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Early mobilisation and rehabilitation in Swiss intensive care units: a cross-sectional survey

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Summary

BACKGROUND: Patients in intensive care units (ICUs) are at high risk of developing physical, functional, cognitive, and mental impairments. Early mobilisation aims to improve patient outcomes and is increasingly considered the standard of care. This survey aimed to investigate the characteristics, current use and variations of early mobilisation and rehabilitation in Swiss ICUs.

METHODS: We conducted a cross-sectional survey among all ICU lead physicians, who provided data on their institutional characteristics, early mobilisation and rehabilitation practices, and their perceptions of the use and variation of early rehabilitation practices in Switzerland.

RESULTS: The survey response rate was 44% (37/84). Among ICUs caring for adults (34/37), 26 were in the German-speaking region, five in the French-speaking region, and three in the Italian-speaking region. All ICUs regularly involved physiotherapy in the rehabilitation process and 50% reported having a specialised physiotherapy team. All ICUs reported performing early mobilisation, starting within the first 7 days after ICU admission. About half reported the use of a rehabilitation (45%) or early mobilisation protocol (50%). Regular, structured, interdisciplinary rounds or meetings of the ICU care team to discuss rehabilitation measures and goals for patients were stated to be held by 53%.

The respondents stated that 82% of their patients received early mobilisation measures during their ICU stay. Most frequently provided mobilisation measures included passive range of motion (97%), passive chair position in bed (97%), active range of motion muscle activation and training (88%), active side to side turning (91%), sitting on the edge of the bed (94%), transfer from bed to a chair (97%), and ambulation (94%). The proportion of ICUs providing a specific early mobilisation measure, the proportion of patients receiving it, and the time dedicated to it varied across language regions, hospital types, ICU types, and ICU sizes.

Almost one third of the ICU lead physicians considered early rehabilitation to be underused in their own ICU and about half considered it to be underused in Switzerland more generally. ICU lead physicians stressed lack of personnel, financial resources, and time as key causes for underuse. Moreover, they highlighted the importance of early and systematic or protocol-based rehabilitation and interprofessional approaches that are adaptive to the patients' rehabilitation needs and potential.

CONCLUSION: This survey suggests that almost all ICUs in Switzerland practice some form of early mobilisation with the aim of early rehabilitation. However, the described approaches, as well as the reported use of early mobilisation measures were heterogenous across Swiss ICUs.

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Introduction

Critically ill patients admitted to intensive care units (ICUs) are at high risk of developing physical, functional, cognitive, and mental impairments [1–4]. This may lead to decreased quality of life, as well as increased mortality, healthcare utilisation, and costs [5–8]. Several clinical trials and systematic reviews suggested that early mobilisation in the ICU, as well as early rehabilitation approaches including early mobilisation, may improve physical function and muscle strength in ICU patients [9–11]. Such benefits were shown both in adult and paediatric ICU populations [12]. However, other studies found no or very limited evidence for a potential benefit of early mobilisation [9, 13–16].

Despite uncertainties regarding its effectiveness, the early mobilisation of ICU patients is widely considered a standard of care [3]. So far, not much is known about current ICU practices regarding early mobilisation and rehabilitation in Switzerland and internationally. According to Swiss experts, most ICUs in Switzerland commonly perform re-

habilitative activities, starting early during the ICU stay. A Swiss study published by Sibilla et al. including 161 mechanically ventilated ICU patients reported that 33% of the patients received active mobilisation [17]. Although the structures and practices of ICUs are quite heterogenous globally [18], several other studies showed similar results. For example, in a German study investigating early mobilisation in routine ICU practice only 185 out of 783 patients (24%) were mobilised out of bed [19]. Other studies from the USA and Australia also showed comparable proportions [20, 21].

Meanwhile, it is reasonable to assume that ICU practices regarding early mobilisation and rehabilitation may vary across different regions, hospital types, or hospital sizes. Studies investigating other indications and treatments in Switzerland suggested that there are large, poorly explained geographical and demographic differences in the provision of care [22–26]. One international study that investigated inequalities in accessing inpatient rehabilitation after stroke across 14 countries reported a strong variability in rehabilitation rates, ranging from 13% in Sweden to 57% in Israel [27].

Investigating and understanding practice variation in ICUs across Switzerland may help to develop and implement national guidelines, leading to an improvement of the quality of care and patient outcomes at a national level. This study aimed to investigate the characteristics, current approaches, and variation of early mobilisation and more generally early rehabilitation practices in Swiss ICUs.

Materials and methods

We conducted a cross-sectional, exploratory survey on early mobilisation and rehabilitation practices in ICUs in Switzerland. This survey complements a health technology assessment (HTA) conducted by the Swiss Medical Board (SMB) and the Swiss Federal Office of Public Health (SFOPH) evaluating the effectiveness and safety of early rehabilitation [28].

This cross-sectional survey did not require ethics approval under the Swiss Human Research Act ("Humanforschungsgesetz"). Participation in the survey was voluntary for the addressed ICU lead physicians and there was no collection of individual-level (patient or staff) data.

Data collection

We developed a survey questionnaire targeting the lead physicians of all certified Swiss ICUs. The survey was developed in collaboration with four Swiss ICU experts and the Swiss Society of Intensive Care (SGI-SSMI-SSMI) [29], based on findings from the international literature. We administered the survey exclusively in the English language, as we expected the respondents to be adequately fluent in English to understand and answer the questionnaire.

The survey elicited information on institutional characteristics (canton, hospital type and size, ICU type and size, staff involved in ICU care, and average patient characteristics), early mobilisation practices and protocols, general rehabilitation practices and protocols, including measures related to swallowing, speech, nutrition, and psychological impact, as well as measurement of patient outcomes (supplementary table S1 in the appendix). We defined early mobilisation as active or passive physical mobilisation measures starting within 7 days of ICU admission for questions eliciting the frequency of provision of early mobilisation measures. This is a conservative timeframe in line with previous systematic reviews [9, 13]. We also asked ICU lead physicians to provide definitions for early mobilisation as they were applied in their ICU. Early rehabilitation was defined as any rehabilitative activities that include, but are not limited to, mobilisation within 7 days of ICU admission (e.g., additional rehabilitative activities targeted at swallowing, speech, nutrition, and psychological impact). We prompted participants to use the minimal dataset of the SGI-SSMI-SSMI (MDSi), which collects summary information on the patient characteristics of individual ICUs, as a basis for answering questions related to patient characteristics (age distribution and main diagnoses of patient collective) [30]. Furthermore, we elicited information on the perceptions of ICU lead physicians regarding overuse, underuse, and practice variation of early rehabilitation in Switzerland.

A pilot test with a convenience sample of four ICU lead physicians (two each from academic and regional hospitals) was conducted to evaluate the understandability of the questionnaire and relevant inconsistencies in the obtained responses.

The survey was administered electronically via an online platform between 6 May 2019 and 9 June 2019. A contact list of lead physicians of the 84 Swiss ICUs that were recognised and certified at that time was provided by the SGI-SSMI-SSMI. An invitation letter supported by the SMB, SFOPH, SGI-SSMI-SSMI, and the research group leaders at the Universities of Zurich and Basel was mailed to the lead physicians on 24 April 2019. We aimed to elicit data from all Swiss ICUs in order to gather the most comprehensive information possible and to minimise risks of selection bias. If ICU lead physicians were absent, we additionally contacted their deputies. In total, we sent three email reminders over the course of the survey timeframe.

Data analysis

Descriptive statistics for the collected quantitative data are reported using frequencies and percentages, means with standard deviations (SDs), or medians and ranges, as appropriate. Where data on proportions of patients were provided, means of proportions are reported throughout the document, and full results are additionally presented in tables. Based on the study objectives, descriptive results were stratified by language region (German, French, Italian), hospital type (academic, cantonal/regional, private), ICU size (1–8 beds: "small"; 9–16 beds: "medium-sized"; ≥17 beds: "large"), and ICU type (adult or paediatric), as defined a priori. We present data from ICUs caring for adults only in the main manuscript, while data from paediatric ICUs are provided in the supplementary material.

Qualitative data retrieved through free text fields were summarised using an iterative coding approach. Data on general rehabilitation approaches, specific early mobilisation practices, over-/underuse, and practice variation were assigned to the following categories: different practices, intervention criteria, goals, organisational factors, and determinants of care.

The representativeness of the data collected through our survey was investigated by comparing our results with those reported by the SGI-SSMI-SSMI in the most recent MDSi report at the time of conduct (data from 2018, document version 10 June 2019), wherever this was possible [30].

Since we invited all ICUs in Switzerland and since the analysis was descriptive, no statistical testing was conducted. All descriptive analyses were performed using R (version 3.6.1) and Microsoft Excel® 2016.

Results

Intensive care unit characteristics

The response rate of the survey was 44% (37/84 Swiss ICUs). The cumulative number of represented ICU beds was 473, corresponding to 48.3% of ICU beds in Switzerland (total 980 according to the list of Swiss ICUs by the SGI-SSMI-SSMI in September 2019). Among the 34 ICUs caring for adult patients, most were from the German-speaking region of Switzerland (76%; 26/34), and 15% (5/34) and 9% (3/34) were from the French-speaking and Italian-speaking regions, respectively. Most were located in cantonal/regional hospitals (23/34 ICUs; 68%), three were in academic hospitals (9%), and eight in private hospitals (24%).

The number of ICU beds and patients treated per year was higher in academic hospitals than cantonal/regional hospitals and private hospitals (table 1). ICU bed capacity and case load were similar across the language regions. Details on paediatric ICUs are provided in the appendix material (supplementary table S2).

The average number of senior physicians, assistant physicians, and nurses was higher in academic hospitals (17.0, 20.1, 179.4 full time equivalents [FTEs], respectively) compared with cantonal/regional hospitals (3.5, 6.2, 35.9 FTEs, respectively). In private hospitals, the number of senior physicians was slightly higher (6.0 FTEs), and the number of assistant physicians and nurses was lower (3.6 and 24.2 FTEs) than in cantonal/regional hospitals.

All adult ICUs regularly involved physiotherapy in the rehabilitation process. Half of the respondents (50%; 16/32; two missing) reported a specialised physiotherapy team specifically employed for the ICU. Most reported regular involvement of occupational therapists (82%, 27/34), speech therapists (64%, 21/33; one missing), nutritional therapists (79%, 26/34), psychological care teams (48%, 16/34), spiritual care teams (82%, 27/34), and relatives (79%, 26/33; one missing) in the rehabilitation process. Larger ICUs and those located in academic hospitals were more likely to have a specific physiotherapy team and had higher numbers of physiotherapists. Only one ICU in a private hospital reported employing an ICU-specific physiotherapy team. There were no substantial variations between language regions with respect to the involved physiotherapy teams.

Patient characteristics

Overall, ICUs reported that about one-third of their patients received mechanical ventilation during their ICU stay (supplementary table S3). The proportion of mechan-

Table 1:
Characteristics of participating intensive care units (ICUs) by language region, hospital type, and ICU size (ICUs caring for adults only).

Institution characteristics		All (n = 34)	Language region			Hospital type			ICU size		
			German (n = 26)	French (n = 5)	Italian (n = 3)	Acad. (n = 3)	Cant./ Reg. (n = 23)	Private (n = 8)	1–8 beds (n = 17)	9–16 beds (n = 10)	≥17 beds (n = 7)
Number of ICU beds	Mean (SD)	12.5 (9.4)	12.6 (9.5)	13.4 (12.1)	10.3 (5.1)	38.0 (3.6)	10.4 (5.1)	9.2 (4.7)	7.0 (0.9)	10.9 (2.5)	28.3 (9.5)
	Median (range)	9 (6–42)	9 (6–42)	9 (7–35)	9 (6–16)	37 (35–42)	9 (6–24)	8 (6–20)	7 (6–8)	10 (9–16)	24 (18–42)
Number of ICU patients per year	Mean (SD)	1325 (1034)	1403 (1149)	1149 (545)	943 (425)	3700 (1510)	1097 (597)	1092 (788)	761 (180)	1072 (178)	3057 (1115)
	Median (range)	952 (514–5100)	980 (514–5100)	915 (780–2100)	870 (559–1400)	3900 (2100–5100)	921 (514–3000)	894 (600–3000)	711 (514–1033)	1033 (870–1400)	3000 (2100–5100)
Specific ICU physiotherapy team employed	% (n/N)	50.0 (16/32)	46.2 (12/26)	40.0 (3/5)	66.7 (2/3)	100 (3/3)	47.8 (11/23)	16.7 (1/6)	25.0 (4/16)	77.8 (7/9)	71.4 (5/7)
ICU staffing (in FTE)											
Senior physicians	Mean (SD)	5.2 (4.8)	5.4 (5.2)	5.7 (4.4)	3.6 (2.7)	17.0 (3.9)	3.5 (2.7)	6.0 (2.6)	3.0 (1.9)	4.4 (3.1)	12.7 (5.5)
	Median (range)	3.0 (1.0–20.0)	2.9 (1.0–20.0)	4.0 (1.0–12.6)	3.0 (1.3–6.5)	18.4 (12.6–20.0)	2.5 (1.0–10.0)	5.8 (2.0–10.0)	2.3 (1.0–7.0)	3.0 (1.0–10.0)	11.3 (6.0–20.0)
Assistant physicians	Mean (SD)	7.2 (5.8)	6.7 (5.0)	10.5 (9.5)	5.3 (3.2)	20.1 (7.2)	6.2 (3.6)	3.6 (2.7)	3.7 (1.9)	6.8 (2.4)	16.4 (6.6)
	Median (range)	5.0 (1.0–27.4)	5.0 (1.0–20.0)	7.0 (5.0–27.0)	4.0 (3.0–9.0)	20.0 (13.0–27.0)	5.0 (1.0–17.0)	2.0 (1.0–7.0)	3.5 (1.0–7.0)	6.5 (4.0–11.0)	15.0 (10.0–27.0)
Nurses[1]	Mean (SD)	42.3 (42.1)	39.9 (39.7)	56.0 (63.6)	39.0 (25.9)	179.4(15.0)	35.9 (24.5)	24.2 (10.0)	21.4 (5.0)	38.2 (14.1)	121.5 (58.6)
	Median (range)	26.0 (12.8–190)	25.8 (12.8–190.0)	26.0 (19.5–168.8)	31.0 (18.0–68.0)	179.4 (168.8–190.0)	27.7 (12.8–105.0)	22.1 (13.8–45.0)	22.1 (12.8–29.0)	36.0 (23.0–68.0)	105.0 (43.7–190.0)
Physiotherapists	Mean (SD)	2.3 (2.4)	2 .0 (1.3)	5.5 (6.4)	0.9 (0.9)	4.7 (4.7)	1.7 (1.3)	2 .0 (NA)	0.8 (0.8)	1.9 (1.2)	4.0 (3.5)
	Median (range)	1.8 (0.2–10.0)	2.0 (1.0–4.0)	5.5 (1.0–10.0)	0.9 (0.2–1.5)	3.0 (1.0–10.0)	1.3 (0.0–4.0)	2.0 (2.0–2.0)	0.5 (0.2–2.0)	1.5 (1.0–4.0)	3.0 (1.0–10.0)

Acad.= Academic; Cant./Reg.: Cantonal/Regional; FTE: full time equivalents; ICU: intensive care unit; SD: standard deviation. [1] Nurses were defined as expert nurses, expert critical care (ICU) nurses, and registered nurses working in the ICU.

ically ventilated patients widely ranged from 4% to 70% across ICUs and was generally higher in academic hospitals (56%). About 40% of the patients were admitted to the ICU after surgery (range 5–75%). Private hospitals reported the highest proportions of postoperative patients (60%), followed by academic hospitals (49%) and cantonal/regional hospitals (30%). The overall patient collective consisted of 37% patients aged 16–65 years and 37% patients aged 65–80 years, with patients younger than 16 years and older than 80 years being less frequent (8% and 17%, respectively). The main diagnoses among adults related to cardiovascular (28%), respiratory (13%), gastrointestinal (15%), and neurological disorders (13%).

Implementation of rehabilitation and early mobilisation practices

All participating ICUs reported early mobilisation of their patients, starting within the first 7 days after admission (table 2, supplementary table S4). A specific early mobilisation protocol was stated to be available in 50% (17/34) of the participating adult ICUs. This was the case for 62% (16/26) of the ICUs in the German-speaking region, none (0/5) in the French-speaking region, and 33% (1/3) in the Italian-speaking region. Specific early mobilisation protocols were more frequently reported to be used in large ICUs compared to medium-sized and small ICUs. Among those with an early mobilization protocol, six ICUs (35%) reported starting mobilisation measures on the first day after ICU admission and seven (41%) on the first day after stabilisation. Two ICUs reported starting early mobilisation from day 2 according to their protocol and one ICU on day 1, without specifying whether this related to admission or stabilisation.

When asked about the provision of rehabilitation more generally, slightly fewer adult ICUs (85%; 29/34) reported providing some form of rehabilitation in their ICU. Overall, 45% (13/29) of the participating ICUs reported use of a written rehabilitation protocol. Such a protocol was stated to be available in 50% (11/22), 25% (1/4), and 33% (1/3) of the ICUs in the German-speaking, French-speaking, and Italian-speaking regions, respectively. Most academic hospital ICUs and large ICUs reported having a protocol, whereas private hospital ICUs and small ICUs did so less frequently.

The participating adult ICUs stated that about half (54%) of ICU patients would receive general rehabilitative measures. The reported proportion of patients receiving early mobilisation was much higher (82%). Generally, the proportion of patients receiving general rehabilitation and early mobilisation measures was lower than average in the ICUs in the French-speaking and Italian-speaking regions, and higher in private hospitals.

The proportion of mechanically ventilated and postoperative patients among those receiving early mobilisation were reported to be higher than the respective proportions in the total ICU patient collective (65% vs 30% and 77% vs

Table 2:
General rehabilitation approaches and early mobilisation in participating intensive care units (ICUs caring for adults only).

General rehabilitation		All (n = 34)	Language region			Hospital type			ICU size		
			German (n = 26)	French (n = 5)	Italian (n = 3)	Acad. (n = 3)	Cant./ Reg. (n = 23)	Private (n = 8)	1–8 beds (n = 17)	9–16 beds (n = 10)	≥17 beds (n = 7)
ICUs providing any rehabilitation	% (n/N)	85.3 (29/34)	84.6 (22/26)	80.0 (4/5)	100 (3/3)	100 (3/3)	87.0 (20/23)	75 (6/8)	82.4 (14/17)	90.0 (9/10)	85.7 (6/7)
ICUs with general rehabilitation protocol	% (n/N)	44.8 (13/29)	50.0 (11/22)	25.0 (1/4)	33.3 (1/3)	100.0 (3/3)	40.0 (8/20)	33.3 (2/6)	21.4 (3/14)	44.4 (4/9)	100 (6/6)
Patients receiving any rehabilitation (% of ICU collective)	Mean (SD)	53.9 (32.6)	57.0 (33.9)	45.0 (37.6)	43.3 (15.3)	41.6 (31.8)	50.7 (32.2)	70.8 (33.4)	49.9 (31.8)	56.1 (36.6)	60.0 (32.4)
	Median (range)	60 (3–100)	60 (3–100)	43 (5–90)	40 (30–60)	60 (5–60)	50 (3–100)	82.5 (10–95)	45 (3–100)	60 (5–100)	60 (5–95)
Early mobilisation											
Early mobilisation protocol available	% (n/N)	50.0 (17/34)	61.5 (16/26)	0 (0/5)	33.3 (1/3)	66.7 (2/3)	47.8 (11/23)	50.0 (4/8)	29.4 (5/17)	60.0 (6/10)	85.7 (6/7)
Proportion of patients receiving early mobilisation (%)	Mean (SD)	81.9 (22.1)	87.3 (14.4)	68.0 (37.7)	60.0 (30.0)	65.0 (18.0)	79.2 (24.0)	95.6 (7.3)	84.9 (21.3)	77.0 (26.3)	82.1 (19.3)
	Median (range)	90 (10–100)	90 (40–100)	90 (10–100)	60 (30–90)	80 (50–90)	90 (10–100)	100 (80–100)	90 (30–100)	80 (10–100)	90 (50–100)
Proportion of mechanically ventilated patients among those receiving early mobilisation (%)	Mean (SD)	65.1(31.6)	63.6 (34.1)	58.8 (17.5)	86.7 (15.3)	53.3 (15.3)	62.9 (32.2)	77.1 (34.6)	59.6 (34.3)	72.5 (29.6)	66.4 (30.6)
	Median (range)	70 (3–100)	70 (3–100)	50 (50–85)	90 (70–100)	50 (40–70)	65 (3–100)	95 (10–100)	50 (3–100)	82.5 (10–100)	70 (20–100)
Age distribution of patients receiving early mobilisation (%)											
<16 years	Mean (SD)	0.1 (0.4)	0 (0.5)	0 (0)	0 (0)	0 (0)	0 (0.5)	0.1 (0.4)	0.2 (0.6)	0 (0.3)	0 (0)
16–65 years	Mean (SD)	44.1 (13.3)	42.1 (9.3)	54.0 (24.9)	43.3 (14.4)	45.0 (5.0)	43.8 (9.6)	44.5 (22.5)	44.7 (17.7)	42.8 (10.5)	44.6 (3.4)
66–80 years	Mean (SD)	38.4 (10.2)	39.7 (8.4)	33.4 (18.0)	36.7 (7.6)	44.0 (5.3)	38.2 (8.4)	36.9 (15.3)	37.5 (13.1)	37.5 (8.3)	41.9 (3.8)
>80 years	Mean (SD)	17.4 (7.5)	18.0 (7.0)	12.6 (8.3)	20.0 (10.0)	11.0 (1.7)	17.9 (7.0)	18.5 (9.4)	17.7 (9.3)	19.6 (6.0)	13.6 (2.7)

Acad.= Academic; Cant./Reg.: Cantonal/Regional; ICU: intensive care unit; Ped.: paediatric; SD: standard deviation.

40%, respectively). The reported proportion of patients undergoing early mobilisation varied considerably across language regions (64% in German-speaking, 59% in French-speaking, and 87% in Italian-speaking ICUs) and hospital types (50% in academic hospitals, 65% in cantonal/regional hospitals, and 95% in private hospitals).

Regular, structured interdisciplinary rounds or meetings to discuss rehabilitation measures and goals for patients were reported to be held by slightly more than half of the adult ICUs (53%; 18/34). Such rounds were reported to be held more frequently in ICUs in academic hospitals (100%; 3/3), as well as in the German-speaking (54%; 14/26) and Italian-speaking regions (67%; 2/3). In contrast, they were less frequently conducted in private hospitals (25%; 2/8) and the French-speaking part of Switzerland (40%; 2/5).

Four out of 34 adult ICUs (12%) reported that patients' relatives were involved in the provision of early mobilisation measures.

Early mobilisation measures

Specific early mobilisation measures that were reported to be provided by most adult ICUs included passive range motion (97%; 33/34), passive chair position in bed (97%; 33/34), active range of motion muscle activation and training (88%; 30/34), active side to side turning (91%; 31/34), sitting on the edge of the bed (94%; 32/34), transfer from bed to a chair (97%; 33/34), and ambulation (94%; 32/34) (table 3). Other measures were provided less frequently. The proportion of ICUs providing a specific early mobilisation measure, the proportion of patients receiving it, as well as the time dedicated to it (minutes per day, number of days) seemed to vary across language regions, hospital types, ICU types, and by ICU size. Several early mobilisation measures were provided more frequently in German-speaking or Italian-speaking ICUs, whereas French-speaking ICUs reported lower percentages. The proportion of patients reported to be receiving a specific mobilisation measure was generally higher for German-speaking ICUs, whereas Italian-speaking ICUs reported in many cases very low proportions. French-speaking ICUs had proportions comparable to those in the German-speaking ICUs for 7 out of 12 mobilisation measures. The average duration that the measures were reported to be provided per day, as well as the average numbers of days that were reported to be dedicated to providing each specific mobilisation measure were highly variable across language regions, hospital types, ICU types, and by ICU size (supplementary tables S5–S16).

Additional general rehabilitation practices and patient follow-up

Most of the participating adult ICUs reported screening for swallowing abnormalities in their patients (91%; 31/34); whereas there were no major variations across language regions, trends were visible for hospital type (higher screening use in academic and cantonal/regional hospitals, lower in private hospitals) and ICU size (higher in large ICUs, lower in small ICUs). Regular visits by occupational therapists, speech therapy specialists, or nutritional therapy specialists were scheduled in 35% (12/34), 29% (10/34), and 36% (12/33; one missing) of the participating ICUs, respectively. We noted variations between language regions, hospital types, ICU type, and by ICU size (supplementary table S17). We additionally elicited information on rehabilitation measures aimed at mitigating the psychological impact of critical illness on patients and their relatives, as well as patient follow-up (supplementary table S18). Half of the participating adult ICUs (17/34) reported keeping a diary for their patients' ICU stay. Diaries were mainly kept by nurses (100%; 17/17), patients' relatives (71%; 12/17), physicians (35%; 6/17), and physiotherapists (29%; 5/17). Most of the participating ICUs reported that the involvement of a psychological support or care team was possible to support ICU patients (85%; 28/33; one missing) and relatives (79%; 27/34). Only five of the participating adult ICUs (15%) stated that they routinely evaluated patient outcomes.

Table 3:
Overview of early mobilisation measures provided in intensive care units (ICUs caring for adults only).

Early mobilisation measure (total n = 34)	ICUs providing the measure, % (n/N)	Proportion of patients receiving the measure, mean % (SD)	Average daily time dedicated to providing the measure, minutes (SD)	Average number of days on which the measure is provided, days (SD)
Transfers from bed to a chair	97.1 (33/34)	79.6 (22.6)	61.2 (52.5)	3.3 (1.5)
Passive range of motion	97.1 (33/34)	69.3 (33.6)	27.1 (16.2)	3.5 (3.3)
Passive chair position in bed, tilt table	97.1 (33/34)	54.8 (38.3)	57.7 (48.2)	3.3 (1.6)
Sitting on the edge of the bed	94.1 (32/34)	86.0 (19.1)	49.5 (36.3)	3.3 (1.3)
Active side to side turning	91.1 (31/34)	71.8 (33.9)	38.2 (38.2)	3.5 (1.7)
Active range of motion muscle activation and training	88.2 (30/34)	68.1 (51.7)	32.9 (19.5)	4.0 (1.3)
Ambulation (walking with patient)	94.1 (32/34)	28.1 (23.5)	23.1 (9.5)	3.4 (1.6)
Other active exercises in bed	64.7 (22/34)	56.1 (39.0)	46.5 (40.7)	4.3 (2.4)
Active cycling in bed	64.7 (22/34)	11.8 (13.1)	39.2 (30.7)	4.5 (2.6)
Passive cycling in bed	52.9 (18/34)	12.0 (13.5)	33.8 (30.5)	3.8 (2.5)
Active resistance exercises, bedside cycling	47.1 (16/34)	21.1 (26.5)	34.3 (11.3)	3.6 (1.4)
Neuro-muscular electrostimulation	11.8 (4/34)	264.0 (41.9)	46.7 (23.1)	2.3 (2.5)

ICU: Intensive care unit; SD: Standard deviation.

Underuse and variation of early mobilisation and rehabilitation practices in Switzerland

Participating Swiss ICU lead physicians defined underuse as a failure to provide rehabilitation early and in all patients with a rehabilitation potential or need, and as a failure to achieve optimal outcomes due to a lack of knowledge, motivation, or prioritisation. Overuse was defined as an inefficient use of resources by not adapting efforts to the rehabilitation potential, need and clinical status of patients, providing rehabilitation beyond the patients' limits, and providing more care than necessary to achieve optimal recovery. ICU lead physicians defined appropriate use as rehabilitation according to the patients' needs and potential for rehabilitation, involving the screening and evaluation of eligible patients, starting rehabilitation efforts early, systematically using protocols, and taking an interprofessional approach.

At a team level, factors such as awareness, knowledge and motivation were mentioned as important drivers of practice variation within Switzerland. At an organisational level, the lack of a national consensus or protocols with resulting local team cultures and leadership challenges were seen as important issues. Differences in the available resources, such as specialized personnel, finances, and time, as well as differences in case mix were also seen to contribute to practice variation between Swiss ICUs.

Almost one third of the ICU lead physicians (12/37) considered early rehabilitation to be underused in their own ICU and about half (19/37) considered it to be underused in Switzerland more generally. About two thirds (24/37) saw it as being appropriately used in their ICU, and only 41% (15/37) had that perception for ICUs across Switzerland in general. The lack of resources such as personnel, finances, and time, was stressed as a key determinant for underuse. Additional reasons seen by ICU lead physicians within their own ICU were a lack of motivation or internal resistance, whereas they perceived a lack of awareness, knowledge, and motivation in other Swiss ICUs more generally. Finally, ICU lead physicians identified a need for protocols and standardised practices to improve rehabilitation efforts in Swiss ICUs.

Discussion

The present report describes the early mobilisation and more general early rehabilitation practices in Switzerland according to information provided by 37 out of 84 Swiss ICUs, representing 48% of Swiss ICU beds. All ICU lead physicians reported the use of early mobilization, starting within the first seven days after ICU admission, but only about half reported use of a rehabilitation or early mobilisation protocol. Most ICUs with an early mobilisation protocol reported starting rehabilitative measures within one day after admission (35%) or stabilisation (41%) of the patient. The proportion of ICUs providing a specific early mobilisation measure, the proportion of patients receiving it, as well as the time dedicated to it varied considerably across language regions, hospital types, ICU types, and by ICU size. Almost one third of the ICU lead physicians considered early rehabilitation to be underused in their own ICU and about half considered it to be underused in Switzerland more generally. The lack of personnel, of financial resources, and of time were stressed as key causes for underuse.

Overall, ICU lead physicians reported that postoperative patients accounted for approximately 40% of ICU admissions. The age distribution and diagnoses of the patient collective in the participating ICUs were comparable to those reported by the SGI-SSMI-SSMI in the 2018 MDSi report based on data from 76 Swiss ICUs, which reported that 17% of the patients were over 80 years, 31% had cardiovascular problems, 12% respiratory problems, 12% gastrointestinal problems, 14% problems of the nervous system, and 6% were admitted due to accidents [30]. Similarly, the proportion of patients receiving mechanical ventilation reported in the MDSi report (32%) was comparable to the proportion reported in this survey (33%). Therefore, we believe that the sample of ICUs that participated in our survey is sufficiently representative for all the ICUs in Switzerland.

The proportion of mechanically ventilated and postoperative patients among those receiving early mobilisation were reported to be higher than the respective proportions in the total ICU patient collective. This may indicate a special perceived importance of mobilising such patients and may imply that other patient groups receive less mobilisation than mechanically ventilated and postoperative patients. Although it appears plausible that mechanically ventilated patients receive early mobilisation more frequently due to their increased risk of ICU-acquired weakness (ICUAW) and post-intensive care syndrome (PICS), it may be less likely that patients admitted after surgery are in special need for mobilisation compared with the rest of the ICU population. A reason for this discrepancy could be that reported proportions in the general ICU population were based on MDSi data, whereas proportions for mechanically ventilated patients were based on the ad hoc estimates of survey respondents. Further reasons could be that postoperative patients are more often able to mobilise on their own, or that there are more established standards or protocols for the postoperative care of patients.

The proportion of ICUs conducting regular interdisciplinary rounds was somewhat lower than reported in the point prevalence study by Sibilla et al. in 35 ICUs in Switzerland (53% vs 69%) [17]. However, this apparent difference might be due to differences in wording, as Sibilla et al. reported on ICUs conducting multidisciplinary discussions, which might not have been regularly scheduled (as requested in our survey).

Overall, about half of the participating ICUs reported use of written protocols for rehabilitation (45%) and early mobilisation (50%) of their patients. These estimates are lower than the one reported by Sibilla et al., who found 74% of the surveyed ICUs to have an early mobilisation protocol [17]. Another study from the United States by Bakhru et al. reported that two thirds of ICUs performing early mobilisation had a written protocol [18]. Reasons for the differences between our findings and those of other studies are unclear and they may have arisen because of differences in study design and associated biases, changes in rehabilitation practices over time (the study by Sibilla et al. was conducted in 2014), or differences between countries. Furthermore, in Switzerland, provided care is often documented in separate systems by medical, nursing, physical, and

occupational therapy staff. This may further have affected the mutual awareness of the extent of rehabilitative activities performed and influence the results of different surveys depending on the population surveyed. Shared documentation of all medical professions involved in ICU care may thus be useful.

The participating ICUs reported that about 80% of patients receive early mobilisation and about half receive rehabilitation in general. The described early mobilisation and rehabilitation approaches, as well as the early mobilisation measures were heterogenous across the participating ICUs.

The majority of the respondents saw early rehabilitation as being appropriately used in Switzerland, but about 35–40% reported perceiving an underuse in their own ICU or in other Swiss ICUs. ICU lead physicians identified a need for an increase in awareness and knowledge about early mobilisation in Switzerland and stressed the importance of the creation and implementation of early, systematic protocols or (national) standards, as well as ensuring adequate resources for ICUs to provide early rehabilitation and optimise outcomes of their patients, according to their needs and potential.

In this survey, we were able to collect information on early mobilisation and rehabilitation practices and present estimates stratified by different language regions, hospital types, ICU types, and between ICUs of different size. However, there are several limitations that have to be considered. First, the response rate was rather low (44%). This may have led to selection bias as ICUs participating in this survey might have been more interested and active in providing early mobilisation and rehabilitation to patients than nonparticipating ICUs. Consequently, the proportion of patients receiving early mobilisation measures in Switzerland might have been overestimated. It may further explain the finding that early mobilisation was considered to be underused more frequently in Switzerland than in the ICUs of participating ICU lead physicians. However, comparisons of the data collected in this survey and the MDSi statistics of the SGI-SSMI-SSMI suggested that a representative sample was reached [30]. A second limitation concerns the analyses stratified by language region, hospital type, ICU type, and ICU size, which were based on a limited and sometimes incomplete number of answers. For example, stratified analyses were based on only three ICUs for the Italian-speaking region and on five ICUs caring for adults for the French-speaking region. Equally, data for academic ICUs caring for adults was limited to three ICUs. For this reason, it is important to emphasise that the actual practices related to rehabilitation and early mobilisation in all Swiss ICUs may differ from those found in this survey owing to selection effects and chance. Especially within subgroups, our results may not be generalisable to all Swiss ICUs within the respective subgroup and need to be interpreted with caution. A third limitation is that all responses were self-reported by ICUs, which may have led to response bias. In fact, a few discrepancies in the responses were identified. For example, all ICUs stated that they provided early mobilisation, whereas 85% of them stated that they provided rehabilitation more generally. The proportion of patients receiving any rehabilitation was also reported to be lower than the proportion of patients receiving early mobilisation. It remains unclear whether these variations were due to different wording in the question or other reasons. It may be that the survey respondents did not consider early mobilisation to be part of rehabilitation in general. Alternatively, the discrepancy may have arisen because information on general rehabilitation measures was elicited first and that awareness for early mobilisation as a mainstay of rehabilitation in the ICU increased during the completion of the survey. A fourth limitation is the quality of reporting. Despite conducting a pilot test and adapting the questionnaire design, the survey was relatively long and complicated (supplementary table S1). We noticed that questions in the first half of the survey (including institution characteristics, general rehabilitation measures, and general early mobilisation information) were answered by almost all participating ICUs. Thereafter, the number of ICUs providing full answers decreased for some questions. It cannot be excluded that the length of the survey, combined with the general lack of time available to ICU staff to participate in such research, may have led to a lower quality of answers, especially in the second part of the survey (focusing on specific early rehabilitation measures, outcome evaluation, and perception of underuse and overuse). Lastly, the results of this survey are based on aggregated data. These may provide a general idea of how early mobilisation and rehabilitation practices are implemented in Switzerland. This is especially important since the evidence suggests that the current standard of care seems to be an important determinant of whether additional efforts dedicated to early mobilisation would also provide a benefit to patients [16]. However, it is important to emphasise that ICU patients are an extremely heterogeneous population, often requiring personalised care. The use of early mobilisation and rehabilitation practices within specific patient collectives thus should be further investigated. This survey represents only a first step towards a better understanding of practice variation regarding early mobilisation across Switzerland. The results, combined with a thorough investigation of patient-relevant outcomes, may emphasise the importance and need of national guidelines, leading to an overall improvement of quality of care and patient outcomes at a national level.

A final remark concerns the ongoing pandemic of coronavirus disease 2019 (COVID-19). This survey illustrates the status quo of early mobilisation and rehabilitation in the pre-pandemic era. Although a return to “normality” may be possible in the mid to long term, it is evident that COVID-19 had an enormous impact on health systems worldwide. The care in ICUs was particularly affected by the sudden increase of patients requiring mechanical ventilation [31]. Because of resource limitations, many hospitals were forced to re-allocate their staff/beds to deal with the unexpected high number of cases requiring mechanical ventilation [32–34]. The overcrowding of the ICUs led in many cases to critical situations and presumably had an important influence on early mobilisation and rehabilitation practices. Several recommendations to deal with COVID patients have been published [32, 35–37]. The way ICUs are managed and structured, from the number of available beds to the availability of trained personnel, may significantly change in order to be better prepared to face future pandemics. Repeating this survey after the current pandemic may provide important information on the

potential evolution/changes of ICU practices and organisation in the future.

In summary, the results of this survey suggest that early mobilisation and early rehabilitation more generally are practiced in almost all ICUs in Switzerland. However, the described approaches, as well as the use of specific early mobilisation measures were heterogenous across different language regions, hospital types, ICU types, and ICU sizes. The participating ICU lead physicians highlighted the importance of early and systematic or protocolised, as well as interprofessional approaches, which are adaptive to patients' rehabilitation needs and potential.

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Appendix

Survey Questionnaire

Table S1. Questionnaire

1. Institution Characteristics

Canton	.....
Hospital type *(choose one)*	☐ University hospital ☐ Cantonal / regional hospital ☐ Private clinic
ICU type *(choose one)* (The term ICU is meant to also refer to IMCs in all questions.)	☐ Medical ☐ Surgical ☐ Mixed (medical/surgical) ☐ Specialized cardiac unit ☐ Specialized neurological unit ☐ Specialized burns unit ☐ Intermediate care unit (IMC) ☐ Pediatric
Total hospital patient beds	..... beds
No. of patient beds in ICU	..... beds
No. of ICU patients per year	..... patients/year
Patient types (main diagnosis) *(please make sure that percentages add up to 100%)*	..... % Cardiovascular ..... % Respiratory / ENT ..... % Gastrointestinal ..... % Neurological / neurosurgical ..... % Metabolic ..... % Traumatological ..... % Sepsis ..... % Other (MDSi: excl. Sepsis)
Proportion of post-operative patients *(in %)*	..... %
Proportion of mechanically ventilated patients *(invasive or non-invasive, in %)*	..... %
Patient age distribution *(please make sure that percentages add up to 100%)*	..... % <16 years ..... % 16-65 years ..... % 66-80 years ..... % >80 years
No. of physicians employed in ICU *(in full time equivalents (FTE))*	..... senior / specialized physicians ..... assistant / non-specialized physicians
No. of nursing staff (dipl. Experts, Experts Intensive Care and dipl. Nursing staff) employed in ICU? *(in FTE)*	..... nurses
Is a physiotherapy team involved in care in your ICU?	☐ Yes ☐ No

If yes, is there a specialized physiotherapy team employed specifically for the ICU?	☐ Yes ☐ No If yes, No. of physiotherapist employed *(in FTE)*: ..... physiotherapists

What other specific experts or medical personnel are regularly integrated in the rehabilitation process? *(choose all that apply)* (Speech therapy refers to health professionals in Logopädie (*de*), logopédie (*fr*), logopedia (*it*))	☐ Ergotherapy ☐ Speech therapy ☐ Nutritional therapy ☐ Psychological care team ☐ Religious support team ☐ Relatives ☐ Other: .....

2. General Rehabilitation Measures

Do you perform any rehabilitation measures for the patients in your ICU?	☐ Yes ☐ No
Do you have a defined (written) protocol or concept for these rehabilitation measures?	☐ Yes ☐ No
Please describe the **rehabilitation approach** in your ICU. *(in a few sentences)*	....
What estimated proportion of patients in your ICU receives these general rehabilitation measures? *(in %)*	..... %
Are regular, structured interdisciplinary rounds/meetings held to discuss rehabilitation measures and goals for patients in your ICU?	☐ Yes ☐ No If yes, how often? Every ..... days. If yes, who participates *(choose all that apply)*? ☐ ICU physicians ☐ Nursing staff ☐ Physiotherapy staff ☐ Ergotherapy staff ☐ Speech therapy staff ☐ Nutritional therapy staff ☐ Psychological care team / religious support team ☐ Other: .....

3. Early Mobilization

Do you perform an early mobilization of the patients in your ICU (i.e., during the first 7 days after ICU admission)?		☐ Yes ☐ No	
What estimated proportion of patients in your ICU receives these early mobilization measures? *(in %)*		..... %	
What is the estimated proportion of post-operative patients among the patients receiving early mobilization? *(in %)*		..... %	
What is the estimated proportion of mechanically ventilated patients among the patients receiving early mobilization? *(both invasive and non-invasive, in %)*		..... %	
What is the estimated age distribution of the patients receiving early mobilization? *(please make sure that percentages add up to 100%)*		..... % <16 years ..... % 16-65 years ..... % 66-80 years ..... % >80 years	
Do you have a defined (written) protocol or concept for these early mobilization measures?		☐ Yes ☐ No	
If yes:	When does this early mobilization start according to your protocol/concept?	From *(choose one)*: ☐ From day 1 ☐ From day 2 ☐ From day 3 ☐ From day 4-7 ☐ From day 8-10 ☐ From day 11 or later	After *(choose one)*: ☐ After admission to ICU ☐ After stabilization ☐ After weaning from mechanical ventilation ☐ Other criterion: .....
	Which patient collective does it apply to?	*(choose one)* ☐ All ICU patients ☐ Restricted to:	*(if restricted, choose all that apply)* ☐ Mechanically ventilated patients ☐ Non-ventilated patients ☐ Neurological / stroke patients ☐ Orthopedic / trauma patients ☐ Age-defined patient group: ..... years. ☐ Other: .....
Please describe the definition of **early mobilization activities** as it applies in your ICU. *(in a few sentences)*		.....	

How does early mobilization usually start in your ICU? *(please choose the first measure that is usually performed)*	☐ Passive mobilization in bed (e.g. passive movement of extremities, passive cycling in bed) ☐ Passive muscle activation through neuromuscular electrostimulation ☐ Active mobilization in bed (e.g. active side to side turning, active range of muscle activation, training, active cycling in bed) ☐ Active assisted mobilization with a third person (e.g. sitting on the edge of the bed, transfers to chair, ambulation) ☐ Other *(please state)*: .....
Who usually performs the early mobilization activities? *(choose all that apply)*	☐ Nursing staff ☐ Physiotherapy staff ☐ Ergotherapy staff ☐ ICU physicians ☐ Relatives

Which of the following mobilization measures do you provide in your ICU? *(choose all that apply)*	What estimated proportion of all ICU patients receives this measure?	Who usually performs this measure?		What is the estimated average daily time requirement for personnel to perform this measure **with one patient**?	What is the estimated average number of days on which this measure is performed **for one patient?**
☐ Passive range of motion (contracture prophylaxis)	….. %	☐ Nursing staff ☐ Physiotherapy staff ☐ Ergotherapy staff	☐ ICU Physicians ☐ Relatives	….. minutes/day	….. days
☐ Neuro-muscular electro-stimulation	….. %	☐ Nursing staff ☐ Physiotherapy staff ☐ Ergotherapy staff	☐ ICU Physicians ☐ Relatives	….. minutes/day	….. days
☐ Passive chair position in bed, tilt table	….. %	☐ Nursing staff ☐ Physiotherapy staff ☐ Ergotherapy staff	☐ ICU Physicians ☐ Relatives	….. minutes/day	….. days
☐ Passive cycling in bed	….. %	☐ Nursing staff ☐ Physiotherapy staff ☐ Ergotherapy staff	☐ ICU Physicians ☐ Relatives	….. minutes/day	….. days
☐ Active range of motion muscle activation and training	….. %	☐ Nursing staff ☐ Physiotherapy staff ☐ Ergotherapy staff	☐ ICU Physicians ☐ Relatives	….. minutes/day	….. days
☐ Active side to side turning	….. %	☐ Nursing staff ☐ Physiotherapy staff ☐ Ergotherapy staff	☐ ICU Physicians ☐ Relatives	….. minutes/day	….. days
☐ Active cycling in bed	….. %	☐ Nursing staff ☐ Physiotherapy staff ☐ Ergotherapy staff	☐ ICU Physicians ☐ Relatives	….. minutes/day	….. days
☐ Other active exercises in bed	….. %	☐ Nursing staff ☐ Physiotherapy staff ☐ Ergotherapy staff	☐ ICU Physicians ☐ Relatives	….. minutes/day	….. days
☐ Sitting on the edge of the bed	….. %	☐ Nursing staff ☐ Physiotherapy staff ☐ Ergotherapy staff	☐ ICU Physicians ☐ Relatives	….. minutes/day	….. days

Which of the following mobilization measures do you provide in your ICU? *(choose all that apply)*	What estimated proportion of all ICU patients receives this measure?	Who usually performs this measure?		What is the estimated average daily time requirement for personnel to perform this measure **with one patient**?	What is the estimated average number of days on which this measure is performed **for one patient?**
☐ Transfers from bed to a chair	….. %	☐ Nursing staff ☐ Physiotherapy staff ☐ Ergotherapy staff	☐ ICU Physicians ☐ Relatives	….. minutes/day	….. days
☐ Ambulation (walking with patient)	….. %	☐ Nursing staff ☐ Physiotherapy staff ☐ Ergotherapy staff	☐ ICU Physicians ☐ Relatives	….. minutes/day	….. days
☐ Active resistance exercises, bedside cycling	….. %	☐ Nursing staff ☐ Physiotherapy staff ☐ Ergotherapy staff	☐ ICU Physicians ☐ Relatives	….. minutes/day	….. days

4. Speech, Swallowing, Nutrition

Do you perform a screening for swallowing abnormalities of the patients in your ICU?		☐ Yes ☐ No	
If yes:	In what patient collective?	*(choose one)* ☐ All patients ☐ Restricted to:	*(if restricted, choose all that apply)* ☐ Neurological / neurosurgical patients ☐ Mechanically ventilated patients (after extubation) ☐ Other: .....
	What estimated proportion of ICU patients receives screening for swallowing abnormalities?	…… %	
	What is the estimated average time requirement of the screening for one patient?	…… minutes	
	Who usually performs the screening?	☐ Nursing staff ☐ Physiotherapy staff ☐ Ergotherapy staff ☐ Speech therapy staff ☐ ICU physicians ☐ Other:	

Is there a regularly scheduled consultation/visit by **ergotherapists** for patients in your ICU?	☐ Yes ☐ No	
Is there a regularly scheduled consultation/visit by **speech therapy specialists** for patients in your ICU?	☐ Yes ☐ No	
Is there a regularly scheduled consultation/visit by **nutritional therapy specialists** for patients in your ICU?	☐ Yes ☐ No	

5. Psychological Impact

Do you keep a diary for patients during their stay in your ICU?		☐ Yes ☐ No	
If yes:	In what patient collective?	*(choose one)* ☐ All patients ☐ Restricted to:	*(if restricted, choose all that apply)* ☐ Mechanically ventilated patients ☐ Sedated patients ☐ Patients with an expected ICU stay of longer than ..... days ☐ Other: .....
	For what estimated proportion of ICU patients do you keep a diary?	…… %	
	What is the estimated average daily time requirement of the diary keeping for one patient?	…… minutes/day	

Who usually performs the diary keeping?	☐ Nursing staff ☐ Physiotherapy staff ☐ Ergotherapy staff ☐ Speech therapy staff ☐ Psychological care team ☐ ICU physicians ☐ Relatives ☐ Other: .....

Do you have the possibility to involve a psychological support or care team **in the care of patients** in your ICU?	☐ Yes ☐ No
Do you have the possibility to involve a psychological support or care team **to support relatives of patients** in your ICU?	☐ Yes ☐ No

6. Follow-up and Evaluation after Intensive Care

Do you routinely evaluate outcomes of patients that were hospitalized in your ICU?		☐ Yes ☐ No
If yes, which of the following outcomes do you evaluate in your ICU? *(choose all that apply)*	Muscle strength	☐ Medical Research Council (MRC) Muscle Scale ☐ Hand-held dynamometry or handgrip strength ☐ Others *(please list)*: .....
	Functional mobility	☐ Barthel Index ☐ Activities of daily living (ADL after Katz et al.) ☐ Functional Independence Measure (FIM) ☐ Physical Function in the ICU Test (PFIT) ☐ ICU Mobility Scale (IMS) ☐ Time to mobility milestones (e.g. time to independence from assistance, time to discharge, time to first out of bed, time to standing, time-up-and go, time to work) ☐ Timed up-and-go test (TUG) ☐ Walking tests (e.g. 6-minute (6MWT) or other walking tests, distance walked without assistance) ☐ Others *(please list)*: .....
	Quality of life	☐ Quality of life measures (generic or disease-specific)
	Safety and/or adverse events	☐ Harm-related outcomes regarding rehabilitative activities and sequelae (accidents/falls, fractures, catheter/endotracheal tube/nasogastric tube dislodgement, loss of muscle tone, hypotension, pain due to insertion and reinsertion of catheters)
	Cognitive function and psychological outcomes	☐ Delirium incidence (e.g. RASS, ICDSC, CAM-ICU) ☐ Delirium duration ☐ Memory (e.g. MOCA, MMSE) ☐ Anxiety (e.g. HADS) ☐ Depression (e.g. HADS) ☐ Others *(please list)*: .....

Other	☐ Length of ICU or hospital stay ☐ Duration of mechanical ventilation, ☐ Sedative or analgesic use ☐ Hospital readmission ☐ Mortality
If yes, at what time points? *(choose all that apply)*	☐ ICU discharge ☐ Hospital discharge ☐ After 1 month ☐ After 3 months ☐ After 6 months ☐ After 12 months ☐ After >1 year
Do you offer a follow-up for former patients of your ICU (e.g. follow-up consultations or visits)?	☐ Yes ☐ No If yes, what type of follow-up is offered? *(in a few sentences)* .... If yes, who sees these patients? *(choose all that apply)* ☐ ICU physician ☐ ICU nursing staff ☐ ICU-related physiotherapy staff ☐ Other: .....

7. Over- and Underuse of Rehabilitation Measures in Switzerland

According to your opinion, what drives differences in rehabilitation approaches between Swiss ICUs? *(in a few sentences)*	....
How would you define underuse, appropriate use and overuse of early rehabilitation activities in Swiss ICUs? *(in a few sentences)*	Underuse: .... Appropriate use: .... Overuse: ....

According to these definitions, how would you rate the use of early rehabilitation activities **in Swiss ICUs in general**?	☐ Underused ☐ Appropriately used ☐ Overused If under- or overuse occur in Switzerland, what are the reasons? *(in a few sentences)* ....
According to these definitions, how would you rate the use of early rehabilitation activities **in your ICU**?	☐ Underused ☐ Appropriately used ☐ Overused If under- or overuse occur in your ICU, what are the reasons? *(in a few sentences)* ....
Is there a general remark you would like to make regarding (early) rehabilitation in ICUs in Switzerland?	....

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Table S2. Characteristics of participating intensive care units (by ICU type)

Institution characteristics		All (n=37)	ICU type	
			Adult (n=34)	Pediatric (n=3)
Number of ICU beds	Mean (SD)	12.8 (9.2)	12.5 (9.4)	15.7 (8.1)
	Median (range)	9 (6-42)	9 (6-42)	12 (10-25)
Number of ICU patients per year	Mean (SD)	1276 (1009)	1325 (1034)	717 (419)
	Median (range)	937 (450-5100)	952 (514-5100)	500 (450-1200)
Specific ICU physiotherapy team employed	% (n/N)	48.6 (17/35)	50.0 (16/32)	33.3 (1/3)
ICU staffing (in FTE)				
Senior physicians	Mean (SD)	5.3 (4.7)	5.2 (4.8)	6.3 (3.3)
	Median (range)	3.8 (1.0-20.0)	3.0 (1.0-20.0)	5.2 (3.8-10.0)
Assistant physicians	Mean (SD)	7.6 (5.9)	7.2 (5.8)	12.0 (6.0)
	Median (range)	5.5 (1.0-27.4)	5.0 (1.0-27.4)	12.0 (6.0-18.0)
Nurses	Mean (SD)	44.1 (41.3)	42.3 (42.1)	63.3 (31.9)
	Median (range)	27.7 (12.8-190.0)	26.0 (12.8-190)	48.0 (42.0-100.0)
Physiotherapists	Mean (SD)	2.3 (2.3)	2.3 (2.4)	1.5 (NA)
	Median (range)	1.5 (0.2-10.0)	1.8 (0.2-10.0)	1.5 (1.5-1.5)

Legend: FTE= Full time equivalents; ICU= Intensive care unit; NA= Not available; SD= Standard deviation.

Table S3. Characteristics of patient collectives in participating intensive care units *(including both adult and pediatric ICUs)*

ICU patient characteristics		All (n=37)	Language region			Hospital type			ICU type		ICU size		
			German (n=28)	French (n=6)	Italian (n=3)	Acad. (n=5)	Cant./ Reg. (n=24)	Private (n=8)	Adult (n=34)	Ped. (n=3)	1-8 beds (n=17)	9-16 beds (n=12)	≥17 beds (n=8)
Mechanically ventilated patients (% of ICU patient collective)	Mean (SD)	33.0 (16.8)	31.2 (14.9)	38.0 (24.9)	40.0 (17.3)	56.4 (13.6)	28.2 (14.4)	32.8 (13.9)	30.3 (14.4)	63.3 (11.5)	23.2 (11.8)	40.4 (17.5)	42.9 (14.2)
	Median (range)	30 (4-70)	28 (4-70)	36 (12-70)	30 (30-60)	61 (36-70)	26 (4-70)	32 (9-49)	28 (4-65)	70 (50-70)	23 (4-49)	33 (20-70)	37 (25-65)
Post-operative patients (%)	Mean (SD)	39.3 (20.2)	41.9 (19.5)	33.3 (26.6)	27.0 (8.5)	48.8 (12.5)	30.3 (15.8)	60.4 (18.5)	39.8 (20.4)	33.3 (20.8)	36.2 (21.1)	32.3 (17.0)	56.4 (13.9)
	Median (range)	40 (5-75)	40 (10-73)	28 (5-75)	28 (18-35)	44 (40-70)	27 (5-70)	67 (20-75)	38 (5-75)	40 (10-50)	30 (5-75)	28 (10-73)	57 (40-73)
Patient main diagnosis (%)													
Cardiovascular	Mean (SD)	27.4 (14.2)	26.1 (14.0)	37.2 (14.1)	19.4 (9.2)	39.6 (6.1)	23.8 (11.9)	30.4 (19.8)	27.7 (13.9)	23.3 (20.8)	22.8 (11.2)	26.6 (16.2)	38.2 (12.4)
Respiratory/ENT	Mean (SD)	14.2 (6.0)	14.0 (6.0)	13.2 (6.3)	18.8 (5.4)	18.0 (6.5)	14.0 (5.9)	12.7 (5.8)	13.2 (4.9)	26.7 (2.9)	13.3 (5.2)	16.0 (7.5)	13.5 (5.2)
Gastrointestinal	Mean (SD)	14.0 (9.4)	15.8 (9.9)	6.0 (3.3)	13.8 (2.1)	4.2 (4.2)	14.2 (6.3)	19.6 (14.5)	15.0 (9.2)	3.7 (5.5)	17.2 (11.1)	12.7 (7.3)	9.5 (6.4)
Neurological/neurosurgical	Mean (SD)	13.0 (8.5)	12.2 (6.7)	16.0 (13.9)	14.5 (13.5)	11.2 (4.7)	14.1 (8.8)	10.7 (9.7)	13.1 (8.7)	11.7 (7.6)	10.9 (7.0)	14.7 (10.9)	14.8 (7.4)
Metabolic	Mean (SD)	6.7 (4.9)	6.3 (3.8)	7.8 (9.3)	8.5 (4.5)	2.8 (2.2)	8.2 (5.1)	4.7 (3.9)	7.2 (4.9)	2.0 (2.6)	9.2 (5.5)	5.7 (3.9)	3.2 (1.7)
Trauma	Mean (SD)	6.8 (4.7)	7.5 (4.9)	3.5 (1.9)	6.3 (3.5)	7.4 (4.4)	8.1 (4.6)	2.5 (1.9)	6.6 (4.6)	8.3 (5.8)	7.2 (5.8)	5.6 (2.7)	7.5 (4.3)
Sepsis	Mean (SD)	6.7 (4.9)	6.3 (5)	6.8 (4.6)	10.7 (5.0)	6 (4.2)	6.7 (4.8)	7.3 (6.2)	6.7 (5.1)	6.7 (2.9)	8.2 (6.2)	6.6 (3.1)	3.9 (3.0)
Others	Mean (SD)	11.1 (9.3)	11.8 (10.1)	9.5 (4.8)	8.0 (9.8)	10.8 (12.2)	10.8 (8.7)	12.2 (10.2)	10.5 (8.0)	17.7 (20.4)	11.2 (8.9)	12.1 (10.3)	9.4 (9.4)
Patient age distribution (%)													
<16 years	Mean (SD)	8.0 (26.7)	7.2 (25.5)	15.8 (38.8)	0 (0)	38.6 (52.9)	4.3 (19.8)	0.1 (0.4)	0.2 (0.5)	96.7 (1.5)	0.3 (0.6)	16.1 (37.3)	12.2 (34.6)
16-65 years	Mean (SD)	37.4 (14.2)	38.7 (13.2)	32.7 (20.8)	34.7 (10.5)	29.2 (23.8)	40.6 (12.0)	32.8 (11.6)	40.4 (10.3)	3.3 (1.5)	36.6 (11.7)	37.5 (17.5)	38.8 (15.5)
66-80 years	Mean (SD)	37.1 (14.8)	36.6 (13.6)	36.5 (22.9)	43.3 (7.6)	24.4 (22.5)	36.4 (11.8)	47.4 (11.9)	40.4 (10.1)	0 (0)	41.6 (13.1)	31.5 (16.2)	36.0 (14.8)
>80 years	Mean (SD)	17.5 (8.4)	17.5 (8.5)	15.0 (9.4)	22.0 (3.5)	7.8 (7.2)	18.8 (8.4)	19.8 (4.5)	19 (6.8)	0 (0)	21.4 (8.2)	14.9 (8.1)	13.0 (5.7)

Legend: Acad.= Academic; Cant./Reg.= Cantonal/Regional; ENT= Ear nose throat; ICU= Intensive care unit; NA= Not available; Ped.= Pediatric; SD= Standard deviation.

Table S4. General rehabilitation approaches and early mobilization in participating intensive care units (by ICU type)

General rehabilitation		All (n=37)	ICU type	
			Adult (n=34)	Pediatric (n=3)
ICUs providing any rehabilitation	% (n/N)	86.5 (32/37)	85.3 (29/34)	100 (3/3)
ICUs with general rehabilitation protocol	% (n/N)	46.9 (15/32)	44.8 (13/29)	66.7 (2/3)
Patients receiving any rehabilitation (% of ICU collective)	Mean (SD)	53.1 (33.3)	53.9 (32.6)	45.0 (47.7)
	Median (range)	55 (3-100)	60 (3-100)	20 (15-100)
Early mobilization (total n=37)				
Early mobilization protocol available	% (n/N)	45.9 (17/37)	50.0 (17/34)	0 (0/3)
Proportion of patients receiving early mobilization (%)	Mean (SD)	81.8 (21.3)	81.9 (22.1)	80.0 (10.0)
	Median (range)	90 (10-100)	90 (10-100)	80 (70-90)
Proportion of mechanically ventilated patients among those receiving early mobilization (%)	Mean (SD)	63.0 (32.8)	65.1 (31.6)	40.0 (43.6)
	Median (range)	70 (3-100)	70 (3-100)	20 (10-90)
Age distribution of patients receiving early mobilization (%)				
<16 years	Mean (SD)	8.4 (27.4)	0.1 (0.4)	96.7 (1.5)
16-65 years	Mean (SD)	40.6 (17.2)	44.1 (13.3)	3.3 (1.5)
66-80 years	Mean (SD)	35.1 (14.6)	38.4 (10.2)	0 (0)
>80 years	Mean (SD)	15.9 (8.7)	17.4 (7.5)	0 (0)

Legend: ICU= Intensive care unit; SD= Standard deviation.

Details on early rehabilitation measures (including both adult and pediatric ICUs)

Table S5. Passive range of motion

	ICUs providing the measure (% (n/N))	Proportion of patients receiving the measure (mean % (SD))	Average daily time dedicated to provide the measure (minutes (SD))	Average number of days in which the measure is provided (days (SD))
Total	97.3 (36/37)	71.5 (32.9)	28.5 (16.8)	3.8 (3.3)
German	100 (28/28)	72.1 (33.8)	28.3 (17.4)	3.9 (3.7)
French	83.3 (5/6)	87.5 (25.0)	32.5 (18.9)	3.8 (2.8)
Italian	100 (3/3)	35.0 (7.1)	22.5 (10.6)	3.5 (0.7)
University	100 (5/5)	80.0 (26.5)	29.0 (22.9)	5.3 (2.4)
Cantonal/Regional	100 (24/24)	76.5 (29.0)	28.8 (16.1)	3.7 (3.9)
Private	87.5 (7/8)	58.6 (42.2)	27.5 (17.8)	2.8 (1.5)
Adult	97.1 (33/34)	69.3 (33.6)	27.1 (16.2)	3.5 (3.3)
Pediatric	100 (3/3)	95.0 (7.1)	45.0 (21.2)	7.0 (0)
≥17 beds	100 (8/8)	72.5 (26.3)	15.2 (12.0)	4.7 (2.5)
9-16 beds	100 (12/12)	76.1 (32.4)	42.8 (17.5)	5.3 (4.4)
1-8 beds	94.1 (16/17)	67.0 (38)	22.7 (10.0)	2.2 (1.2)

Legend: ICU - Intensive Care Unit; SD - Standard Deviation.

Table S6. Neuro-muscular electrostimulation

	ICUs providing the measure (% (n/N))	Proportion of patients receiving the measure (mean % (SD))	Average daily time dedicated to provide the measure (minutes (SD))	Average number of days in which the measure is provided (days (SD))
Total	10.8 (4/37)	33.0 (45.3)	46.7 (23.1)	2.3 (2.5)
German	10.8 (3/28)	43.3 (49.3)	46.7(23.1)	2.3 (2.5)
French	16.7 (1/6)	2.0 (0)	NA	NA
Italian	0 (0/3)	0	NA	NA
University	0 (0/5)	0	NA	NA
Cantonal/Regional	12.5 (3/24)	40.7 (52.2)	40.0 (28.3)	2.5 (3.5)
Private	12.5 (1/8)	10.0 (0)	60.0 (0)	2.0 (0)
Adult	11.8 (4/34)	33.0 (45.3)	46.7 (23.1)	2.3 (2.5)
Pediatric	0 (0/3)	0	NA	NA
≥17 beds	0 (0/8)	0	NA	NA
9-16 beds	25.0 (3/12)	40.7 (52.2)	40.0 (28.3)	2.5 (3.5)
1-8 beds	5.9 (1/17)	10.0 (0)	60.0 (0)	2.0 (0)

Legend: ICU - Intensive Care Unit; NA - Not Available; SD - Standard Deviation.

Table S7. Passive chair position in bed, tilt table

	ICUs providing the measure (% (n/N))	Proportion of patients receiving the measure (mean % (SD))	Average daily time dedicated to provide the measure (minutes (SD))	Average number of days in which the measure is provided (days (SD))
Total	97.3 (36/37)	54.3 (38.9)	57.9 (46.3)	3.5 (1.7)
German	96.4 (27/28)	53.6 (40.9)	55.8 (49.0)	3.0 (1.5)
French	100 (6/6)	66.2 (32.5)	57.5 (45.0)	4.5 (1.9)
Italian	100 (3/3)	20.0 (0)	80.0 (28.2)	5.0 (1.4)
University	80.0 (4/5)	36.7 (50.6)	40.0 (23.1)	5.3 (1.3)
Cantonal/Regional	100 (24/24)	62.7 (36.5)	64.1 (44.1)	3.3 (1.7)
Private	100 (8/8)	46.4 (40.7)	53.3 (64.4)	2.5 (0.6)
Adult	97.1 (33/34)	54.8 (38.3)	57.7 (48.2)	3.3 (1.6)
Pediatric	100 (3/3)	50.0 (63.6)	60.0 (0)	5.5 (2.1)
≥17 beds	87.5 (7/8)	44.0 (51.2)	55.0 (47.3)	4.7 (0.6)
9-16 beds	100 (12/12)	52.5 (35.5)	71.7 (56.8)	4.3 (2.0)
1-8 beds	100 (17/17)	61.0 (38.1)	49.2 (39.0)	2.4 (0.7)

Legend: ICU - Intensive Care Unit; SD - Standard Deviation.

Table S8. Passive cycling in bed

	ICUs providing the measure (% (n/N))	Proportion of patients receiving the measure (mean % (SD))	Average daily time dedicated to provide the measure (minutes (SD))	Average number of days in which the measure is provided (days (SD))
Total	48.6 (18/37)	12.0 (13.5)	33.8 (30.5)	3.8 (2.5)
German	50.0 (14/28)	13.6 (14.6)	35.5 (33.4)	3.7 (2.7)
French	33.3 (2/6)	5.0 (0)	30.0 (0)	4.0 (0)
Italian	66.7 (2/3)	5.0 (0)	20 (0)	5.0 (0)
University	60.0 (3/5)	2.0 (0)	22.5 (10.6)	4.5 (0.7)
Cantonal/Regional	50.0 (12/24)	13.6 (16.3)	29.3 (17.2)	4.2 (3.3)
Private	37.5 (3/8)	11.7 (7.6)	51.7 (59.2)	2.7 (0.6)
Adult	52.9 (18/34)	12 (13.5)	33.8 (30.5)	3.8 (2.5)
Pediatric	0 (0/3)	0	NA	NA
≥17 beds	62.5 (5/8)	3.5 (2.1)	22.5 (10.6)	4.5 (0.7)
9-16 beds	75.0 (9/12)	15.0 (17.3)	29.2 (18.8)	4.6 (3.5)
1-8 beds	23.5 (4/17)	11.7 (7.6)	46.3 (49.6)	2.5 (0.6)

Legend: ICU - Intensive Care Unit; NA - Not Available; SD - Standard Deviation.

Table S9. Active range of motion muscle activation and training

	ICUs providing the measure (% (n/N))	Proportion of patients receiving the measure (mean % (SD))	Average daily time dedicated to provide the measure (minutes (SD))	Average number of days in which the measure is provided (days (SD))
Total	89.2 (33/37)	59.3 (35.6)	34.2 (19.5)	4.3 (1.5)
German	89.3 (25/28)	61.1 (38.9)	36.6 (20.2)	4.3 (1.6)
French	83.3 (5/6)	50.0 (0)	21.7 (7.6)	4.3 (1.1)
Italian	100 (3/3)	NA	NA	NA
University	100 (5/5)	40.7 (34.9)	35.0 (17.3)	5.5 (1.0)
Cantonal/Regional	87.5 (21/24)	67.2 (33.6)	32.7 (19.5)	4.0 (1.7)
Private	87.5 (7/8)	56.7 (40.9)	37.5 (26.0)	3.3 (0.6)
Adult	88.2 (30/34)	59.2 (37.7)	32.9 (19.5)	4.0 (1.3)
Pediatric	100 (3/3)	60.0 (14.1)	45.0 (21.2)	6.0 (1.4)
≥17 beds	100 (8/8)	57.4 (44.3)	31.3 (20.2)	5.7 (1.1)
9-16 beds	100 (12/12)	63.6 (27.8)	45.0 (19.4)	4.6 (1.7)
1-8 beds	76.5 (13/17)	55.8 (42.0)	26.3 (16.9)	3.2 (0.5)

Legend: ICU - Intensive Care Unit; NA - Not Available; SD - Standard Deviation.

Table S10. Active side to side turning

	ICUs providing the measure (% (n/N))	Proportion of patients receiving the measure (mean % (SD))	Average daily time dedicated to provide the measure (minutes (SD))	Average number of days in which the measure is provided (days (SD))
Total	91.9 (34/37)	71.2 (33.2)	42.3 (36.7)	4.0 (2.0)
German	96.4 (27/28)	72.1 (35.1)	44.4 (38.5)	3.7 (1.8)
French	66.7 (4/6)	73.3 (30.6)	30 (26.0)	5.3 (2.9)
Italian	100 (3/3)	50.0 (0)	NA	3.0 (0)
University	100 (5/5)	50.0 (36.1)	38.8 (24.6)	6.0 (2.0)
Cantonal/Regional	95.8 (23/24)	82.1 (24.6)	46.5 (42.2)	3.4 (1.6)
Private	75.0 (6/8)	60.0 (43.0)	28.3 (27.6)	2.5 (0.7)
Adult	91.2 (31/34)	71.8 (33.9)	40.3 (38.3)	3.5 (1.7)
Pediatric	100 (3/3)	65.0 (35.4)	60 (0)	7.0 (0)
≥17 beds	100 (8/8)	65.0 (41.2)	28.8 (21.0)	5.7 (2.3)
9-16 beds	100 (12/12)	73.1 (21.2)	48.3 (41.2)	4.6 (2.2)
1-8 beds	82.4 (14/17)	73.1 (41.1)	44.0 (40.5)	2.9 (1.1)

Legend: ICU - Intensive Care Unit; NA - Not Available; SD - Standard Deviation.

Table S11. Active cycling in bed

	ICUs providing the measure (% (n/N))	Proportion of patients receiving the measure (mean % (SD))	Average daily time dedicated to provide the measure (minutes (SD))	Average number of days in which the measure is provided (days (SD))
Total	59.5 (22/37)	11.8 (13.1)	39.2 (30.7)	4.5 (2.0)
German	64.3 (18/28)	13.2 (13.7)	38.2 (32.8)	4.6 (2.9)
French	33.3 (2/6)	2.0 (0)	30 (0)	5.0 (0)
Italian	66.7 (2/3)	5.0 (0)	60 (0)	3.0 (0)
University	60.0 (3/5)	2.0 (0)	22.5 (10.6)	5.0 (0)
Cantonal/Regional	58.3 (14/24)	14.0 (16.2)	37.9 (22.7)	4.0 (3.2)
Private	62.5 (5/8)	10.2 (7.6)	50.0 (48.5)	5.0 (2.7)
Adult	64.7 (22/34)	11.8 (13.1)	39.2 (30.7)	4.5 (2.6)
Pediatric	0 (0/3)	NA	NA	NA
≥17 beds	62.5 (5/8)	3.5 (2.1)	22.5 (10.6)	5.0 (0)
9-16 beds	83.3 (10/12)	15.3 (17.0)	35.7 (20.9)	5.0 (3.1)
1-8 beds	41.2 (7/17)	10.2 (7.6)	53.8 (48.5)	3.0 (1.0)

Legend: ICU - Intensive Care Unit; NA - Not Available; SD - Standard Deviation.

Table S12. Other active exercises in bed

	ICUs providing the measure (% (n/N))	Proportion of patients receiving the measure (mean % (SD))	Average daily time dedicated to provide the measure (minutes (SD))	Average number of days in which the measure is provided (days (SD))
Total	67.6 (25/37)	55.2 (39.1)	44.6 (37.1)	4.7 (2.3)
German	67.9 (19/28)	68.5 (34.2)	48.5 (39.7)	5.0 (2.4)
French	66.7 (4/6)	10.7 (9)	25.0 (7.1)	3.5 (2.1)
Italian	66.7 (2/3)	NA	NA	NA
University	60.0 (3/5)	50.0 (56.6)	35.0 (7.1)	6.0 (1.4)
Cantonal/Regional	70.8 (17/24)	53.1 (38.6)	30.0 (14.1)	4.3 (2.2)
Private	62.5 (5/8)	61.2 (44.8)	85.0 (60.6)	4.3 (3.2)
Adult	64.7 (22/34)	56.1 (38.9)	46.5 (40.7)	4.3 (2.4)
Pediatric	100 (3/3)	50.0 (56.6)	35.0 (7.1)	6.0 (1.4)
≥17 beds	50.0 (4/8)	95.0 (7.1)	30.0 (14.1)	7.0 (0)
9-16 beds	83.3 (10/12)	30.3 (25.6)	54.0 (39.1)	6.3 (1.5)
1-8 beds	64.7 (11/17)	69.0 (42.5)	41.0 (44.5)	2.5 (0.6)

Legend: ICU - Intensive Care Unit; NA - Not Available; SD - Standard Deviation.

Table S13. Sitting on the edge of the bed

	ICUs providing the measure (% (n/N))	Proportion of patients receiving the measure (mean % (SD))	Average daily time dedicated to provide the measure (minutes (SD))	Average number of days in which the measure is provided (days (SD))
Total	94.6 (35/37)	83 (24.5)	47.7 (35.2)	3.6 (1.5)
German	96.4 (27/28)	82.8 (26.8)	53.9 (36)	3.4 (1.3)
French	83.3 (5/6)	88.3 (7.6)	16.7 (5.8)	4.3 (2.5)
Italian	100 (3/3)	70.0 (0)	30 (0)	3.0 (0)
University	100 (5/5)	41.7 (46.5)	35.0 (19.2)	4.8 (1.5)
Cantonal/Regional	91.7 (22/24)	87.5 (12.9)	52.3 (37.0)	3.1 (1.5)
Private	100 (8/8)	92.9 (8.1)	46.0 (43.4)	3.3 (0.6)
Adult	94.1 (32/34)	86.0 (19.1)	49.5 (36.3)	3.3 (1.3)
Pediatric	100 (3/3)	52.5 (60.1)	30.0 (14.1)	5.5 (2.1)
≥17 beds	100 (8/8)	63.0 (44.1)	52.5 (29.9)	4.0 (0)
9-16 beds	91.7 (11/12)	88.1 (13.1)	41.4 (27.3)	4.3 (2.1)
1-8 beds	94.1 (16/17)	89.4 (11.3)	50.0 (42.90)	2.7 (0.8)

Legend: ICU - Intensive Care Unit; SD - Standard Deviation.

Table S14. Transfers from bed to a chair

	ICUs providing the measure (% (n/N))	Proportion of patients receiving the measure (mean % (SD))	Average daily time dedicated to provide the measure (minutes (SD))	Average number of days in which the measure is provided (days (SD))
Total	97.3 (36/37)	76.7 (25.8)	59.4 (50.8)	3.5 (1.7)
German	96.4 (27/28)	79.4 (23.4)	61.1 (46.1)	3.3 (1.5)
French	100 (6/6)	80.0 (18.7)	65.0 (76.8)	4.5 (2.4)
Italian	100 (3/3)	10.0 (0)	6.0 (0)	3.0 (0)
University	100 (8/8)	53.3 (37.9)	35.0 (17.3)	5.0 (1.8)
Cantonal/Regional	95.8 (23/24)	73.8 (26.9)	68.3 (49.8)	3.2 (1.6)
Private	100 (8/8)	90.0 (9.6)	54.0 (70.8)	2.7 (0.6)
Adult	97.1 (33/34)	79.5 (22.6)	61.2 (52.5)	3.3 (1.5)
Pediatric	100 (3/3)	45.0 (49.5)	40.0 (28.3)	5.5 (2.1)
≥17 beds	100 (8/8)	71.0 (36.1)	45.0 (17.3)	4.3 (1.5)
9-16 beds	91.7 (11/12)	76.2 (28.9)	64.4 (63.9)	4.7 (2.0)
1-8 beds	100 (17/17)	79.5 (20.1)	61.3 (52.5)	2.4 (0.5)

Legend: ICU - Intensive Care Unit; SD - Standard Deviation.

Table S15. Ambulation (walking with patient)

	ICUs providing the measure (% (n/N))	Proportion of patients receiving the measure (mean % (SD))	Average daily time dedicated to provide the measure (minutes (SD))	Average number of days in which the measure is provided (days (SD))
Total	89.2 (33/37)	26.6 (23)	25.2 (12.1)	3.7 (1.7)
German	89.3 (25/28)	25.6 (23.4)	25.9 (13.4)	3.4 (1.4)
French	83.3 (5/6)	34.0 (23.0)	23.8 (7.5)	3.8 (2.2)
Italian	100 (3/3)	5.0 (0)	20.0 (0)	7.0 (0)
University	80.0 (4/5)	8.3 (2.9)	31.3 (20.2)	4.8 (1.7)
Cantonal/Regional	87.5 (21/24)	18.0 (10.8)	22.9 (10.3)	3.4 (1.9)
Private	100 (8/8)	46.2 (27.7)	26.0 (8.9)	3.0 (1.0)
Adult	94.1 (32/34)	28.1 (23.5)	23.2 (9.5)	3.4 (1.6)
Pediatric	33.3 (1/3)	10.0 (0)	45.0 (21.2)	5.5 (2.1)
≥17 beds	87.5 (7/8)	16.5 (22.6)	31.7 (24.7)	4.0 (1.0)
9-16 beds	75.0 (9/12)	15.6 (6.8)	23.6 (8.5)	5.0 (1.8)
1-8 beds	100 (17/17)	38.2 (26.4)	24.6 (10.6)	2.4 (1.0)

Legend: ICU - Intensive Care Unit; SD - Standard Deviation.

Table S16. Active resistance exercises, bedside cycling

	ICUs providing the measure (% (n/N))	Proportion of patients receiving the measure (mean % SD))	Average daily time dedicated to provide the measure (minutes (SD))	Average number of days in which the measure is provided (days (SD))
Total	45.9 (17/37)	19.5 (25.5)	33.8 (10.6)	3.8 (1.4)
German	39.3 (11/28)	26.1 (28.4)	35.0 (12.2)	3.3 (1.4)
French	50.0 (3/6)	3.5 (2.1)	30.0 (0)	5.0 (0)
Italian	100 (3/3)	5.0 (0)	NA	NA
University	60.0 (3/5)	5.0 (0)	30.0 (0)	5.0 (0)
Cantonal/Regional	50.0 (12/24)	22.9 (30.2)	30.0 (0)	3.8 (1.5)
Private	25.0 (2/8)	15.0 (7.1)	45.0 (21.2)	2.5 (0.7)
Adult	47.1 (16/34)	21.1 (26.5)	34.3 (11.3)	3.6 (1.4)
Pediatric	33.3 (1/3)	5.0 (0)	30.0 (0)	5.0 (0)
≥17 beds	37.5 (3/8)	80.0 (0)	30.0 (0)	5.0 (0)
9-16 beds	66.7 (8/12)	13.7 (18.1)	30.0 (0)	4.5 (1.0)
1-8 beds	35.3 (6/17)	11.0 (8.5)	40.0 (17.3)	2.3 (0.6)

Legend: ICU - Intensive Care Unit; NA - Not Available; SD - Standard Deviation.

Table S17. Swallowing, speech, and nutrition *(including both adult and pediatric ICUs)*

Swallowing, speech and nutrition		All (n=37)	Language region			Hospital type			ICU type		ICU size		
			German (n=28)	French (n=6)	Italian (n=3)	Acad. (n=5)	Cant./ Reg. (n=24)	Private (n=8)	Adult (n=34)	Ped. (n=3)	1-8 beds (n=17)	9-16 beds (n=12)	≥17 beds (n=8)
Screening for swallowing abnormalities in ICU patients	% (n/N)	89.2 (33/37)	89.3 (25/28)	83.3 (5/6)	100 (3/3)	100 (5/5)	91.7 (22/24)	75 (6/8)	91.2 (31/34)	66.7 (2/3)	82.4 (14/17)	91.7 (11/12)	100 (8/8)
Proportion of ICU patients screened for swallowing abnormalities (%)	Mean (SD)	32.6 (22.6)	31.9 (22.6)	29.4 (29.6)	43.3 (11.5)	37.0 (30.7)	33.9 (22.2)	24.5 (18.6)	34.0 (22.7)	12.5 (10.6)	19.6 (14.0)	42.3 (25.6)	41.4 (21.2)
Time requirement to screen one patient (min)	Mean (SD)	19.0 (10.7)	20.7 (11.6)	12.0 (5.7)	18.3 (2.9)	15.0 (14.6)	19.8 (11.1)	20.0 (5.5)	18.4 (10.3)	27.5 (17.7)	17.7 (9.3)	22.3 (10.6)	16.4 (13.5)
Scheduled visit by occupational therapist (%)	% (n/N)	32.4 (12/37)	32.1 (9/28)	33.3 (2/6)	33.3 (1/3)	20.0 (1/5)	37.5 (9/24)	25.0 (2/8)	35.3 (12/34)	0 (0/3)	29.4 (5/17)	25.0 (3/12)	50.0 (4/8)
Scheduled visit by speech therapy specialist	% (n/N)	29.7 (11/37)	32.1 (9/28)	16.7 (1/6)	33.3 (1/3)	0 (0/5)	41.7 (10/24)	12.5 (1/8)	29.4 (10/34)	33.3 (1/3)	11.8 (2/17)	50.0 (6/12)	37.5 (3/8)
Scheduled visit by nutritional therapy specialist	% (n/N)	38.9 (14/36)	35.7 (10/28)	80.0 (4/5)	0 (0/3)	60.0 (3/5)	33.3 (8/24)	42.9 (3/7)	36.4 (12/33)	66.7 (2/3)	43.8 (7/16)	41.7 (5/12)	25.0 (2/8)

Legend: ICU - Intensive Care Unit; SD - Standard Deviation.

Table S18. Psychological impact *(including both adult and pediatric ICUs)*

Psychological impact		All (n=37)	Language region			Hospital type			ICU type		ICU size		
			German (n=28)	French (n=6)	Italian (n=3)	Acad. (n=5)	Cant./ Reg. (n=24)	Private (n=8)	Adult (n=34)	Ped. (n=3)	1-8 beds (n=17)	9-16 beds (n=12)	≥17 beds (n=8)
ICUs keeping a diary for patients during ICU stay	% (n/N)	51.4 (19/37)	57.1 (16/28)	50.0 (3/6)	0 (0/3)	80.0 (4/5)	45.8 (11/24)	50.0 (4/8)	50.0 (17/34)	66.7 (2/3)	35.3 (6/17)	50.0 (6/12)	87.5 (7/8)
Proportion of patients for which a diary is kept (%)	Mean (SD)	15.2 (12.0)	16.9 (12.5)	6.7 (2.9)	-	15.0 (10.0)	16.7 (12.2)	11.5 (15.8)	14.3 (11.8)	30.0 (0)	8.5 (10.7)	23.0 (12.5)	15.3 (10.8)
Average daily time requirement to keep the diary (minutes)	Mean (SD)	15.0 (7.5)	15.7 (8.1)	11.7 (2.9)	-	8.8 (2.5)	16.7 (7.1)	17.5 (9.6)	15.3 (7.6)	10.0 (0)	14.2 (4.9)	19.0 (10.8)	12.5 (6.1)
Possibility of involvement of a psychological support or care team to support ICU patients	% (n/N)	86.1 (31/36)	88.9 (24/27)	83.3 (5/6)	66.7 (2/3)	100 (5/5)	91.3 (21/23)	62.5 (5/8)	84.8 (28/33)	100 (3/3)	88.2 (15/17)	81.8 (9/11)	87.5 (7/8)
Possibility of involvement of a psychological support or care team to support patients' relatives	% (n/N)	81.1 (30/37)	85.7 (24/28)	66.7 (4/6)	66.7 (2/3)	80.0 (4/5)	83.3 (20/24)	75.0 (6/8)	79.4 (27/34)	100 (3/3)	88.2 (15/17)	75.0 (9/12)	75.0 (6/8)

Legend: ICU - Intensive Care Unit; SD - Standard Deviation.