

**Enhancing Health Professional Clinical Performance through
Supervision Strategies: From 5,311 Facilities across
8 Countries in Sick Child Healthcare**

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Appendix 1. Measurements of the quality of care provided by health professionals in sick child health services

Quality of care	Clinical action by health workers
Measures for the main analysis - 20 items	
Systematic assessment	Provider asked / caretaker mentioned if child unable to drink or breastfeed
	Provider asked / caretaker mentioned cough or difficult breathing
	Provider asked / caretaker mentioned diarrhea
	Provider asked / caretaker mentioned fever
	Provider asked / caretaker mentioned convulsions
	Provider asked about mother's HIV status
	Provider asked / caretaker mentioned ear pain
	Provider counted respiration for 60 seconds
	Provider weighed client
	Provider plotted weight on growth chart
	Provider took temperature
	Provider checked palms / conjunctiva / mouth for pallor
	Provider checked for edema
	Provider asked if child received vitamin A within past 6 months
	Provider asked if child received any deworming medication in last 6 month
	Provider asked caretaker about vomiting
Diagnosis	Provider stated diagnosis to caretaker
Treatment	Provider recommended food / liquid intake
Counseling	Provider explained dosing if medication prescribed
	Provider described more than 1 danger sign requiring return to facility
Alternative measures for sensitivity analysis - 10 items	
History-taking	Asks about the ability to drink
	Asks about fever
	Asks about sick feeding pattern
	Asks about cough/trouble breathing or vomiting
Examination	Measures temperature
	Assesses dehydration
	Assesses respiration
	Measures weight
Counseling	States diagnosis
	Counsels on 1+ danger signs

Appendix 2. Multilevel regression sensitivity analysis assessing the impact of supervision modalities on clinical quality

	Coef.	95%CI	Coef.	95%CI	Coef.	95%CI
Supervision Only	0.063	[-0.01,0.13]				
Supervision + Feedback			0.102**	[0.04,0.17]		
Supervision + Training					0.249***	[0.18,0.32]
Sex (Ref. =Male)						
Female	0.008	[-0.03,0.05]	0.008	[-0.03,0.05]	0.008	[-0.03,0.05]
Age of sick child (month)	-0.006***	[-0.01,-0.00]	-0.006***	[-0.01,-0.00]	-0.006***	[-0.01,-0.00]
Relationship to child (Ref. = Mother)						
Non-mother	-0.101**	[-0.16,-0.04]	-0.101**	[-0.16,-0.04]	-0.099**	[-0.16,-0.04]
Age of the caretaker	-0.003*	[-0.01,-0.00]	-0.003*	[-0.01,-0.00]	-0.003*	[-0.01,-0.00]
Provider type (Ref. = Physician)						
Nurse	-0.166**	[-0.27,-0.06]	-0.171**	[-0.27,-0.07]	-0.181***	[-0.28,-0.08]
Years of working	-0.005	[-0.01,0.00]	-0.005*	[-0.01,-0.00]	-0.007**	[-0.01,-0.00]
Working hours per day	0.002	[-0.01,0.02]	0.002	[-0.01,0.02]	0.002	[-0.01,0.02]
Years of education	0.016*	[0.00,0.03]	0.016*	[0.00,0.03]	0.016*	[0.00,0.03]
Supportive environment	0.225***	[0.16,0.29]	0.219***	[0.15,0.29]	0.205***	[0.14,0.27]
Ownership (Ref. = Government)						
Private	0.256***	[0.17,0.35]	0.258***	[0.17,0.35]	0.273***	[0.18,0.36]
Location (Ref. = Urban)						
Rural	0.232***	[0.14,0.33]	0.229***	[0.14,0.32]	0.223***	[0.13,0.32]
Facility type (Ref. = Hospital)						
Clinic	0.011	[-0.09,0.11]	0.007	[-0.09,0.11]	-0.005	[-0.10,0.09]
Country Fixed Effects	Yes		Yes		Yes	
N	19,171		19,171		19,171	

Appendix 3. Multilevel regression sensitivity analysis results on supervision alone of health professionals and clinical quality across different organizational contexts

	Not Implemented Quality Assurance		Implemented Quality Assurance		Not Implemented Data Collection System		Implemented Data Collection System		Not Implemented Both		Both Implemented	
	Coef.	95%CI	Coef.	95%CI	Coef.	95%CI	Coef.	95%CI	Coef.	95%CI	Coef.	95%CI
Supervision Alone	-0.019	[-0.12,0.08]	0.146**	[0.05,0.24]	-0.139	[-0.40,0.12]	0.085*	[0.01,0.16]	-0.036	[-0.13,0.06]	0.169***	[0.07,0.27]
Sex (Ref. =Male)												
Female	0.038	[-0.02,0.09]	-0.032	[-0.09,0.03]	-0.001	[-0.17,0.17]	0.008	[-0.03,0.05]	0.042	[-0.01,0.10]	-0.032	[-0.09,0.03]
Age of sick child (month)	-0.006***	[-0.01,-0.00]	-0.006***	[-0.01,-0.00]	-0.010***	[-0.02,-0.00]	-0.006***	[-0.01,-0.00]	-0.006***	[-0.01,-0.00]	-0.006***	[-0.01,-0.00]
Relationship to child (Ref. = Mother)												
Non-mother	-0.078	[-0.16,0.00]	-0.134**	[-0.23,-0.04]	-0.089	[-0.32,0.14]	-0.104**	[-0.17,-0.04]	-0.076	[-0.16,0.00]	-0.130**	[-0.22,-0.04]
Age of the caretaker	-0.002	[-0.01,0.00]	-0.004	[-0.01,0.00]	0.002	[-0.01,0.01]	-0.003*	[-0.01,-0.00]	-0.002	[-0.01,0.00]	-0.003	[-0.01,0.00]
Provider type (Ref. = Physician)												
Nurse	-0.151*	[-0.29,-0.02]	-0.134	[-0.29,0.03]	-0.142	[-0.56,0.28]	-0.164**	[-0.27,-0.06]	-0.129	[-0.26,0.01]	-0.158	[-0.32,0.00]
Years of working	-0.005	[-0.01,0.00]	-0.005	[-0.01,0.00]	-0.009	[-0.03,0.01]	-0.005	[-0.01,0.00]	-0.005	[-0.01,0.00]	-0.005	[-0.01,0.00]
Working hours per day	-0.008	[-0.03,0.01]	0.016	[-0.00,0.04]	0.005	[-0.04,0.05]	0.003	[-0.01,0.02]	-0.006	[-0.02,0.01]	0.014	[-0.01,0.03]
Years of education	0.025*	[0.00,0.04]	0.006	[-0.02,0.03]	0.062*	[0.00,0.12]	0.014	[-0.00,0.03]	0.026**	[0.01,0.05]	0.004	[-0.02,0.03]
Supportive environment	0.259***	[0.16,0.36]	0.195***	[0.10,0.29]	0.351*	[0.05,0.65]	0.223***	[0.15,0.29]	0.273***	[0.18,0.37]	0.177***	[0.08,0.28]
Ownership (Ref. = Government)												
Private	0.227***	[0.11,0.35]	0.291***	[0.15,0.43]	-0.187	[-0.55,0.17]	0.286***	[0.19,0.38]	0.220***	[0.10,0.34]	0.287***	[0.14,0.43]
Location (Ref. = Urban)												
Rural	0.187**	[0.06,0.31]	0.332***	[0.19,0.47]	0.086	[-0.25,0.42]	0.247***	[0.15,0.34]	0.184**	[0.06,0.31]	0.332***	[0.19,0.47]
Facility type (Ref. = Hospital)												
Clinic	-0.001	[-0.16,0.15]	0.092	[-0.05,0.23]	0.308	[-0.14,0.76]	-0.014	[-0.12,0.09]	0.022	[-0.13,0.17]	0.066	[-0.08,0.21]
Country Fixed Effects	Yes		Yes		Yes		Yes		Yes		Yes	
N	10315		8764		1346		17825		10717		8454	

The STROBE reporting checklist

For checking that observational epidemiology research articles can be understood and used by everyone

Note

If you have not used a reporting guideline before, read about [how and why to use them](#) and check whether STROBE is the [most applicable reporting guideline](#) for your work.

Reporting guidelines are most useful when used early in research. When writing a manuscript or application, consider using the [Full Guidance](#) where you'll see explanations and examples for each item.

After writing, demonstrate adherence by completing this checklist:

1. Specify where each item is described (see [Note 1](#)).
2. Cite this checklist (See [Note 2](#)).
3. Include your completed checklist as a supplement when submitting to a journal so that future readers can use it to find information.

	Item Description	Location (or reason for not reporting)
Title and abstract		
1a. Indicate the study's design	Indicate the study's design with a commonly used term in the title or the abstract.	1
1b. Abstract	Provide in the abstract an informative and balanced summary of what was done and what was found.	1-2
Introduction		
2. Background / rationale	Explain the scientific background and rationale for the investigation being reported.	2-3
3. Objectives	State specific objectives, including any prespecified hypotheses.	3
Methods		
4. Study design	Present key elements of study design early in the paper.	4
5. Setting	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection.	4
6a. Eligibility criteria	Cohort study: Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up. Case-control study: Give the eligibility criteria, and the sources and	4

	methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls. Cross-sectional study: Give the eligibility criteria, and the sources and methods of selection of participants.	
6b. Matching criteria	Cohort study: For matched studies, give matching criteria and number of exposed and unexposed. Case-control study: For matched studies, give matching criteria and the number of controls per case.	/
7. Variables	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	4-5
8. Data sources / measurement	For each variable of interest give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	4-5
9. Bias	Describe any efforts to address potential sources of bias.	5-6
10. Study size	Explain how the study size was arrived at.	4
11. Quantitative variables	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen, and why.	4-6
12a. Statistical methods	Describe all statistical methods, including those used to control for confounding.	5-6
12b. Statistical methods – subgroups and interactions	Describe any methods used to examine subgroups and interactions.	5-6
12c. Statistical methods – missing data	Explain how missing data were addressed.	4
12di. Statistical methods – loss to follow-up	Cohort study: If applicable, describe how loss to follow-up was addressed.	/
12dii. Statistical methods – matching cases and controls	Case-control study: If applicable, explain how matching of cases and controls was addressed.	/
12diii. Statistical methods – sampling strategy	Cross-sectional study: If applicable, describe analytical methods taking account of sampling strategy.	6
12e. Statistical methods – sensitivity analyses	Describe any sensitivity analyses.	6
Results		

13a. Participant numbers	Report the numbers of individuals at each stage of the study—e.g., numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed; Consider use of a flow diagram.	/
13b. Participants – non-participation	Give reasons for non-participation at each stage.	/
13c. Participants – flow diagram	Consider use of a flow diagram.	/
14a. Descriptive data – participant characteristics	Give characteristics of study participants (e.g., demographic, clinical, social) and information on exposures and potential confounders. Present the information in a table.	6
14b. Descriptive data – missing data	Indicate the number of participants with missing data for each variable of interest.	/
14c. Descriptive data – follow-up time	Cohort study: Summarise follow-up time—e.g., average and total amount.	/
15. Outcome data	Cohort study: Report numbers of outcome events or summary measures over time. Case-control study: Report numbers in each exposure category, or summary measures of exposure. Cross-sectional study: Report numbers of outcome events or summary measures.	6
16a. Main results	Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence intervals). Make clear which confounders were adjusted for and why they were included.	6-7
16b. Main results – category boundaries	Report category boundaries when continuous variables were categorised.	/
16c. Main results – risk	If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period.	/
17. Other analyses	Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses.	6-7
Discussion		
18. Key results	Summarise key results with reference to study objectives.	7
19. Limitations	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	9
20. Interpretation	Give a cautious overall interpretation considering objectives, limitations, multiplicity of analyses, results	7-9

	from similar studies, and other relevant evidence.	
21. Generalisability	Discuss the generalisability (external validity) of the study results.	9-10
Other information		
22. Funding	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based.	/

1 How to specify where content is

Tell the reader where they can find information. E.g.,

- Results; paragraph 2
- Methods, Participants; paragraphs 1 & 2.
- Table 3
- Supplement B, para. 4

If you have chosen not to describe an item, explain why. You can do this in the checklist, or as a note below it.

You can describe items in the article body, or in tables, figures, or supplementary materials, and should prioritize items you feel are most important to your intended audience. The order of items in your manuscript does not need to match the order of items in this checklist. You can decide how best to structure your work.

2 How to cite

Describe how you used STROBE at the end of your Methods section, referencing the resources you used e.g.,

‘We used the STROBE reporting guideline(1) to draft this manuscript, and the STROBE reporting checklist(2) when editing, included in supplement A’

If you use a reporting checklist, remember to include it as a supplement when publishing so that readers can easily find information and see how you have interpreted the guidance.

1. Elm E von, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP, et al. The strengthening the reporting of observational studies in epidemiology (STROBE) statement: Guidelines for reporting observational studies. *Annals of Internal Medicine* [Internet]. 2007 Oct;147(8):573–7. Available from: <https://www.acpjournals.org/doi/10.7326/0003-4819-147-8-200710160-00010>
2. Elm E von, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP, et al. The STROBE reporting checklist. In: Harwood J, Albury C, Beyer J de, Schlüssel M, Collins G, editors. *The EQUATOR network reporting guideline platform* [Internet]. The UK EQUATOR Centre; 2025. Available from: <https://resources.equator-network.org/reporting-guidelines/strobe/strobe-checklist.docx>