

Quality of facility-based health care around the time of childbirth during the COVID-19 pandemic: online survey investigating the maternal perspective in 12 countries of the WHO European Region

Supplementary Material

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Supplementary Table 1 Checklist of items that should be included in reports of cross-sectional studies

	Item No	Recommendation	Pages
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract (b) Provide in the abstract an informative and balanced summary of what was done and what was found	1,3 3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	5
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5-6
Data sources/ measurement	8*	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	5-6
Bias	9	Describe any efforts to address potential sources of bias	6-7
Study size	10	Explain how the study size was arrived at	
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	6-7
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding (b) Describe any methods used to examine subgroups and interactions (c) Explain how missing data were addressed (d) If applicable, describe analytical methods taking account of sampling strategy (e) Describe any sensitivity analyses	6-7
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram	8-19
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (b) Indicate number of participants with missing data for each variable of interest	8-19
Outcome data	15*	Report numbers of outcome events or summary measures	8-19
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were	8-19

		included	
		(b) Report category boundaries when continuous variables were categorized	
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	17
Discussion			
Key results	18	Summarise key results with reference to study objectives	19
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	19-20
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	20
Generalisability	21	Discuss the generalisability (external validity) of the study results	20
Other information			
Funding	22	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	23

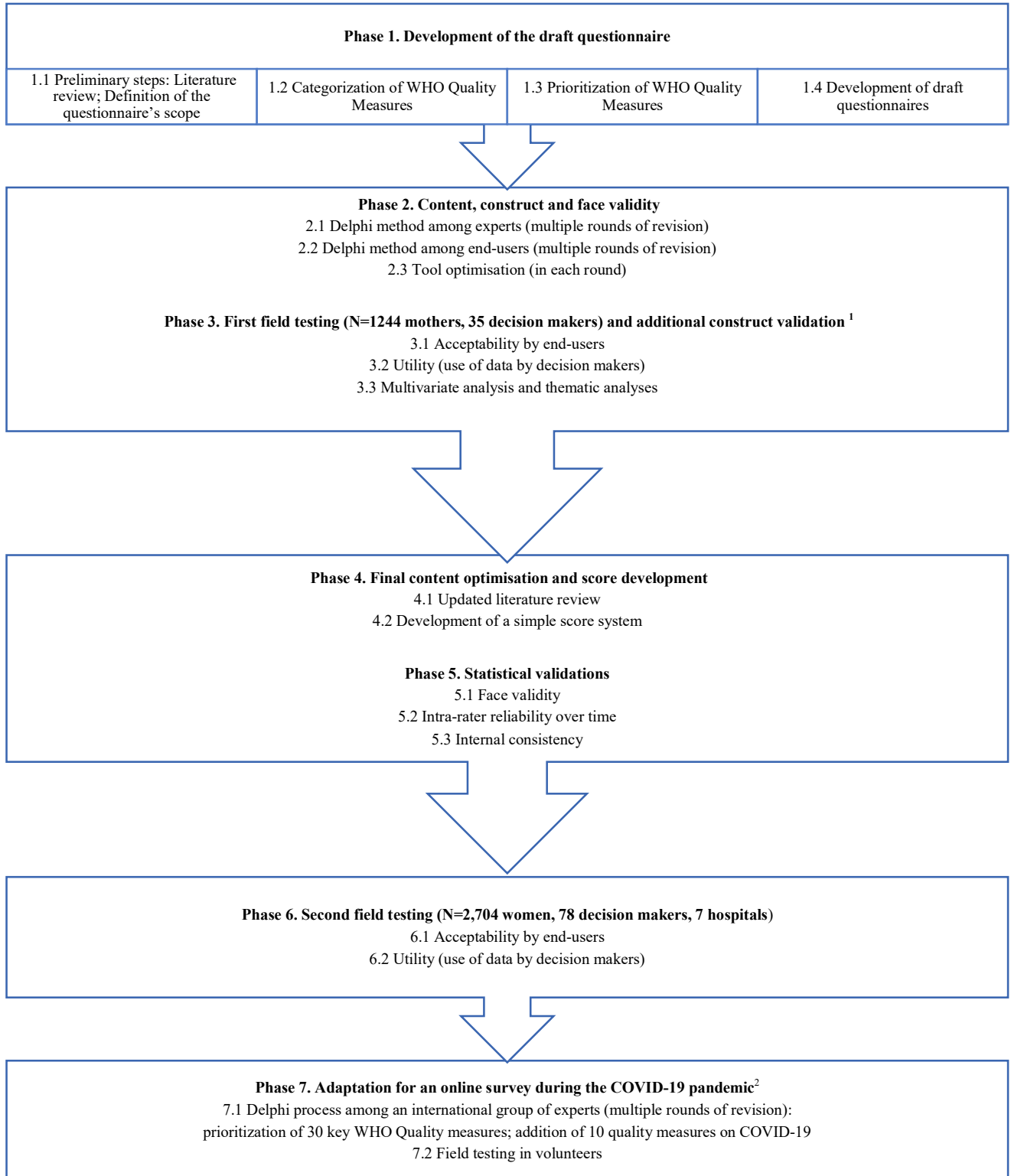
Notes: * Give information separately for exposed and unexposed groups.

Supplementary Table 2 Data collection period by language

	Languages*	Date of online availability	Country team responsible
Dissemination under direct responsibility of a specific country team			
	Romanian	02/09/2020	Romania
	Slovenian	20/10/2020	Slovenia
	Portuguese	13/11/2020	Portugal
	Serbian	17/11/2020	Serbia
	Italian	18/11/2020	Italy
	Swedish	26/11/2020	Sweden
	German	02/12/2020	Germany and Luxembourg
	Croatian	03/12/2020	Croatia
	Spanish	07/12/2020	Spain
	Catalan	07/12/2020	Spain
	French	07/12/2020	France** and Luxembourg
	Norwegian	10/02/2021	Norway
Dissemination not under direct responsibility of a specific country team for this round of data collection			
	English	02/09/2020	NA
	Bosnian	18/09/2020	
	Albanian	06/11/2020	
	Russian	09/11/2020	
	Bengali	20/01/2021	
	Arabic	20/01/2021	
	Hindi	20/01/2021	
	Nepalese	20/01/2021	
	Chinese	20/01/2021	

Notes: *All links always available to all countries after start date; ** Roll up in France on 13/01/2021.
Abbreviation: NA = not applicable.

Supplementary Figure 1 Questionnaire development and validation



Additional details on Phase 7

During the first months of the COVID-19 pandemic, the questionnaire was further optimized and adapted for an online survey. Specifically:

- 1 The online format was chosen due to lower costs of dissemination and possibility of quicker responses in many countries (1-3). The questionnaire was shortened to 30 key WHO Quality measures in order to improve acceptability and questions were adapted for an online survey, ie. including clear explanations for women (such as, for example, the meaning of “active labour” in order to standardized answers).
- 2 To be able to collect data related to the emergency, 10 key questions relevant to the COVID-19 pandemic, prioritized among recommended indicators in existing WHO guidelines, professional association statements, protocols released by European countries (4-24), were added.

Questions were selected through a Delphi process, including 26 experts from 11 countries of the WHO European Region with the following different backgrounds: clinical staff directly involved in the QMNC, sociologists, psychologist, anthropologist, public health experts, lactation consultants and reproductive rights advocates. Experts were asked to assess comprehensiveness and clarity of the questions, suggest rewording or additional relevant questions if necessary, using and *ad hoc* template. Criteria to reach consensus were pre-defined (25). The final questionnaire was field tested in volunteers’ mothers.

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Supplementary Table 3 Quality of maternal and neonatal care index score system

	Number of questions	Score options for each answer	Total score (range)
Provision of care	10	0, 5, 10	0 - 100
Experience of care	10	0, 5, 10	0 - 100
Availability of physical and human resources	10	0, 5, 10	0 - 100
COVID-19	10	0, 5, 10	0 - 100
QMNC Index	40	0, 5, 10	0 - 400

Abbreviation: QMNC = Quality of maternal and neonatal care

Supplementary Table 4 Proportion of participants compared to expected number of births within the study period based on 2019 data by country

Country	Sample collected in each country	Contribution to total sample (% of N=21027)	Country births 2019	% of births collected on total birth in 12 months*
Norway	3220	15.3	54404	5.9
Luxemburg	441	2.1	6320	7.0
Slovenia	2092	9.9	18794	11.1
Sweden	4800	22.8	114523	4.2
Portugal	1685	8.0	86579	2.0
Croatia	458	2.2	35985	1.3
Italy	4813	22.9	420084	1.2
Serbia	630	3.0	64757	1.0
Romania	571	2.7	185677	0.3
Germany	1081	5.1	778100	0.1
France	544	2.6	753000	0.1
Spain	347	1.7	360617	0.1

Notes: * Women who gave birth from March 1, 2020 up to the end of the data collection period (March 15, 2021) were invited to participate in an online survey; data collection approximated to 12 months.

Supplementary Table 5 Comparison of the characteristics of responders between women who underwent labour and women with prelabour caesarean section

	Women who underwent labour N=18063 n (%)	Women with prelabour caesarean section N=2964 n (%)	p value
Country			
Italy	3973 (22· 0)	840 (28· 3)	<0· 001
Sweden	4355 (24· 1)	445 (15· 0)	<0· 001
Norway	2989 (16· 5)	231 (7· 8)	<0· 001
Slovenia	1838 (10· 2)	254 (8· 6)	0· 007
Portugal	1298 (7· 2)	387 (13· 1)	<0· 001
Germany	949 (5· 3)	132 (4· 5)	0· 067
Serbia	478 (2· 6)	152 (5· 1)	<0· 001
Romania	315 (1· 7)	256 (8· 6)	<0· 001
France	497 (2· 8)	47 (1· 6)	<0· 001
Croatia	398 (2· 2)	60 (2· 0)	0· 536
Luxembourg	382 (2· 1)	59 (2· 0)	0· 662
Spain	309 (1· 7)	38 (1· 3)	0· 090
Other countries ¹	282 (1· 6)	63 (2· 1)	0· 025
Year of birth			
2020	16366 (90· 6)	2731 (92· 1)	<0· 001
2021	1181 (6· 5)	119 (4· 0)	0· 007
Missing	516 (2· 9)	114 (3· 8)	0· 003
Gave birth in the same country where were born			
Yes	16367 (90· 6)	2654 (89· 5)	0· 066
No	1301 (7· 2)	222 (7· 5)	0· 576
Missing	395 (2· 2)	88 (3· 0)	0· 008
Age range			
18-24	880 (4· 9)	69 (2· 3)	<0· 001
25-30	6541 (36· 2)	782 (26· 4)	<0· 001
31-35	7068 (39· 1)	1145 (38· 6)	0· 605
36-39	2472 (13· 7)	598 (20· 2)	<0· 001
≥40	710 (3· 9)	282 (9· 5)	<0· 001
Missing	392 (2· 2)	88 (3· 0)	0· 007
Educational level ²			
None	7 (0· 0)	1 (0· 0)	0· 897
Elementary school	40 (0· 2)	6 (0· 2)	0· 837
Junior High school	931 (5· 2)	169 (5· 7)	0· 215
High School	4413 (24· 4)	739 (24· 9)	0· 556
University degree	7580 (42· 0)	1145 (38· 6)	0· 001
Postgraduate degree / Master's /Doctorate or higher	4699 (26· 0)	816 (27· 5)	0· 082
Missing	393 (2· 2)	88 (3· 0)	0· 007
Parity			
1	10906 (60· 4)	1648 (55· 6)	<0· 001
>1	6764 (37· 4)	1228 (41· 4)	<0· 001
Missing	393 (2· 2)	88 (3· 0)	0· 007
Type of facility			
Public	16684 (92· 4)	2476 (83· 5)	<0· 001
Private	986 (5· 5)	401 (13· 5)	<0· 001
Missing	393 (2· 2)	87 (2· 9)	0· 010
Type of healthcare providers who directly assisted the birth ³			
Midwife	16371 (90· 6)	1782 (60· 1)	<0· 001
Nurse	6337 (35· 1)	1731 (58· 4)	<0· 001
A student (ie, before graduation)	3171 (17· 6)	279 (9· 4)	<0· 001
Obstetrics registrar / medical resident (under post-graduate training)	3003 (16· 6)	777 (26· 2)	<0· 001
Obstetrician-gynaecologist doctor	8470 (46· 9)	2406 (81· 2)	<0· 001
I don't know (healthcare providers did not introduce themselves)	1455 (8· 1)	347 (11· 7)	<0· 001
Other	2442 (13· 5)	587 (19· 8)	<0· 001
Other characteristics			
Newborn admitted in neonatal intensive or semi-intensive care unit	1311 (7· 3)	429 (14· 5)	<0· 001
Mother admitted in intensive care unit	201 (1· 1)	146 (4· 9)	<0· 001
Multiple birth	139 (0· 8)	121 (4· 1)	<0· 001

Notes: ¹ Other countries: Belgium (n=122); Austria (n=41); UK (n=36); Finland (n=28); Bosnia Herzegovina (n=27); Switzerland (n=21); Denmark (n=15); Greece, Ireland, Netherlands, Ukraine, Andorra, Montenegro, Russian Federation, Lithuania, Iceland, Poland, Turkey, Hungary, Albania, Cyprus, Latvia, Macedonia, and Czech Republic (each fewer than 10 cases); ² Wording on education levels agreed

among partners during the Delphi; questionnaire translated and back translated according to ISPOR Task Force 25 for Translation and Cultural Adaptation Principles of Good Practice;³ More than one possible answer.

Supplementary Table 6 Results on provision of care

Women who underwent labour

	Overall	Croatia	France	Germany	Italy	Luxembourg	Norway	Portugal	Romania	Serbia	Slovenia	Spain	Sweden	Other countries
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
N	18063	398	497	949	3973	382	2989	1298	315	478	1838	309	4355	282
1. No pain relief during labour	20·8 (20·2; 21·4)	33·4 (28·8; 38·1)	6·4 (4·3; 8·6)	23 (20·3; 25·6)	43·3 (41·8; 44·8)	10·2 (7·2; 13·2)	12·7 (11·5; 13·9)	7·2 (5·8; 8·6)	42·2 (36·8; 47·7)	46·2 (41·8; 50·7)	21·5 (19·7; 23·4)	11 (7·5; 14·5)	7·2 (6·4; 8·0)	18·8 (14·2; 23·4)
2. Mode of birth														
2a. IVB	10·7 (10·2; 11·1)	2·8 (1·2; 4·4)	19·3 (15·8; 22·8)	8·9 (7·0; 10·7)	8·6 (7·8; 9·5)	16·8 (13; 20·5)	13·5 (12·3; 14·8)	30·8 (28·3; 33·3)	1·6 (0·2; 3·0)	2·7 (1·3; 4·2)	4·0 (3·1; 4·9)	18·1 (13·8; 22·4)	8·1 (7·3; 8·9)	9·2 (5·8; 12·6)
2b. ECS during labour	11·2 (10·8; 11·7)	11·1 (8·0; 14·1)	6·8 (4·6; 9·1)	17·1 (14·7; 19·5)	12·7 (11·7; 13·7)	13·4 (9·9; 16·8)	8·9 (7·9; 9·9)	14·3 (12·4; 16·2)	32·1 (26·9; 37·2)	8·8 (6·2; 11·3)	8·8 (7·5; 10·1)	12 (8·4; 15·6)	9·1 (8·3; 10)	13·5 (9·5; 17·5)
3a. Episiotomy (in SVB)	20·1 (19·4; 20·7)	48·1 (42·8; 53·4)	10·9 (7·7; 14·1)	13·1 (10·6; 15·6)	19·6 (18·2; 21)	15 (10·7; 19·3)	16·6 (15·1; 18·1)	40·7 (37·1; 44·3)	66 (59·6; 72·4)	59·3 (54·7; 64)	31 (28·7; 33·3)	21·3 (15·8; 26·8)	6·1 (5·3; 6·9)	25·7 (19·9; 31·5)
3b. Fundal pressure (in IVB)	41·2 (39; 43·4)	90·9 (73·9; 107·9)	11·5 (5·1; 17·8)	65·5 (55·3; 75·6)	67·9 (63; 72·9)	31·2 (19·9; 42·6)	18 (14·3; 21·8)	49·2 (44·4; 54·1)	100 (100; 100)	84·6 (65; 104·2)	95·9 (91·5; 100)	48·2 (35·1; 61·3)	21·4 (17·1; 25·7)	26·9 (9·9; 44)
3c. No pain relief after CS	15·2 (13·6; 16·8)	11·4 (2·0; 20·7)	32·4 (16·6; 48·1)	11·7 (6·8; 16·7)	13·1 (10·1; 16)	13·7 (4·3; 23·2)	18·4 (13·8; 23·1)	10·8 (6·3; 15·2)	10·9 (4·8; 17)	4·8 (0·0; 11·2)	8·7 (4·3; 13)	21·6 (8·4; 34·9)	23·1 (19; 27·3)	10·5 (0·8; 20·3)
4. No skin to skin	9·1 (8·7; 9·5)	9·0 (6·2; 11·9)	4·8 (2·9; 6·7)	1·7 (0·9; 2·5)	14·5 (13·4; 15·6)	0·5 (0·0; 1·2)	3·5 (2·9; 4·2)	16·6 (14·6; 18·7)	64·4 (59·2; 69·7)	30·5 (26·4; 34·7)	8·8 (7·5; 10·1)	4·5 (2·2; 6·8)	2·9 (2·4; 3·4)	5·3 (2·7; 7·9)
5. No early breastfeeding	12·9 (12·5; 13·4)	25·1 (20·9; 29·4)	18·9 (15·5; 22·4)	5·6 (4·1; 7·0)	17·1 (15·9; 18·3)	4·7 (2·6; 6·8)	8·6 (7·6; 9·6)	6·3 (5·0; 7·6)	62·9 (57·5; 68·2)	69·9 (65·8; 74)	8·1 (6·9; 9·4)	7·1 (4·3; 10)	7·4 (6·7; 8·2)	10·3 (6·7; 13·8)
6. Inadequate breastfeeding support	31·2 (30·5; 31·8)	35·4 (30·7; 40·1)	32·8 (28·7; 36·9)	27·1 (24·3; 29·9)	36·3 (34·8; 37·8)	16·5 (12·8; 20·2)	20·5 (19·1; 22)	25·9 (23·5; 28·3)	48·3 (42·7; 53·8)	56·9 (52·5; 61·3)	22·9 (20·9; 24·8)	27·2 (22·2; 32·1)	37·2 (35·8; 38·7)	23 (18·1; 28)
7. No rooming-in	19·4 (18·8; 20)	37·2 (32·4; 41·9)	9·9 (7·2; 12·5)	10 (8·1; 11·9)	21·7 (20·5; 23)	5·5 (3·2; 7·8)	21·2 (19·7; 22·7)	5·8 (4·5; 7·0)	40·0 (34·6; 45·4)	55·6 (51·2; 60·1)	23·6 (21·7; 25·6)	8·7 (5·6; 11·9)	16·8 (15·7; 17·9)	12·4 (8·6; 16·3)
8. Not allowed to stay with the baby as wished	7·0 (6·7; 7·4)	7·0 (4·5; 9·5)	2·0 (0·8; 3·2)	1·6 (0·8; 2·4)	7·1 (6·3; 7·9)	0·3 (0·0; 0·8)	3·6 (2·9; 4·3)	3·3 (2·3; 4·3)	22·2 (17·6; 26·8)	39·7 (35·4; 44·1)	4·5 (3·5; 5·4)	2·3 (0·6; 3·9)	9·7 (8·8; 10·5)	4·3 (1·9; 6·6)
9. No exclusive breastfeeding at discharge	27·7 (27; 28·4)	42 (37·1; 46·8)	36·6 (32·4; 40·9)	25·4 (22·6; 28·2)	29·7 (28·3; 31·1)	24·9 (20·5; 29·2)	23·2 (21·6; 24·7)	22·3 (20·1; 24·6)	44·1 (38·6; 49·6)	39·5 (35·2; 43·9)	34·3 (32·2; 36·5)	17·5 (13·2; 21·7)	24·9 (23·6; 26·2)	20·9 (16·2; 25·7)
10. No immediate attention when needed	31·4 (30·7; 32·1)	30·7 (26·1; 35·2)	34·0 (29·8; 38·2)	24·9 (22·1; 27·6)	31·5 (30·0; 32·9)	20·2 (16·1; 24·2)	30·9 (29·3; 32·6)	30·8 (28·3; 33·3)	43·8 (38·3; 49·3)	60·7 (56·3; 65·0)	31·1 (29; 33·2)	23·3 (18·6; 28·0)	31·0 (29·6; 32·3)	26·6 (21·4; 31·8)

Women with prelabour caesarean section

	Overall n (%)	Croatia n (%)	France n (%)	Germany n (%)	Italy n (%)	Luxembourg n (%)	Norway n (%)	Portugal n (%)	Romania n (%)	Serbia n (%)	Slovenia n (%)	Spain n (%)	Sweden n (%)	Other countries n (%)
N	2964	60	47	132	840	59	231	387	256	152	254	38	445	63
1. Mode of birth														
1a. Elective CS	67.3 (65.6; 69)	63.3 (51.1; 75.5)	66.0 (52.4; 79.5)	80.3 (73.5; 87.1)	64.2 (60.9; 67.4)	74.6 (63.5; 85.7)	61.9 (55.6; 68.2)	68.2 (63.6; 72.9)	73.0 (67.6; 78.5)	72.4 (65.3; 79.5)	72.8 (67.4; 78.3)	55.3 (39.5; 71.1)	64.5 (60; 68.9)	63.5 (51.6; 75.4)
1b. ECS before labour	32.7 (31.0; 34.4)	36.7 (24.5; 48.9)	34.0 (20.5; 47.6)	19.7 (12.9; 26.5)	35.8 (32.6; 39.1)	25.4 (14.3; 36.5)	38.1 (31.8; 44.4)	31.8 (27.1; 36.4)	27.0 (21.5; 32.4)	27.6 (20.5; 34.7)	27.2 (21.7; 32.6)	44.7 (28.9; 60.5)	35.5 (31.1; 40)	36.5 (24.6; 48.4)
2. No pain relief after CS	13.2 (12.0; 14.4)	5.0 (0.0; 10.5)	38.3 (24.4; 52.2)	15.2 (9.0; 21.3)	13.3 (11; 15.6)	6.8 (0.4; 13.2)	13.0 (8.7; 17.3)	10.1 (7.1; 13.1)	10.2 (6.5; 13.9)	11.2 (6.2; 16.2)	10.2 (6.5; 14.0)	7.9 (0.0; 16.5)	20.2 (16.5; 24)	4.8 (0.0; 10.0)
3. No skin to skin	35.0 (33.3; 36.7)	45.0 (32.4; 57.6)	27.7 (14.9; 40.4)	9.1 (4.2; 14.0)	38.1 (34.8; 41.4)	1.7 (0.0; 5.0)	19.5 (14.4; 24.6)	30.0 (25.4; 34.5)	71.9 (66.4; 77.4)	59.2 (51.4; 67)	52.0 (45.8; 58.1)	23.7 (10.2; 37.2)	16.9 (13.4; 20.3)	20.6 (10.6; 30.6)
4. No early breastfeeding	35.7 (34; 37.5)	61.7 (49.4; 74)	40.4 (26.4; 54.5)	15.9 (9.7; 22.1)	37.1 (33.9; 40.4)	8.5 (1.4; 15.6)	31.2 (25.2; 37.1)	14.5 (11.0; 18.0)	73.8 (68.4; 79.2)	74.3 (67.4; 81.3)	45.7 (39.5; 51.8)	28.9 (14.5; 43.4)	21.1 (17.3; 24.9)	22.2 (12; 32.5)
5. Inadequate breastfeeding support	37.3 (35.6; 39.1)	41.7 (29.2; 54.1)	38.3 (24.4; 52.2)	37.1 (28.9; 45.4)	41.8 (38.5; 45.1)	18.6 (8.7; 28.6)	26.0 (20.3; 31.6)	25.6 (21.2; 29.9)	44.9 (38.8; 51)	48.7 (40.7; 56.6)	27.6 (22.1; 33.1)	34.2 (19.1; 49.3)	46.5 (41.9; 51.2)	22.2 (12; 32.5)
6. No rooming-in	36.1 (34.4; 37.8)	48.3 (35.7; 61.0)	23.4 (11.3; 35.5)	16.7 (10.3; 23)	39.4 (36.1; 42.7)	6.8 (0.4; 13.2)	39 (32.7; 45.2)	13.7 (10.3; 17.1)	54.7 (48.6; 60.8)	80.3 (73.9; 86.6)	63 (57.1; 68.9)	15.8 (4.2; 27.4)	19.3 (15.7; 23)	25.4 (14.6; 36.1)
7. Not allowed to stay with the baby as wished	14.3 (13.0; 15.6)	13.3 (4.7; 21.9)	10.6 (1.8; 19.5)	3.0 (0.1; 6.0)	14.3 (11.9; 16.7)	0.0 (0.0; 0.0)	10.8 (6.8; 14.8)	5.2 (3.0; 7.4)	25.4 (20.1; 30.7)	53.3 (45.4; 61.2)	13.8 (9.5; 18)	5.3 (0.0; 12.4)	10.6 (7.7; 13.4)	19.0 (9.4; 28.7)
8. No exclusive breastfeeding at discharge	47.0 (45.2; 48.8)	46.7 (34; 59.3)	46.8 (32.5; 61.1)	44.7 (36.2; 53.2)	50.2 (46.9; 53.6)	39.0 (26.5; 51.4)	41.6 (35.2; 47.9)	41.9 (36.9; 46.8)	60.2 (54.2; 66.2)	48.0 (40.1; 56.0)	44.9 (38.8; 51.0)	44.7 (28.9; 60.5)	45.4 (40.8; 50)	31.7 (20.3; 43.2)
9. No immediate attention when needed	35.6 (33.9; 37.3)	28.3 (16.9; 39.7)	40.4 (26.4; 54.5)	28.0 (20.4; 35.7)	34.2 (31; 37.4)	27.1 (15.8; 38.5)	39.8 (33.5; 46.1)	29.2 (24.7; 33.7)	41.0 (35; 47.0)	46.7 (38.8; 54.6)	31.1 (25.4; 36.8)	21.1 (8.1; 34)	43.8 (39.2; 48.4)	25.4 (14.6; 36.1)
10. No timely care by HCP at facility arrival	14.7 (13.4; 16.0)	5.0 (0.0; 10.5)	19.1 (7.9; 30.4)	21.2 (14.2; 28.2)	14.9 (12.5; 17.3)	6.8 (0.4; 13.2)	14.3 (9.8; 18.8)	14.5 (11.0; 18.0)	16.0 (11.5; 20.5)	34.9 (27.3; 42.4)	10.2 (6.5; 14)	15.8 (4.2; 27.4)	10.1 (7.3; 12.9)	9.5 (2.3; 16.8)

Notes

All the indicators in the domain of provision of care are directly based on WHO standards.

Indicators identified with letters (eg, 3a, 3b) were tailored to take into account different mode of birth (ie, spontaneous vaginal, instrumental vaginal, and caesarean section). These were calculated on subsamples (eg, 3a was calculated on spontaneous vaginal births; 3b was calculated on instrumental vaginal births).

Abbreviations: CS = caesarean section; ECS = emergency caesarean section; HCP = health care provider; IVB= instrumental vaginal birth; SVB = spontaneous vaginal birth

Supplementary Table 7 Results on experience of care

Women who underwent labour

	Overall n (%)	Croatia n (%)	France n (%)	Germany n (%)	Italy n (%)	Luxembourg n (%)	Norway n (%)	Portugal n (%)	Romania n (%)	Serbia n (%)	Slovenia n (%)	Spain n (%)	Sweden n (%)	Other countries n (%)
N	18063	398	497	949	3973	382	2989	1298	315	478	1838	309	4355	282
1. No freedom of movements during labour	25.6 (25.0; 26.2)	66.8 (62.2; 71.5)	25.6 (21.7; 29.4)	15.4 (13.1; 17.7)	18.0 (16.8; 19.2)	14.9 (11.3; 18.5)	7.9 (6.9; 8.9)	46.0 (43.3; 48.7)	46.3 (40.8; 51.9)	68.2 (64.0; 72.4)	51.6 (49.3; 53.9)	30.4 (25.3; 35.6)	20.9 (19.7; 22.1)	18.8 (14.2; 23.4)
2a. No choice of birth position (in SVB)	42.8 (42.0; 43.6)	81.9 (77.9; 86.0)	47.7 (42.6; 52.8)	38.3 (34.7; 41.9)	32.4 (30.8; 34.1)	39.0 (33.1; 44.8)	32.9 (31.0; 34.8)	65.2 (61.7; 68.7)	75.6 (69.8; 81.4)	80.6 (76.8; 84.4)	61.6 (59.2; 64.0)	52.3 (45.7; 59.0)	35.6 (34.0; 37.2)	39.4 (33.0; 45.9)
2b. No consent requested (for IVB)	53.6 (51.4; 55.8)	81.8 (59.0; 104.6)	62.5 (52.8; 72.2)	59.5 (49.0; 70.0)	62.4 (57.3; 67.5)	42.2 (30.1; 54.3)	43.7 (38.9; 48.5)	63.2 (58.5; 68.0)	40.0 (0.0; 82.9)	69.2 (44.1; 94.3)	64.9 (54; 75.7)	78.6 (67.8; 89.3)	35.9 (30.9; 40.9)	53.8 (34.7; 73)
2c. No information on newborn (in ECS)	37.7 (35.6; 39.8)	38.6 (24.2; 53.0)	58.8 (42.3; 75.4)	22.2 (15.8; 28.6)	32.3 (28.2; 36.4)	19.6 (8.7; 30.5)	35.3 (29.6; 41.1)	25.3 (19.0; 31.5)	56.4 (46.8; 66.1)	59.5 (44.7; 74.4)	64.6 (57.2; 72.0)	24.3 (10.5; 38.1)	43.0 (38.1; 47.8)	26.3 (12.3; 40.3)
3. No clear/effective communication from HCP	30.3 (29.6; 31.0)	44.2 (39.3; 49.1)	32.6 (28.5; 36.7)	19.6 (17.1; 22.1)	32.9 (31.4; 34.4)	17.5 (13.7; 21.4)	30.5 (28.8; 32.1)	28.3 (25.8; 30.7)	44.8 (39.3; 50.3)	56.3 (51.8; 60.7)	30.8 (28.7; 32.9)	25.6 (20.7; 30.4)	27 (25.6; 28.3)	24.1 (19.1; 29.1)
4. No involvement in choices	34.7 (34.0; 35.3)	55.5 (50.6; 60.4)	34.6 (30.4; 38.8)	28.6 (25.7; 31.4)	39.1 (37.6; 40.7)	21.7 (17.6; 25.9)	26.2 (24.6; 27.8)	41.6 (38.9; 44.3)	50.5 (45.0; 56.0)	77.2 (73.4; 81.0)	30.6 (28.5; 32.7)	34.3 (29.0; 39.6)	31.3 (29.9; 32.6)	27.0 (21.8; 32.1)
5. Companionship not allowed	62.0 (61.3; 62.7)	80.2 (76.2; 84.1)	50.9 (46.5; 55.3)	57.7 (54.6; 60.9)	78.5 (77.2; 79.7)	20.7 (16.6; 24.7)	58.2 (56.4; 59.9)	66.7 (64.2; 69.3)	94.6 (92.1; 97.1)	99.0 (98; 99.9)	60.3 (58.1; 62.6)	12.6 (8.9; 16.3)	51.9 (50.5; 53.4)	34.0 (28.5; 39.6)
6. Not treated with dignity	23.9 (23.3; 24.5)	38.9 (34.2; 43.7)	23.1 (19.4; 26.8)	22.7 (20; 25.3)	24.8 (23.4; 26.1)	12.8 (9.5; 16.2)	21.9 (20.4; 23.4)	31.5 (29.0; 34)	38.4 (33.0; 43.8)	59.8 (55.4; 64.2)	21.2 (19.3; 23.0)	18.8 (14.4; 23.1)	18.9 (17.7; 20.0)	20.2 (15.5; 24.9)
7. No emotional support	27.4 (26.7; 28)	47.7 (42.8; 52.6)	27.4 (23.4; 31.3)	28.2 (25.4; 31.1)	27.4 (26.0; 28.8)	18.6 (14.7; 22.5)	22.6 (21.1; 24.1)	38.7 (36; 41.3)	44.8 (39.3; 50.3)	58.4 (53.9; 62.8)	29.8 (27.7; 31.9)	24.6 (19.8; 29.4)	20.6 (19.4; 21.8)	25.2 (20.1; 30.2)
8. No privacy	18.2 (17.6; 18.7)	36.7 (31.9; 41.4)	14.1 (11.0; 17.1)	19.9 (17.4; 22.5)	16.2 (15; 17.3)	8.9 (6.0; 11.8)	12.0 (10.8; 13.1)	22.5 (20.2; 24.8)	32.7 (27.5; 37.9)	65.9 (61.6; 70.1)	17.2 (15.5; 19)	21.0 (16.5; 25.6)	16.0 (14.9; 17.1)	19.1 (14.6; 23.7)
9. Abuses (physical /verbal /emotional)	12.5 (12.0; 13.0)	21.4 (17.3; 25.4)	18.5 (15.1; 21.9)	12 (9.9; 14.1)	15.3 (14.2; 16.4)	8.9 (6.0; 11.8)	8.2 (7.2; 9.1)	22.7 (20.4; 24.9)	21.9 (17.3; 26.5)	23.4 (19.6; 27.2)	11.1 (9.7; 12.5)	21.4 (16.8; 25.9)	7.0 (6.2; 7.7)	10.6 (7.0; 14.2)
10. Informal payment	2.4 (2.2; 2.6)	1.3 (0.2; 2.4)	6.8 (4.6; 9.1)	3.8 (2.6; 5.0)	1.6 (1.2; 1.9)	8.6 (5.8; 11.5)	0.9 (0.6; 1.2)	0.8 (0.3; 1.3)	19.7 (15.3; 24.1)	26.2 (22.2; 30.1)	0.7 (0.3; 1.0)	0.3 (0.0; 1.0)	0.1 (0.0; 0.2)	7.8 (4.7; 10.9)

Women with prelabour caesarean section

	Overall n (%)	Croatia n (%)	France n (%)	Germany n (%)	Italy n (%)	Luxembourg n (%)	Norway n (%)	Portugal n (%)	Romania n (%)	Serbia n (%)	Slovenia n (%)	Spain n (%)	Sweden n (%)	Other countries n (%)
N	2964	60	47	132	840	59	231	387	256	152	254	38	445	63
1. Consent requested for vaginal examination	28.9 (27.2; 30.5)	66.7 (54.7; 78.6)	8.5 (0.5; 16.5)	17.4 (11.0; 23.9)	38.3 (35.0; 41.6)	16.9 (7.4; 26.5)	6.9 (3.7; 10.2)	22.2 (18.1; 26.4)	22.7 (17.5; 27.8)	69.7 (62.4; 77.0)	42.5 (36.4; 48.6)	36.8 (21.5; 52.2)	11.7 (8.7; 14.7)	27.0 (16; 37.9)
2. No information on newborn	28.7 (27.1; 30.4)	23.3 (12.6; 34.0)	53.2 (38.9; 67.5)	14.4 (8.4; 20.4)	24.4 (21.5; 27.3)	16.9 (7.4; 26.5)	22.9 (17.5; 28.4)	14.2 (10.7; 17.7)	44.5 (38.4; 50.6)	49.3 (41.4; 57.3)	42.9 (36.8; 49.0)	21.1 (8.1; 34.0)	33.9 (29.5; 38.3)	22.2 (12.0; 32.5)
3. No clear/effective communication from HCP	35.0 (33.3; 36.7)	45.0 (32.4; 57.6)	44.7 (30.5; 58.9)	22.7 (15.6; 29.9)	37.0 (33.8; 40.3)	10.2 (2.5; 17.9)	36.4 (30.2; 42.6)	28.7 (24.2; 33.2)	40.6 (34.6; 46.6)	48.0 (40.1; 56)	29.5 (23.9; 35.1)	26.3 (12.3; 40.3)	38.2 (33.7; 42.7)	25.4 (14.6; 36.1)
4. No involvement in choices	43.0 (41.2; 44.8)	48.3 (35.7; 61.0)	48.9 (34.6; 63.2)	27.3 (19.7; 34.9)	48.8 (45.4; 52.2)	16.9 (7.4; 26.5)	33.8 (27.7; 39.9)	37.0 (32.1; 41.8)	43.8 (37.7; 49.8)	74.3 (67.4; 81.3)	37.0 (31.1; 42.9)	36.8 (21.5; 52.2)	41.6 (37; 46.2)	42.9 (30.6; 55.1)
5. Companionship not allowed	71.5 (69.8; 73.1)	93.3 (87; 99.6)	59.6 (45.5; 73.6)	63.6 (55.4; 71.8)	85.5 (83.1; 87.9)	27.1 (15.8; 38.5)	63.2 (57.0; 69.4)	52.2 (47.2; 57.2)	91.0 (87.5; 94.5)	98.0 (95.8; 100)	82.7 (78; 87.3)	21.1 (8.1; 34)	53.3 (48.6; 57.9)	49.2 (36.9; 61.6)
6. Not treated with dignity	30.5 (28.8; 32.2)	36.7 (24.5; 48.9)	34.0 (20.5; 47.6)	22.7 (15.6; 29.9)	31.7 (28.5; 34.8)	15.3 (6.1; 24.4)	31.2 (25.2; 37.1)	26.4 (22.0; 30.7)	35.2 (29.3; 41)	55.9 (48.0; 63.8)	26 (20.6; 31.4)	26.3 (12.3; 40.3)	27.6 (23.5; 31.8)	20.6 (10.6; 30.6)
7. No emotional support	31.4 (29.8; 33.1)	30.0 (18.4; 41.6)	44.7 (30.5; 58.9)	28.0 (20.4; 35.7)	29.6 (26.6; 32.7)	16.9 (7.4; 26.5)	22.1 (16.7; 27.4)	30.0 (25.4; 34.5)	33.2 (27.4; 39)	52.0 (44.0; 59.9)	40.2 (34.1; 46.2)	42.1 (26.4; 57.8)	28.5 (24.3; 32.7)	33.3 (21.7; 45.0)
8. No privacy	20.5 (19.0; 21.9)	26.7 (15.5; 37.9)	12.8 (3.2; 22.3)	18.2 (11.6; 24.8)	16.9 (14.4; 19.4)	18.6 (8.7; 28.6)	15.2 (10.5; 19.8)	15.0 (11.4; 18.5)	19.9 (15; 24.8)	68.4 (61.0; 75.8)	21.7 (16.6; 26.7)	21.1 (8.1; 34)	19.1 (15.4; 22.8)	19.0 (9.4; 28.7)
9. Abuses (physical /verbal/emotional)	14.1 (12.8; 15.3)	16.7 (7.2; 26.1)	14.9 (4.7; 25.1)	15.2 (9.0; 21.3)	16.4 (13.9; 18.9)	8.5 (1.4; 15.6)	7.8 (4.3; 11.2)	16.8 (13.1; 20.5)	14.5 (10.1; 18.8)	18.4 (12.3; 24.6)	12.2 (8.2; 16.2)	15.8 (4.2; 27.4)	9.7 (6.9; 12.4)	14.3 (5.6; 22.9)
10. Informal payment	5.2 (4.4; 6.0)	5.0 (0.0; 10.5)	10.6 (1.8; 19.5)	5.3 (1.5; 9.1)	1.5 (0.7; 2.4)	8.5 (1.4; 15.6)	0.9 (0.0; 2.1)	0.5 (0.0; 1.2)	27.3 (21.9; 32.8)	25.0 (18.1; 31.9)	0.4 (0.0; 1.2)	0.0 (0.0; 0.0)	0.0 (0.0; 0.0)	12.7 (4.5; 20.9)

Notes

All the indicators in the domain of experience of care are directly based on WHO standards.

Indicators identified with letters (eg, 2a, 2b) were tailored to take into account different mode of birth (ie, spontaneous vaginal, instrumental vaginal, and caesarean section). These were calculated on subsamples (eg, 2a was calculated on spontaneous vaginal births; 2b was calculated on instrumental vaginal births).

Abbreviations: ECS = emergency caesarean section; HCP = health care provider; IVB= instrumental vaginal birth; SVB = spontaneous vaginal birth

Supplementary Table 8 Results on availability of physical and human resources

Women who underwent labour

	Overall % (95% CI)	Croatia % (95% CI)	France % (95% CI)	Germany % (95% CI)	Italy % (95% CI)	Luxembourg % (95% CI)	Norway % (95% CI)	Portugal % (95% CI)	Romania % (95% CI)	Serbia % (95% CI)	Slovenia % (95% CI)	Spain % (95% CI)	Sweden % (95% CI)	Other countries % (95% CI)
N	18063	398	497	949	3973	382	2989	1298	315	478	1838	309	4355	282
1. No timely care by HCPs at facility arrival	13.1 (12.6; 13.6)	11.1 (8; 14.1)	13.3 (10.3; 16.3)	15.9 (13.6; 18.2)	12.5 (11.5; 13.5)	10.2 (7.2; 13.2)	14.2 (12.9; 15.4)	13.4 (11.6; 15.3)	19.7 (15.3; 24.1)	32.2 (28.0; 36.4)	11.8 (10.3; 13.3)	11.7 (8.1; 15.2)	10.5 (9.6; 11.5)	13.1 (9.2; 17.1)
2. No information on maternal danger signs	45.3 (44.6; 46)	58.5 (53.7; 63.4)	44.5 (40.1; 48.8)	36.8 (33.7; 39.8)	44.8 (43.3; 46.4)	29.3 (24.8; 33.9)	43.3 (41.5; 45.1)	28.7 (26.3; 31.2)	47.6 (42.1; 53.1)	75.1 (71.2; 79.0)	42.2 (40.0; 44.5)	36.2 (30.9; 41.6)	53.1 (51.6; 54.6)	37.9 (32.3; 43.6)
3. No information on newborn danger signs	55 (54.2; 55.7)	55.8 (50.9; 60.7)	51.1 (46.7; 55.5)	47.5 (44.3; 50.7)	50.7 (49.1; 52.2)	41.9 (36.9; 46.8)	54.8 (53.1; 56.6)	45.2 (42.5; 47.9)	54.6 (49.1; 60.1)	75.9 (72.1; 79.8)	49.4 (47.1; 51.7)	58.6 (53.1; 64.1)	65.5 (64.1; 66.9)	44 (38.2; 49.8)
4. Inadequate room comfort and equipment	8.3 (7.9; 8.7)	12.8 (9.5; 16.1)	8.2 (5.8; 10.7)	3.1 (2.0; 4.2)	9.9 (9.0; 10.9)	0.0 (0.0; 0.0)	9.2 (8.2; 10.3)	4.5 (3.3; 5.6)	9.8 (6.6; 13.1)	27.8 (23.8; 31.8)	7.5 (6.3; 8.7)	7.8 (4.8; 10.8)	7.2 (6.4; 7.9)	6.4 (3.5; 9.2)
5. Inadequate number of women per rooms	8.7 (8.3; 9.2)	9.5 (6.7; 12.4)	2.8 (1.4; 4.3)	4.8 (3.5; 6.2)	9.1 (8.2; 10.0)	4.5 (2.4; 6.5)	9.5 (8.4; 10.5)	6.4 (5.1; 7.7)	7.9 (5.0; 10.9)	18.4 (14.9; 21.9)	7.5 (6.3; 8.7)	11 (7.5; 14.5)	9.9 (9.0; 10.8)	6.7 (3.8; 9.7)
6. Inadequate room cleaning	6.7 (6.3; 7)	12.1 (8.9; 15.3)	3.8 (2.1; 5.5)	4.7 (3.4; 6.1)	7.3 (6.5; 8.1)	1 (0; 2.1)	8.9 (7.9; 10.0)	3.5 (2.5; 4.5)	8.9 (5.7; 12)	24.1 (20.2; 27.9)	2.2 (1.6; 2.9)	2.6 (0.8; 4.4)	6.4 (5.6; 7.1)	5 (2.4; 7.5)
7. Inadequate bathroom	13.4 (12.9; 13.9)	24.4 (20.2; 28.6)	4 (2.3; 5.8)	7.3 (5.6; 8.9)	14.5 (13.4; 15.6)	1.8 (0.5; 3.2)	11.9 (10.7; 13.0)	14.9 (12.9; 16.8)	16.5 (12.4; 20.6)	48.7 (44.3; 53.2)	14.2 (12.6; 15.8)	12 (8.4; 15.6)	11.3 (10.4; 12.3)	9.2 (5.8; 12.6)
8. Inadequate partner visiting hours	61.6 (60.9; 62.3)	91 (88.1; 93.8)	46.3 (41.9; 50.7)	49.9 (46.8; 53.1)	65.8 (64.4; 67.3)	23.0 (18.8; 27.3)	60.2 (58.4; 61.9)	66.6 (64.0; 69.1)	83.5 (79.4; 87.6)	89.3 (86.6; 92.1)	80.4 (78.5; 82.2)	6.1 (3.5; 8.8)	55.5 (54.1; 57.0)	33.7 (28.2; 39.2)
9. Inadequate HCP's number	21 (20.4; 21.6)	36.4 (31.7; 41.2)	20.3 (16.8; 23.9)	13.4 (11.2; 15.5)	17.8 (16.7; 19.0)	7.3 (4.7; 9.9)	29.5 (27.9; 31.1)	13 (11.2; 14.9)	19.4 (15.0; 23.7)	40.8 (36.4; 45.2)	10.6 (9.2; 12.0)	9.7 (6.4; 13.0)	25.6 (24.3; 26.9)	15.6 (11.4; 19.8)
10. Inadequate HCP professionalism	5.5 (5.2; 5.9)	9.8 (6.9; 12.7)	6.6 (4.5; 8.8)	4.4 (3.1; 5.7)	5.4 (4.7; 6.1)	1.3 (0.2; 2.4)	4.4 (3.7; 5.2)	5.5 (4.2; 6.7)	9.5 (6.3; 12.8)	19.2 (15.7; 22.8)	4.4 (3.4; 5.3)	6.8 (4.0; 9.6)	5.2 (4.6; 5.9)	3.5 (1.4; 5.7)

Women with prelabour caesarean section

	Overall % (95% CI)	Croatia % (95% CI)	France % (95% CI)	Germany % (95% CI)	Italy % (95% CI)	Luxembourg % (95% CI)	Norway % (95% CI)	Portugal % (95% CI)	Romania % (95% CI)	Serbia % (95% CI)	Slovenia % (95% CI)	Spain % (95% CI)	Sweden % (95% CI)	Other countries % (95% CI)
N	2964	60	47	132	840	59	231	387	256	152	254	38	445	63
1. No information on maternal danger signs	45.5 (43.8; 47.3)	53.3 (40.7; 66)	51.1 (36.8; 65.4)	34.1 (26.0; 42.2)	48.3 (45.0; 51.7)	28.8 (17.3; 40.4)	39.4 (33.1; 45.7)	28.4 (23.9; 32.9)	44.5 (38.4; 50.6)	69.1 (61.7; 76.4)	44.9 (38.8; 51.0)	36.8 (21.5; 52.2)	56.6 (52.0; 61.2)	41.3 (29.1; 53.4)
2. No information on newborn danger signs	52.4 (50.6; 54.2)	63.3 (51.1; 75.5)	57.4 (43.3; 71.6)	48.5 (40.0; 57.0)	51.8 (48.4; 55.2)	37.3 (24.9; 49.6)	49.4 (42.9; 55.8)	39.8 (34.9; 44.7)	47.7 (41.5; 53.8)	69.7 (62.4; 77.0)	51.6 (45.4; 57.7)	47.4 (31.5; 63.2)	66.7 (62.4; 71.1)	39.7 (27.6; 51.8)
3. Inadequate room comfort and equipment	10.8 (9.7; 11.9)	26.7 (15.5; 37.9)	8.5 (0.5; 16.5)	6.1 (2; 10.1)	12.5 (10.3; 14.7)	0 (0.0; 0.0)	8.7 (5.0; 12.3)	5.2 (3; 7.4)	10.2 (6.5; 13.9)	25.7 (18.7; 32.6)	5.9 (3.0; 8.8)	7.9 (0.7; 16.5)	13.7 (10.5; 16.9)	4.8 (0.0; 10)
4. Inadequate number of women per rooms	7 (6.0; 7.9)	15 (6.0; 24)	0 (0.0; 0.0)	3.8 (0.5; 7.0)	6.2 (4.6; 7.8)	5.1 (0.0; 10.7)	12.1 (7.9; 16.3)	5.9 (3.6; 8.3)	9 (5.5; 12.5)	12.5 (7.2; 17.8)	5.1 (2.4; 7.8)	13.2 (2.4; 23.9)	4.9 (2.9; 7.0)	6.3 (0.3; 12.4)
5. Inadequate room cleaning	8.3 (7.3; 9.3)	16.7 (7.2; 26.1)	2.1 (0.0; 6.3)	7.6 (3.1; 12.1)	7 (5.3; 8.8)	1.7 (0.0; 5.0)	10 (6.1; 13.8)	4.4 (2.4; 6.4)	11.3 (7.4; 15.2)	27.6 (20.5; 34.7)	3.1 (1.0; 5.3)	5.3 (1.8; 12.4)	8.8 (6.1; 11.4)	6.3 (0.3; 12.4)
6. Inadequate bathroom	14.4 (13.1; 15.7)	35 (22.9; 47.1)	2.1 (0.0; 6.3)	5.3 (1.5; 9.1)	14.5 (12.1; 16.9)	0 (0.0; 0.0)	14.7 (10.1; 19.3)	12.1 (8.9; 15.4)	19.5 (14.7; 24.4)	37.5 (29.8; 45.2)	9.4 (5.9; 13)	15.8 (4.2; 27.4)	11.5 (8.5; 14.4)	11.1 (3.4; 18.9)
7. Inadequate partner visiting hours	66.4 (64.7; 68.1)	88.3 (80.2; 96.5)	61.7 (47.8; 75.6)	50 (41.5; 58.5)	70.5 (67.4; 73.6)	22 (11.5; 32.6)	61.5 (55.2; 67.7)	55.8 (50.9; 60.8)	81.6 (76.9; 86.4)	92.1 (87.8; 96.4)	84.3 (79.8; 88.7)	13.2 (2.4; 23.9)	58.7 (54.1; 63.2)	46 (33.7; 58.3)
8. Inadequate HCP's number	21.3 (19.8; 22.8)	40 (27.6; 52.4)	21.3 (9.6; 33.0)	18.2 (11.6; 24.8)	20.6 (17.9; 23.3)	10.2 (2.5; 17.9)	29.9 (24.0; 35.8)	12.4 (9.1; 15.7)	18.8 (14.0; 23.5)	39.5 (31.7; 47.2)	11 (7.2; 14.9)	18.4 (6.1; 30.7)	27.4 (23.3; 31.6)	19 (9.4; 28.7)
9. Inadequate HCP professionalism	6.4 (5.6; 7.3)	8.3 (1.3; 15.3)	4.3 (0.0; 10)	4.5 (1.0; 8.1)	6.2 (4.6; 7.8)	1.7 (0.0; 5.0)	6.5 (3.3; 9.7)	4.1 (2.2; 6.1)	12.5 (8.4; 16.6)	12.5 (7.2; 17.8)	4.3 (1.8; 6.8)	5.3 (1.8; 12.4)	6.1 (3.8; 8.3)	4.8 (0.0; 10)
10. Inadequate wards reorganization	40.9 (39.1; 42.6)	63.3 (51.1; 75.5)	29.8 (16.7; 42.9)	33.3 (25.3; 41.4)	45.7 (42.3; 49.1)	16.9 (7.4; 26.5)	36.8 (30.6; 43)	31.3 (26.6; 35.9)	35.5 (29.7; 41.4)	69.1 (61.7; 76.4)	27.6 (22.1; 33.1)	34.2 (19.1; 49.3)	47.9 (43.2; 52.5)	36.5 (24.6; 48.4)

Notes

All the indicators in the domain of resources are directly based on WHO standards

Abbreviations: HCP = health care provider

Supplementary Table 9 Results on reorganizational changes due to COVID-19

Women who underwent labour

	Overall % (95% CI)	Croatia % (95% CI)	France % (95% CI)	Germany % (95% CI)	Italy % (95% CI)	Luxembourg % (95% CI)	Norway % (95% CI)	Portugal % (95% CI)	Romania % (95% CI)	Serbia % (95% CI)	Slovenia % (95% CI)	Spain % (95% CI)	Sweden % (95% CI)	Other countries % (95% CI)
N	18063	398	497	949	3973	382	2989	1298	315	478	1838	309	4355	282
1. Difficulties in attending routine antenatal visits	41·8 (41·1; 42·6)	43·2 (38·3; 48·1)	42·9 (38·5; 47·2)	26·1 (23·3; 28·9)	44·7 (43·1; 46·2)	36·6 (31·8; 41·5)	46·1 (44·3; 47·9)	49·2 (46·5; 51·9)	63·5 (58·2; 68·8)	63·0 (58·6; 67·3)	45·8 (43·5; 48)	62·8 (57·4; 68·2)	30·8 (29·5; 32·2)	40·1 (34·4; 45·8)
2. Any barriers in accessing the facility	31·4 (30·7; 32·1)	37·7 (32·9; 42·4)	24·1 (20·4; 27·9)	31·3 (28·3; 34·2)	31·9 (30·4; 33·3)	29·8 (25·3; 34·4)	33·7 (32; 35·4)	32·6 (30; 35·1)	42·2 (36·8; 47·7)	50·0 (45·5; 54·5)	29·4 (27·4; 31·5)	31·1 (25·9; 36·2)	27·5 (26·2; 28·8)	30·1 (24·8; 35·5)
3. Inadequate info graphics	5·5 (5·2; 5·9)	9·8 (6·9; 12·7)	6·6 (4·5; 8·8)	4·4 (3·1; 5·7)	5·4 (4·7; 6·1)	1·3 (0·2; 2·4)	4·4 (3·7; 5·2)	5·5 (4·2; 6·7)	9·5 (6·3; 12·8)	19·2 (15·7; 22·8)	4·4 (3·4; 5·3)	6·8 (4·0; 9·6)	5·2 (4·6; 5·9)	3·5 (1·4; 5·7)
4. Inadequate wards reorganization	37·1 (36·4; 37·9)	58·3 (53·4; 63·1)	28·2 (24·2; 32·1)	30·2 (27·3; 33·2)	41·0 (39·5; 42·6)	16·5 (12·8; 20·2)	31·9 (30·2; 33·6)	37·4 (34·8; 40·1)	39·4 (34; 44·8)	70·5 (66·4; 74·6)	28·3 (26·3; 30·4)	35·6 (30·3; 40·9)	40 (38·6; 41·5)	29·4 (24·1; 34·8)
5. Inadequate room reorganization	37·9 (37·2; 38·6)	60·6 (55·8; 65·4)	17·1 (13·8; 20·4)	41·5 (38·4; 44·7)	47 (45·4; 48·5)	20·4 (16·4; 24·5)	27·8 (26·2; 29·4)	39·6 (36·9; 42·3)	38·7 (33·4; 44·1)	72·4 (68·4; 76·4)	42·7 (40·4; 45·0)	27·5 (22·5; 32·5)	32·6 (31·2; 34·0)	29·1 (23·8; 34·4)
6. Lacking one functioning accessible hand-washing station	13·6 (13·1; 14·1)	20·6 (16·6; 24·6)	10·5 (7·8; 13·2)	7·3 (5·6; 8·9)	34·7 (33·2; 36·2)	4·7 (2·6; 6·8)	5·8 (4·9; 6·6)	9·6 (8·0; 11·2)	17·5 (13·3; 21·7)	35·6 (31·3; 39·9)	3·4 (2·6; 4·3)	11·7 (8·1; 15·2)	4·6 (4·0; 5·3)	11·3 (7·6; 15)
7. HCP not always using PPEs	34·4 (33·7; 35·1)	42·2 (37·4; 47·1)	8·5 (6·0; 10·9)	21·1 (18·5; 23·7)	9·5 (8·6; 10·4)	5·2 (3·0; 7·5)	60·6 (58·8; 62·3)	11·3 (9·6; 13)	13·3 (9·6; 17·1)	34·5 (30·3; 38·8)	17·6 (15·8; 19·3)	12·0 (8·4; 15·6)	64·8 (63·3; 66·2)	23·4 (18·5; 28·3)
8. Insufficient HCP number	31·8 (31·1; 32·5)	50·5 (45·6; 55·4)	28·4 (24·4; 32·3)	24·9 (22·1; 27·6)	29·9 (28·5; 31·3)	20·7 (16·6; 24·7)	34·6 (32·9; 36·3)	27·5 (25·1; 29·9)	30·2 (25·1; 35·2)	53·1 (48·7; 57·6)	21·3 (19·5; 23·2)	17·8 (13·5; 22·1)	37·7 (36·3; 39·2)	22·3 (17·5; 27·2)
9. Communication inadequate to contain COVID-19 related stress	38·1 (37·4; 38·8)	59·5 (54·7; 64·4)	43·7 (39·3; 48)	32·6 (29·6; 35·5)	38·7 (37·2; 40·2)	24·9 (20·5; 29·2)	34·8 (33·1; 36·5)	37·2 (34·6; 39·8)	47·3 (41·8; 52·8)	55·9 (51·4; 60·3)	33·7 (31·5; 35·8)	29·8 (24·7; 34·9)	40·4 (39; 41·9)	28·7 (23·4; 34)
10. Reduction in QMNC due to COVID-19	49·9 (49·1; 50·6)	45·7 (40·8; 50·6)	37·2 (33·0; 41·5)	45·8 (42·7; 49·0)	44 (42·4; 45·5)	38·5 (33·6; 43·4)	66 (64·3; 67·7)	47·3 (44·6; 50·0)	58·1 (52·6; 63·5)	60·7 (56·3; 65·0)	48·2 (45·9; 50·4)	51·8 (46·2; 57·4)	48·3 (46·9; 49·8)	35·8 (30·2; 41·4)

Women with prelabour caesarean section

	Overall % (95% CI)	Croatia % (95% CI)	France % (95% CI)	Germany % (95% CI)	Italy % (95% CI)	Luxembourg % (95% CI)	Norway % (95% CI)	Portugal % (95% CI)	Romania % (95% CI)	Serbia % (95% CI)	Slovenia % (95% CI)	Spain % (95% CI)	Sweden % (95% CI)	Other countries % (95% CI)
N	2964	60	47	132	840	59	231	387	256	152	254	38	445	63
1. Difficulties in attending routine antenatal visits	43.7 (41.9; 45.5)	41.7 (29.2; 54.1)	42.6 (28.4; 56.7)	33.3 (25.3; 41.4)	44.2 (40.8; 47.5)	33.9 (21.8; 46.0)	45.5 (39.0; 51.9)	43.4 (38.5; 48.3)	51.6 (45.4; 57.7)	64.5 (56.9; 72.1)	41.3 (35.3; 47.4)	47.4 (31.5; 63.2)	36.2 (31.7; 40.6)	44.4 (32.2; 56.7)
2. Any barriers in accessing the facility	35.1 (33.3; 36.8)	33.3 (21.4; 45.3)	25.5 (13.1; 38.0)	43.2 (34.7; 51.6)	30.2 (27.1; 33.3)	33.9 (21.8; 46.0)	39 (32.7; 45.2)	32.8 (28.1; 37.5)	38.3 (32.3; 44.2)	53.3 (45.4; 61.2)	33.5 (27.7; 39.3)	26.3 (12.3; 40.3)	36.2 (31.7; 40.6)	38.1 (26.1; 50.1)
3. Inadequate info graphics	6.4 (5.6; 7.3)	8.3 (1.3; 15.3)	4.3 (0.0; 10)	4.5 (1.0; 8.1)	6.2 (4.6; 7.8)	1.7 (0.0; 5.0)	6.5 (3.3; 9.7)	4.1 (2.2; 6.1)	12.5 (8.4; 16.6)	12.5 (7.2; 17.8)	4.3 (1.8; 6.8)	5.3 (0.0; 12.4)	6.1 (3.8; 8.3)	4.8 (0.0; 10.0)
4. Inadequate wards reorganization	40.9 (39.1; 42.6)	63.3 (51.1; 75.5)	29.8 (16.7; 42.9)	33.3 (25.3; 41.4)	45.7 (42.3; 49.1)	16.9 (7.4; 26.5)	36.8 (30.6; 43)	31.3 (26.6; 35.9)	35.5 (29.7; 41.4)	69.1 (61.7; 76.4)	27.6 (22.1; 33.1)	34.2 (19.1; 49.3)	47.9 (43.2; 52.5)	36.5 (24.6; 48.4)
5. Inadequate room reorganization	39.8 (38.0; 41.6)	65.0 (52.9; 77.1)	19.1 (7.9; 30.4)	40.9 (32.5; 49.3)	49.2 (45.8; 52.5)	13.6 (4.8; 22.3)	30.3 (24.4; 36.2)	28.7 (24.2; 33.2)	37.5 (31.6; 43.4)	65.1 (57.6; 72.7)	42.5 (36.4; 48.6)	28.9 (14.5; 43.4)	31.5 (27.1; 35.8)	34.9 (23.1; 46.7)
6. Lacking one functioning accessible hand-washing station	19.1 (17.6; 20.5)	18.3 (8.5; 28.1)	6.4 (0.0; 13.4)	5.3 (1.5; 9.1)	39.8 (36.5; 43.1)	5.1 (0.0; 10.7)	6.1 (3.0; 9.1)	10.1 (7.1; 13.1)	17.2 (12.6; 21.8)	38.2 (30.4; 45.9)	4.7 (2.1; 7.3)	15.8 (4.2; 27.4)	5.4 (3.3; 7.5)	15.9 (6.8; 24.9)
7. HCP not always using PPEs	28.2 (26.6; 29.8)	36.7 (24.5; 48.9)	8.5 (0.5; 16.5)	36.4 (28.2; 44.6)	12.4 (10.2; 14.6)	1.7 (0.0; 5.0)	63.2 (57; 69.4)	10.9 (7.8; 14.0)	16.8 (12.2; 21.4)	32.9 (25.4; 40.4)	18.5 (13.7; 23.3)	10.5 (0.8; 20.3)	69.9 (65.6; 74.1)	20.6 (10.6; 30.6)
8. Insufficient HCP number	34.4 (32.7; 36.1)	45.0 (32.4; 57.6)	25.5 (13.1; 38)	34.1 (26; 42.2)	34.0 (30.8; 37.3)	16.9 (7.4; 26.5)	39.8 (33.5; 46.1)	28.4 (23.9; 32.9)	32.0 (26.3; 37.7)	43.4 (35.5; 51.3)	28.0 (22.4; 33.5)	13.2 (2.4; 23.9)	43.1 (38.5; 47.7)	33.3 (21.7; 45.0)
9. Communication inadequate to contain COVID-19 related stress	42.6 (40.8; 44.4)	58.3 (45.9; 70.8)	44.7 (30.5; 58.9)	39.4 (31.1; 47.7)	44.5 (41.2; 47.9)	25.4 (14.3; 36.5)	42.4 (36.1; 48.8)	32.8 (28.1; 37.5)	37.9 (31.9; 43.8)	55.9 (48; 63.8)	37.8 (31.8; 43.8)	23.7 (10.2; 37.2)	50.8 (46.1; 55.4)	44.4 (32.2; 56.7)
10. Reduction in QMNC due to COVID-19	50.2 (48.4; 52.0)	45 (32.4; 57.6)	44.7 (30.5; 58.9)	43.9 (35.5; 52.4)	47.4 (44; 50.8)	42.4 (29.8; 55.0)	68.4 (62.4; 74.4)	45.5 (40.5; 50.4)	50.0 (43.9; 56.1)	57.2 (49.4; 65.1)	50.4 (44.2; 56.5)	52.6 (36.8; 68.5)	53.5 (48.8; 58.1)	38.1 (26.1; 50.1)

Notes

Indicator 6 was defined as: at least one functioning and accessible hand-washing station (near or inside the room where the mother was hospitalised) supplied with water and soap or with disinfectant alcohol solution.

Abbreviations: HCP = health care provider; PPE = personal protective equipment; QMNC = quality of maternal and newborn care.

Supplementary Table 10 Comparison of the 40 key quality measures between women who underwent labour (N=18063) and women who did not (N=2964)

Provision of care	OR (95% CI)	p value	Experience of care	OR (95% CI)	p value	Availability of physical and human resources	OR (95% CI)	p value	Reorganizational changes due to COVID-19	OR (95% CI)	p value
1. No pain relief during labour	NA	NA	1. No freedom of movements during labour	NA	NA	1. No timely care by HCPs at facility arrival	1.03 (0.90; 1.18)	0.648	1. Difficulties in attending routine antenatal visits	0.98 (0.90; 10.7)	0.728
2. Mode of birth			2a. No choice of birth position (in SVB)	NA	NA	2. No information on maternal danger signs	1.01 (0.92; 1.11)	0.753	2. Any barriers in accessing the facility	1.08 (0.98; 1.19)	0.119
2a. IVB	NA	NA									
2b. ECS during labour	NA	NA									
3a. Episiotomy (in SVB)	NA	NA	2b. No consent requested (for IVB)	NA	NA	3. No information on newborn danger signs	0.97 (0.88; 1.07)	0.554	3. Inadequate info graphics	1.02 (0.92; 1.12)	0.711
3b. Fundal pressure (in IVB)	NA	NA	2c. No information on newborn (in ECS)	0.61 (0.53; 0.70)	<0.001	4. Inadequate room comfort and equipment	1.14 (0.98; 1.33)	0.088	4. Inadequate wards reorganization	1.07 (0.98; 1.18)	0.120
3c. No pain relief after CS	0.91 (0.76; 1.10)	0.339	3. No clear/effective communication from HCP	1.06 (0.96; 1.17)	0.270	5. Inadequate number of women per rooms	0.81 (0.67; 0.96)	0.015	5. Inadequate room reorganization	0.95 (0.86; 1.04)	0.253
4. No skin to skin	3.39 (3.02; 3.81)	<0.001	4. No involvement in choices	1.07 (0.98; 1.18)	0.141	6. Inadequate room cleaning	1.15 (0.97; 1.37)	0.114	6. Lacking one functioning accessible hand; washing station	1.01 (0.89; 1.15)	0.903
5. No early breastfeeding	2.95 (2.63; 3.30)	<0.001	5. Companionship not allowed	1.25 (1.13; 1.39)	<0.001	7. Inadequate bathroom	0.89 (0.78; 1.01)	0.080	7. HCP not always using PPEs	1.17 (1.04; 1.31)	0.008
6. Inadequate breastfeeding support	1.13 (1.02; 1.24)	0.016	6. Not treated with dignity	1.11 (1.00; 1.23)	0.044	8. Inadequate partner visiting hours	1.11 (1.01; 1.23)	0.035	8. Insufficient HCP number	1.27 (1.02; 1.24)	0.015
7. No rooming-in	1.68 (1.50; 1.89)	<0.001	7. No emotional support	0.88 (0.80; 0.98)	0.017	9. Inadequate HCP's number	1.05 (0.94; 1.18)	0.402	9. Communication inadequate to contain COVID; 19 related stress	1.12 (1.02; 1.23)	0.014
8. Not allowed to stay with the baby as wished	1.35 (1.15; 1.58)	<0.001	8. No privacy	0.84 (0.75; 0.95)	0.005	10. Inadequate HCP professionalism	0.88 (0.73; 1.07)	0.211	10. Reduction in QMNC due to COVID; 19	1.01 (0.94; 1.09)	0.748
9. No	1.76	<0.001	9. Abuses	0.86	0.031						

exclusive breastfeeding at discharge	(1.60; 1.94)		(physical /verbal /emotional)	(0.76; 0.98)	
10. No immediate attention when needed	1.11 (1.01; 1.22)	0.034	10. Informal payment	1.23 (0.91; 1.58)	0.091

Notes

OR are calculated taking women who underwent labour as reference and adjusting for all socio-demographic variables, type of professionals assisting the woman, newborn admission in neonatal intensive or semi-intensive care unit, mother admission in intensive care unit and multiple birth.

All the indicators in the domains of provision of care, experience of care, and resources are directly based on WHO standards.

Indicators identified with letters (eg, 3a, 3b) were tailored to take into account different mode of birth (ie, spontaneous vaginal, instrumental vaginal, and caesarean section). These were calculated on subsamples (eg, 3a was calculated on spontaneous vaginal births; 3b was calculated on instrumental vaginal births).

Indicator 6 in the domains of reorganizational changes due to COVID-19 was defined as: at least one functioning and accessible hand-washing station (near or inside the room where the mother was hospitalised) supplied with water and soap or with disinfectant alcohol solution.

Abbreviations: CS = caesarean section; ECS = emergency caesarean section; HCP = health care provider; IVB = instrumental vaginal birth; PPE = personal protective equipment; QMNC = quality maternal and newborn care; SVB = spontaneous vaginal birth

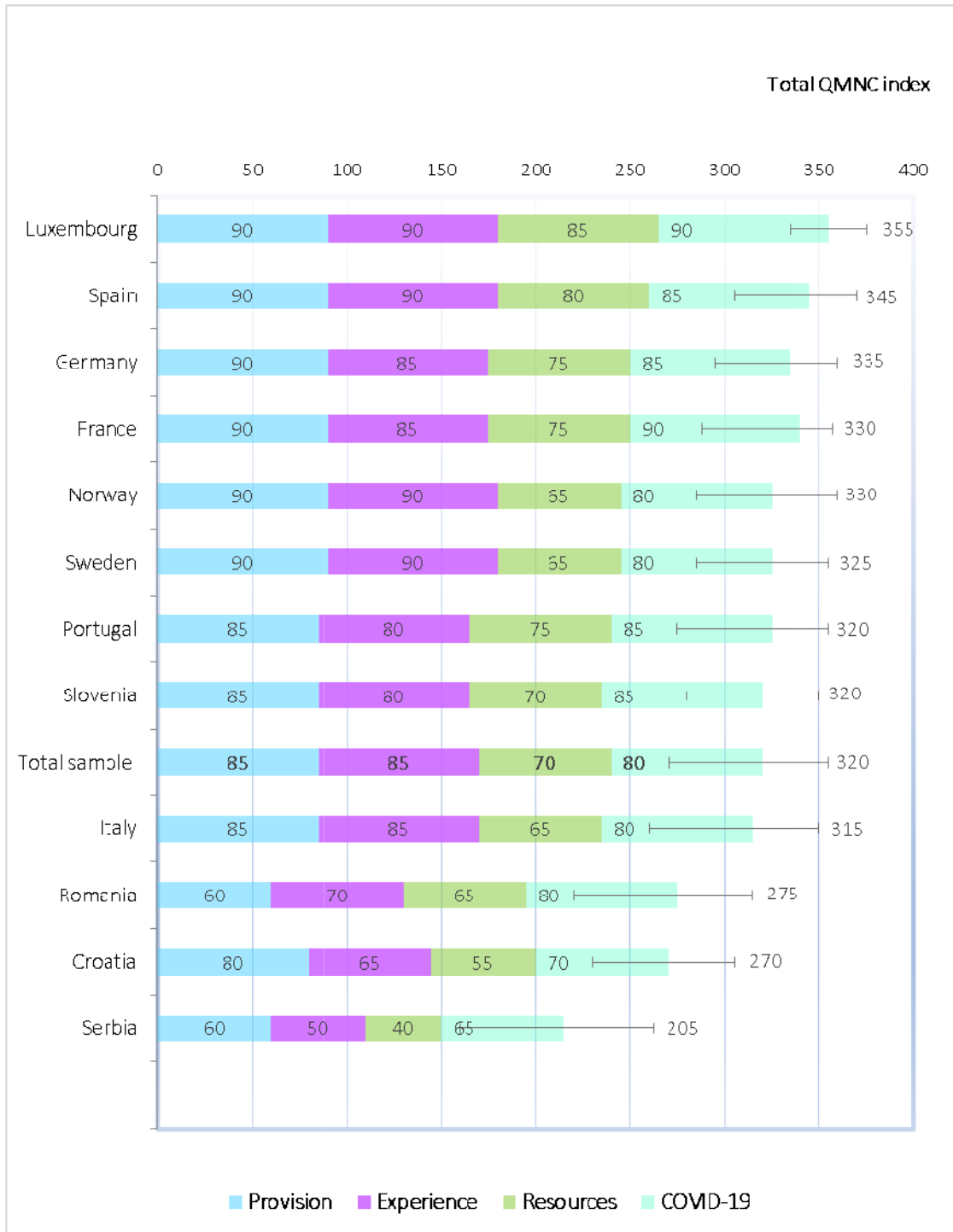
Supplementary Table 11 QMNC Index by country

Country	n	QMNC Index Median (IQR; min-max)	p value*
Luxembourg	351	355 (335-375; 155-400)	<0·001
Spain	286	345 (305-370; 135-400)	<0·001
Germany	798	335 (295-360; 95-400)	<0·001
France	405	330 (290-360; 130-400)	0·001
Norway	1588	330 (285-360; 90-400)	<0·001
Sweden	3779	325 (285-355; 55-400)	0·003
Portugal	1271	320 (275-355; 90-400)	0·181
Slovenia	1711	320 (280-350; 45-400)	0·240
Italy	3730	315 (260-350; 55-400)	<0·001
Romania	406	275 (220-315; 65-385)	<0·001
Croatia	346	270 (230-305; 105-380)	<0·001
Serbia	468	205 (160-262.5; 50-375)	<0·001
Total sample	15139	320 (270-355; 45-400)	

Notes: *Comparison between total median and country median;

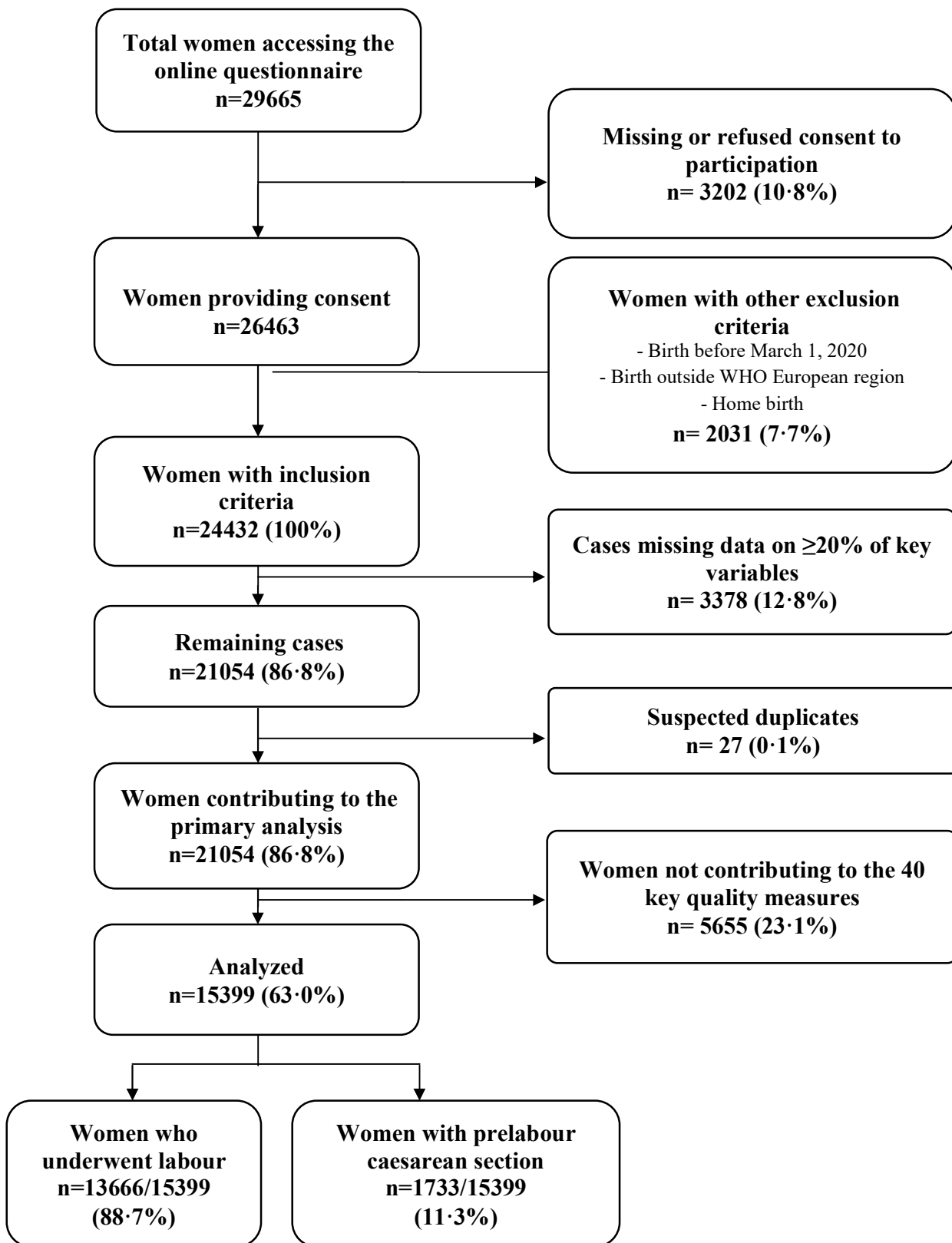
Abbreviation: IQR = interquartile range; QMNC = quality maternal and newborn care

Supplementary Figure 2 QMNC Index by country



Note: the figure shows by country the median QMNC index values in each of the four domains (in the coloured bars), and the overall median value (in grey on the right of each bar) and interquartile ranges (error bars in grey) (N=21027).
Abbreviation: QMNC = quality maternal and newborn care

Supplementary Figure 3 Sensitivity analysis #1: flow diagram (N=15399)



Supplementary Table 12 Sensitivity analysis #1: characteristics of responders (N=15399)

	N=15399 n	%
Country		
Sweden	3779	24·5
Italy	3730	24·2
Slovenia	1711	11·1
Norway	1586	10·3
Portugal	1271	8·3
Germany	798	5·2
Serbia	468	3
France	405	2·6
Romania	406	2·6
Luxembourg	351	2·3
Croatia	346	2·2
Spain	286	1·9
Other ¹	262	1·7
Year of birth		
2020	14054	91·3
2021	908	5·9
Missing	437	2·8
Gave birth in the same country where you were born		
Yes	13948	90·6
No	1127	7·3
Missing	324	2·1
Age range		
18-24	687	4·5
25-30	5360	34·8
31-35	6074	39·4
36-39	2263	14·7
≥40	692	4·5
Missing	323	2·1
Educational level²		
None	6	0·1
Elementary school	29	0·2
Junior high school	841	5·5
High secondary	3782	24·6
University degree	6331	41·1
Postgraduate degree / Master /Doctorate or higher	4087	26·5
Missing	323	2·1
Parity		
1	9040	58·7

>1	6036	39·2
Missing	323	2·1
Mode of birth		
Vaginal spontaneous	11246	73·0
Instrumental vaginal birth	1323	8·6
Caesarean section	2830	18·3
Elective caesarean section	1157	7·5
Emergency caesarean section during labour	1097	7·1
Emergency caesarean section before going into labour	576	3·7
Type of facility		
Public	14025	91·1
Private	1050	6·8
Missing	324	2·1
Type of healthcare providers who directly assisted the birth ³		
Midwife	13459	87·4
Nurse	5624	36·5
A student (i.e., before graduation)	2463	16·0
Obstetrics registrar / medical resident (under post-graduation training)	2421	15·7
Obstetrics and gynaecology doctor	7606	49·4
I don't know (healthcare providers did not introduce themselves)	1221	7·9
Other	1999	13·0

Notes: ¹ Other countries (sample): Belgium (101); Austria (29); UK (25); Bosnia Herzegovina (19); Finland (19) Switzerland (19); Denmark; Greece; Ireland; Netherlands; Ukraine; Andorra; Montenegro; Russian Federation; Lithuania; Iceland; Poland; Turkey; Hungary; Albania; Cyprus; Latvia; Macedonia; Czech Republic (for each country less than 10 cases); ² Wording on education levels agreed among partners during the Delphi and questionnaire translated and back translated according to ISPOR Task Force for Translation and Cultural Adaptation Principles of Good Practice²⁵; ³ More than one possible answer.

Supplementary Table 13 Sensitivity analysis #1: results of the 40 key quality measures between women who underwent labour (N=1366) and women who did not (N=1733)

Women who underwent labour (N=1366)

Provision of care	Overall % (95% CI)	Experience of care	Overall % (95% CI)	Availability of physical and human resources	Overall % (95% CI)	Reorganizational changes due to COVID-19	Overall % (95% CI)
1. No pain relief during labour	23.7 (23.0; 24.4)	1. No freedom of movements during labour	28.8 (28.1; 29.6)	1. No timely care by HCPs at facility arrival	12.1 (11.5; 12.6)	1. Difficulties in attending routine antenatal visits	41.1 (40.2; 41.9)
2. Mode of birth		2a. No choice of birth position (in SVB)	42.1 (41.2; 43.1)	2. No information on maternal danger signs	44.7 (43.9; 45.6)	2. Any barriers in accessing the facility	31.1 (30.3; 31.9)
2a. IVB	9.7 (9.2; 10.2)	2b. No consent requested (for IVB)	54.0 (51.4; 56.7)	3. No information on newborn danger signs	54.9 (54.1; 55.7)	3. Inadequate info graphics	5.1 (4.7; 5.5)
2b. CS	8.0 (7.6; 8.5)	2c. No information on newborn (in ECS)	33.8 (31.0; 36.6)	4. Inadequate room comfort and equipment	7.8 (7.4; 8.3)	4. Inadequate wards reorganization	36.8 (36.0; 37.6)
3a. Episiotomy (in SVB)	19.5 (18.8; 20.3)	3. No clear/effective communication from HCP	28.9 (28.2; 29.7)	5. Inadequate number of women per rooms	8.6 (8.1; 9.1)	5. Inadequate room reorganization	37.8 (37.0; 38.7)
3b. Fundal pressure (in IVB)	42.9 (40.3; 45.6)	4. No involvement in choices	33.4 (32.6; 34.2)	6. Inadequate room cleaning	6.1 (5.7; 6.5)	6. Lacking one functioning accessible hand-washing station	13.6 (13.0; 14.2)
3c. No pain relief after CS	14.9 (12.8; 17.1)	5. Companionship not allowed	61.2 (60.4; 62)	7. Inadequate bathroom	12.8 (12.3; 13.4)	7. HCP not always using PPEs	32.6 (31.8; 33.4)
4. No skin to skin	9.1 (8.6; 9.5)	6. Not treated with dignity	22.1 (21.4; 22.8)	8. Inadequate partner visiting hours	61.2 (60.3; 62)	8. Insufficient HCP number	30.9 (30.1; 31.6)
5. No early breastfeeding	13.6 (13.0; 14.2)	7. No emotional support	25.9 (25.2; 26.6)	9. Inadequate HCP's number	19.9 (19.3; 20.6)	9. Communication inadequate to contain COVID-19 related stress	37.0 (36.2; 37.9)
6. Inadequate breastfeeding support	30.4 (29.7; 31.2)	8. No privacy	17.5 (16.9; 18.2)	10. Inadequate HCP professionalism	5.1 (4.7; 5.5)	10. Reduction in QMNC due to COVID-19	48.1 (47.2; 48.9)
7. No rooming-in	14.2 (13.7; 14.8)	9. Abuses (physical /verbal /emotional)	11.7 (11.2; 12.3)				
8. Not allowed to stay with the baby as wished	5.0 (4.7; 5.4)	10. Informal payment	2.3 (2.1; 2.6)				
9. No exclusive breastfeeding at discharge	24.8 (24.1; 25.5)						
10. No immediate attention when needed	30.4 (29.6; 31.1)						

Women with prelabour caesarean section (N=1733)

Provision of care	Overall % (95% CI)	Experience of care	Overall % (95% CI)	Availability of physical and human resources	Overall % (95% CI)	Reorganizational changes due to COVID-19	Overall % (95% CI)
1. Mode of birth		1. Consent requested for vaginal examination	38.5 (36.2; 40.8)	1. No information on maternal danger signs	45.8 (43.5; 48.2)	1. Difficulties in attending routine antenatal visits	44.6 (42.3; 46.9)
1a. Elective CS	66.8 (64.5; 69.0)						
1b. ECS before labour	33.2 (31.0; 35.5)	2. No information on newborn	26.7 (24.6; 28.8)	2. No information on newborn danger signs	53.6 (51.3; 56)	2. Any barriers in accessing the facility	34.3 (32; 36.5)
2. No pain relief after CS	12.6 (11.0; 14.1)	3. No clear/effective communication from HCP	35.2 (33.0; 37.4)	3. Inadequate room comfort and equipment	10.7 (9.2; 12.1)	3. Inadequate info graphics	7.3 (6.0; 8.5)
3. No skin to skin	44.9 (42.6; 47.2)	4. No involvement in choices	42.9 (40.6; 45.3)	4. Inadequate number of women per rooms	6.7 (5.5; 7.9)	4. Inadequate wards reorganization	39.9 (37.6; 42.2)
4. No early breastfeeding	47.5 (45.2; 49.9)	5. Companionship not allowed	74.9 (72.9; 76.9)	5. Inadequate room cleaning	8.7 (7.3; 10.0)	5. Inadequate room reorganization	40.6 (38.3; 42.9)
5. Inadequate breastfeeding support	37.9 (35.6; 40.1)	6. Not treated with dignity	31.3 (29.1; 33.5)	6. Inadequate bathroom	14.1 (12.4; 15.7)	6. Lacking one functioning accessible hand-washing station	21.5 (19.5; 23.4)
6. No rooming-in	30.6 (28.5; 32.8)	7. No emotional support	32.1 (29.9; 34.3)	7. Inadequate partner visiting hours	68.5 (66.3; 70.7)	7. HCP not always using PPEs	23.5 (21.5; 25.5)
7. Not allowed to stay with the baby as wished	11.0 (9.5; 12.4)	8. No privacy	20.8 (18.9; 22.7)	8. Inadequate HCP's number	21.5 (19.5; 23.4)	8. Insufficient HCP number	33.9 (31.7; 36.2)
8. No exclusive breastfeeding at discharge	45.4 (43.0; 47.7)	9. Abuses (physical /verbal/emotional)	14.6 (12.9; 16.3)	9. Inadequate HCP professionalism	7.3 (6.0; 8.5)	9. Communication inadequate to contain COVID-19 related stress	42 (39.6; 44.3)
9. No immediate attention when needed	34.9 (32.7; 37.2)	10. Informal payment	6.7 (5.5; 7.9)	10. Inadequate wards reorganization	39.9 (37.6; 42.2)	10. Reduction in QMNC due to COVID-19	49.9 (47.5; 52.2)
10. No timely care by HCP at facility arrival	15.8 (14.1; 17.5)						

Notes

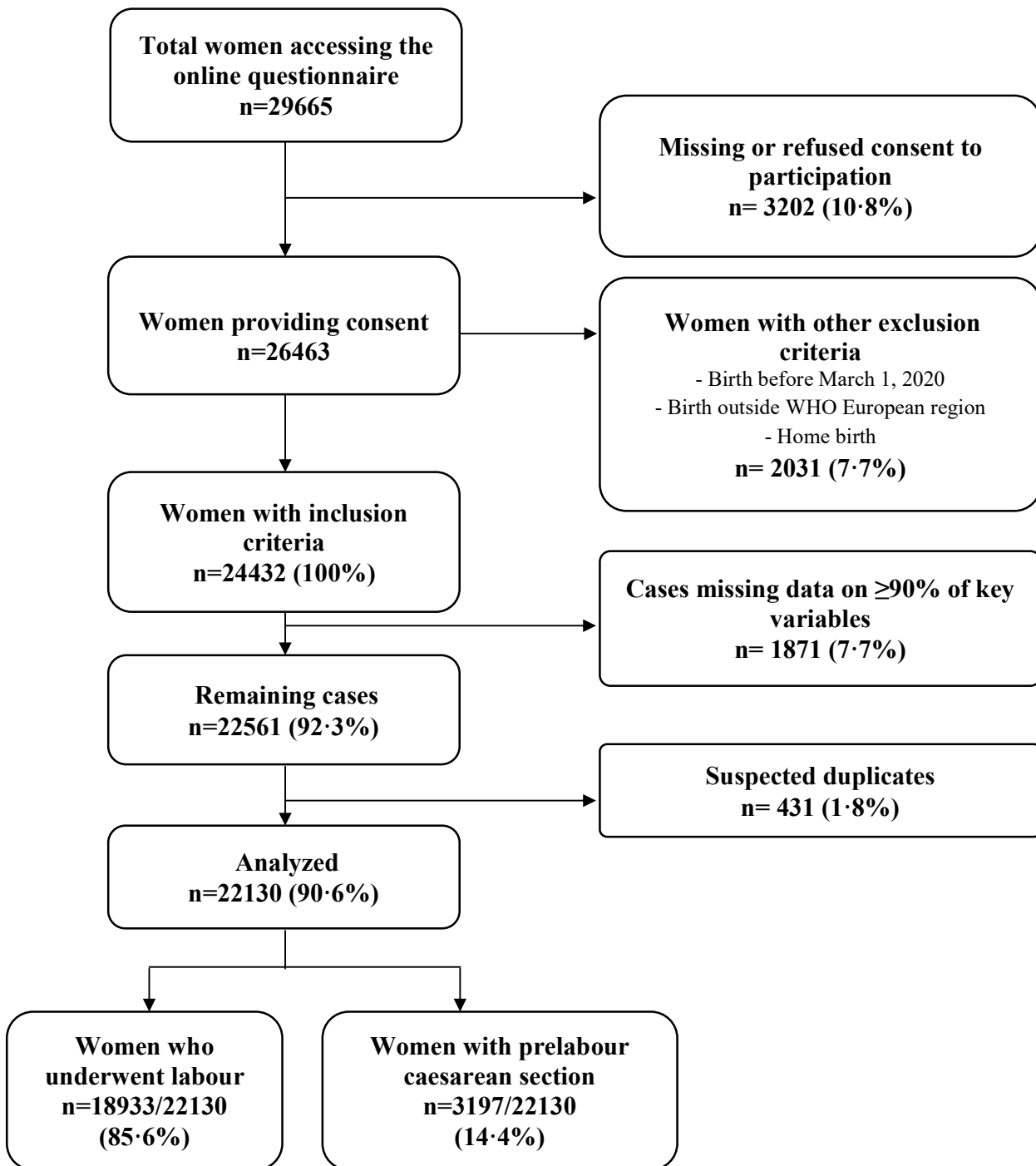
All the indicators in the domains of provision of care, experience of care, and resources are directly based on WHO standards.

Indicators identified with letters (eg, 3a, 3b) were tailored to take into account different mode of birth (ie, spontaneous vaginal, instrumental vaginal, and caesarean section). These were calculated on subsamples (eg, 3a was calculated on spontaneous vaginal births; 3b was calculated on instrumental vaginal births).

Indicator 6 in the domains of reorganizational changes due to COVID-19 was defined as: at least one functioning and accessible hand-washing station (near or inside the room where the mother was hospitalised) supplied with water and soap or with disinfectant alcohol solution.

Abbreviations: CS = caesarean section; ECS = emergency caesarean section; HCP = health care provider; IVB = instrumental vaginal birth; PPE = personal protective equipment; QMNC = quality maternal and newborn care; SVB = spontaneous vaginal birth

Supplementary Figure 4. Sensitivity analysis #2: flow diagram (N=22130)



Supplementary Table 14 Sensitivity analysis #2: characteristics of responders (N=22130)

	N=22130	%
	n	
Country		
Italy	5119	23·1
Sweden	4918	22·2
Norway	3367	15·2
Slovenia	2217	10·0
Portugal	1777	8·0
Germany	1147	5·2
Serbia	677	3·1
Romania	632	2·9
France	578	2·6
Croatia	486	2·2
Luxembourg	467	2·1
Spain	371	1·7
Other ¹	374	1·7
Year of birth		
2020	11458	51·8
2021	8752	39·5
Missing	1920	8·7
Gave birth in the same country where you were born		
Yes	19021	86·0
No	1523	6·9
Missing	1586	7·2
Age range		
18-24	949	4·3
25-30	7323	33·1
31-35	8213	37·1
36-39	3070	13·9
≥40	992	4·5
Missing	1583	7·2
Educational level ²		
None	6	0·1
Elementary school	46	0·2
Junior high school	1100	5·0
High secondary	5152	23·3
University degree	8725	39·4
Postgraduate degree / Master /Doctorate or higher	5515	24·9
Missing	1586	7·2
Parity		
1	12554	56·7

>1	7992	36·1
Missing	1584	7·2
Mode of birth		
Vaginal spontaneous	14110	67·1
Instrumental vaginal birth	1928	9·2
Caesarean section	4989	23·7
Elective caesarean section	2155	9·7
Emergency caesarean section during labour	2155	9·7
Emergency caesarean section before going into labour	1042	4·7
Type of facility		
Public	19160	86·6
Private	1387	6·3
Missing	1583	7·2
Type of healthcare providers who directly assisted the birth ³		
Midwife	18153	82·0
Nurse	8068	36·5
A student (i.e. before graduation)	3450	15·6
Obstetrics registrar / medical resident (under post-graduation training)	3780	17·1
Obstetrics and gynaecology doctor	10876	49·1
I don't know (healthcare providers did not introduce themselves)	1802	8·1
Other	3029	13·7

Notes: ¹ Other countries (sample): Belgium (129); Austria (42); UK (38); Bosnia Herzegovina (33); Finland (32); Switzerland (23); Denmark (17); Greece (10); Ireland; Netherlands; Ukraine; Andorra; Montenegro; Russian Federation; Lithuania; Iceland; Poland; Turkey; Hungary; Albania; Cyprus; Latvia; Macedonia; Czech Republic (for each country less than 10 cases); ² Wording on education levels agreed among partners during the Delphi and questionnaire translated and back translated according to ISPOR Task Force for Translation and Cultural Adaptation Principles of Good Practice; ³ More than one possible answer.

Supplementary Table 15 Sensitivity analysis #2: results of the 40 key quality measures between women who underwent labour (N=18933) and women who did not (N=3197)

Women who underwent labour (N=18933)

Provision of care	Overall % (95% CI)	Experience of care	Overall % (95% CI)	Availability of physical and human resources	Overall % (95% CI)	Reorganizational changes due to COVID-19	Overall % (95% CI)
1. No pain relief during labour	21.0 (20.4; 21.5)	1. No freedom of movements during labour	25.7 (25.1; 26.4)	1. No timely care by HCPs at facility arrival	13.2 (12.7; 13.7)	1. Difficulties in attending routine antenatal visits	39.9 (39.2; 40.6)
2. Mode of birth		2a. No choice of birth position (in SVB)	42.8 (42.0; 43.6)	2. No information on maternal danger signs	45.3 (44.6; 46.0)	2. Any barriers in accessing the facility	30.0 (29.3; 30.6)
2a. IVB	10.8 (10.3; 11.2)	2b. No consent requested (for IVB)	53.5 (51.3; 55.6)	3. No information on newborn danger signs	54.9 (54.2; 55.6)	3. Inadequate info graphics	5.4 (5.1; 5.7)
2b. CS	11.4 (10.9; 11.8)	2c. No information on newborn (in ECS)	37.5 (35.5; 39.5)	4. Inadequate room comfort and equipment	8.1 (7.7; 8.4)	4. Inadequate wards reorganization	35.5 (34.8; 36.1)
3a. Episiotomy (in SVB)	20.4 (19.8; 21.1)	3. No clear/effective communication from HCP	29.9 (29.3; 30.6)	5. Inadequate number of women per rooms	8.5 (8.1; 8.9)	5. Inadequate room reorganization	36.2 (35.5; 36.9)
3b. Fundal pressure (in IVB)	41.5 (39.4; 43.7)	4. No involvement in choices	34.1 (33.5; 34.8)	6. Inadequate room cleaning	6.5 (6.1; 6.8)	6. Lacking one functioning accessible hand-washing station	13.0 (12.5; 13.4)
3c. No pain relief after CS	15.1 (13.6; 16.6)	5. Companionship not allowed	60.9 (60.2; 61.6)	7. Inadequate bathroom	13 (12.5; 13.5)	7. HCP not always using PPEs	32.9 (32.2; 33.5)
4. No skin to skin	9.3 (8.8; 9.7)	6. Not treated with dignity	23.5 (22.9; 24.1)	8. Inadequate partner visiting hours	59.7 (59.0; 60.4)	8. Insufficient HCP number	30.3 (29.7; 31.0)
5. No early breastfeeding	13.2 (12.7; 13.7)	7. No emotional support	27.0 (26.3; 27.6)	9. Inadequate HCP's number	20.4 (19.8; 20.9)	9. Communication inadequate to contain COVID-19 related stress	36.4 (35.7; 37.1)
6. Inadequate breastfeeding support	31.3 (30.7; 32.0)	8. No privacy	17.9 (17.4; 18.5)	10. Inadequate HCP professionalism	5.4 (5.1; 5.7)	10. Reduction in QMNC due to COVID-19	47.6 (46.9; 48.3)
7. No rooming-in	19.8 (19.2; 20.3)	9. Abuses (physical /verbal /emotional)	12.3 (11.8; 12.8)				
8. Not allowed to stay with the baby as wished	7.2 (6.8; 7.6)	10. Informal payment	2.4 (2.2; 2.7)				
9. No exclusive breastfeeding at discharge	28.1 (27.5; 28.7)						
10. No immediate attention when needed	30.9 (30.2; 31.5)						

Women with prelabour caesarean section (N=3197)

Provision of care	Overall % (95% CI)	Experience of care	Overall % (95% CI)	Availability of physical and human resources	Overall % (95% CI)	Reorganizational changes due to COVID-19	Overall % (95% CI)
1. Mode of birth 1a. Elective CS	67.4 (65.8; 69.0)	1. Consent requested for vaginal examination	29.1 (27.5; 30.6)	1. No information on maternal danger signs	45.4 (43.7; 47.1)	1. Difficulties in attending routine antenatal visits	40.6 (38.9; 42.3)
1b. ECS before labour	32.6 (31; 34.2)	2. No information on newborn	29.3 (27.7; 30.9)	2. No information on newborn danger signs	52.5 (50.8; 54.2)	2. Any barriers in accessing the facility	32.5 (30.9; 34.2)
2. No pain relief after CS	13.2 (12.1; 14.4)	3. No clear/effective communication from HCP	34.5 (32.9; 36.2)	3. Inadequate room comfort and equipment	10.2 (9.1; 11.2)	3. Inadequate info graphics	6.1 (5.3; 7.0)
3. No skin to skin	35.0 (33.3; 36.6)	4. No involvement in choices	42.1 (40.4; 43.8)	4. Inadequate number of women per rooms	6.7 (5.8; 7.6)	4. Inadequate wards reorganization	37.9 (36.2; 39.6)
4. No early breastfeeding	36.2 (34.5; 37.9)	5. Companionship not allowed	69.8 (68.2; 71.4)	5. Inadequate room cleaning	7.9 (6.9; 8.8)	5. Inadequate room reorganization	36.9 (35.2; 38.6)
5. Inadequate breastfeeding support	37.7 (36.0; 39.3)	6. Not treated with dignity	29.7 (28.2; 31.3)	6. Inadequate bathroom	13.6 (12.4; 14.8)	6. Lacking one functioning accessible hand-washing station	17.7 (16.4; 19.0)
6. No rooming-in	36.6 (35.0; 38.3)	7. No emotional support	30.7 (29.1; 32.3)	7. Inadequate partner visiting hours	63.8 (62.1; 65.4)	7. HCP not always using PPEs	26.1 (24.6; 27.6)
7. Not allowed to stay with the baby as wished	14.4 (13.1; 15.6)	8. No privacy	20 (18.6; 21.4)	8. Inadequate HCP's number	20.4 (19; 21.8)	8. Insufficient HCP number	31.9 (30.3; 33.5)
8. No exclusive breastfeeding at discharge	47.5 (45.8; 49.3)	9. Abuses (physical /verbal/emotional)	13.7 (12.5; 14.9)	9. Inadequate HCP professionalism	6.1 (5.3; 7.0)	9. Communication inadequate to contain COVID-19 related stress	39.5 (37.8; 41.2)
9. No immediate attention when needed	34.9 (33.3; 36.6)	10. Informal payment	5.2 (4.4; 5.9)	10. Inadequate wards reorganization	37.9 (36.2; 39.6)	10. Reduction in QMNC due to COVID-19	46.5 (44.8; 48.3)
10. No timely care by HCP at facility arrival	14.7 (13.5; 15.9)						

Notes

All the indicators in the domains of provision of care, experience of care, and resources are directly based on WHO standards.

Indicators identified with letters (eg, 3a, 3b) were tailored to take into account different mode of birth (ie, spontaneous vaginal, instrumental vaginal, and caesarean section). These were calculated on subsamples (eg, 3a was calculated on spontaneous vaginal births; 3b was calculated on instrumental vaginal births).

Indicator 6 in the domains of reorganizational changes due to COVID-19 was defined as: at least one functioning and accessible hand-washing station (near or inside the room where the mother was hospitalised) supplied with water and soap or with disinfectant alcohol solution.

Abbreviations: CS = caesarean section; ECS = emergency caesarean section; HCP = health care provider; IVB = instrumental vaginal birth; PPE = personal protective equipment; QMNC = quality maternal and newborn care; SVB = spontaneous vaginal birth

Supplementary Table 16 Multivariable quantile regression estimates (n=14954)

	0·25th centile		0·50th centile (median)		0·75th centile	
	Coefficient (95%CI)	p value	Coefficient (95%CI)	p value	Coefficient (95%CI)	p value
Parity						
1	Ref		Ref		Ref	
>1	20·0 (17·3; 22·7)	<0·001	13·2 (11·0; 15·4)	<0·001	10·0 (8·5; 11·5)	<0·001
Mother and newborn's country of birth						
Same country	Ref		Ref		Ref	
Different country	-1·7 (-7·9; 4·6)	0·601	2·7 (-0·9; 5·5)	0·057	0·0 (-2·4; 2·4)	1·0
Type of facility						
Public	Ref		Ref		Ref	
Private	28·3 (23·6; 33·0)	<0·001	28·6 (24·5; 32·7)	<0·001	20·0 (18·0; 22·0)	<0·001
Age range						
18-24	-11·7 (-17·0; -6·4)	<0·001	-10·9 (-17·0; -4·8)	<0·001	-5·0 (-9·5; -0·5)	0·030
25-30	0·0 (-3·1; 3·1)	1·0	-0·5 (-3·0; 2·1)	0·727	0·0 (-1·6; 1·6)	1·0
31-35	Ref		Ref		Ref	
36-40	3·3 (-0·2; 6·9)	0·065	0·5 (-2·2; 3·1)	0·733	0·0 (-2·0; 2·0)	1·0
>40	5·0 (-0·1; 9·9)	0·055	1·8 (-2·7; 6·3)	0·426	5·0 (-0·6; 10·6)	0·081
Educational level						
None or elementary	-8·3 (-45·9; 29·2)	0·663	1·8 (-44·0; 47·6)	0·938	-5·0 (-14·1; 4·1)	0·284
Junior high school	5·0 (-0·5; 10·5)	0·075	7·3 (3·7; 10·8)	<0·001	5·0 (2·2; 7·8)	0·001
High school	0·0 (-3·3; 3·3)	1·0	1·8 (-0·7; 4·3)	0·150	0·0 (-1·5; 1·5)	1·0
University or higher	Ref		Ref		Ref	
Year of birth						
2020	Ref		Ref		Ref	
2021	21·7 (18·6; 24·8)	<0·001	16·8 (14·1; 19·5)	<0·001	10·0 (7·2; 12·8)	<0·001
Mode of birth						
Spontaneous VB	Ref		Ref		Ref	
Instrumental VB	-23·3 (-28·3; -18·4)	<0·001	-20·5 (-24·9; -16·0)	<0·001	-15·0 (-17·6; -12·4)	<0·001
CS	-28·3 (-32·6; -24·1)	<0·001	-21·8 (-25·3; -18·3)	<0·001	-15·0 (-17·4; -12·6)	<0·001
Midwife in the team who assisted the birth						
No	Ref		Ref		Ref	
Yes	31·7 (25·7; 37·7)	<0·001	24·5 (19·9; 29·2)	<0·001	15·0 (11·0; 19·0)	<0·001
OB-GYN doctor in the team who assisted the birth						
No	Ref		Ref		Ref	
Yes	10·0 (7·1; 12·9)	<0·001	6·4 (3·9; 8·8)	<0·001	0·0 (-1·7; 1·7)	1·0
Country						
Croatia	-35·0 (-45·8; -24·2)	<0·001	-43·2 (-49·6; -36·8)	<0·001	-40·0 (-48·6; -31·4)	<0·001
France	13·3 (5·0; 21·6)	0·002	9·1 (3·6; 14·6)	0·001	5·0 (-1·5; 11·5)	0·131
Germany	25·0 (18·9; 31·1)	<0·001	13·2 (8·9; 17·5)	<0·001	5·0 (2·6; 7·4)	<0·001
Italy	Ref		Ref		Ref	
Luxembourg	55·0 (47·2; 62·8)	<0·001	35·5 (31·5; 39·4)	<0·001	20·0 (17·3; 22·7)	<0·001
Norway	20·0 (14·9; 25·1)	<0·001	11·8 (7·1; 16·5)	<0·001	5·0 (1·7; 8·3)	0·003
Portugal	26·7 (21·3; 32·0)	<0·001	19·1 (14·4; 23·8)	<0·001	10·0 (7·3; 12·7)	<0·001
Romania	-28·3 (-37·0; -19·7)	<0·001	-29·5 (-40·3; -18·8)	<0·001	-25·0 (-31·2; -18·8)	<0·001
Serbia	-100 (-110·6; -89·4)	<0·001	-105 (-113·7; -96·3)	<0·001	-90·0 (-101·3; -78·7)	<0·001
Slovenia	10·0 (4·7; 15·3)	<0·001	2·3 (-2·2; 6·7)	0·318	-5·0 (-8·0; -2·0)	0·001
Spain	36·7 (31·3; 42·0)	<0·001	23·2 (16·9; 29·4)	<0·001	15·0 (7·6; 22·4)	<0·001
Sweden	15·0 (10·6; 19·4)	<0·001	7·3 (3·4; 11·1)	<0·001	0·0 (-2·3; 2·3)	1·0
Other countries	30·0 (21·5; 38·5)	<0·001	26·8 (19·0; 34·7)	<0·001	20·0 (16·9; 23·1)	<0·001
Intercept	228·3 (221·0; 235·7)	<0·001	285·5 (279·6; 291·4)	<0·001	335·0 (330·4; 229·6)	<0·001

Notes: 95% CI and p value are calculated using robust estimation of standard errors.

Abbreviations: CI = confidence interval; CS = caesarean section; OB-GYN = obstetrics and gynaecology; VB = vaginal birth.