mechanical and structural characterisation for applications in cardio-thoracic surgery

Frank R. Halfwerk^{a,b,*}, Jeroen Rouwkema^b, Jan A. Gossen^c, Jan G. Grandjean^{a,b}



Halfwerk F, Groot Jebbink E, Groenier M
MedEdPublish
<https://doi.org/10.15694/mep.2020.000284.1>



Research article

Open Access

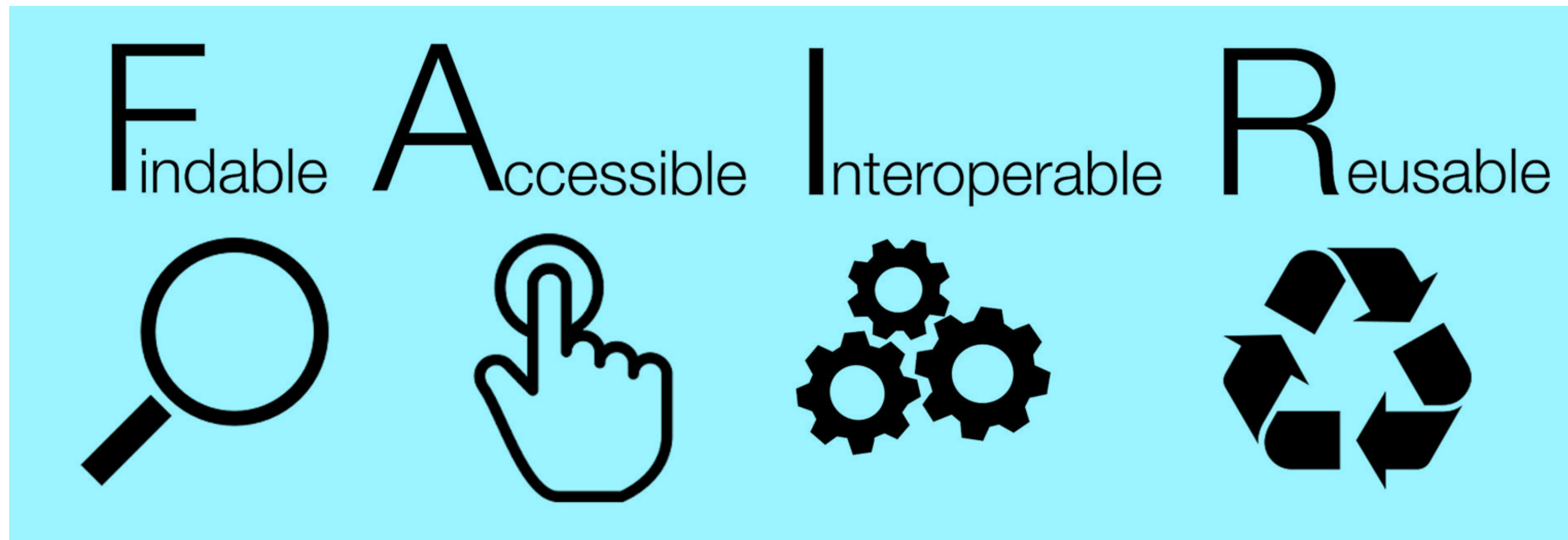
Development and Evaluation of a Proficiency-based and Simulation-based Surgical Skills Training for Technical Medicine Students

OPEN SCIENCE WEEK 2022, 20-23 JUNE



HOW TO PUBLISH YOUR (FILL IN...) DATA

- FAIR principles



- Aim:

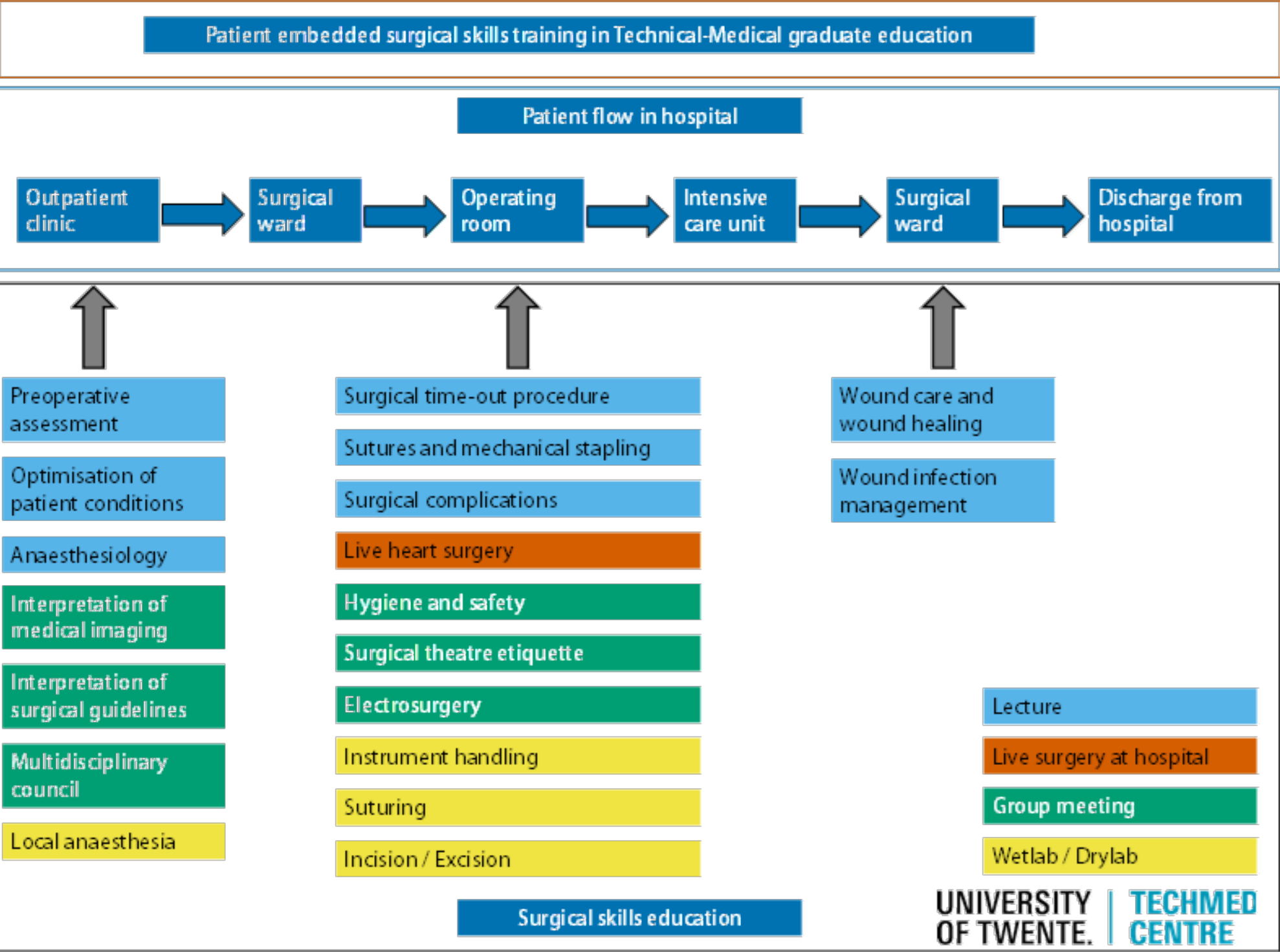
- To present a best practice for publishing simulation-based training data
- Graduate Surgical Skills course as use case

Wilkinson et al., Nature Sci Data, 2016.

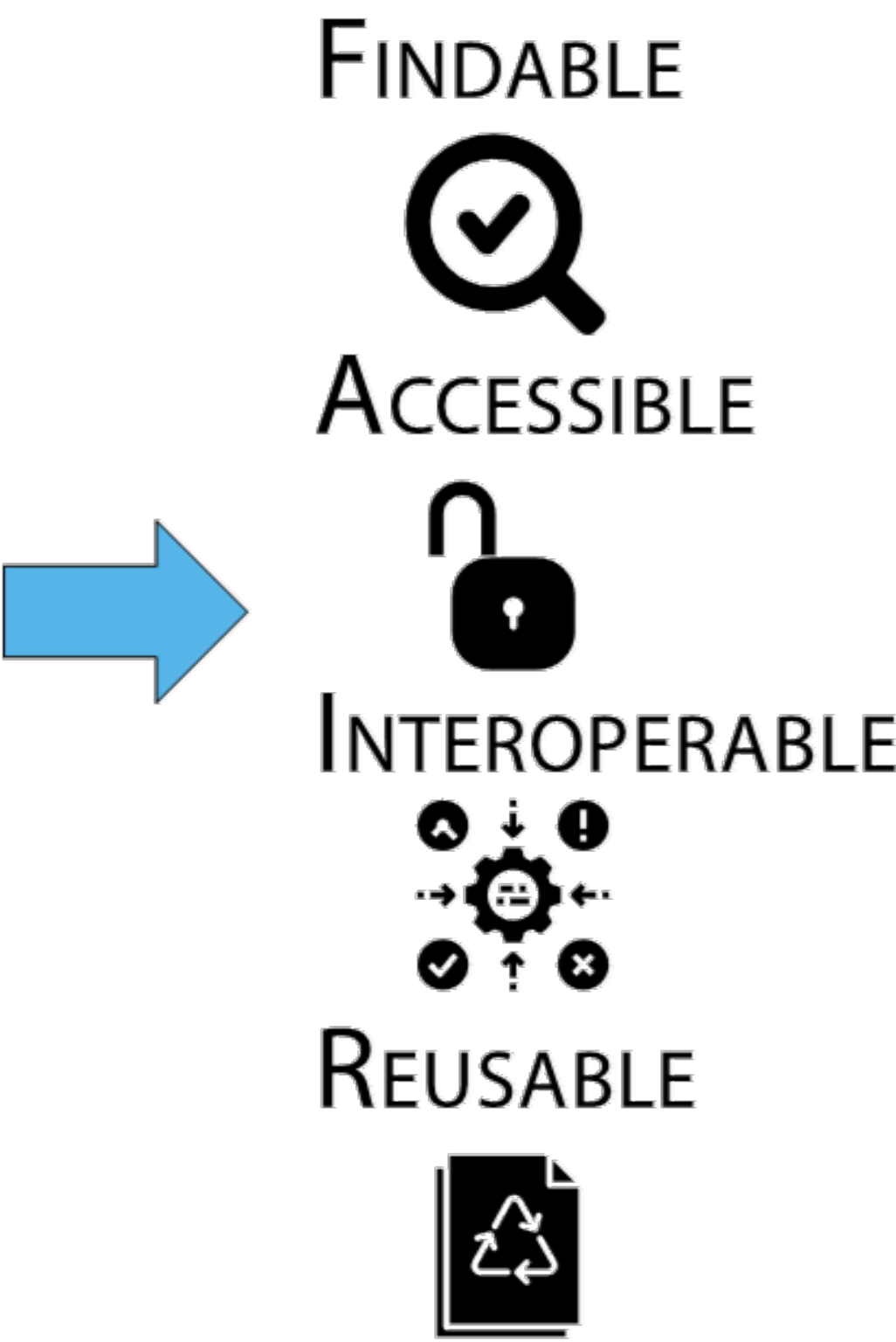
ORIGINAL WORK: GRADUATE SURGICAL SKILLS CURRICULUM DEVELOPMENT

10-week 3 ECTS master course

Making data from a graduate surgical skills curriculum



✓ Rating Scales ✓ Assessment Scores ✓ Evaluation Survey





Halfwerk F, Groot Jebbink E, Groenier M
MedEdPublish
<https://doi.org/10.15694/mep.2020.000284.1>



Research article Open Access

Development and Evaluation of a Proficiency-based and Simulation-based Surgical Skills Training for Technical Medicine Students

- Assign DOI
- Metadata
 - i.e. content
 - contact information 
 - location 
- Use DOI from F1 in your metadata
- Repository should be indexed
 - i.e. Google Scholar



Data underlying the Research on "Development and Evaluation of a Proficiency-based and Simulation-based Surgical Skills Training for Technical Medicine Students"

[Cite](#)[Download all \(1.34 MB\)](#)[Share](#)[Embed](#)[+ Collect](#)

DataCite ▼

Halfwerk, Frank; Groot Jebbink, Erik; Groenier, Marleen (2021): Data underlying the Research on "Development and Evaluation of a Proficiency-based and Simulation-based Surgical Skills Training for Technical Medicine Students". 4TU.ResearchData. Dataset. <https://doi.org/10.4121/14837907.v1>

[Copy citation](#)

<https://doi.org/10.4121/14837907.v1> [Copy DOI](#)

TIPS

Select your citation style and then place your mouse over the citation text to select it or use the Copy button.

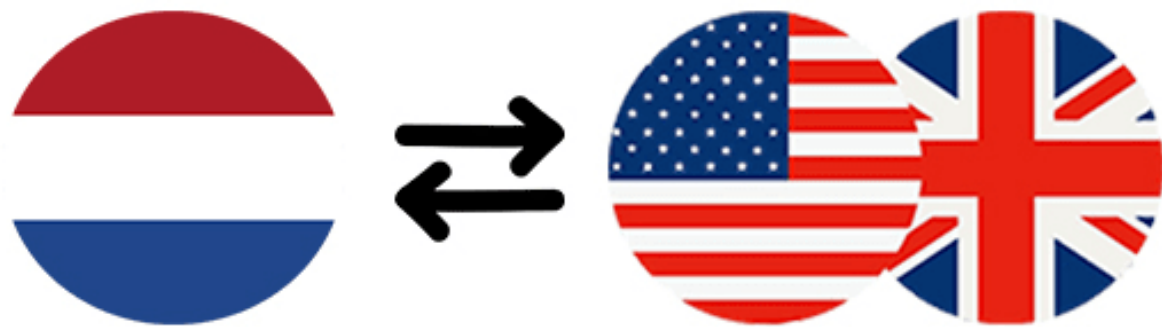


<https://doi.org/10.4121/14837907.v1>



- Assign data to DOI
 - Open access (not restricted) / Restrict to specific users (restricted)
- Preserve data and metadata
- Anonymize student data
 - i.e. age to age intervals

Dutch - English
Translation



Suturing skills

Name student:

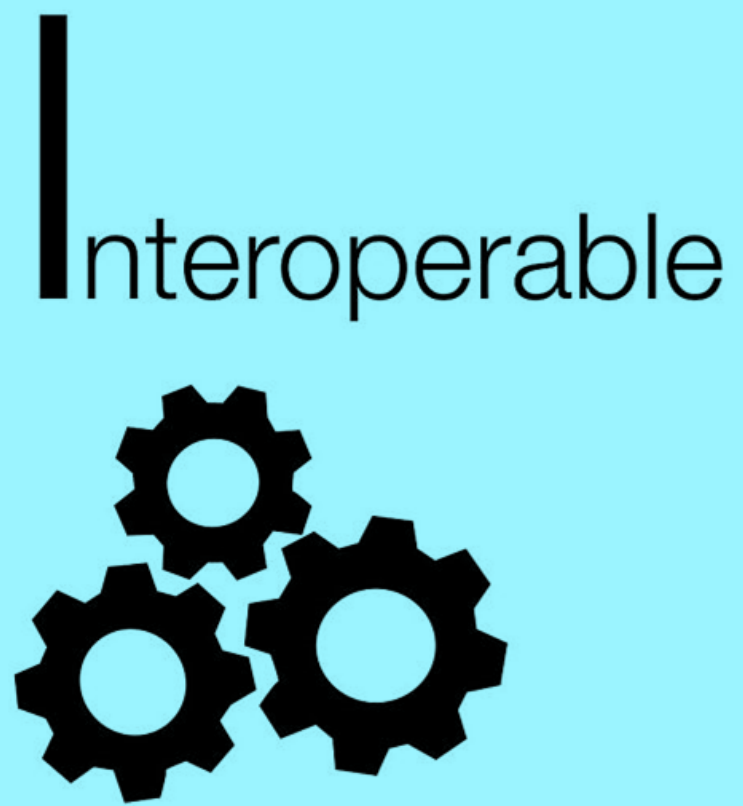
Name assessor:

Date:

	1	2	3	4	5
1. Suturing technique selection	Student is unable to discriminate between techniques / materials	Can discriminate between suturing techniques but unable of providing a rationale for them	Selects appropriate technique but is unable to provide a rationale for instrument selection	Selects appropriate technique, superficial knowledge of materials	Selects appropriate technique immediately and able to provide a rationale for selected technique
2. Movement	Frequently makes unnecessary movements		Acceptable efficiency, some unnecessary movements		Economic movements, maximum efficiency
3. Instrument selection	Student is unable to discriminate between instruments		Selects appropriate instruments, unable to provide an adequate rationale for selection		Selects appropriate instruments immediately and provides a rationale for selected instruments
4. Instrument use	Repeatedly makes insecure and/or clumsy movements		Skillful use, at times a bit stiff or clumsy		Fluent movements, skillful use
5. Use of feedback	Ignores feedback		Uses feedback to improve performance		Requires no feedback for performance improvement
6. Knot tying	Knot is loose, slipping, not enough knots		Unilateral well tied knot		Right knot, right amount and right amount of alternations
7. Tissue sensitivity	Frequently uses unnecessary force or damages tissue due to inappropriate instrument use		Careful tissue handling, some tissue damage		Consistent, careful handling of tissue without damage
8. Final result	Final result not achieved	Secondary wound healing	Suture is cosmetically adequate	Suture is functionally adequate	Suture is functionally and cosmetically adequate
9. Safety	Disregards safety		Adequate attention to personal safety, neglects colleague / patient		Adequate attention to personal safety and safety of others
Feedback:					

Procedure-specific rating scale for suturing. Red colored boxes represent critical errors where students fail the assessment immediately. Scale from 1 (lowest) to 5 (highest).

INTEROPERABLE



NOT EXCEL ONLY: interpretation and combination!

INTEROPERABLE

- NOT EXCEL ONLY: interpretation and combination!
- Use standards
 - i.e. STROBE
- Include external links for context



STROBE

Strengthening the reporting of observational studies in epidemiology



Netherlands	USA	UK	Definition
10	A+	A+	Excellent
9.5	A+	A+	Excellent
9	A+	A+	Excellent
8.5	A+	A	Excellent
8	A	A/A-	Very good
7.5	A/A-	B+	Very good
7	B+	B	Good
6.5	B	C+	Good
6	B-/C	C/D	Satisfactory
5.5	D	D	Sufficient
5	F	F	Almost sufficient
4	F	F	Insufficient
3	F	F	Low
2	F	F	Bad
1	F	F	Bad

Halfwerk F, Groot Jebbink E, Groenier M

MedEdPublish

<https://doi.org/10.15694/mep.2020.000284.1>



Research article

Open Access

Development and Evaluation of a Proficiency-based and Simulation-based Surgical Skills Training for Technical Medicine Students



INTEROPERABLE

- Measurements, definitions, study protocol



Cohort	Skills_ScrubbingDonning	Skills_Sutu	Sex/Gender	Age
2015-2016	0	0	Male	22 to 26 years
2015-2016	0	0	Female	22 to 26 years
2015-2016	5	0	Male	22 to 26 years
2015-2016	2	0	Female	22 to 26 years
2015-2016	5	0	Female	22 to 26 years
2015-2016	5	0	Male	22 to 26 years
2015-2016	0	0	Male	22 to 26 years

A cohort study was conducted of Technical Medicine graduate students who received mandatory surgical skills training in academic years 2015-2016 and 2016-2017 and was evaluated after at least one clinical rotation, depending on the start of their clinical rotations program.

Students were approached by e-mail 8 months after the course.

The online survey (SurveyMonkey, San Mateo, California, USA) consisted of statements related to confidence in own capabilities, patient safety and application of knowledge and self-reported technical skills in practice.

Halfwerk et al., 4TU.ResearchData, 2021.

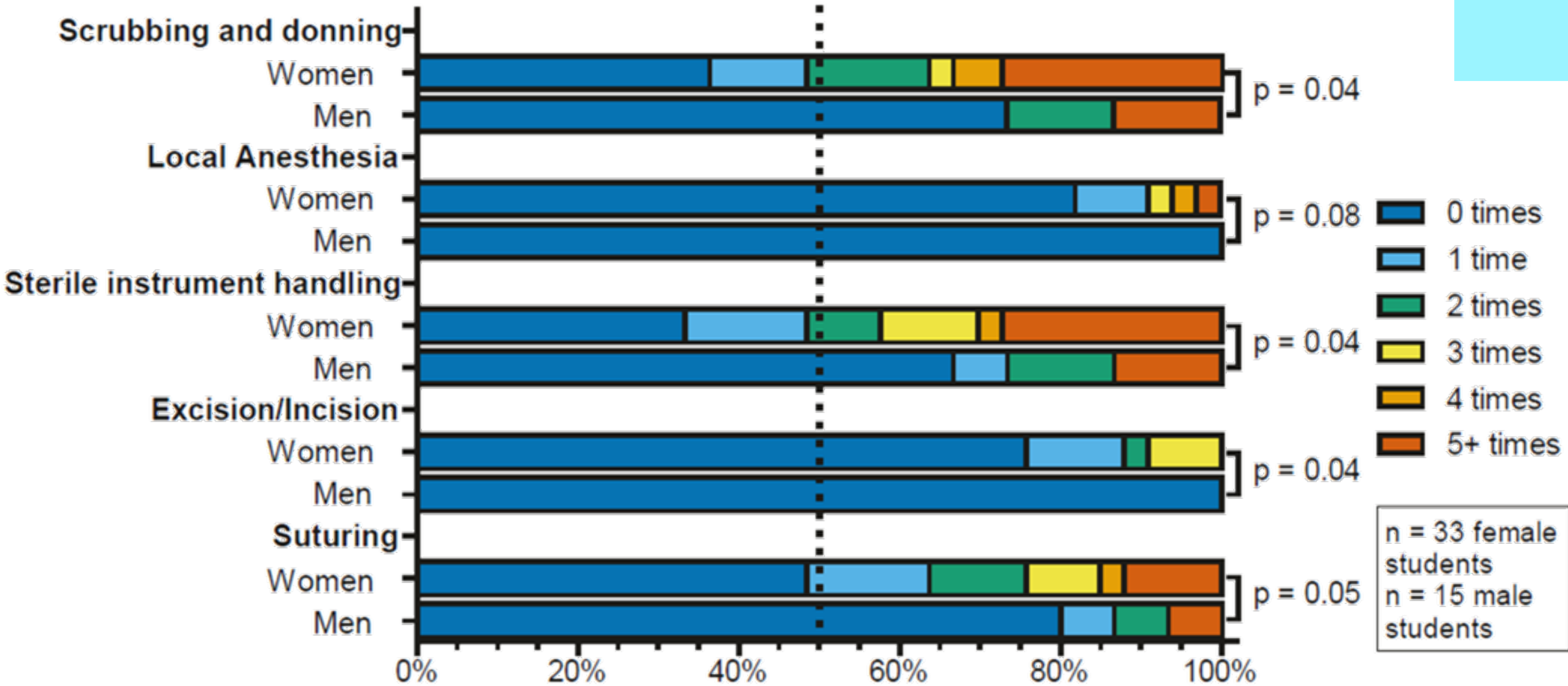
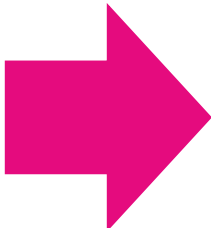
REUSABLE

- Make data readable

R_{eusable}



Cohort	Skills_ScrubbingDonning	Skills_Sutu	Sex/Gender	Age
2015-2016	0	0	Male	22 to 26 years
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2015-2016	0	0	Male	22 to 26 years



Halfwerk et al., 4TU.ResearchData, 2021.



REUSABLE

- Make data readable
 - State license (reuse? Commercial use?)
 - How to cite?

CREATIVE COMMONS LICENSES		COPY & PUBLISH	ATTRIBUTION REQUIRED	COMMERCIAL USE	MODIFY & ADAPT	CHANGE LICENSE
	PUBLIC DOMAIN	✓	✗	✓	✓	✓
	CC BY	✓	✓	✓	✓	✓
	CC BY-SA	✓	✓	✓	✓	✗
	CC BY-ND	✓	✓	✓	✗	✓
	CC BY-NC	✓	✓	✗	✓	✓
	CC BY-NC-SA	✓	✓	✗	✓	✗
	CC BY-NC-ND	✓	✓	✗	✗	✓

You can redistribute (copy, publish, display, communicate, etc.)

You have to attribute the original work

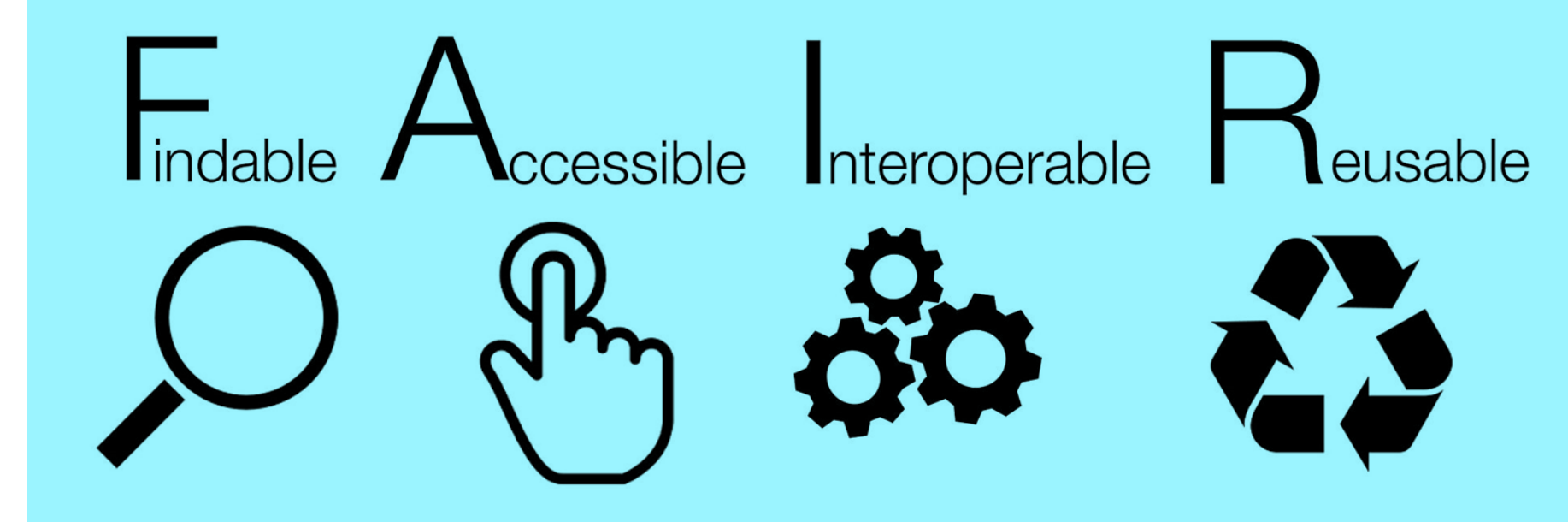
You can use the work commercially

You can modify and adapt the original work

You can choose license type for your adaptations of the work.



IMPLICATIONS AND OUTLOOK



- It is feasible to publish simulation-based data
 - Anonymize
 - Think about unique data
 - Considered as output



Dataset posted on 17.12.2021, 09:58 by **Frank Halfwerk**, Erik Groot Jebbink, Marleen Groenier

Objective
Surgical graduate training to achieve practice-ready students is needed, yet is often lacking. This study developed

USAGE METRICS

300 views	227 downloads	0 citations
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- Future work:
 - Think about FAIR while designing and conducting your studies!

Contact: Dr. Frank R. Halfwerk, f.r.halfwerk@utwente.nl

OPEN SCIENCE WEEK 2022, 20-23 JUNE



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TECHMED
CENTRE