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The Swiss chiropractic practice-based research network and musculoskeletal pain cohort: protocol of a nationwide resource to advance musculoskeletal health services research

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Page 1 of 27

BMJ Open

The Swiss chiropractic practice-based research network and musculoskeletal pain cohort:
protocol of a nationwide resource to advance musculoskeletal health services research
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Introduction

Abstract

Musculoskeletal (MSK) pain conditions are a leading cause of disability. Evidence suggests that many MSK pain conditions, such as low back pain and neck pain, share similarities with respect to prognostic factors and clinical care recommendations. A nationwide Swiss chiropractic practice-based research network (PBRN) and MSK pain patient cohort study has potential to monitor the epidemiological trends of MSK pain conditions and contribute to health care quality improvement. The four primary aims are to 1) develop a MSK focused PBRN within the Swiss chiropractic setting and describe the characteristics of clinicians recruited; 2) describe characteristics of patients with new healthcare seeking for MSK pain presenting to Swiss chiropractors; 3) assess the clinical course of patients with new healthcare seeking for MSK pain; 4) examine the feasibility for a larger subsequent prospective cohort study using the newly ich developed PBRN infrastructure.

Methods and analysis

This initiative is conceptualized with two distinct study phases. Phase 1 will focus on PBRN development and description of the Swiss chiropractic PBRN and uses a cross-sectional design to collect information from chiropractic clinicians nationwide. Phase 2 will recruit consecutive patients aged 18 years or older with MSK pain from community-based chiropractic practices participating in the PBRN into a prospective chiropractic cohort (Swiss ChiCo) study. All data collection will occur through electronic surveys offered in the three Swiss national languages (German, French, Italian) and English. Surveys will be provided to patient participants prior to initial assessment, 1-hour after assessment and at 2-, 6-, and 12-weeks after assessment.

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49	Ethics and dissemination
50	Ethics approval has been obtained from the independent research ethics committee of Canton
51	Zurich (BASEC-Nr: 2021-01479). Informed consent will be obtained electronically from all
52	participants. Findings will be reported to stakeholders after each study phase, presented at local
53	and international conferences, and disseminated through peer-reviewed publications.
54	
55	Trial registration
56	Phase 1 – Swiss chiropractic PBRN (ClinicalTrials.gov identifier: NCT05046249); Phase 2 –
57	Swiss chiropractic cohort (Swiss ChiCo) study (ClinicalTrials.gov identifier: NCT05116020).
58	
59	Strengths and limitations of this study
60	• Flexible practice-based research network model allows for a diverse range of nested study
61	design types as well as the future expansion of the network.
62	• Development of protocol methods guided by patient and public involvement activities with
63	the Swiss chiropractic patient association, the Swiss chiropractic association, Swiss
64	chiropractors, and researchers.
65	• A mixed musculoskeletal pain cohort study within a practice-based setting is innovative.
66	• The sole use electronic data capture methods may lead to selective participation of both
67	clinician and patient participants.
68	• Maintenance of the practice-based research network and subsequent expansion of the patient
69	cohort is dependent on ongoing stakeholder support.
70	
71	Keywords: chiropractic, health care quality, musculoskeletal health, musculoskeletal pain,
72	manual medicine
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73 INTRODUCTION

Musculoskeletal (MSK) pain conditions are the leading cause of disability worldwide, with low back pain being the largest single cause in over 160 countries, including Switzerland.[1, 2] This health burden translates to an economic cost of approximately 6.6 billion Euros or about 2% of Switzerland's total GDP for low back pain alone.[3] Best practice recommendations and systematic reviews on MSK pain largely focus primarily on regional pain locations, such as low back pain or neck pain.[4-6] However, in the population and in primary care settings, it is common that those experiencing a MSK pain complaint also present with co-existing pain in another body region. [7, 8] There is increasing evidence suggesting that these pain conditions, although localized to different regions, share similarities with respect to the course of symptoms, prognostic factors, and clinical care recommendations.[9, 10] An entirely regional focus to MSK health may create gaps in patient centered research and difficulties with knowledge implementation in health care settings. Further contributing to practice gaps, is the lack practice-based data collection in MSK health care research.[11] To help bridge the divide between research and practice, countries such as the UK, Denmark, Sweden, and Australia have engaged in practice-based research and worked with MSK-focused practice-based research networks (PBRNs).[12-14] A PBRN is a group of at least 15 primary-care settings united under a commitment to advance the science base

91 of clinical care.[15] These "real world" clinical research environments allow for sustained

92 collaborations between practitioners, patients, and academicians facilitating the co-creation of

relevant research questions and production of clinically applicable results.[11, 15, 16]

94 The chiropractic scope of practice in Switzerland includes the diagnosis and management
95 of MSK pain conditions through manual medicine, prescription medication, and diagnostic
96 imaging (radiography, ultrasound, CT, MRI). MSK complaints such as low back pain and neck

Page 5 of 27

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97 pain, which result in the largest burdens of disability are commonly seen in chiropractic 98 practice.[17] Chiropractic health care centres may serve as useful primary care settings to further 99 investigate MSK pain conditions, to understand what role chiropractors play in the current 100 management of these conditions, and to identify opportunities for Swiss MSK primary health 101 care quality improvement. As management of MSK conditions moves away from traditional 102 medical treatments and towards more physical and preventative approaches, there is a need to 103 describe non-pharmacological treatment options to make informed decisions on how best to use 104 this capacity in the current health care system.[4, 18] 105 Our protocol describes the development of a nationwide Swiss chiropractic PBRN and 106 subsequent nested prospective cohort (Swiss ChiCo) study for community-based patients presenting with MSK pain conditions. Development of the Swiss chiropractic PBRN and the 107 108 Swiss ChiCo study have been guided through participatory engagement of multiple stakeholder 109 groups including patients, clinicians, scientists, and policymakers. After consultation, it was 110 agreed to explore both clinical and feasibility related objectives to help drive recruitment and 111 facilitate buy-in from community-based chiropractors and patients. The main objectives are to: 112 1) develop a MSK focused PBRN within the Swiss chiropractic setting and describe the 113 characteristics of clinicians enrolled in the PBRN; 2) describe characteristics of patients with 114 new healthcare seeking for MSK pain presenting to Swiss chiropractors; 3) assess the clinical 115 course of patients with new conservative healthcare seeking for MSK pain over 12 weeks; 4) examine the feasibility for performing a larger subsequent prospective cohort study using the 116 established Swiss chiropractic PBRN. Once established, this PBRN may provide the framework 117 118 to help monitor the epidemiological trends of MSK pain in primary care settings, contribute to 119 MSK health care quality improvement, and support the development and growth of clinical 120 researchers.

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2 3 4	121	
5 6	122	METHODS AND ANALYSIS
7 8	123	Study design
9 10 11	124	The Swiss chiropractic PBRN uses a sub-study PBRN model, similar to that of the Australian
12 13	125	Chiropractic Research Network (ACORN).[12, 19, 20] In sub-study PBRN models, data is
14 15	126	initially collected from participating clinicians/clinical practices through self-report to first
16 17 18	127	establish and describe characteristics of the PBRN. Following development, nested sub-studies
19 20	128	may be performed using this PBRN framework.
21 22	129	Based on the sub-study model, this project has been conceptualized with two distinct
23 24 25	130	phases. Phase 1, the Swiss chiropractic PBRN, will focus on development and description of the
25 26 27	131	PBRN and uses a cross-sectional design to collect information from chiropractic clinicians
28 29	132	nationwide at study initiation (ClinicalTrials.gov identifier: NCT05046249). This will be
30 31	133	followed by Phase 2, the Swiss ChiCo study, which will recruit patients from community-based
32 33 34	134	chiropractic practices participating in the Swiss chiropractic PBRN infrastructure into a 12-week
35 36	135	observational prospective cohort study (ClinicalTrials.gov identifier: NCT05116020). Figure 1
37 38	136	provides an overview of the two nested phases of this project.
39 40	137	
41 42 43	138	Patient and public involvement
44 45	139	Multistakeholder engagement activities were first performed collaboratively with all
46 47	140	stakeholders and focused on study relevance, team building, project infrastructure development
48 49 50	141	and the collaborative creation of relevant research questions. A shared understanding was
50 51 52	142	reached by all members which outlined the need for more clinical MSK research within the
53 54	143	Swiss setting and a pledge to provide in-kind support to achieve this project goal. Other
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Page 7 of 27

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44 recommendations from the advisory group included the practicality to start with a small cohort 45 study to first test assumptions, data collection methods, and research infrastructure. 46 Individualized one-on-one meetings were subsequently conducted to discuss specific study processes with each stakeholder group. Recommendations provided from the Swiss 47 Chiropractic Association (ChiroSuisse) and the patient association (Pro Chiropractic 48 49 Switzerland) included the addition of several questions to the Swiss ChiCo study patient participant questionnaires. Consequently, questions relating to patient work status, past use of .50 .51 chiropractic care, and use of other healthcare in MSK pain management were added. Both

associations also recommended increasing patient participant recruitment weighting for the
Swiss ChiCo study in the French and Italian language regions of Switzerland by 5% from what
was initially proposed.

One-on-one meetings with Swiss chiropractors were carried out for the purpose of .55 understanding how best to integrate study processes into clinical practice settings. According to .56 57 all clinician advisors, the recruitment of approximately 5-10 consecutive patients per clinical practice was feasible. Outside of clinical workflow processes, patient participant inclusion 58 criteria were revised from new healthcare seeking for a MSK pain condition (operationalized as .59 .60 not having received any (patient-reported) health care for current MSK complaint) to new conservative healthcare seeking for a MSK complaint (not having received any (patient-reported)) .61 .62 chiropractic, physiotherapy, osteopathy, or massage therapy for current MSK complaint in the 63 last 1 month, and not a follow-up visit). Many clinician advisors recommended this change based on the clinical profile of their patients and insurance coverage practices in Switzerland (where 64 65 chiropractic care typically follows an initial visit with a primary care physician or general 66 practitioner).

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Participatory engagement is an iterative process and requires continuous reflection of previous study processes and results to inform subsequent study phases (action-reflection process).[21] Following completion of each project phase, individual meetings with each stakeholder group will be scheduled to disseminate findings, discuss how best to generate future PBRN growth, and explore ways to expand the MSK clinical cohort study.

- 173 Phase 1 Development of the Swiss chiropractic PBRN
- 174 Participants

All registered active chiropractor members (fully licensed chiropractors and postgraduate
assistant chiropractors) of the Swiss Chiropractic Association (ChiroSuisse) will be eligible and
invited to participate. Approximately 98% of all practicing Swiss chiropractors hold an active
membership with ChiroSuisse (personal communication, April 22, 2021).

180 Recruitment

To aid with clinician recruitment, the PBRN development phase was scheduled for launch at the .81 .82 annual ChiroSuisse Continuing Education (CE) Convention 2021 (Lausanne, September 9-11, .83 2021). Clinicians had the opportunity to ask questions directly of the study team, test electronic .84 study methods, sign up as a clinician member of the PBRN, and provided input and feedback for .85 the subsequent Swiss ChiCo study. Those interested, were invited to join the Swiss chiropractic .86 PBRN by scanning a quick response (QR) code and completing the linked clinician entry survey .87 using personal mobile devices. An invitation email containing a Research Electronic Data Capture (REDCap) survey link will also be sent to eligible chiropractors not recruited at the CE .88 .89 Convention 2021. The invitation to join the Swiss chiropractic PBRN will be paired with an .90 information sheet outlining study goals, good study conduct procedures for PBRN and

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	subsequent sub	study involvement, and risks and benefits for participation. We hope	to achieve a
192	participation p	roportion of 50% or greater.	
193			
194	Data collection	n procedures and variables	
195	All data acquisition will occur electronically using the REDCap web application platform.[22]		
196	Clinicians participating in the Swiss chiropractic PBRN will be asked to fully complete 1		
197	electronic survey of approximately 10 minutes duration. Clinician surveys will only be provided		
198	in English as th	his is the official language used for communication by ChiroSuisse. Ta	ble 1
199	outlines the spo	ecific data to be collected from clinicians for the development of the Sy	wiss
200	chiropractic PH	BRN. Supplementary file 1 provides the data dictionary and specific r	esponse
201	options to be u	sed for the Swiss chiropractic PBRN phase.	
202	Table 1. Outco	ome measures to be collected for description of the Swiss chiropractic	PBRN
	Construct	Measurement method / instrument	Inception
			Inception X
	Demographics	Gender, age, year of graduation	X
		Gender, age, year of graduation Number of years in practice, location of practice	X X
	Demographics Practice	Gender, age, year of graduation Number of years in practice, location of practice Primary language used in practice	X X X X
	Demographics Practice	Gender, age, year of graduation Number of years in practice, location of practice Primary language used in practice Number of healthcare practitioners involved in practice	X X X X X
	Demographics Practice	Gender, age, year of graduation Number of years in practice, location of practice Primary language used in practice Number of healthcare practitioners involved in practice Type of healthcare offered	X X X X X X
	Demographics Practice	Gender, age, year of graduation Number of years in practice, location of practice Primary language used in practice Number of healthcare practitioners involved in practice Type of healthcare offered Average number of patients seen per week	X X X X X X X
	Demographics Practice	Gender, age, year of graduation Number of years in practice, location of practice Primary language used in practice Number of healthcare practitioners involved in practice Type of healthcare offered Average number of patients seen per week	X X X X X X X X
	Demographics Practice Characteristics	Gender, age, year of graduation Number of years in practice, location of practice Primary language used in practice Number of healthcare practitioners involved in practice Type of healthcare offered Average number of patients seen per week	X X X X X X X X X
	Demographics Practice Characteristics Confidence	Gender, age, year of graduation Number of years in practice, location of practice Primary language used in practice Number of healthcare practitioners involved in practice Type of healthcare offered Average number of patients seen per week Types of patients seen within practice Frequency of complaints seen within practice Practitioner self-confidence scale (PCS) [23]	X X X X X X X X X X
	Demographics Practice Characteristics Confidence Beliefs and	Gender, age, year of graduation Number of years in practice, location of practice Primary language used in practice Number of healthcare practitioners involved in practice Type of healthcare offered Average number of patients seen per week Types of patients seen within practice Frequency of complaints seen within practice Practitioner self-confidence scale (PCS) [23] Pain attitudes and beliefs scale – Musculoskeletal (PABS-MSK) [24]	X X X X X X X X X X X X
	Demographics Practice Characteristics Confidence	Gender, age, year of graduation Number of years in practice, location of practice Primary language used in practice Number of healthcare practitioners involved in practice Type of healthcare offered Average number of patients seen per week Types of patients seen within practice Frequency of complaints seen within practice Practitioner self-confidence scale (PCS) [23] Pain attitudes and beliefs scale – Musculoskeletal (PABS-MSK) [24] Level of motivation to be involved in the Swiss ChiCo	X X X X X X X X X X X X
	Demographics Practice Characteristics Confidence Beliefs and Attitudes Digitalization of	Gender, age, year of graduation Number of years in practice, location of practice Primary language used in practice Number of healthcare practitioners involved in practice Type of healthcare offered Average number of patients seen per week Types of patients seen within practice Frequency of complaints seen within practice Practitioner self-confidence scale (PCS) [23] Pain attitudes and beliefs scale – Musculoskeletal (PABS-MSK) [24] Level of motivation to be involved in the Swiss ChiCo Electronic patient record system in practice	X X X X X X X X X X X X X X
	Demographics Practice Characteristics Confidence Beliefs and Attitudes Digitalization of chiropractic	Gender, age, year of graduation Number of years in practice, location of practice Primary language used in practice Number of healthcare practitioners involved in practice Type of healthcare offered Average number of patients seen per week Types of patients seen within practice Frequency of complaints seen within practice Practitioner self-confidence scale (PCS) [23] Pain attitudes and beliefs scale – Musculoskeletal (PABS-MSK) [24] Level of motivation to be involved in the Swiss ChiCo Electronic patient record system in practice Encrypted email use in practice	X X X X X X X X X X X X X X X X
	Demographics Practice Characteristics Confidence Beliefs and Attitudes Digitalization of chiropractic practices COVID-19	Gender, age, year of graduation Number of years in practice, location of practice Primary language used in practice Number of healthcare practitioners involved in practice Type of healthcare offered Average number of patients seen per week Types of patients seen within practice Frequency of complaints seen within practice Practitioner self-confidence scale (PCS) [23] Pain attitudes and beliefs scale – Musculoskeletal (PABS-MSK) [24] Level of motivation to be involved in the Swiss ChiCo Electronic patient record system in practice Encrypted email use in practice Offering virtual care in practice Change in quality of life, change in patient numbers, change in work hours, change in use	X X X X X X X X X X X X X X
203	Demographics Practice Characteristics Confidence Beliefs and Attitudes Digitalization of chiropractic practices	Gender, age, year of graduation Number of years in practice, location of practice Primary language used in practice Number of healthcare practitioners involved in practice Type of healthcare offered Average number of patients seen per week Types of patients seen within practice Frequency of complaints seen within practice Practitioner self-confidence scale (PCS) [23] Pain attitudes and beliefs scale – Musculoskeletal (PABS-MSK) [24] Level of motivation to be involved in the Swiss ChiCo Electronic patient record system in practice Encrypted email use in practice	X X X X X X X X X X X X X X X X

Construct	Measurement method / instrument	Inception
Demographics	Gender, age, year of graduation	Х
Practice	Number of years in practice, location of practice	Х
Characteristics	Primary language used in practice	Х
	Number of healthcare practitioners involved in practice	Х
	Type of healthcare offered	Х
	Average number of patients seen per week	Х
	Types of patients seen within practice	Х
	Frequency of complaints seen within practice	Х
Confidence	Practitioner self-confidence scale (PCS) [23]	Х
Beliefs and	Pain attitudes and beliefs scale – Musculoskeletal (PABS-MSK) [24]	Х
Attitudes	Level of motivation to be involved in the Swiss ChiCo	Х
Digitalization of	Electronic patient record system in practice	Х
chiropractic	Encrypted email use in practice	Х
practices	Offering virtual care in practice	Х
COVID-19 aspects	Change in quality of life, change in patient numbers, change in work hours, change in use of telehealth/e-health services.	X
Main outcome	s and analysis	

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Both phase 1 and phase 2 of this study have been conceptualized with 2 primary clinical outcomes and 2 primary feasibility outcomes.

The first primary clinical outcome is self-confidence in the clinical management of patients with low back pain (as measured by the practitioner self-confidence scale (PCS)).[23] The PCS contains four items with a total score of 20. A score of 4 represents higher selfconfidence in the management of patients with low back pain, while a score of 20 represents lower self-confidence. The second primary clinical outcome is biomedical versus biopsychosocial MSK pain treatment orientation (as measured by the pain attitudes and beliefs scale, musculoskeletal version (PABS-MSK)).[24] The PABS-MSK contains two domains, with a higher score on either the domains (each 10-items, with a score range of 10-60) representing higher biomedical and biopsychosocial MSK pain treatment orientation. The order of 20 items of the PABS-MSK was randomized using the "randomizeR" package in RStudio and administered as a single questionnaire so as to mask respondents to the specific treatment orientation domains. Both primary clinical outcomes will be reported as means and standard deviations (SDs), with 95% confidence intervals (CIs) calculated as appropriate. Primary feasibility outcomes of 1) clinician participation proportion in the Swiss chiropractic PBRN will be assessed by reporting the proportion of all eligible clinicians that enroll in the PBRN development phase using raw numbers and percentages; and 2) motivation for clinician participation in the Swiss ChiCo study will be assessed using a visual analog scale (VAS, 0-100), with higher scores reflecting higher motivation for participation. Level of motivation to participate in the Swiss ChiCo study will be reported as means, SDs, and with 95% CIs calculated as appropriate.

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1 2		
2 3 4	228	Participants
5 6 7	229	Patient participants will be eligible to participate if they are 18 years of age or older; are seeking
, 8 9	230	new conservative healthcare for a MSK pain condition (new conservative healthcare seeking is
10 11	231	operationalised as not having received (patient-reported) chiropractic care, physiotherapy,
12 13 14	232	osteopathy or massage therapy for their current MSK complaint in the 1 month prior to their
15 16	233	current initial visit to the chiropractor and not a follow-up visit); consent to chiropractic
17 18	234	treatment; are able to respond to surveys in German, French, Italian, or English; have an active
19 20 21	235	email account; and are willing and able to complete electronic study questionnaires. Patient
22 23	236	participants will be excluded if they present to clinician practices with red flag symptoms (i.e.,
24 25	237	saddle anesthesia, loss of bowel and/or bladder control, history of major trauma, fracture, fever,
26 27 28	238	severe or rapidly progressive neurologic deficit, sudden unexplained weight loss), and/or with a
29 30	239	non-MSK based pain condition based on the chiropractor's clinical suspicion that symptoms
31 32	240	relate to a systemic disease.
33 34 35	241	relate to a systemic disease.
36 37	242	Recruitment
38 39	243	Following the development of the Swiss chiropractic PBRN, a subset of clinicians will be
40 41 42	244	recruited to participate in the Swiss ChiCo study. Chiropractors will be recruited through general
43 44	245	interest and using a purposeful sampling approach based on Swiss chiropractic clinician
45 46 47	246	distribution across German, French, and Italian language regions of Switzerland (55% DE, 35%
47 48 49	247	FR, 10% IT). The Swiss ChiCo study aims to recruit at least 20 chiropractors. Participating
50 51	248	chiropractors will be asked to recruit new consecutive patient participants from their clinical
52 53 54 55 56	249	practices. The Swiss ChiCo study aims to recruit at least 100 patient participants to enable a

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preliminary characterization of the population, enabled by representative selection ofchiropractic clinicians with respect to language region.

Potentially eligible patients visiting a participating clinician will be first provided a study flyer, which will briefly outline the study objectives and participation requirements. Patients will then be asked to rate their initial level of interest to participate using a brief electronic survey on a dedicated study tablet device. Those not interested will be prompted to provide reasons for non-participation. Patients expressing interest in participation will be forwarded to the full study information form and electronic informed consent procedure. This in-clinic patient participant procedure was developed in consultation with Swiss chiropractic clinicians (both women and men) across all language regions. To aid with workflow, clinicians expressed interest in asking new patients to arrive approximately 20 minutes prior to their appointment to complete electronic study forms. Clinicians also recommended adding "disruption to clinic workflow" as an option for eligible patient non-participation. This survey option would be selected by clinical staff when patient participant recruitment would greatly impact clinical workflow (e.g., patient was late for visit, emergency visit). Figure 2 outlines the in-clinic patient recruitment procedure.

3 265

266 Data collection procedures and variables

Immediately following completion of the in-clinic recruitment procedure, study participants will
be forwarded to the first patient survey (pre-visit patient survey) on the study tablet. This previsit initial patient survey will collect information on clinical measures that are likely to be
influenced by the first visit (i.e., pain impact, musculoskeletal health status, illness
perception).[25-27] The pre-visit patient survey will take approximately 5 minutes to complete
and is the only survey that is completed at clinical practices. Subsequent questionnaires will take

approximately 10-12 mins to complete and are emailed directly to patient participants 1 hour after (post-visit patient survey), and at 2-, 6-, and 12-weeks following completion of the pre-visit survey. Similar administration procedures were performed for the Danish chiropractic low back pain cohort study.[28] Patient participant surveys will be provided in English, German, French and Italian, with patients having the ability to choose their preferred language for completion. Table 2 outlines specific outcome measures and timing of data collection for the Swiss ChiCo study. Supplementary file 2 provides the data dictionary and specific response options to be used.

2 281 Table 2. Outcome measures and timing of data collection for the Swiss ChiCo study
--

Construct	Measurement method / instrument	Pre- visit	Post- visit	Wk 2	Wk 6	Wk 12
Demographics	Gender, age, nationality, level of education, smoking status		Х			
	Work status, time lost from work due to pain complaint		Х	X	Х	Х
Injury characteristics	Naïve to chiropractic care		Х			
	Duration of complaint		Х			
	Pain, enjoyment, general activity (PEG) scale [25]	х	х	X	X	Х
	Other healthcare professional involved in care		Х	X	X	X
	Number of chiropractic visits since initial visit			X	X	Х
Medication usage	Medication use (prescription vs non-prescription)		х	X	X	Х
Imaging use	Diagnostic imaging use for this specific MSK complaint			X	X	Х
	Diagnostic imaging received in the past year for other complaint		х			
Psychosocial profile	Örebro Musculoskeletal Pain Screening Questionnaire – Short Form (ÖMPSQ short) [34]		x			
COVID-19 aspects	Quality of life now compared to before COVID-19		Х			
	Activity compared to before COVID-19		Х			
	Cancelled medical treatment due to COVID-19		Х			
MSK health status	Musculoskeletal health questionnaire (MSK-HQ) [26]	Х	Х	Х	Х	Х
Illness perception	Brief illness perception questionnaire (Brief IPQ, Question 9) [27]	Х				
Change in condition	Patient Global Impression of Change (PGIC) scale [35]			Х	Х	X

285 measured by the 3-item pain, enjoyment, and general activity scale (PEG scale, score range 0-10)

The prespecified primary clinical outcomes are: 1) change in musculoskeletal pain impact, as

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Swiss ChiCo study if at least 15 clinical practices agree to participate in the Swiss chiropractic PBRN and each recruit at least 5 patients for enrolment in the Swiss ChiCo study. Ethics and dissemination The Swiss chiropractic PBRN and Swiss ChiCo study have been reviewed and jointly approved by the independent research ethics committee of Canton Zurich (BASEC-Nr: 2021-01479). Informed consent will be obtained from both clinician and patient participants electronically upon entry into the Swiss chiropractic PBRN and the Swiss ChiCo study. The findings from the Swiss chiropractic PBRN and the Swiss ChiCo study will be disseminated first to the various stakeholder groups involved in study development through individual meetings. Findings will also be presented through abstract and poster presentations at academic conferences and in peer-reviewed journals.

higher scores reflecting better health status. Clinical outcomes of the PEG scale and MSK-HQ prior to initial chiropractic assessment will be reported as means, SDs, and 95% CIs; and clinical course of patient pain impact and MSK health status will be reported as a mean difference with SDs and 95% CIs as appropriate. The primary feasibility outcomes are: 1) the proportion of invited patients presenting to chiropractic practices who subsequently agree to participate in this study; and 2) change in patient participant follow-up and retention over 12 weeks. Invited patient participation will be reported as raw numbers and proportions. Patient participant retention will be reported as the proportion of enrolled participants who complete follow-up surveys across 12weeks. Based on the definition of a PBRN from the Agency for Healthcare Research and Quality (AHRQ),[15] it will be deemed feasible to initiate the Swiss chiropractic PBRN and expand the

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1		
1 2		
3 4	310	
5 6	311	Availability of data and materials
7 8	312	Data from this work will be made available for research purposes. Requests, including a synopsis
9 10 11	313	of the study plan, can be addressed to the corresponding author.
12 13	314	
14 15	315	DISCUSSION
16 17	316	This study is designed to attract a large proportion of Swiss chiropractors into a nationwide
18 19 20	317	PBRN and subsequently recruit patients from participating clinics into a longitudinal cohort
20 21 22	318	study. This study approach combines a sub-study PBRN model, with longitudinal electronic
23 24	319	capture more readily seen in register-based approaches. The unique collaboration with clinicians,
25 26	320	advocacy groups and academicians, a growing trend in health care research, has led to the
27 28	321	promotion of research objectives which are clinically relevant and patient-centred, and a study
29 30 31	322	implementation strategy vetted by Swiss chiropractic primary care clinicians.
32 33	323	Traditional health care research approaches typically face challenges with regards to
34 35		
36 37	324	study relevance, patient recruitment, and knowledge translation.[11, 29] The use of a
38 39	325	participatory research approach can help overcome such challenges by integrating the diverse
40 41	326	knowledge, values, and preferences of non-academics into the research process. An example of a
42 43	327	longitudinal register-based study successfully implementing this approach is the Swiss Multiple
44 45 46	328	Sclerosis Registry (SMSR).[30] This project was designed in collaboration with the Multiple
40 47 48	329	Sclerosis (MS) community in Switzerland to tackle the lack of epidemiological data and to
49 50	330	promote patient-perspectives in MS research. Participatory elements of the SMSR include a
51 52	331	flexible approach to study involvement based on participant comfort, involvement of patients in
53 54	332	the study design and execution, and data feedback to provide ongoing results to participants. Due
55 56 57	333	to such efforts, recruitment for the SMSR exceeded expectations; with the goal of 400
58 59		15
60		For peer review only - http://hmiopen.hmi.com/site/about/guidelines.yhtml

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participants achieved in under 20 days.[31] A second example of a participatory research approach driving recruitment are the recently established national osteopathy PBRNs of Australia (ORION) and New Zealand (ORC-NZ).[32] Here, the project team engaged with both osteopathic communities for 12 months prior to clinician recruitment. Today, these two PBRNs represent the largest coverage of any voluntary health profession PBRN, with 43.5% of all registered osteopaths in Australasia. The Swiss chiropractic PBRN has followed a similar approach, with community outreach and promotion efforts lasting 12 months prior to clinician recruitment.

What remains unclear is if early engagement of stakeholders can overcome the unique limitations of electronic observational studies. Typically, unequal access to technology resources and lack of digital literacy can lead to a young, well-educated, and high socio-economic status study sample. For example, participants in the SMSR who opt for physical forms are older, show increased care-seeking behaviour, and suffer from more progressive illness compared to those using electronic forms. This trend also extends to clinician participants, as our own 2019 survey on eHealth technology use among Swiss chiropractors showed clinicians 65 years and over were 74% less likely to use electronic health records (EHRs) when compared to the those under 40 years.[33] To limit this threat to external validity, the Swiss chiropractic PBRN plans to recruit clinicians through both online and in-person channels. In addition, chiropractic clinician recruitment for the Swiss ChiCo will be proportionally overweighted in French and Italian language regions. These areas have shown lowered use eHealth technology use when compared to the German speaking regions of Switzerland. To recruit a diverse group of patient participants, clinicians will be asked to consecutively recruit eligible patients from private practice. Although consecutive recruitment does not eliminate the threat of self-selection bias, it ensures all eligible participants seeking chiropractic care are aware of the study and invited to participate in a

Page 17 of 27

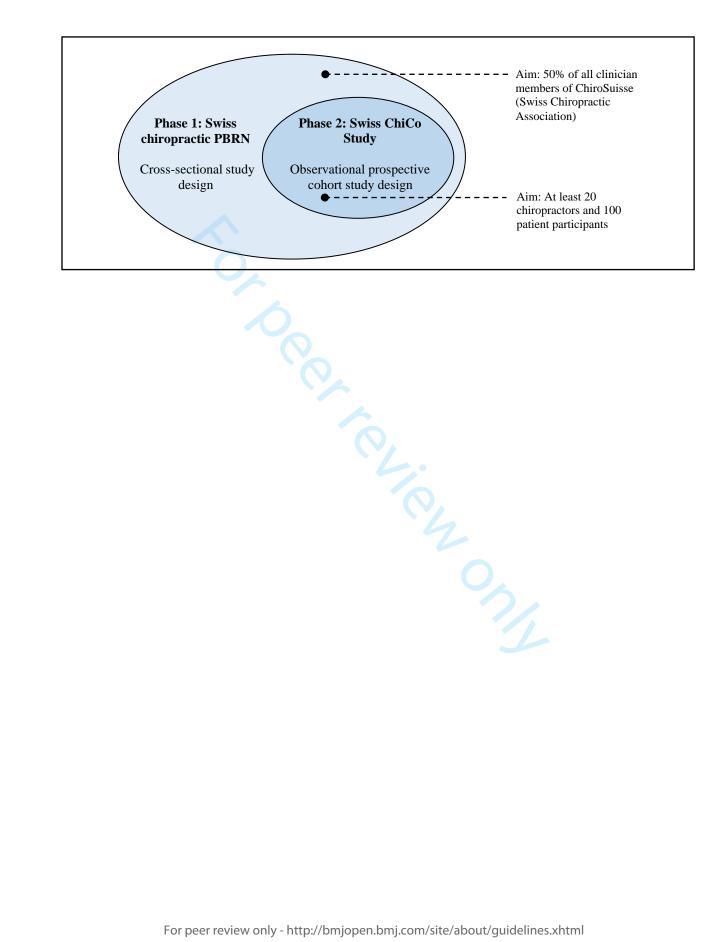
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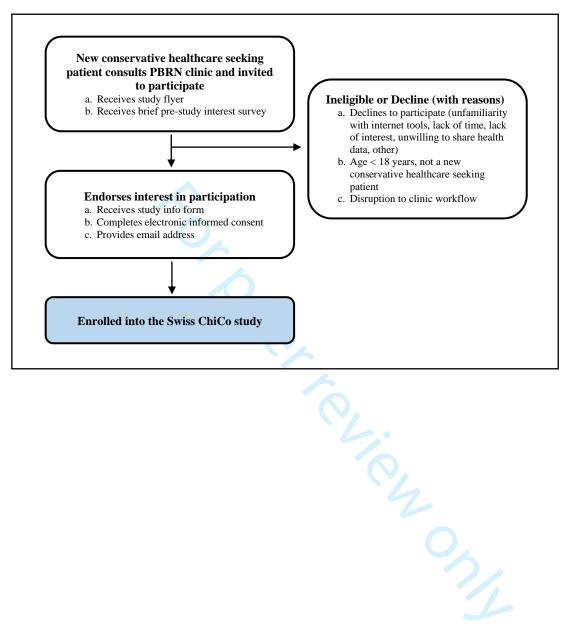
1 2		
2 3 4	358	nonselective manner. The Swiss chiropractic PBRN and Swiss ChiCo study presents a model for
5 6	359	PBRN development and rapid engagement of a newly created clinical research network. Once
7 8 9	360	complete, this PBRN will serve as a platform for answering important research questions in the
9 10 11	361	field of MSK primary health care.
12 13	362	
14 15 16	363	Figure 1. Nested design of the Swiss chiropractic PBRN and the Swiss ChiCo study
16 17 18	364	
19 20	365	Figure 2. Summary of the Swiss ChiCo study in-clinic patient participant recruitment
21 22	366	
23 24 25	367	ACKNOWLEDGEMENTS
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28 29	369	and Swiss chiropractic clinicians involved in this project for their continued participatory
30 31 32	370	engagement and support.
33 34	371	
35 36	372	AUTHOR CONTRIBUTIONS
37 38 20	373	CAH and RL conceived the idea for study. RL, CAH, AK, VvW, MAP, and LH contributed to
39 40 41	374	the design of the protocol. RL and CAH designed, undertook, and coordinated stakeholder
42 43	375	participatory activities. RL and CAH led the drafting of the protocol manuscript. All authors
44 45	376	gave important intellectual input and provided critical review of the protocol manuscript and
46 47 48	377	approved the final version of the manuscript. CAH obtained funding. RL and CAH are the
49 50	378	guarantors of this manuscript. The corresponding author attests that all listed authors meet
51 52	379	authorship criteria and that no others meeting the criteria have been omitted.
53 54 55	380	
55 56 57	381	FUNDING
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3 4	382	Thi	s work was internally supported by the Department of Chiropractic Medicine, Faculty of						
5 6	383	Me	dicine, at University of Zurich and Balgrist University Hospital through funding from the						
7 8 9	384	Foundation for the Education of Chiropractors in Switzerland. The funder had no role in							
10 11	385	con	sidering the research questions, study design, protocol methods or analysis, or in writing of						
12 13	386	the	protocol manuscript, or the decision to submit the article for publication.						
14 15 16	387								
16 17 18	388	CO	MPETING INTERESTS						
19 20	389	The	e authors declare that they have no competing interests.						
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b of 27 BMJ Open Supplementary material 1. Clinician reported-variables captured in the Swiss chiropractic practice-based research network

Construct	Item Content	Variable Code	Choices, Calculations, OR Slider Labels	Branching Logic
dentification	Record ID	record id		
	I consent to participate in the Swiss ChiCo study clinician survey	clin_consent	1, Yes 2, No 🗸	
	Clinic name:	clinic_name		
	Clinic address:	clinic_address	20	
Demographics	Sex	sex	1, Male 2, Fentaje	
0			1, Assistant / Resident, first year 2, Assistant / Resident, second year 3, Fully licensed	
	ChiroSuisse member classification	membership	chiropractor O	
	Years of chiropractic practice	practice years		
	Average number of patients seen per week over the last 3 months	n patients	$1, < 50 2, 50 - 9 = 3, 100 - 149 4, 150 - 199 5, 200 - 249 6, \ge 250$	
	Average number of new patients seen per week over the last 3 months	n new	1, 0 2, 1-3 3, 306 4, 7-9 5, 10-12 6, 13-15 7, 16-20 8, > 20	
	How many chiropractors work at your clinic?	n chiros	$1, 1 \mid 2, 2 \mid 3, 3 \mid 2, 4 \mid 5, 5 \mid 6, 6 \text{ or more}$	
	Do you work with other healthcare professionals besides chiropractors?	other health	1, Yes 2, No	
	How many other healthcare professionals work at your clinic?	n otherhealth	1, 1 2, 2 3, 3 = 4 5, 5 6, 6 or more	[other health] = '1'
		-	1, Physiotherapise 2, Massage therapist 3, Medical doctor 4, Acupuncturist 5, Nutritionist 6,	,
	Other healthcare practitioners involved in the practice (select all that apply)	specify_otherhealth	Other {specify otherhealth2}	[other health] = '1'
		specify otherhealth2		[specify otherhealth(6)]
	What language do you primarily use in your practice?	lang	1, Deutsch 2, Français 3, Italiano 4, Romansh 5, English 6, Other {otherlang}	C1 2_ (7)
	······································	otherlang	·, - · · · · · · · · · · · · · · · · · ·	[lang] = '6'
requency with which each condition is managed in your practice	Neck pain without arm pain	msk 1	1, Often 2, Sometimes 3, Rarely 4, Never	1 01
	Neck pain with arm pain	msk 2	1, Often 2, Sometimes 3, Rarely 4, Never	
	Neck pain with headache	msk 3	1, Often 2, Sometimes 3, Rarely 4, Never	
	Thoracic spine and rib pain	msk 4	1, Often 2, Sometimes 3, Rarely 4, Never	
	Low back pain without leg pain	msk 5	1, Often 2, Sometimes 3, Rarely 4, Never	
	Low back pain with leg pain	msk_6	1, Often 2, Sometimes 3, Rarely 4, Never	
	Shoulder pain	msk 7	1, Often 2, Sometimes 3, Rarely 4, Never	
	Elbow pain	msk 8	1, Often 2, Sometimes 3, Rarely 4, Never	
	Wrist and hand pain	msk 9	1, Often 2, Sometimes 3, Rarely 4, Never	
	Hip pain	msk_10	1, Often 2, Sometimes 3, Rarely 4, Never	
	Knee pain	msk 11	1, Often 2, Sometimes 3, Rarely 4, Never	
	Ankle and foot pain	msk_12	1, Often 2, Sometimes 3, Rarely 4, Never	
	Jaw pain / TMJ pain	msk 13	1, Often 2, Sometimes 3, Rarely 4, Never	
	Degenerative spine disorders	msk_19 msk_14	1, Often 2, Sometimes 3, Rarely 4, Never	
	Other degenerative joint disorders	msk 15	1, Often 2, Sometimes 3, Rarely 4, Never	
	Postural disorders	msk_15 msk_16	1, Often 2, Sometimes 3, Rarely 4, Never	
	Headaches	msk 17	1, Often 2, Sonttimes 3, Rarely 4, Never	
	Tendinopathy	msk 18		
	Chronic pain	msk_18 msk 19	1, Often 2, Sometimes 3, Rarely 4, Never 1, Often 2, Sometimes 3, Rarely 4, Never	
	Spinal health maintenance	msk_19 msk_20	1, Often 2, Sometimes 3, Rarely 4, Never	
	Non MSK complaints	msk_21	1, Often 2, Sontettimes 3, Rarely 4, Never	
requency with which each patient type is managed in your	Children (0-3 years of age)	motiont trans1	L Often 2. Semetimes 2. Benely 4. Never	
ractice		patient_type1	1, Often 2, Sometimes 3, Rarely 4, Never	
	Children (4-18 years of age)	patient_type2	1, Often 2, Sometimes 3, Rarely 4, Never	
	Older persons (≥ 65 years of age)	patient_type3	1, Often 2, Sortetimes 3, Rarely 4, Never	
	Pregnant women	patient_type4	1, Often 2, Sor \mathbf{p} times 3, Rarely 4, Never	
	Motor-vehicular accident injuries	patient_type5	1, Often 2, Sortetimes 3, Rarely 4, Never	
	Work-related injuries	patient_type6	1, Often 2, Sometimes 3, Rarely 4, Never	
	Sport-related injuries	patient_type7	1, Often 2, Sometimes 3, Rarely 4, Never	
	Post surgical care and rehabilitation	patient_type8	1, Often 2, Sorbetimes 3, Rarely 4, Never	
	Ethnic and minority groups	patient_type9	1, Often 2, Sontetimes 3, Rarely 4, Never	
ractitoner confidence scale (PCS)	I lack the diagnostic tools or knowledge needed to effectively assess patients with low back pain	pcs_1	1, 1. Strongly agree 2, 2. Agree 3, 3. Not sure 4, 4. Disagree 5, 5. Strongly disagree	
	I know exactly what to do to effectively treat patients with low back pain	pcs_2	1, 1. Strongly agree 2, 2. Agree 3, 3. Not sure 4, 4. Disagree 5, 5. Strongly disagree	
	I am very comfortable treating patients with low back pain	pcs_3	1, 1. Strongly agree 2, 2. Agree 3, 3. Not sure 4, 4. Disagree 5, 5. Strongly disagree	
	How well prepared to manage low back pain are you?	pcs_4	1, 1. Very well 2, 2. Well 3, 3. Adequately 4, 4. Poorly 5, 5. Very poorly	
	atients	mi.com/site/ab	ut/auidelines.xhtml	
	patients	pcs_5	1, T. Ströngly ägree 2, 2. Agree 3, 3. Not Sure 4, 4. Disagree 5, 5. Strongly Disagree	
	I feel confident working with a patient with low back pain not basing this on a structural diagnosis	pcs 6	1, 1. Strongly agree 2, 2. Agree 3, 3. Not sure 4, 4. Disagree 5, 5. Strongly disagree	

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Construct	Item Content	Variable Code	Choices&alculations, OR Slider Labels	Branching Logic
ain Attitudes and Beliefs Musculoskeletal (PABS-MSK)		pabs_med_1 (randomized	1, Totallodisagree 2, Largely disagree 3, Disagree to some extent 4, Agree to some extent	
Questionnaire - Biomedical	Pain is a nociceptive stimulus, indicating tissue damage	to Q17)	5, Large agree 6, Totally agree	
		pabs_med_2 (randomized	1, Totall disagree 2, Largely disagree 3, Disagree to some extent 4, Agree to some extent	
	Patients with musculoskeletal pain should preferably practice only pain free movements	to Q7)	5, Largely agree 6, Totally agree	
		pabs_med_3 (randomized	1, Totall disagree 2, Largely disagree 3, Disagree to some extent 4, Agree to some extent	
	Musculoskeletal pain indicates the presence of organic injury	to Q18)	5, Largely agree 6, Totally agree	
	If musculoskeletal pain increases in severity, I immediately adjust the intensity of treatment	pabs_med_4 (randomized		
	accordingly	to Q2)	5, LargeNagree 6, Totally agree	
	If therapy does not result in a reduction in pain, there is a high risk of severe restrictions in the	pabs_med_5 (randomized	1, Totally disagree 2, Largely disagree 3, Disagree to some extent 4, Agree to some extent	
	long term	to Q6)	5, Largewagree 6, Totally agree	
		pabs_med_6 (randomized	1, Totalledisagree 2, Largely disagree 3, Disagree to some extent 4, Agree to some extent	
	Pain reduction is a precondition for the restoration of normal functioning	to Q16)	5, Large p agree 6, Totally agree	
		pabs_med_7 (randomized	1, Totall disagree 2, Largely disagree 3, Disagree to some extent 4, Agree to some extent	
	Increased pain indicates new tissue damage or the spread of existing damage	to Q3)	5, Large agree 6, Totally agree	
		pabs_med_8 (randomized	1, Totall disagree 2, Largely disagree 3, Disagree to some extent 4, Agree to some extent	
	If patients complain of pain during exercise, I worry that damage is being caused	to Q9)	5, Largely, agree 6, Totally agree	
		pabs_med_9 (randomized	1, Totallodisagree 2, Largely disagree 3, Disagree to some extent 4, Agree to some extent	
	The severity of tissue damage determines the level of pain	to Q11)	5, Large 🕏 agree 6, Totally agree	
	In the long run, patients with musculoskeletal pain have a higher risk of developing functional	pabs_med_10 (randomized	1, Totallydisagree 2, Largely disagree 3, Disagree to some extent 4, Agree to some extent	
	impairments	to Q15)	5, Large agree 6, Totally agree	
Pain Attitudes and Beliefs Musculoskeletal (PABS-MSK)		pabs_biopsyc_1	1, Totally disagree 2, Largely disagree 3, Disagree to some extent 4, Agree to some extent	
Questionnaire - Biopsychosocial	Biological, psychological and social factors should be included in the clinical assessment	(randomized to Q19)	5, Large agree 6, Totally agree	
		pabs_biopsyc_2	1, Total disagree 2, Largely disagree 3, Disagree to some extent 4, Agree to some extent	
	How a patient currently copes with their pain problem must be assessed	(randomized to Q13)	5, Large agree 6, Totally agree	'
		pabs_biopsyc_3	1, Totallodisagree 2, Largely disagree 3, Disagree to some extent 4, Agree to some extent	
	The reaction of a patient's family and friends will promote recovery	(randomized to Q5)	5, Largety agree 6, Totally agree	'
		pabs_biopsyc_4	1, Totallydisagree 2, Largely disagree 3, Disagree to some extent 4, Agree to some extent	
	A patient's beliefs about the cause of their musculoskeletal pain must be understood	(randomized to Q1)	5, Largery agree 6, Totally agree	
		pabs_biopsyc_5	1, Totall disagree 2, Largely disagree 3, Disagree to some extent 4, Agree to some extent	
	Specific and realistic goals for treatment must be agreed	(randomized to Q4)	5, Large agree 6, Totally agree	
	speenie and realistic gouis for neutrient must be agreed	pabs_biopsyc_6	1, Totally disagree 2, Largely disagree 3, Disagree to some extent 4, Agree to some extent	
	A patients perceived barriers to work must be assessed	(randomized to Q10)	5, Largein agree 6, Totally agree	
	r parlents percerved carriers to work mast or assessed	pabs_biopsyc_7	1, Totall blisagree 2, Largely disagree 3, Disagree to some extent 4, Agree to some extent	
	A patient's expectations about treatment for musculoskeletal pain affect their outcome	(randomized to Q14)	5, Large agree 6, Totally agree	
		pabs biopsyc 8	1, Totally disagree 2, Largely disagree 3, Disagree to some extent 4, Agree to some extent	
	I consider a patient's social support network in my clinical management		5, Large agree 6, Totally agree	
	A patient's physical activity level should be considered in the management of their	pabs_biopsyc_9	1, Totally disagree 2, Largely disagree 3, Disagree to some extent 4, Agree to some extent	
	musculoskeletal pain problem	(randomized to Q12)	5, Large gagree 6, Totally agree	
	musculoskeletar pain problem	pabs biopsyc 10	1, Totall disagree 2, Largely disagree 3, Disagree to some extent 4, Agree to some extent	
	Deducine a notion the face is accounted to the tweater out measure	(randomized to Q8)		
Disite line time of all star	Reducing a patient's fear is essential to the treatment process	× × ×	5, Largely-agree 6, Totally agree 1, Yes. Mse only an EPR system 2, Partially. I use a mix of an EPR and paper	
Digitalization of clinics	Do you use an electronic patient record (EPR) system for clinical record keeping in your practice?	epr_use	3, No. I Ge a paper-based system, but am considering switching 4, No. I use only a paper-	
	Diagon in diagta the Manufacturer Name and Desire Manufacture for the DDD information of the		based sympem	fame weals III
	Please indicate the Manufacturer Name and Product Name for the EPR information system that		i si i s	[epr_use] = '1' or [epr_u
	you use in practice.	epr_manu_prod	_ <u>_</u>	2
	Please indicate the Manufacturer Name and Product Name for the EPR information system that	epr_manu_prod_considerin	Protect	F
	you are considering to use in practice	g		[epr_use] = '3'
	Do you use a secure/encrypted email system for patient communication in your practice (e.g.,	.,		
	HIN or ProtonMail)?	secure_email_use	I, Yes No	
	Please indicate the Product Name for the secure/encrypted email system you use in practice.	email_manu_prod	Ţ	[secure_email_use] = '1
	How would you compare your quality of life now, when compared to before the COVID-19			
	pandemic?	cov_clin_1	1, Better 2, Similar 3, Worsened	
	How have your patient numbers been affected since the start of the COVID-19 pandemic?	cov_clin_2	1, Increased 2, Unchanged 3, Decreased	
	Have you changed your work hours since the start of the COVID-19 pandemic?	cov_clin_3	1, Increased 2, Unchanged 3, Decreased	
	Does your clinic offer telehealth/virtual care services?	cov_clin_4	1, Yes No 3, No, but I am considering integrating it into my practice	
	How has patient use of telehealth or virtual care services changed since the start of the COVID-19			
	pandemic?	telehealth	1, Increased use 2, Unchanged 3, Decreased use	[cov_clin_4] = '1'
	On a scale from 0 to 100 how motivated are you to participate in the patient cohort phase of the . Swiss ChiCo study? FOT PEET REVIEW ONLY - http://bmjopen.bmj			

Supplementary material 2. Patient-reported variables captured in the Swiss ChiCo patient cohort

			21-059380	
Supplementary ma	aterial 2. Patient-reported variables captured in the Swiss	s ChiCo patient cohort	on 1	
onstruct	Item Content	Variable Code	ω Choices, Calculations, OR Slider Labels	Branching Logic
easons for non-participation	Record ID	record_id		
Collected at in-clinic recruitment	Are you interested in participating in this study?	chico_interest	1, Y 🛃 2, No	
			1, No mail address 2, Unfamiliar with electronic or internet tools 3, Lack of time	F 1
	Reasons for not participating Other reason for not participating	nonparticipation	4, Lato of interest in the study 5, Data privacy concerns 6, Other	[chico_interest] = '2'
	For clinic staff only	nonparticipation_other clinic disrup	1, Disption to clinic workflow	[nonparticipation(6)] = '1' [nonparticipation(6)] = '1'
ain, enjoyment and general		peg_q1_beforetx / peg_q1 / peg_q1_2wks / peg_q1_6wks /	1, 0 So pain $ 2, 1 3, 2 4, 3 5, 4 6, 5 7, 6 8, 7 9, 8 10, 9 11, 10 = Pain as$	
ctivity (PEG) scale	What number best describes your pain on average in the past week?	peg q1 12wks	bad as you can imagine	
	6-What number best describes how, during the past week, pain has interfered with your enjoyment of		1, 0 = oes not interfere 2, 1 3, 2 4, 3 5, 4 6, 5 7, 6 8, 7 9, 8 10, 9 11, 10 =	
and 12-wks	life?	peg_q2_12wks	Competely interferes	
	What number best describes how, during the past week, pain has interfered with your general activity		1, 0 = cos not interfere 2, 1 3, 2 4, 3 5, 4 6, 5 7, 6 8, 7 9, 8 10, 9 11, 10 =	
	?	peg_q3_12wks	Completely interferes	
Iusculoskeletal health	1 Designation of the start of the start		TOP	
uestionnaire (MSK-HQ)	1. Pain/stiffness during the day	making at hafanaty (making at (making at 2 min)		1
and 12-wks	6-How severe was your usual joint or muscle pain and/or stiffness overall during the day in the last 2 weeks	mskhq_q1_beforetx / mskhq_q1 / mskhq_q1_2wks / mskhq_q1_6wks / mskhq_q1_12wks	1, Notht all 2, Slightly 3, Moderately 4, Fairly severe 5, Very severe	
and 12-wks	2. Pain/stiffness during the night	liiskiiq_q1_0wks / liiskiiq_q1_12wks	1, Nor at an [2, Signity [5, Modelately [4, 1 any severe [5, very severe	
	How severe was your usual joint or muscle pain and/or stiffness overall during the night in the last 2	mskhq_q2_beforetx / mskhq_q2 / mskhq_q2_2wks /		
	weeks?	mskhq q2 6 wks / mskhq q2 12 wks	1, Notat all 2, Slightly 3, Moderately 4, Fairly severe 5, Very severe	
	3. Walking	mskhq_q3_beforetx / mskhq_q3 / mskhq_q3_2wks /		
	How much have your symptoms interfered with your ability to walk in the last 2 weeks?	mskhq_q3_6wks / mskhq_q3_12wks	1, Notat all 2, Slightly 3, Moderately 4, Severely 5, Unable to walk	
	4. Washing/Dressing			
	How much have your symptoms interfered with your ability to wash or dress yourself in the last 2	mskhq_q4_beforetx / mskhq_q4 / mskhq_q4_2wks /	1, Notat all 2, Slightly 3, Moderately 4, Severely 5, Unable to wash or dress	
	weeks?	mskhq_q4_6wks / mskhq_q4_12wks	myseff	
	5. Physical activity levels		1 N 5 4 11 2 Clintels 2 Mathematical 4 Marcanesh 15 Hackberry Instructure	
	How much has it been a problem for you to do physical activities (e.g. going for a walk or jogging) to the level you want because of your joint or muscle symptoms in the last 2 weeks?	mskhq_q5_beforetx / mskhq_q5 / mskhq_q5_2wks / mskhq q5 6wks / mskhq q5 12wks	1, Nogat all 2, Slightly 3, Moderately 4, Very much 5, Unable to do physical	
	6. Work/daily routine	liiskiiq_q5_0wks7 liiskiiq_q5_12wks	activities O	
	How much have your joint or muscle symptoms interfered with your work or daily routine in the last	t mskhq q6 beforetx / mskhq q6 / mskhq q6 2wks /		
	2 weeks (including work & jobs around the house)?	mskhq_q6_6wks / mskhq_q6_12wks	1, Notat all 2, Slightly 3, Moderately 4, Severely 5, Extremely	
	7. Social activities and hobbies			
	How much have your joint or muscle symptoms interfered with your social activities and hobbies in	mskhq_q7_beforetx / mskhq_q7 / mskhq_q7_2wks /	20	
	the last 2 weeks?	mskhq_q7_6wks / mskhq_q7_12wks	1, Not at all 2, Slightly 3, Moderately 4, Severely 5, Extremely	1
	8. Needing Help			
	How often have you needed help from others (including family, friends or carers) because of your	mskhq_q8_beforetx / mskhq_q8 / mskhq_q8_2wks /	1, Not at all 2, Rarely 3, Sometimes 4, Frequently 5, All the time	
	joint or muscle symptoms in the last 2 weeks? 9. Sleep	mskhq_q8_6wks / mskhq_q8_12wks	1, Not at all 2, Rarely 3, Sometimes 4, Frequently 5, All the time	
	How often have you had trouble with either falling asleep or staying asleep because of your joint or	mskhq_q9_beforetx / mskhq_q9 / mskhq_q9_2wks /	l ĝ	1
	muscle symptoms in the last 2 weeks?	msking_q9_betoreex / msking_q9 / msking_q9_2 wks / msking_q9_6wks / msking_q9_12wks	1, No at all 2, Rarely 3, Sometimes 4, Frequently 5, Every night	
	10. Fatigue or low energy	mskhq_q10_beforetx / mskhq_q10 / mskhq_q10_2wks /	St St	
	How much fatigue or low energy have you felt in the last 2 weeks?	mskhq_q10_6wks / mskhq_q10_12wks	1, Notat all 2, Slight 3, Moderate 4, Severe 5, Extreme	1
	11. Emotional well-being		i ř	1
	How much have you felt anxious or low in your mood because of your joint or muscle symptoms in		te	1
	the last 2 weeks?	mskhq_q11_6wks / mskhq_q11_12wks	1, Note all 2, Slightly 3, Moderately 4, Severely 5, Extremely	1
	12. Understanding of your condition and any current treatment	makka al2 hafanatu (makka al2 (makka al2 2-t- (d d	1
	Thinking about your joint or muscle symptoms, how well do you feel you understand your condition and any current treatment (including your diagnosis and medication)?		1, Completely 2, Very well 3, Moderately 4, Slightly 5, Not at all	
	13. Confidence in being able to manage your symptoms	mskhq_q12_6wks / mskhq_q12_12wks	O	1
	How confident have you felt in being able to manage your joint or muscle symptoms by yourself in	mskhq_q13_beforetx / mskhq_q13 / mskhq_q13_2wks /	1, Externely 2, Very 3, Moderately 4, Slightly 5, Not at all	1
	the last 2 weeks (e.g. medication, changing lifestyle)?	mskhq q13 6wks / mskhq q13 12wks	1, Extremely 2, Very 3, Moderately 4, Slightly 5, Not at all	
	14. Overall Impact	mskhq_q14_beforetx / mskhq_q14 / mskhq_q14_2wks /		1
	How much have your joint or muscle symptoms bothered you overall in the last 2 weeks?	mskhq_q14_6wks / mskhq_q14_12wks	1, Nortat all 2, Slightly 3, Moderately 4, Very much 5, Extremely	1
	Physical activity Levels	mskhq_activity_beforetx / mskhq_activity /		1
	In the past week, on how many days have you done a total of 30 militual of the sense of the sense of the sense	mskhq_activity_2wks / mskhq_activity_6wks /	Idolinos vibtada a su a	1

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Construct	Item Content	Variable Code	Δ Choices, Calculations, OR Slider Labels	Branching Logic
	Please list in rank-order the three most important factors that you believe caused your current pain			
rief illness perception (IPO brief)	complaint	briefillness		
Collected at baseline	1	ipq_q1	Ň	
	2	ipq_q2		
	3	ipq q3	2022	
emographics	Sex	sex_p	1, Male 7, Female	
Collected 1 hour after initial				
ssessment	Nationality	nationality	1, Swis≰ 2, Non-Swiss	
	Highest level of education	education	1, Comprisory 2, Secondary 3, Tertiary	
	At present, are you working	Job	1, Full the at your usual job 2, Full time at a lighter job 3, Part time 4, Not	
			working disability 5, Not working - IV/pensioner applicant	
			6, Hothewife/Househusband 7, Retired (not disability) 8, Unemployed 9,	
			Studen	
				[job] = '1' or [job] = '2' or [job] =
	How would you describe the total physical strain caused by your work?	workstrain	1, Very Light 2, Light 3, Somewhat strenuous 4, Strenuous 5, Very strenuous	or [job] = '5' or [job] = '8'
	Have you missed any days of work due to your current pain complaint?	sick leave	1, Yes 🛱 No	
	How many days of sick leave have you had in the last 2 weeks?	n sickleave		[sick leave] = '1'
	Smoking Status	smoking	1, Current smoker 2, Previous smoker 3, Never smoker	L
	How much do you smoke on average per day?	n cigarettes	· · · · · · · · · · · · · · · · · · ·	[smoking] = '1'
	Have you visited a chiropractor before?	newpatient	1, I am we to chiropractic 2, I have visited a chiropractor before	[smoking]
njury Characteristics	Have you visited a medical doctor for your current pain complaint?	md currentpain	1, Yes 2, No	
Collected 1 hour after initial	nave you visited a medical doctor for your carrent pain complaint.	ind_currentpain	r, ros @, ro	
ssessment	Were you referred to chiropractic care for your pain complaint from a healthcare professional?	referral source	1, Yes 💆 No	
issessment	were you referred to enhopractic care for your pain complaint from a nearlicate professionar:	lelenar_source	1, Other hiropractor 2, Family practitioner 3, Internist 4, Orthopaedic surgeon	
	Which healthcare professional referred you to chiropractic care?	hcrefer specify	5, Physical therapist 6, Massage therapist 7, Other	[referral source] = '1'
	Please specify which healthcare professional referred you to chiropractic care.	hc refer other	S, r hysical merapist 6, Massage merapist 7, Other	[hcrefer specify] = '7'
	r lease specify which heatincare professional referred you to chilopractic care.	nc_rerer_other	1 + 1 = 3 $2 = 7$ days $ 2 + 1 = 2$ weaks $ 4 = 2.4$ weaks $ 5 + 1 = 2$ menths $ 6 + 4.12$ ment	· · ·
	How long has it been since your current pain complaint began?	date of inj	1, 1-2 days 2, 3-7 days 3, 1-2 weeks 4, 2-4 weeks 5, 1-3 months 6, 4-12 mont 7, Mo than 12 months	ns
	Main location of pain complaint	compaint	1, Neck pain only 2, Neck pain with arm pain 3, Neck pain with headache 4, Mi	
		companit	back pain only 2, Neck pain only 6, Low back pain with leg pain	a
			7, Shouder pain 8, Elbow pain 9, Wrist or hand pain 10, Hip pain 11, Knee	
			pain 1 DAnkle or foot pain 13, Jaw pain 14, Headache	
	Are you currently taking medication to reduce your pain?	medication	1, Yes, prescription medication 2, Yes, non-prescription medication 3, No	
maging Use	In the last 1 month have you received any diagnostic imaging for your current pain complaint?	image postvisit	1, Yes 🔀 No	
Collected 1 hour after initial	in the fast 1 month have you received any diagnostic imaging for your current pain complaint?	inage_postvisit		
assessment	X ray (radiography) in the last 1 month?	xray postvisit	1, Yes $\frac{1}{2}$, No 3, Unsure	[image postvisit] = '1'
issessment	Ultrasound scan in the last 1 month?	ultra postvisit	1, Yes $[2, No 3, Unsure$ 1, Yes $[3, No 3, Unsure$	[image_postvisit] = '1'
	MRI scan in the last 1 month?	mri postvisit	1, Yes 3, No 3, Unsure	[image_postvisit] = '1'
	CT scan in the last 1 month?	ctscan postvisit	1, Yes $(\mathbf{A}, No 3, Unsure$ 1, Yes $(\mathbf{A}, No 3, Unsure$	
			1, Yes ω , No	[image_postvisit] = '1'
	In the last 1 year have you received diagnostic imaging for any pain complaint?	imaging1y_postvisit	1, Yes $ 2, N_0 $ 3, Unsure	Development of the second studied at 111
	X-ray (radiography) in the last 1 year?	xray_1yr	1, Yes $\begin{bmatrix} 2 & No \end{bmatrix}$ 3, Unsure 1, Yes $\begin{bmatrix} 2 & No \end{bmatrix}$ 3, Unsure	[imaging1y_postvisit] = '1'
	Ultrasound scan in the last 1 year?	ultrasound_1yr		[imaging1y_postvisit] = '1'
	MRI scan in the last 1 year?	mri_1yr	1, Yes 😫 No 3, Unsure 1, Yes 😫 No 3, Unsure	[imaging1y_postvisit] = '1'
OVID 10 concerts	CT scan in the last 1 year?	ctscan_lyr		[imaging1y_postvisit] = '1'
OVID-19 aspects	How is your quality of life at the moment compared to the time before the COVID-19 pandemic?	patient_cov_1	1, Better 2, Similar 3, Worsened	
Collected 1 hour after initial	How are your physical activity habits at the moment compared to the time before the COVID-19			
assessment	pandemic?	pat_cov_2	1, Bette 2, Similar 3, Worsened	
	Have you been unable to seek planned or necessary medical treatment because of the COVID-19		I, Yes A, No	
	pandemic?	pat_cov_3	1, Yes 9, No	
	What treatment could you not participate in because of the COVID-19 pandemic?	pat_cov_4		[pat_cov_3] = '1'
	Would you be interested in receiving virtual or telehealth chiropractic sessions?	virtual	1, Yes 🔁; No 3, Unsure	

27		BMJ Open	21-059380	
Construct	Item Content	Variable Code	→ Choices, Calculations, OR Slider Labels	Branching Logic
Orebro Musculoskeletal Pain			1, 0-2 weeks 2, 2-3 weeks 3, 4-5 weeks 4, 6-7 weeks 5, 8-9 weeks 6, 10-11	
Screening Questionnaire - Short Collected 1 hour after initial	How long have you had your current pain complaint?	omps_q1	weel [7, 12-23 weeks 8, 24-35 weeks 9, 36-52 weeks 10, > 52 weeks 1, 0 [7] [7] [7] [7] [7] [7] [7] [7] [7] [7]	
assessment	How would you rate the pain that you have had during the past week?	omps_q2	bad a Xit could be 1, 0 A bsolutely calm and relaxed 2, 1 3, 2 4, 3 5, 4 6, 5 7, 6 8, 7 9, 8 10, 9	
	How tense or anxious have you felt in the past week?	omps_q5	$ 11, \mathbf{N} = As$ tense and anxious as l've ever felt 1, 0 $\overrightarrow{\mathbf{N}}$ tot at all 2, 1 3, 2 4, 3 5, 4 6, 5 7, 6 8, 7 9, 8 10, 9 11, 10 =	
	How much have you been bothered by feeling depressed in the past week?	omps_q6	Extrogely 1, 0 No risk 2, 1 3, 2 4, 3 5, 4 6, 5 7, 6 8, 7 9, 8 10, 9 11, 10 = Very large	
	In your view, how large is the risk that your current pain may become persistent?	omps_q7	risk 1, 0 No chance 2, 1 3, 2 4, 3 5, 4 6, 5 7, 6 8, 7 9, 8 10, 9 11, 10 = Very	
	In your estimation, what are the chances you will be working your normal duties in 3 months?	omps_q8	larg completely disagree 2, 1 3, 2 4, 3 5, 4 6, 5 7, 6 8, 7 9, 8 10, 9 11, 10	
	An increase in pain is an indication that I should stop what I'm doing until the pain decreases.	omps_q9	$ \begin{array}{c} 1, 0 \\ \hline \\ \hline \\ Completely disagree 2, 1 3, 2 4, 3 5, 4 6, 5 7, 6 6, 7 9, 8 10, 9 11, 10 \\ \hline \\ \hline \\ 1, 0 \\ \hline \\ \hline \\ Completely disagree 2, 1 3, 2 4, 3 5, 4 6, 5 7, 6 8, 7 9, 8 10, 9 11, 10 \\ \hline \\ \hline \\ \end{array} $	
	I should not do my normal work with my present pain.	omps_q10	$ \begin{array}{l} 1.0 \end{array} \\ \hline Completely agree \\ 1.0 \end{array} \\ \hline Can't do it because of the pain problem \\ 2, 1 3, 2 4, 3 5, 4 6, 5 7, 6 8, 7 \\ 1.0 \end{array} \\ \hline \begin{array}{l} 1.0 \end{array} \\ \hline \begin{array}{l} 2.0 \end{array} \\ \hline \begin{array}{l} 1.0 \end{array} \\ \hline \begin{array}{l} 2.0 \end{array} \\ \hline \begin{array}{l} 1.0 \end{array} \\ \hline \begin{array}{l} 2.0 \end{array} \\ \hline \begin{array}{l} 1.0 \end{array} \\ \hline \begin{array}{l} 2.0 \end{array} \\ \hline \begin{array}{l} 1.0 \end{array} \\ \hline \begin{array}{l} 2.0 \end{array} \\ \hline \begin{array}{l} 1.0 \end{array} \\ \hline \begin{array}{l} 2.0 \end{array} \\ \hline \begin{array}{l} 1.0 \end{array} \\ \hline \begin{array}{l} 2.0 \end{array} \\ \hline \begin{array}{l} 1.0 \end{array} \\ \hline \begin{array}{l} 2.0 \end{array} \\ \hline \begin{array}{l} 1.0 \end{array} \\ \hline \begin{array}{l} 2.0 \end{array} \\ \hline \begin{array}{l} 1.0 \end{array} \\ \hline \begin{array}{l} 2.0 \end{array} \\ \hline \begin{array}{l} 1.0 \end{array} \\ \hline \begin{array}{l} 2.0 \end{array} \\ \hline \begin{array}{l} 1.0 \end{array} \\ \hline \begin{array}{l} 2.0 \end{array} \\ \hline \begin{array}{l} 1.0 \end{array} \\ \hline \begin{array}{l} 2.0 \end{array} \\ \hline \begin{array}{l} 1.0 \end{array} \\ \hline \begin{array}{l} 1.0 \end{array} \\ \hline \begin{array}{l} 2.0 \end{array} \\ \hline \end{array} \\ \hline \begin{array}{l} 1.0 \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline \begin{array}{l} 1.0 \end{array} \\ \hline \end{array} $	
	I can do light work for an hour	omps_q3	9, 8 \mathbb{R}^{0} , 9 11, 10 = Can do it without pain being a problem	
	I can sleep at night.	omps q4	1, 0 can't do it because of the pain problem 2, 1 3, 2 4, 3 5, 4 6, 5 7, 6 8, 7 9, 8 30, 9 11, 10 = Can do it without pain being a problem	
Follow-up Questionnaire: injury	In the last 2 wks / 4 wks / 6 wks have you had any follow-up visits with the chiropractor for your	ompo_q.		
characteristics and imaging use	pain complaint?	fu_chiro_2wks / fu_chiro_6wks / fu_chiro_12wks	1, Y 2, No	[fu chiro 2wks]/[fu chiro
Collected at 2-, 6-, and 12-wks	How many times have you seen your chiropractor in the last 2 wks / 4 wks / 6 wks? In the last 2 wks / 4 wks / 6 wks have you visited another healthcare professional other than your	nfu_chiro_2wks / nfu_chiro_6wks / nfu_chiro_12wks	1, Orige 2, 2-4 times 3, More than 4 times	[fu_chiro_12wks] = '1'
	chiropractor for your pain complaint?	hc_2wks / hc_6wks / hc_12wks nfu otherhealth 2wks / nfu otherhealth 6wks /	I, Y (2, No	[hc_2wks] / [hc_6wks] / [hc
	How many times have you visited another healthcare professional in the last 2 wks / 4 wks / 6 wks?	nfu_otherhealth_12wks	1, Offee 2, 2-4 times 3, More than 4 times	= '1' [hc 2wks] / [hc 6wks] / [hc
	Medical doctor visit in the last 2 wks / 4 wks / 6 wks for your pain complaint?	gp_2wks / gp_6wks / gp_12wks	1, Y = 2, No	= '1' [hc_2wks] / [hc_6wks] / [hc
	Physiotherapist visit in the last 2 wks / 4 wks / 6 wks for your pain complaint?	physo_2wks/physo_6wks/physo_12wks	1, Y = 2, No	$[hc_2wks] / [hc_6wks] / [hc_$
	Other healthcare professional seen in the last 2 wks / 4 wks / 6 wks for your pain complaint?	otherhealth_2wks / otherhealth_6wks / otherhealth_12wks	N 1, Y29 2, No	= '1' [otherhealth 2wks]/
		specif_otherhealth_2wks / specif_otherhealth_6wks /	2024	[otherhealth_6wks] /
	Which other healthcare professional did you see? Are you currently taking medication to reduce your muscle and joint pain?	specif_otherhealth_12wks medication 2wks / medication 6wks / medication 12wks	1, Y , prescription medication 2, Yes, non-prescription medication 3, No	[otherhealth_12wks]= '1'
	Have you missed any days of work due to your pain complaint in the last 2 wks / 4 wks / 6 wks?	sickleave 2wks/sickleave 6wks/sickleave 12wks		
	How many days of sick leave have you had in the last 2 wks / 4 wks / 6 wks of wks.		1, Y 2, No	[sickleave_2wks] / [sickleave
	complaint?	n_sickleave_2wks/n_sickleave_6wks/n_sickleave_12wks		/[sickleave_2wks] / [sickleave /[sickleave_12wks] = '1'
	In the last 2 wks / 4 wks / 6 wks have you received any diagnostic imaging for your pain complaint?		1, Yes 2, No	[imaging_2wks] / [imaging_
	X-Ray (radiography) in the last 2 wks / 4 wks / 6 wks	xray_2wks / xray_6wks / xray_12wks	1, Y Q 2, No 3, Unsure	[imaging_2wks] / [imaging_' [imaging_12wks] = '1' [imaging_2wks] / [imaging_'
	Ultrasound scan in the last 2 wks / 4 wks / 6 wks	ultra_2wks / ultra_6wks / ultra_12wks	1, Y (2, No 3, Unsure	[imaging_2wks] / [imaging_0 [imaging_12wks] = '1' [imaging_2wks] / [imaging_0
	MRI scan in the last 2 wks / 4 wks / 6 wks	mri_2wks / mri_6wks / mri_12wks	1, Y 2, No 3, Unsure	[imaging_2wks] / [imaging_6 [imaging_12wks] = '1' [imaging_2wks] / [imaging_6
	CT scan in the last 2 wks / 4 wks / 6 wks	ct_2wks/ct_6wks/ct_12wks	1, Y 2 2, No 3, Unsure	[imaging_2wks] / [imaging_ [imaging_12wks] = '1'
Patients' Global Impression of Change (PGIC) scale Collected at 2-, 6-, and 12-wks	To what extent has your pain complaint changed when compared with the situation just before you started chiropractic care?	pgic_q1_2wks / pgic_q1_6wks / pgic_q1_12wks	1, 1. Completely recovered 2, 2. Much improved 3, 3. Slightly improved 4, 4. Not changed 5, 5. Slightly worsened 6, 6. Much worsened 7, 75 Worse than ever	

The Swiss chiropractic practice-based research network and musculoskeletal pain cohort pilot study: protocol of a nationwide resource to advance musculoskeletal health services research

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1 2		
3 4	25	
5 6	26	Abstract
7 8 9	27	Introduction
9 10 11	28	Musculoskeletal (MSK) pain conditions, a leading cause of global disability, are usually first
12 13	29	managed in primary care settings such as medical, physiotherapy, and chiropractic community-
14 15	30	based practices. While chiropractors often treat MSK conditions, there is limited real-world
16 17 18	31	evidence on the topic of health service outcomes among patients receiving this type of care. A
19 20	32	nationwide Swiss chiropractic practice-based research network (PBRN) and MSK pain patient
21 22	33	cohort study will have potential to monitor the epidemiological trends of MSK pain conditions
23 24 25	34	and contribute to health care quality improvement. The primary aims of this protocol are to 1)
26 27	35	describe the development of a MSK focused PBRN within the Swiss chiropractic setting; and 2)
28 29	36	describe the methodology of the first nested study to be conducted within the PBRN – an
30 31 32	37	observational prospective patient cohort pilot study.
33 34	38	
35 36	39	Methods and analysis
37 38	40	This initiative is conceptualized with two distinct phases. Phase 1 focuses on the development of
39 40 41	41	the Swiss chiropractic PBRN, and will use a cross-sectional design to collect information from
42 43	42	chiropractic clinicians nationwide. Phase 2 will recruit consecutive patients aged 18 years or
44 45	43	older with MSK pain from community-based chiropractic practices participating in the PBRN
46 47 48	44	into a prospective chiropractic cohort pilot study. All data collection will occur through
49 50	45	electronic surveys offered in the three Swiss national languages (German, French, Italian) and
51 52	46	English. Surveys will be provided to patients prior to initial assessment, 1-hour after assessment
53 54 55	47	and at 2-, 6-, and 12-weeks after assessment.
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49	Ethics and dissemination
50	Ethics approval has been obtained from the independent research ethics committee of Canton
51	Zurich (BASEC-Nr: 2021-01479). Informed consent will be obtained electronically from all
52	participants. Findings will be reported to stakeholders after each study phase, presented at local
53	and international conferences, and disseminated through peer-reviewed publications.
54	
55	Trial registration
56	Phase 1 – Swiss chiropractic PBRN (ClinicalTrials.gov identifier: NCT05046249);
57	Phase 2 – Swiss chiropractic cohort (Swiss ChiCo) pilot study (ClinicalTrials.gov identifier:
58	NCT05116020).
59	
60	Strengths and limitations of this study
61	• Use of a flexible practice-based research network model will allow for a diverse range of
62	nested study design types as well as the future expansion of the network.
63	• Development of protocol methods is guided by patient and public involvement activities with
64	key stakeholders.
65	• Sole use electronic data capture methods may lead to selective participation of both clinician
66	and patient participants.
67	
68	Keywords: chiropractic, health care quality, musculoskeletal health, musculoskeletal pain,
69	manual medicine
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73 INTRODUCTION

Musculoskeletal (MSK) pain conditions are the leading cause of disability worldwide, with low back pain being the largest single cause in over 160 countries, including Switzerland.[1,2] This health burden translates to an economic cost of approximately 6.6 billion Euros or about 2% of Switzerland's total gross domestic product for low back pain alone.[3] Best practice recommendations and systematic reviews on MSK pain largely focus primarily on regional pain locations, such as low back pain or neck pain.[4-6] However, in the population and in primary care settings, it is common that those experiencing a MSK pain complaint also present with co-existing pain in another body region. [7,8] There is increasing evidence suggesting that these pain conditions, although localized to different regions, share similarities with respect to the course of symptoms, prognostic factors, and clinical care recommendations.[9,10] An entirely regional focus to MSK health may create gaps in patient centered research and difficulties with knowledge implementation in health care settings. Further contributing to practice gaps, is the lack of practice-based data collection in MSK health care research.[11] To help bridge the divide between research and practice, countries such as the UK, Denmark, Sweden, and Australia have engaged in practice-based research and worked with MSK-focused practice-based research networks (PBRNs).[12-14] A PBRN is a group of at least 15 primary-care settings united under a commitment to advance the science base of clinical care.[15] These "real world" clinical research environments allow for sustained collaborations between practitioners, patients, and academicians facilitating the cocreation of relevant research questions and production of clinically applicable results.[11,15,16] The chiropractic scope of practice in Switzerland includes the diagnosis and management of MSK pain conditions through manual medicine, prescription medication, and diagnostic imaging (radiography, ultrasound, CT, MRI). As of December 2021, there were approximately

Page 5 of 38

BMJ Open

326 chiropractors practicing across Switzerland with the large majority providing care in community-based settings. MSK complaints such as low back pain and neck pain, which result in the largest burdens of disability are commonly seen in chiropractic practice.[17] Chiropractic health care centres may serve as useful settings to further investigate MSK pain conditions, to understand what role chiropractors play in the current management of these conditions, and to identify opportunities for Swiss MSK primary health care quality improvement. As management of MSK conditions moves away from traditional medical treatments and towards more physical and preventative approaches, there is a need to describe non-pharmacological treatment options to make informed decisions on how best to use this capacity in the current health care system.[4,18] Given the high burden of MSK pain conditions, which are frequently managed by chiropractors, and limited practice-based evidence on the topic of chiropractic care for MSK conditions, particularly in Switzerland, this protocol outlines the creation of a nationwide PBRN and subsequent nested prospective cohort (Swiss ChiCo) pilot study for chiropractic patients with MSK pain. Once established, this PBRN will provide the framework to help monitor the epidemiological trends of MSK pain in primary care settings, contribute to MSK health care quality improvement, and support future development and growth of practice-based MSK clinical research. The main objectives of this report are to: 1) describe the development of a MSK focused PBRN and describe the enrolment of Swiss chiropractors into the PBRN; and 2) describe the methods of the first nested study to be conducted within the PBRN – an observational prospective patient cohort pilot study.

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120 METHODS AND ANALYSIS

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121 Study design

The Swiss chiropractic PBRN will use a substudy PBRN model, similar to that of the Australian
Chiropractic Research Network (ACORN).[12,19,20] In substudy PBRN models, data is initially
collected from participating clinicians/clinical practices through self-report to first establish and
describe characteristics of the PBRN. Following development, nested substudies may be

126 performed using this PBRN framework.

The current project will consist of two phases. In phase 1, we aim to develop the Swiss
chiropractic PBRN and describe the demographics of participating chiropractors at project
initiation using a cross-sectional study design (ClinicalTrials.gov identifier: NCT05046249). In
phase 2, we aim to launch a 12-week observational prospective Swiss chiropractic cohort (Swiss
ChiCo) pilot study which will assess the feasibility for longitudinal data collection and describe
the clinical course of patients with MSK pain presenting to Swiss chiropractors.

133 (ClinicalTrials.gov identifier: NCT05116020). Figure 1 provides an overview of the two nested
134 phases of this project.

- - 136 Patient and public involvement

Key stakeholders identified for the development of this project include the Swiss Chiropractic Association (ChiroSuisse), the Swiss Chiropractic Patient Association (Pro Chiropractic Switzerland), Swiss chiropractors, and an international group of researchers with experience in practice-based research. Participatory engagement activities were first performed collaboratively with all stakeholders and focused on study relevance, team building, project infrastructure development and the collaborative creation of relevant research questions. A consensus-based understanding was reached by all members which outlined the need for more clinical MSK research within the Swiss setting and a pledge to provide support to achieve this project goal.

Page 7 of 38

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Other recommendations included the practicality to start with a small cohort study to first test data collection methods, as well to explore both clinical and feasibility related objectives to help drive recruitment from community-based chiropractors and patients. Individualized one-on-one meetings were subsequently conducted to discuss specific project methods with each stakeholder group. Recommendations provided by ChiroSuisse and Pro Chiropractic Switzerland included the addition of several questions to the Swiss ChiCo pilot study patient participant questionnaires. Consequently, questions relating to patient work status,

past use of chiropractic care, and use of other healthcare in MSK pain management were added. Both associations also recommended increasing patient participant recruitment weighting for the Swiss ChiCo pilot study in the French and Italian language regions of Switzerland by 5% from what was initially proposed.

One-on-one meetings with Swiss chiropractors were carried out for the purpose of understanding how best to integrate study processes into clinical practice settings. According to all clinician advisors, the recruitment of approximately 5-10 consecutive patients per clinical practice was feasible. Outside of clinical workflow processes, patient participant inclusion criteria were revised from new healthcare seeking for a MSK pain condition (operationalized as not having received any (patient-reported) health care for current MSK complaint) to new conservative healthcare seeking for a MSK complaint (not having received any (patient-reported)) chiropractic, physiotherapy, osteopathy, or massage therapy for current MSK complaint in the last 1 month, and not a follow-up visit). Many clinician advisors recommended this change based on the clinical profile of their patients and insurance coverage practices in Switzerland (where chiropractic care typically follows an initial visit with a primary care physician or general practitioner).

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Participatory engagement is an iterative process and requires continuous reflection of previous project processes and results to inform subsequent phases (action-reflection process).[21] Following completion of each project phase, individual meetings with each stakeholder group will be scheduled to disseminate findings, discuss how best to generate future PBRN growth, and explore ways to expand the MSK clinical cohort study. Phase 1 – Development of the Swiss chiropractic PBRN **Participants** All registered active chiropractor members (fully licensed chiropractors and postgraduate assistant chiropractors) of ChiroSuisse will be eligible and invited to participate. Approximately 98% of all practicing Swiss chiropractors hold an active membership with ChiroSuisse (personal communication, April 22, 2021). erie Recruitment To aid with clinician recruitment, we plan to launch the PBRN development phase on September 9, 2021 at the annual ChiroSuisse Continuing Education (CE) Convention 2021 (Lausanne, September 9-11, 2021). Clinicians will have the opportunity to ask questions directly of the project team, test electronic study methods, sign up as a clinician member of the PBRN, and provide input and feedback for the subsequent Swiss ChiCo pilot study. Those interested, will be invited to join the Swiss chiropractic PBRN by scanning a quick response (QR) code and completing the linked clinician entry survey using personal mobile devices. For those who do not attend the conference, we plan to use electronic email invitations containing the Research Electronic Data Capture (REDCap) PBRN entry survey link. This invitation will be paired with an information sheet outlining project goals, good conduct procedures for the PBRN and For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

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2 3 4	192	subsequent sub	ostudy involvement, and risks and benefits for participation. Clinician r	recruitment
5 6	193	for the Swiss c	chiropractic PBRN will be scheduled to end on December 19, 2021. Sir	nilar to
7 8 9	194	other PBRNs w	within the scope of chiropractic and MSK health, we hope to achieve a	clinician
10 11	195	participation p	roportion of approximately 50%.[19,22]	
12 13	196			
14 15 16	197	Data collectio	n procedures and variables	
17 18	198	All data acquis	sition will occur electronically using the REDCap web application plat	form.[23]
19 20 21	199	Clinicians part	cicipating in the Swiss chiropractic PBRN will be asked to fully comple	ete 1
22 23	200	electronic surv	ey of approximately 10 minutes duration. Clinician surveys will only b	be provided
24 25	201	in English as tl	his is the official language used for communication by ChiroSuisse. Ta	able 1
26 27 28	202	outlines the sp	ecific data which will be collected from clinicians for the development	of the
29	203	Swiss chiropra	notic DDDN Supplementary file 1 provides the date distingury and an	ecific
30	205	Swiss chilopia	ectic PBRN. Supplementary file 1 provides the data dictionary and spe	
30 31 32	204	-	ns which will be used for the Swiss chiropractic PBRN.	
30 31 32 33 34		response option		PBRN
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207	Main	outcomes	and	analysis
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208 The primary clinical outcome will be practitioner self-confidence in the clinical 209 management of patients with low back pain (as measured by the practitioner self-confidence 210 scale (PCS)).[24] The PCS contains four items with a total score of 20. A score of 4 represents higher self-confidence in the management of patients with low back pain, while a score of 20 211 represents lower self-confidence. The second primary clinical outcome will be practitioner 212 213 biomedical versus biopsychosocial MSK pain treatment orientation (as measured by the pain 214 attitudes and beliefs scale, musculoskeletal version (PABS-MSK)).[25] The PABS-MSK 215 contains two domains, with a higher score on either the domains (each 10-items, with a score 216 range of 10-60) representing higher biomedical and biopsychosocial MSK pain treatment 217 orientation. The order of 20 items of the PABS-MSK will be randomized using the 218 "randomizeR" package in RStudio and administered as a single questionnaire so as to mask 219 respondents to the specific treatment orientation domains. Both primary clinical outcomes will be reported as means and standard deviations (SDs), with 95% confidence intervals (CIs) 220 calculated as appropriate. 221

The feasibility outcomes are: 1) clinician participation proportion in the Swiss 222 chiropractic PBRN will be assessed by reporting the proportion of all eligible clinicians that 223 224 enroll in the PBRN development phase using raw numbers and percentages; and 2) motivation for clinician participation in the Swiss ChiCo pilot study will be assessed using a visual analog 225 226 scale (VAS, 0-100), with higher scores reflecting higher motivation for participation. Level of 227 motivation to participate in the Swiss ChiCo pilot study will be reported as means, SDs, and with 228 95% CIs calculated as appropriate. Participants who score 70 or more on the VAS will be 229 defined as "highly motivated", and described using raw numbers, proportions and 95% CIs.

231	Phase 2 – The Swiss chiropractic cohort (Swiss ChiCo) pilot study
232	Participants
233	Patients will be eligible to participate if they are 18 years of age or older; are seeking new
234	conservative healthcare for a MSK pain condition (new conservative healthcare seeking is
235	operationalised as not having received (patient-reported) chiropractic care, physiotherapy,
236	osteopathy or massage therapy for their current MSK complaint in the 1 month prior to their
237	current initial visit to the chiropractor and not a follow-up visit); consent to chiropractic
238	treatment; are able to respond to surveys in German, French, Italian, or English; have an active
239	email account; and are willing and able to complete electronic study questionnaires. Patient
240	participants will be excluded if they present to clinician practices with red flag symptoms (i.e.,
241	saddle anesthesia, loss of bowel and/or bladder control, history of major trauma, fracture, fever,
242	severe or rapidly progressive neurologic deficit, sudden unexplained weight loss), and/or with a
243	non-MSK based pain condition based on the chiropractor's clinical suspicion that symptoms
244	relate to a systemic disease.
245	

a 246 **Recruitment**

Following the development of the Swiss chiropractic PBRN, we plan to recruit a subset of
clinicians to participate in the Swiss ChiCo pilot study. Chiropractors will be recruited through
general interest, VAS motivation score (≥70) on the PBRN entry questionnaire, and using a
purposeful sampling approach based on Swiss chiropractic clinician distribution across German,
French, and Italian language regions of Switzerland (55% DE, 35% FR, 10% IT). The Swiss
ChiCo pilot study aims to recruit at least 20 chiropractors. Participating chiropractors will be
asked to recruit new consecutive patient participants from their clinical practices. We will hold

Page 12 of 38

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pilot study introductory meetings with participant clinicians and clinical staff to reinforce study objectives, methods and procedures prior to the tentative date for initiation of the patient cohort pilot study recruitment of April 01, 2022. During previous patient and public involvement work, Swiss chiropractors described the recruitment of 5 to 10 consecutive patients with new conservative onset MSK pain as feasible. Based on this work, we will aim to recruit at least 100 patient participants to enable a preliminary characterisation of the population, enabled by representative selection of chiropractic clinicians with respect to language region. A stopping point for recruitment will be set at 200 patients. Potentially eligible patients visiting a participating clinician will be first provided a study flyer, which will briefly outline the study objectives and participation requirements. Patients will then be asked to rate their initial level of interest to participate using a brief electronic survey. Those not interested will be prompted to provide reasons for non-participation. Patients expressing interest in participation will be forwarded to the full study information form and electronic informed consent procedure. This in-clinic patient participant procedure was developed in consultation with Swiss chiropractic clinicians (both women and men) across all language regions. To aid with workflow, clinicians expressed interest in asking new patients to arrive approximately 20 minutes prior to their appointment to complete electronic study forms. Clinicians also recommended adding "disruption to clinic workflow" as an option for eligible patient non-participation. This survey option would be selected by clinical staff when patient participant recruitment may greatly impact clinical workflow (e.g., patient was late for visit, emergency visit). Figure 2 outlines the in-clinic patient recruitment procedure.

276 Data collection procedures and variables

Page 13 of 38

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Immediately following completion of the in-clinic recruitment procedure, study participants will be forwarded to the first patient survey (pre-visit patient survey) on an electronic device (mobile phone or tablet). This pre-visit initial patient survey will collect information on clinical measures that are likely to be influenced by the first visit (i.e., pain impact, musculoskeletal health status, illness perception).[26-28] The pre-visit patient survey will take approximately 5 minutes to complete and is the only survey that is completed at clinical practices. Subsequent questionnaires will take approximately 10-12 mins to complete and are emailed directly to patient participants 1 hour after (post-visit patient survey), and at 2-, 6-, and 12-weeks following completion of the pre-visit survey. REDCap will be used for longitudinal data collection, with survey data transmitted automatically to the research team at Balgrist University Hospital and the University of Zurich. Similar administration procedures were performed for the Danish chiropractic low back pain cohort study. [29] Patient participant surveys will be provided in English, German, French and Italian, with patients having the ability to choose their preferred language for completion. Validated, translated versions of the patient reported outcome measures (PROMs) will be used when possible. [30-37] If not available, translation of the PROMs by a native speaker will be performed. Table 2 outlines specific outcome measures and timing of data collection for the Swiss ChiCo pilot study. Supplementary file 2 provides the data dictionary and specific response options to be used.

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Table 2. Outcome measures and timing of data collection for the Swiss ChiCo patient pilot study

Construct	Measurement method / instrument	Pre- visit	Post- visit	Wk 2	Wk 6	Wk 12
Clinic	Clinic name, clinician	X				
Demographics	Gender, age, nationality, level of education, smoking status		х			
	Work status, time lost from work due to pain complaint		х	Х	X	X
Injury characteristics	Naïve to chiropractic care		х			
	Duration of complaint		х			
	Location of pain complaint		х			
	Pain, enjoyment, general activity (PEG) scale [26]	x	х	Х	Х	X
	Other healthcare professional involved in care		х	Х	Х	X
	Number of chiropractic visits since initial visit			X	Х	X
Pain medication use	Medication use for pain reduction (prescription or non- prescription)		X	X	X	X
Imaging use	Diagnostic imaging use for this specific MSK complaint			Х	х	х
	Diagnostic imaging received in the past year for other complaint		Х			
Psychosocial profile	Örebro Musculoskeletal Pain Screening Questionnaire – Short Form (ÖMPSQ short) [38]		X			
COVID-19 aspects	Quality of life now compared to before COVID-19		Х			
	Activity compared to before COVID-19		Х			
	Cancelled medical treatment due to COVID-19		х			
MSK health status	Musculoskeletal health questionnaire (MSK-HQ) [27]	х	х	х	х	х
Illness perception	Brief illness perception questionnaire (Brief IPQ, Question 9) [28]	X				
				Х		Х

302 Main outcomes and analysis

The prespecified primary clinical outcomes will be: 1) change in musculoskeletal pain impact, as 303 304 measured by the 3-item pain, enjoyment, and general activity scale (PEG scale, score range 0-10) 305 [26] with higher scores representing worse outcomes; and 2) change in MSK health status, as 306 measured by the musculoskeletal health questionnaire (MSK-HQ, score range 0-56) [27] with 307 higher scores reflecting better health status. Clinical outcomes of the PEG scale and MSK-HQ prior to initial chiropractic assessment will be reported as means, SDs, and 95% CIs; and clinical 308 309 course of patient pain impact and MSK health status will be reported as a mean difference with 310 SDs and 95% CIs as appropriate. The primary feasibility outcomes will be: 1) the proportion of 311 invited patients presenting to chiropractic practices who subsequently agree to participate in this

study; and 2) change in patient participant follow-up and retention over 12 weeks. Invited patient participation will be reported as raw numbers and proportions. Patient participant retention will be reported as the proportion of enrolled participants who complete follow-up surveys across 12-weeks. Based on the definition of a PBRN from the Agency for Healthcare Research and Quality (AHRQ),[15] it will be deemed feasible to initiate the Swiss chiropractic PBRN and expand the Swiss ChiCo pilot study if at least 15 clinical practices agree to participate in the Swiss chiropractic PBRN and each recruit at least 5 patients for enrolment in the Swiss ChiCo pilot study. Ethics and dissemination The Swiss chiropractic PBRN and Swiss ChiCo pilot study have been reviewed and jointly approved by the independent research ethics committee of Canton Zurich (BASEC-Nr: 2021-01479). Informed consent will be obtained from both clinician and patient participants electronically upon entry into the Swiss chiropractic PBRN and the Swiss ChiCo pilot study. Clinician responses for PBRN development will be stored securely within REDCap, but not anonymous due to necessity of identifying clinicians to participate in future nested research projects. Data collected for PBRN development and for the Swiss ChiCo pilot study will be stored as two separate projects within REDCap. Individual-level data will not be shared with study stakeholders. The findings from the Swiss chiropractic PBRN and the Swiss ChiCo pilot study will be disseminated first to the various stakeholder groups involved in study development through individual meetings. Findings will also be presented through abstract and poster presentations at academic conferences and fully reported in peer-reviewed publications.

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336 Availability of data and materials

337 Data from this work will be made available for research purposes. Requests, including a synopsis338 of the study proposal, can be addressed to the corresponding author.

DISCUSSION

This project is designed to attract a large proportion of Swiss chiropractors into a nationwide
PBRN and subsequently recruit patients from participating clinics into a longitudinal cohort pilot
study. This approach combines a substudy PBRN model, with longitudinal electronic capture
more readily seen in register-based approaches. The unique collaboration with clinicians,
advocacy groups and academicians, a growing trend in health care research, has led to the
promotion of research objectives which are clinically relevant and patient-centred, and a study
implementation strategy vetted by Swiss chiropractic primary care clinicians.

Traditional health care research approaches typically face challenges with regards to study relevance, patient recruitment, and knowledge translation.[11,40] The use of a participatory research approach can help overcome such challenges by integrating the diverse knowledge, values, and preferences of non-academics into the research process. An example of a longitudinal register-based study successfully implementing this approach is the Swiss Multiple Sclerosis Registry (SMSR).[41] This project was designed in collaboration with the Multiple Sclerosis (MS) community in Switzerland to tackle the lack of epidemiological data and to promote patient-perspectives in MS research. Participatory elements of the SMSR include a flexible approach to study involvement based on participant comfort, involvement of patients in the study design and execution, and data feedback to provide ongoing results to participants. Due to such efforts, recruitment for the SMSR exceeded expectations; with the goal of 400 participants achieved in under 20 days.[42] A second example of a participatory research

approach driving recruitment are the recently established national osteopathy PBRNs of Australia (ORION) and New Zealand (ORC-NZ).[22] Here, the project team engaged with both osteopathic communities for 12 months prior to clinician recruitment. Today, these two PBRNs represent the largest coverage of any voluntary health profession PBRN, with 43.5% of all registered osteopaths in Australasia. The Swiss chiropractic PBRN has followed a similar approach, with community outreach and promotion efforts lasting 12 months prior to clinician recruitment.

What remains unclear is if early engagement of stakeholders can overcome the unique limitations of electronic observational studies. Typically, unequal access to technology resources and lack of digital literacy can lead to a young, well-educated, and high socio-economic status study sample. For example, participants in the SMSR who opt for physical forms are older, show increased care-seeking behaviour, and suffer from more progressive illness compared to those using electronic forms. This trend also extends to clinician participants, as our own 2019 survey on eHealth technology use among Swiss chiropractors showed clinicians 65 years and over were 74% less likely to use electronic health records (EHRs) when compared to the those under 40 years.[43] To limit this threat to external validity, the Swiss chiropractic PBRN will recruit clinicians through both online and in-person channels. In addition, chiropractic clinician recruitment for the Swiss ChiCo pilot study will be proportionally overweighted in French and Italian language regions. These areas have shown lowered use eHealth technology use when compared to the German speaking regions of Switzerland. To recruit a diverse group of patient participants, clinicians will be asked to consecutively recruit eligible patients from private practice. Although consecutive recruitment does not eliminate the threat of self-selection bias, it ensures all eligible participants seeking chiropractic care will be aware of the study and invited to participate in a nonselective manner. The Swiss chiropractic PBRN and Swiss ChiCo pilot

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3 4	384	study presents a model for PBRN development and rapid engagement of a newly created clinic	cal
5 6	385	research network. Once complete, this PBRN will serve as a platform for answering important	ļ
7 8	386	research questions in the field of MSK primary health care.	
9 10 11	387		
12 13	388	Figure 1. Nested design of the Swiss chiropractic PBRN and the Swiss ChiCo pilot study	
14 15	389		
16 17 18	390	Figure 2. Summary of the Swiss ChiCo pilot study in-clinic patient participant recruitment	
18 19 20	391		
21 22	392	ACKNOWLEDGEMENTS	
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28 29	395	engagement and support.	
30 31	396		
32 33 34	397	AUTHOR CONTRIBUTIONS	
35 36	398	CAH and RL conceived the project idea. RL, CAH, AK, VvW, MAP, and LH contributed to the	he
37 38	399	design of the protocol. RL and CAH designed, undertook, and coordinated stakeholder	
39 40 41	400	participatory activities. RL and CAH led the drafting of the protocol manuscript. All authors	
42 43	401	gave important intellectual input and provided critical review of the protocol manuscript and	
44 45	402	approved the final version of the manuscript. CAH obtained funding. RL and CAH are the	
46 47 48	403	guarantors of this manuscript. The corresponding author attests that all listed authors meet	
49 50	404	authorship criteria and that no others meeting the criteria have been omitted.	
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23 26 27	417	REFERENCES:
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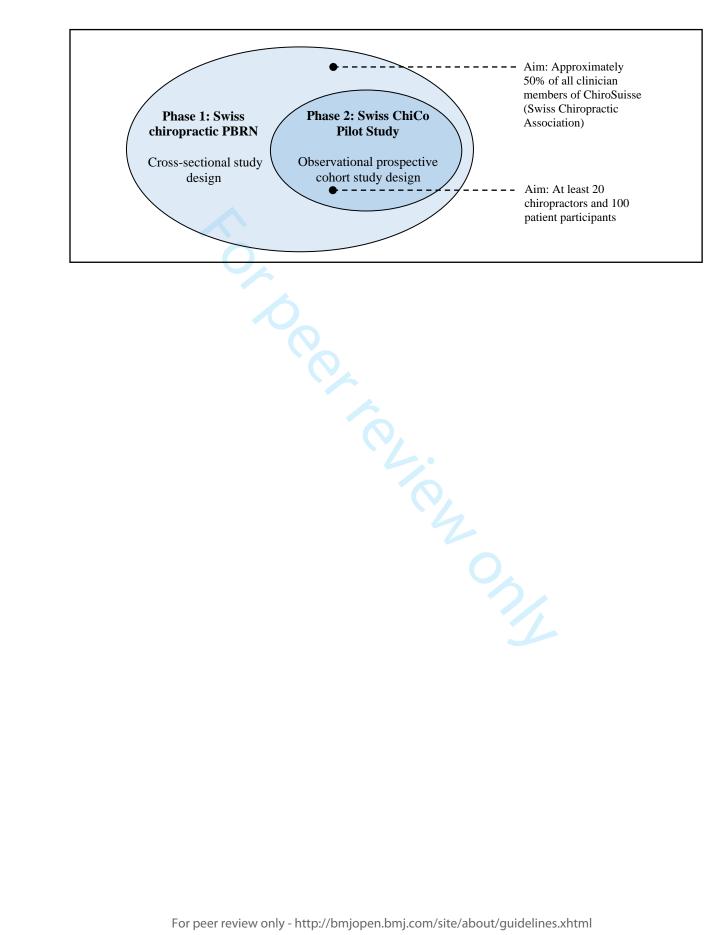
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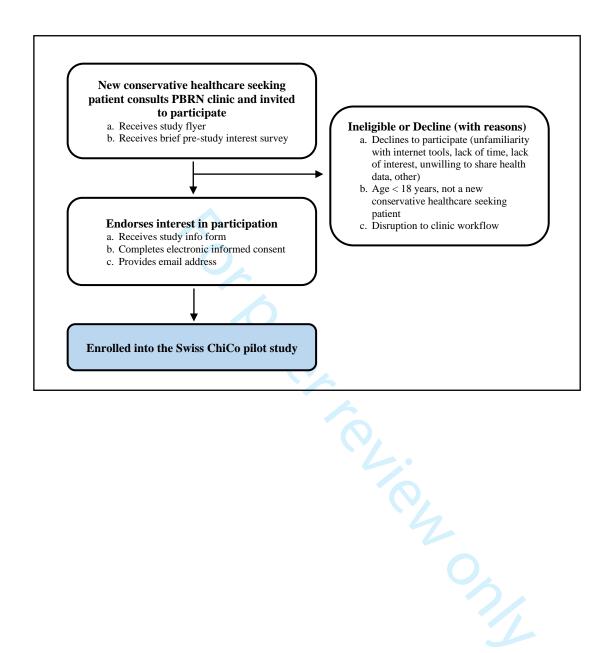
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# b of 38 **BMJ Open Supplementary material 1. Clinician reported-variables captured in the Swiss chiropractic practice-based research network**

Construct	Item Content	Variable Code	Choices, Calcudations, OR Slider Labels	Branching Logic
dentification	Record ID	record id		Branching Logic
	I consent to participate in the Swiss ChiCo study clinician survey	clin consent	1, Yes   2, No 🥰	
	Clinic name:	clinic name		
	Clinic address:	clinic address	20	
Demographics	Sex	sex	1, Male   2, Fenne	
vemographics	JCA	SCA	1, Male   2, Feinde 1, Assistant / Resident, first year   2, Assistant / Resident, second year   3, Fully licensed	
	ChiroSuisse member classification	membership	chiropractor	
	Years of chiropractic practice	practice years		
	Average number of patients seen per week over the last 3 months	n patients	$1, < 50 \mid 2, 50-9$ 3, 100-149 $\mid 4, 150-199 \mid 5, 200-249 \mid 6, \ge 250$	
	Average number of new patients seen per week over the last 3 months	n new	$1, < 50   2, 50   2, 50   5, 100   49   4, 150   199   5, 200   249   0, \geq 2501, 0   2, 1-3   3, 206   4, 7-9   5, 10-12   6, 13-15   7, 16-20   8, > 20$	
	How many chiropractors work at your clinic?	n chiros	1, 0   2, 13   3, 20   4, 73   5, 10   2, 0, 13   5, 70   2, 0, 13   7, 10   20   8, 20 1, 1   2, 2   3, 3 + 4   5, 5   6, 6  or more	
	Do you work with other healthcare professionals besides chiropractors?	other health	1, 1   2, 2   3, 3 ( <b>b</b> ), 4   3, 5   0, 6 of more	
		n otherhealth		[other health] = '1'
	How many other healthcare professionals work at your clinic?	n_othernealth	1, 1   2, 2   3, 3 <b>5</b> , 4   5, 5   6, 6 or more	[other_health] = 1
	Other healthcare practitioners involved in the practice (select all that apply)	specify otherhealth	1, Physiotherap   2, Massage therapist   3, Medical doctor   4, Acupuncturist   5, Nutritionist   6, Other {specify otherhealth2}	[other health] = '1'
	Other nearlineare practitioners involved in the practice (select an that apply)	· · -	Other {specing_othernealth2}	
		specify_otherhealth2	1 Destable 10 Destable 14 Descend 15 Destitut (Odess (eductors))	[specify_otherhealth(6)]
	What language do you primarily use in your practice?	lang	1, Deutsch   2, Français   3, Italiano   4, Romansh   5, English   6, Other {otherlang}	F11
requency with which each condition is managed in your practice	Nack main without one main	otherlang msk 1	1 Often   2 Sea Times   2 Densly   4 Never	[lang] = '6'
requency with which each condition is managed in your practice	1 1	-	1, Often   2, Sometimes   3, Rarely   4, Never	
	Neck pain with arm pain Neck pain with headache	msk_2 msk_3	1, Often   2, Sometimes   3, Rarely   4, Never	
	1	-	1, Often   2, Some times   3, Rarely   4, Never	
	Thoracic spine and rib pain	msk_4	1, Often   2, Sometimes   3, Rarely   4, Never	
	Low back pain without leg pain	msk_5	1, Often   2, Sometimes   3, Rarely   4, Never	
	Low back pain with leg pain	msk_6	1, Often   2, Sometimes   3, Rarely   4, Never	
	Shoulder pain	msk_7	1, Often   2, Sometimes   3, Rarely   4, Never	
	Elbow pain	msk_8	1, Often   2, Sometimes   3, Rarely   4, Never	
	Wrist and hand pain	msk_9	1, Often   2, Sometimes   3, Rarely   4, Never	
	Hip pain	msk_10	1, Often   2, Sometimes   3, Rarely   4, Never	
	Knee pain	msk_11	1, Often   2, Sometimes   3, Rarely   4, Never	
	Ankle and foot pain	msk_12	1, Often   2, Sonetimes   3, Rarely   4, Never	
	Jaw pain / TMJ pain	msk_13	1, Often   2, Sometimes   3, Rarely   4, Never	
	Degenerative spine disorders	msk_14	1, Often   2, Son times   3, Rarely   4, Never	
	Other degenerative joint disorders	msk_15	1, Often   2, Sometimes   3, Rarely   4, Never	
	Postural disorders	msk_16	1, Often   2, Southerman and Strategy   4, Never	
	Headaches	msk_17	1, Often   2, Sonetimes   3, Rarely   4, Never	
	Tendinopathy	msk_18	1, Often   2, Sometimes   3, Rarely   4, Never	
	Chronic pain	msk_19	1, Often   2, Sometimes   3, Rarely   4, Never	
	Spinal health maintenance	msk_20	1, Often   2, Soffeetimes   3, Rarely   4, Never	
	Non MSK complaints	msk_21	1, Often   2, Son times   3, Rarely   4, Never	
requency with which each patient type is managed in your				
ractice	Children (0-3 years of age)	patient_type1	1, Often   2, Sometimes   3, Rarely   4, Never	
	Children (4-18 years of age)	patient_type2	1, Often   2, Sometimes   3, Rarely   4, Never	
	Older persons ( $\geq 65$ years of age)	patient_type3	1, Often   2, Son times   3, Rarely   4, Never	
	Pregnant women	patient_type4	1, Often   2, Sometimes   3, Rarely   4, Never	
	Motor-vehicular accident injuries	patient_type5	1, Often   2, Son getimes   3, Rarely   4, Never	
	Work-related injuries	patient_type6	1, Often   2, Sometimes   3, Rarely   4, Never	
	Sport-related injuries	patient_type7	1, Often   2, Sometimes   3, Rarely   4, Never	
	Post surgical care and rehabilitation	patient_type8	1, Often   2, Sonetimes   3, Rarely   4, Never	
	Ethnic and minority groups	patient_type9	1, Often   2, Sometimes   3, Rarely   4, Never	
ractitoner confidence scale (PCS)	I lack the diagnostic tools or knowledge needed to effectively assess patients with low back pain	pcs_1	1, 1. Strongly agree   2, 2. Agree   3, 3. Not sure   4, 4. Disagree   5, 5. Strongly disagree	
	I know exactly what to do to effectively treat patients with low back pain	pcs_2	1, 1. Strongly a gee   2, 2. Agree   3, 3. Not sure   4, 4. Disagree   5, 5. Strongly disagree	
	I am very comfortable treating patients with low back pain	pcs_3	1, 1. Strongly agree   2, 2. Agree   3, 3. Not sure   4, 4. Disagree   5, 5. Strongly disagree	
	How well prepared to manage low back pain are you?	ncs 4	1 1 Very well 2 2 Well 3 3 Adequately 4 4 Poorly 5 5 Very poorly	
	ations of property of manage of the start of			
	patients For peer review only - nttp://bmjopen.bl	nj.com/site/ab	11, 1. Strongly agree 2, 2, Agree 3, 3, Not Sure 4, 4, Disagree 5, 5, Strongly Disagree	
	I feel confident working with a patient with low back pain not basing this on a structural diagnosis	pcs 6	1, 1. Strongly agree   2, 2. Agree   3, 3. Not sure   4, 4. Disagree   5, 5. Strongly disagree	1

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Construct	Item Content	Variable Code	Choices alculations, OR Slider Labels	Branching Logic
Pain Attitudes and Beliefs Musculoskeletal (PABS-MSK)		pabs med 1 (randomized	1, Totallodisagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	v _ v
Questionnaire - Biomedical	Pain is a nociceptive stimulus, indicating tissue damage	to Q17)	5, Largely agree   6, Totally agree	·
		pabs_med_2 (randomized	1, Totally disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	1
	Patients with musculoskeletal pain should preferably practice only pain free movements	to Q7)	5, Largey agree   6, Totally agree	
		pabs_med_3 (randomized	1, Totall disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	1
	Musculoskeletal pain indicates the presence of organic injury		5, Largely agree   6, Totally agree	
	If musculoskeletal pain increases in severity, I immediately adjust the intensity of treatment		1, Totall Hisagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	1
	accordingly	- /	5, Large Sagree   6, Totally agree	
	If therapy does not result in a reduction in pain, there is a high risk of severe restrictions in the	pabs_med_5 (randomized	1, Totally disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	1
	long term		5, Largewagree   6, Totally agree	
			1, Totall disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	Pain reduction is a precondition for the restoration of normal functioning		5, Large 💆 agree   6, Totally agree	
			1, Totall disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	Increased pain indicates new tissue damage or the spread of existing damage		5, Large agree   6, Totally agree	
			1, Totall disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	1
	If patients complain of pain during exercise, I worry that damage is being caused		5, Largely agree   6, Totally agree	
			1, Totallodisagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	The severity of tissue damage determines the level of pain	to Q11)	5, Largen agree   6, Totally agree	
	In the long run, patients with musculoskeletal pain have a higher risk of developing functional	`	1, Totallydisagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	impairments	to Q15)	5, Larger agree   6, Totally agree	
Pain Attitudes and Beliefs Musculoskeletal (PABS-MSK)		pabs_biopsyc_1	1, Totalle disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
Questionnaire - Biopsychosocial	Biological, psychological and social factors should be included in the clinical assessment		5, Large gagree   6, Totally agree	
		pabs_biopsyc_2	1, Total disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	How a patient currently copes with their pain problem must be assessed		5, Larger agree   6, Totally agree	
		pabs_biopsyc_3	1, Totalledisagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	The reaction of a patient's family and friends will promote recovery		5, Largely agree   6, Totally agree	
		pabs_biopsyc_4	1, Totall disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	A patient's beliefs about the cause of their musculoskeletal pain must be understood		5, Largery agree   6, Totally agree	
		pabs_biopsyc_5	1, Totalle disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	Specific and realistic goals for treatment must be agreed		5, Large agree   6, Totally agree	
		pabs_biopsyc_6	1, Totally disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	A patients perceived barriers to work must be assessed		5, Largel agree   6, Totally agree	
		pabs_biopsyc_7	1, Totall disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	A patient's expectations about treatment for musculoskeletal pain affect their outcome		5, Large agree   6, Totally agree	
		pabs_biopsyc_8	1, Totally disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	I consider a patient's social support network in my clinical management		5, Large agree   6, Totally agree	
	A patient's physical activity level should be considered in the management of their	pabs_biopsyc_9	1, Totally disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	musculoskeletal pain problem	(randomized to Q12) pabs biopsyc 10	5, Large agree   6, Totally agree	
	Deducine e notion the face is acceptial to the treatment measure		1, Totall Relisagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
Digitalization of clinics	Reducing a patient's fear is essential to the treatment process		5, Largeby agree   6, Totally agree 1, Yes. Mse only an EPR system   2, Partially. I use a mix of an EPR and paper	
Digitalization of chines	Do you use an electronic patient record (EPR) system for clinical record keeping in your practice		3, No. I see a paper-based system, but am considering switching   4, No. I use only a paper-	
	Please indicate the Manufacturer Name and Product Name for the EPR information system that		based symperm	[epr_use] = '1' or [epr_u
	you use in practice.	epr manu prod		12'
	Please indicate the Manufacturer Name and Product Name for the EPR information system that	epr_manu_prod considerin	Protect	2
	you are considering to use in practice	a		[epr_use] = '3'
	Do you use a secure/encrypted email system for patient communication in your practice (e.g.,	5	0	[epi_use] = 5
	HIN or ProtonMail)?	secure email use	1, Yes   💇 No	
	Please indicate the Product Name for the secure/encrypted email system you use in practice.	email manu prod		[secure email use] = '1
	How would you compare your quality of life now, when compared to before the COVID-19	prod	by	[use]
	pandemic?	cov_clin_1	1, Better 2, Similar   3, Worsened	
	How have your patient numbers been affected since the start of the COVID-19 pandemic?	cov_clin_1	1, Increased   2, Unchanged   3, Decreased	
	Have you changed your work hours since the start of the COVID-19 pandemic?	cov_clin_3	1, Increased   2, Unchanged   3, Decreased	
	Does your clinic offer telehealth/virtual care services?	cov_clin_4	1, Yes   QNo   3, No, but I am considering integrating it into my practice	
	How has patient use of telehealth or virtual care services changed since the start of the COVID-1			
	pandemic?	telehealth	1, Increased use   2, Unchanged   3, Decreased use	[cov clin 4] = '1'
	On a scale from 0 to 100 how_motivated are you to participate in the patient cohort phase of the Swiss ChiCo study? FOT PEET REVIEW ONLY - http://bmjopen.bm		-,	

#### Supplementary material 2. Patient-reported variables captured in the Swiss ChiCo pilot patient cohort

Construct       Image: Construct       Chained Content       Chained Content       Chained Content       Chained Content       Chained Content       Branching         Construct       Reasons for non-participation       Are you interested in participating in this study?       record_id       interest       1, Y S 1, No       1, Y S	38 Supplementary mat	terial 2. Patient-reported variables captured in the Swiss	BMJ Open	21-059380 on	
Items of responsibility         Normality         Operation of the strength of participating and strength of partic		• •		<u> </u>	Duran kina Lania
School at in dig regime     Note and particular generalization of the sep set					Branching Logic
Image:			-	1, Y es 2, No	
brief in a support table of the set of the					[chico_interest] = '2' [nonparticipation(6)] = '1'
$ \frac{1}{12} (1) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2$			clinic_disrup	1, Dispetion to clinic workflow	[nonparticipation(6)] = '1'
<ul> <li>Julie and Jacks</li> <li>Jul</li></ul>	ain, enjoyment and general		peg_q1_beforetx / peg_q1 / peg_q1_2wks / peg_q1_6wks /	1, 0 = Vo pain   2, 1   3, 2   4, 3   5, 4   6, 5   7, 6   8, 7   9, 8   10, 9   11, 10 = Pain as	
Interface       project       Disk       project       Disk					
Wate runnies liest solutions look, during the past week, prime has interfaced with your genome week of the solution of the past week of the past w					
Interclosket and the second state of the se					
Hareubackella health proteinanter (MSA) Derivitative sease your sumal joint or muscle pain and/or stiffness overall during the day in the last proteinanter (MSA) Calificial a hundline, 1 hour, 2, 6 (deriver was your sumal joint or muscle pain and/or stiffness overall during the day in the last proteinanter (MSA) Calificial a hundline, 1 hour, 2, 6 (deriver mask, q.2) select mask, q.2) forks mask		what number best describes now, during the past week, pain has interfered with your general activity		1, 0 = 0 oes not interferes Completely interferes	
unitability of the second s	Ausculoskeletal health	•	pog_d5_12 wks		
Calebrace during the sight of muscle pain and/or stiffness overall during the duy in the last 2, what and 2		1. Pain/stiffness during the day		Η Ă	
<ul> <li>2. Puniotiffies outing the right</li> <li>How setting the right</li> <li>How much have your supposes interfered with your shifty to wake in the last 2 weeks?</li> <li>How much have your symptoms interfered with your shifty to wake or dress yoursell for the last 2 weeks?</li> <li>How much have your symptoms interfered with your shifts (s.g. going for a wake yoursell point on the last 2 weeks?</li> <li>How much have your symptoms interfered with your social activities (s.g. going for a wake yoursell have your in the hast 2 weeks?</li> <li>How much have your into muck yoursel your out on physical activities (s.g. going for a wake yoursell) in the last 2 weeks?</li> <li>How much have your into muck yoursell your out on the last 2 weeks?</li> <li>How much have your into muck yoursell the bowar?</li> <li>How much have your into muck yoursell the bowar?</li> <li>How much have your into muck yoursell the bowar?</li> <li>How much have your into muck yoursell the bowar?</li> <li>How much have your into muck yoursell the bowar?</li> <li>How much have your into muck yoursell the bowar?</li> <li>How much have your into muck yoursell the bowar?</li> <li>How much have your into muck yoursell the bowar?</li> <li>How much have your into muck yoursell the bowar?</li> <li>How much have your into muck yoursell the bowar?</li> <li>How much have your into muck yoursell the bowar?</li> <li>How much have your into muck yoursell the bowar?</li> <li>How much have your into muck yoursell the bowar?</li> <li>How much have your into muck yoursell the form others (including family, friends or carer) because of your yintor muck yoursell activities (a.g. glober's much, gl, Jawas and a glober's (much, gl, Jawas and glober's (much, glober's (much, gl, Jawas and glober's (much, glober's (much, glober's (much, glober's (much, glober's (much, glober's (much, glo</li></ul>	Collected at baseline, 1 hour, 2-, 6-	How severe was your usual joint or muscle pain and/or stiffness overall during the day in the last 2	mskhq_q1_beforetx / mskhq_q1 / mskhq_q1_2wks /		
How server was your unaid joint or mucke pain and/or stiffness overal during the night in the silemichal of a botts (michal, q, 2) which (q, 2) which	and 12-wks		mskhq_q1_6wks / mskhq_q1_12wks	1, Notest all   2, Slightly   3, Moderately   4, Fairly severe   5, Very severe	
week? J. Waking Kow much have your symptoms interfered with your ability to walk in the last 2 weeks? A. Wahing Threasing Kow much have your symptoms interfered with your ability to walk or dress yourself in hels at 2 weeks? S. Physical activities and bothysical to the level you want because of your joint or muscle symptoms in the last 2 weeks? S. Waking approximation interfered with your ability to walk or dress yourself in hels at 2 weeks? S. Waking approximation interfered with your ability to walk or dress yourself in hels at 2 weeks? S. Waking approximation interfered with your ability to walk or dress weeks? S. Waking approximation interfered with your ability to walk or dress weeks? S. Waking approximation interfered with your work or daily routine in the last 2 weeks? S. Waking approximation interfered with your work or daily routine in the last 2 weeks? S. Waking approximation interfered with your social activities and hobbits in the last 2 weeks? S. Waking approximation interfered with your social activities and hobbits in the last 2 weeks? S. Swaking approximation in the last 2 weeks? S. Swaking approxima					
3. Walking       msking af j. beforest / msking af j. beforest / msking af j. 2wsk / m					
How much have your symptoms interfered with your ability to wak in the last 2 weeks?nskba_q4_fowks/ makha_q4_fixkd, q4_2wsk1, Nograull 12, Slightly 13, Moderniely 14, Severely 15, Unable to walkHow much have your symptoms interfered with your ability to wash or dress yourself in the last 2 weeks?nskba_q4_fowks/ makha_q4_fixkd, q4_2wsk1, Nograull 12, Slightly 13, Moderniely 14, Severely 15, Unable to walk or dress yourself in the last 2 weeks?Now much have your symptoms interfered with your work or daily outsing a trivities (e.g. going for a walk or yourself)mskba_q4_fowks/ mskba_q5_2/awsk1, Nograull 12, Slightly 13, Moderniely 14, Severely 15, Unable to do physical activities (e.g. going for a walk or yourself)How much have your joint or mucele symptoms interfered with your work or daily outsing the last 2 weeks?mskba_q4_fowts/ mskba_q5_2/awsk1, Nograull 12, Slightly 13, Moderniely 14, Severely 15, ExtremelyHow much have your piont or mucele symptoms interfered with your work or daily outsing the mose)?mskba_q4_fowts/ mskba_q5_2/msk1, Nograull 12, Slightly 13, Moderniely 14, Severely 15, ExtremelyHow much have your piont or mucele symptoms in the last 2 weeks?mskba_q4_fowts/ mskba_q5_2/msk1, Nograull 12, Slightly 13, Moderniely 14, Severely 15, ExtremelyNeeding HopNoeding Hopmskba_q4_fowts/ mskba_q5_2/msk1, Nograull 12, Slightly 13, Moderniely 14, Severely 15, ExtremelyHow offen have your piont or mucele symptoms in the last 2 weeks?nskba_q4_fowts/ mskba_q5_2/msk1, Nograull 12, Slightly 13, Moderniely 14, Severely 15, ExtremelyHow offen have your field in the sit 2 weeks?nskba_q4_fowts/ mskba_q6_1/mskba_q6_1/2wsk1, Nograull 12, Slightly 13, Moderniely 14, Severely 15, Extremely <td></td> <td></td> <td></td> <td>O</td> <td></td>				O	
4. Washing/Dessing       Image: A marking of a marking o		e		Notest all 2 Slightly 3 Moderately 4 Severely 5 Unable to walk	
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5. Physical activity levelsImage: Control of the level you wants because of your joint or muscle symptoms in the last 2 weeks?Image: Control of the level you want because of your joint or muscle symptoms in the last 2 weeks?Image: Control of the level you want because of your joint or muscle symptoms interfered with your work or daily routine in the last 2 weeks?Image: Control of the level you want because of your joint or muscle symptoms interfered with your work or daily routine in the last 2 weeks?Image: Control of the level you want because of your joint or muscle symptoms interfered with your social activities and hobbies in the last 2 weeks?Image: Control of the level you want because of your joint or muscle symptoms interfered with your social activities and hobbies in the last 2 weeks?Image: Control of the level you want because of your joint or muscle symptoms in the last 2 weeks?Image: Control of the level you want because of your joint or muscle symptoms in the last 2 weeks?Image: Control of the level you want because of your joint or muscle symptoms in the last 2 weeks?Image: Control of the level you want because of your joint or muscle symptoms in the last 2 weeks?Image: Control of the level you want because of your joint or muscle symptoms in the last 2 weeks?Image: Control of the level you want because of your joint or muscle symptoms in the last 2 weeks?Image: Control of the level you want because of your joint or muscle symptoms in the last 2 weeks?Image: Control of the level you want because of your joint or muscle symptoms in the last 2 weeks?Image: Control of the level you want because of your joint or muscle symptoms in the last 2 weeks?Image: Control of the level you want because of your joint or muscle symptoms in the last 2 weeks?Image: Control of the level you want because of your joint or muscle symptoms in the last 2 w			mskhq_q4_beforetx / mskhq_q4 / mskhq_q4_2wks /	1, Novat all   2, Slightly   3, Moderately   4, Severely   5, Unable to wash or dress	
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b       b       b       workduity routine       mskhq_q5_12wks       activities         6       Workduity routine       mskhq_q5_6wks / mskhq_q6_2wks /       mskhq_q6_2wks /       mskhq_q6_2wks /         1       Nordiculty routine in the last 2 weeks?       mskhq_q6_beforetx / mskhq_q6_12wks       in Nordiculty routine in the last 2 weeks //         1       Nordiculty routine in the last 2 weeks?       mskhq_q6_beforetx / mskhq_q6_12wks       in Nordiculty routine in the last 2 weeks //         1       Nordiculty routine in the last 2 weeks?       mskhq_q6_beforetx / mskhq_q8_12wks       in Nordiculty routine in the last 2 weeks //         8       Needing Help       mskhq_q8_beforetx / mskhq_q8_12wks       in Nordiculty routine in the last 2 weeks //         9       Sleep       mskhq_q9_beforetx / mskhq_q8_1/2wks       in Nordiculty routine in the last 2 weeks //         10       Faire or low energy have you foil in the last 2 weeks //       mskhq_q9_beforetx / mskhq_q9_risks_q4_g2_wks //       in Nordiculty routine in the last 2 weeks //         10       Faire or low energy have you foil in the last 2 weeks //       mskhq_q1_0/mskq_q1_12wks       in Nordiculty routine in the last 2 weeks //         10       Faire or low energy have you fiel in the last 2 weeks //       mskhq_q1_0/mskq_q1_2/wks //       in Nordiculty routine in wheq_q1_0/mskq_q1_2/wks //       in Nordiculty routine in the last 2 weeks //       in Nordiculty routine muscle sym				8	
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2 weeks       inskhq_q0_6wks / mskhq_q0_12wks       I, Net all [2, Slightly ]3, Moderately [4, Severely ]5, Extremely         7. Social activities and hobbies in       mskhq_q0_6wks / mskhq_q0_12wks /       inskhq_q0_2wks /         1 he last 2 weeks?       mskhq_q0_6wks / mskhq_q0_12wks       I, Net all [2, Slightly ]3, Moderately [4, Severely ]5, Extremely         9. Skeep       mskhq_q0_6wks / mskhq_q0_12wks       I, Net all [2, Slightly ]3, Moderately [4, Severely ]5, Extremely         9. Skeep       mskhq_q0_6wks / mskhq_q0_12wks       I, Net all [2, Slightly ]3, Moderately [4, Severely ]5, Extremely         9. Skep       mskhq_q0_6wks / mskhq_q0_12wks       I, Net all [2, Slightly ]3, Moderately [4, Severely ]5, Extremely         10. Faigue of low energy       mskhq_q0_firetx / mskhq_q0_right / mskhq_q0_righ			mskha a6 beforety/mskha a6/mskha a6 2wks/		
7. Social activities and hobbies       mskhq_q7_beforetx / mskhq_q7_mskhq_q7_2wks /       inskhq_q7_beforetx / mskhq_q7_mskhq_q7_2wks /         How much have your pint or muscle symptoms in the last 2 weeks?       mskhq_q7_beforetx / mskhq_q8_mskhq_q8_2wks /       inskhq_q8_beforetx / mskhq_q8_mskhq_q8_2wks /         0. Steep       mskhq_q9_beforetx / mskhq_q9_l2wks       mskhq_q9_beforetx / mskhq_q9_l2wks /       inskhq_q9_beforetx / mskhq_q9_l2wks /         0. Steep       mskhq_q10_beforetx / mskhq_q10_l2wks       mskhq_q10_beforetx / mskhq_q10_l2wks /       inskhq_q10_beforetx / mskhq_q10_l2wks /         10. Farigue or low energy       mskhq_q11_beforetx / mskhq_q11_l2wks /       inskhq_q12_beforetx / mskhq_q11_l2wks /       inskhq_q12_beforetx / mskhq_q11_l2wks /         11. Ennotianal well-being       mskhq_q12_beforetx / mskhq_q11_l2wks /       inskhq_q12_beforetx / mskhq_q11_l2wks /       inskhq_q12_l2wks /         12. Understanding of your condition and any current treatment       mskhq_q12_beforetx / mskhq_q11_l2wks /       inskhq_q12_beforetx / mskhq_q11_l2wks /       inskhq_q12_beforet / mskhq_q11_l2wks /         13. Confidence in being able to manage your symptoms       mskhq_q12_beforetx / mskhq_q12_l2wks /       inskhq_q12_beforet / mskhq_q12_l2wks /       inskhq_q12_beforet / mskhq_q12_l2wks /         13. Confidence in being able to manage your symptoms, how well do you feel you understand your condition and any current treatment (including your dingoins and medication)?       mskhq_q12_beforetx / mskhq_q12_l2wks /       inskhq_q12_beforet / mskhq_q1				المحلي 1, NoPat all   2, Slightly   3, Moderately   4, Severely   5, Extremely	
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Thinking about your joint or muscle symptoms, how well do you feel you understand your condition       mskhq_q12_/mskhq_q12_/mskhq_q12_/mskhq_q12_wsks /         and any current treatment (including your diagnosis and medication)?       mskhq_q12_beforetx / mskhq_q12_l2wks       I, Coupletely   2, Very well   3, Moderately   4, Slightly   5, Not at all         13. Confidence in being able to manage your symptoms       mskhq_q13_beforetx / mskhq_q13_mskhq_q13_wsk       I         How confident have you felt in being able to manage your joint or muscle symptoms betomed you overall in the last 2 weeks?       mskhq_q14_mskhq_q14_mskhq_q14_wsk       I         14. Overall Impact       mskhq_q14_beforetx / mskhq_q14_l2wks       mskhq_q14_wsk / mskhq_q14_l2wks       I, Noet at all   2, Slightly   3, Moderately   4, Very much   5, Extremely			lisking_q11_0wks7 lisking_q11_12wks		
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13. Confidence in being able to manage your symptoms       mskhq_q13_beforetx / mskhq_q13_2wks /       S         How confident have you felt in being able to manage your joint or muscle symptoms by yourseli in       mskhq_q13_beforetx / mskhq_q13_2wks /       S         the last 2 weeks (e.g. medication, changing lifestyle)?       mskhq_q13_beforetx / mskhq_q13_12wks       I, Externely [2, Very   3, Moderately   4, Slightly   5, Not at all         14. Overall Impact       mskhq_q14_beforetx / mskhq_q14_12wks       I, Not at all [2, Slightly   3, Moderately   4, Very much   5, Extremely		and any current treatment (including your diagnosis and medication)?		1, Completely   2, Very well   3, Moderately   4, Slightly   5, Not at all	
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How much have your joint or muscle symptoms bothered you overall in the last 2 weeks? mskhq_114_6wks / mskhq_114_12wks 1, Norther all   2, Slightly   3, Moderately   4, Very much   5, Extremely				1, Extremely   2, Very   3, Moderately   4, Slightly   5, Not at all	
		*		1 North all 2 Slightly 3 Moderately 4 Vary much 5 Extremely	
				1, 190 m an   2, Signuy   5, Wouclatery   4, Very much   5, Extremely	
In the past week, on how many days have you done a total of 30 mikes are builded activity with any with a ctivity 2 wks / mskhq_activity 6 wks /			mskhq activity 2wks/mskhq activity 6wks/		

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			on <u>1</u>	
Construct	Item Content	Variable Code		Branching Logic
	Please list in rank-order the three most important factors that you believe caused your current pain		Lu uy	
Brief illness perception (IPQ brief) Collected at baseline	complaint	briefillness		
Collected at baseline		ipq_q1		
		ipq_q2 ipq_q3	2022	
emographics	Sex	sex_p	1, Male <del>  2</del> , Female	
Collected 1 hour after initial		r	0	
assessment	Nationality	nationality	1, Swis 2, Non-Swiss	
	Highest level of education	education	1, Competisory   2, Secondary   3, Tertiary	
	At present, are you working	Job	1, Full the at your usual job   2, Full time at a lighter job   3, Part time   4, Not	
			workin🔂 disability   5, Not working - IV/pensioner applicant	
			6, Hou wife/Househusband   7, Retired (not disability)   8, Unemployed   9,	
			Student	
				[job] = '1' or [job] = '2' or [job] =
	How would you describe the total physical strain caused by your work?	workstrain	1, Very Light   2, Light   3, Somewhat strenuous   4, Strenuous   5, Very strenuous	or [job] = '6' or [job] = '9'
	Have you missed any days of work due to your current pain complaint?	sick_leave	1, Yes 🔁 No	F . 1 . 1 . 11
	How many days of sick leave have you had in the last 2 weeks ? Smoking Status	n_sickleave smoking	1, Current smoker   2, Previous smoker   3, Never smoker	[sick_leave] = '1'
	How much do you smoke on average per day?	n cigarettes	1, Current smoker   2, Previous smoker   5, Never smoker	[smoking] = '1'
	Have you visited a chiropractor before?	n_cigarettes	1, I am w to chiropractic   2, I have visited a chiropractor before	[smoking] - 1
njury Characteristics	Have you visited a enhibitation before.	md currentpain	1, Yes 2, No	
Collected 1 hour after initial		ing_ourientpain	.,	
assessment	Were you referred to chiropractic care for your pain complaint from a healthcare professional?	referral source	1, Yes 💆 No	
		-	1, Other hiropractor   2, Family practitioner   3, Internist   4, Orthopaedic surgeon	
	Which healthcare professional referred you to chiropractic care?	hcrefer_specify	5, Physical therapist   6, Massage therapist   7, Other	[referral_source] = '1'
	Please specify which healthcare professional referred you to chiropractic care.	hc_refer_other		[hcrefer_specify] = '7'
			1, 1-2 days   2, 3-7 days   3, 1-2 weeks   4, 2-4 weeks   5, 1-3 months   6, 4-12 month	is
	How long has it been since your current pain complaint began?	date_of_inj	7, Mogethan 12 months	
	Main location of pain complaint	pain_complaint	1, Low Fack pain   2, Low back pain with leg pain   3, Neck pain   4, Neck pain with	1
			arm part 5, Middle back pain   6, Headache   7, Shoulder pain   8, Hip pain   9,	
			Knee pain   10, Pain in multiple areas   11, Other	
	Please specify the main location of your pain complaint	pain_complaint_other medication		[pain_complaint] = '11'
maging Use	Are you currently taking medication to reduce your pain? In the last 1 month have you received any diagnostic imaging for your current pain complaint?	image postvisit	1, Yes, prescription medication   2, Yes, non-prescription medication   3, No 1, Yes 🔉 No	
Collected 1 hour after initial	in the last 1 month have you received any diagnostic imaging for your current pain complaint?	image_postvisit		
ssessment	X ray (radiography) in the last 1 month?	xray postvisit	1. Yes $\frac{N}{2}$ No   3. Unsure	[image postvisit] = '1'
55655ment	Ultrasound scan in the last 1 month?	ultra postvisit	1, Yes $\mathcal{G}$ , No   3, Unsure	[image postvisit] = '1'
	MRI scan in the last 1 month?	mri postvisit	1, Yes $(a, No   3, Unsure)$	[image postvisit] = '1'
	CT scan in the last 1 month?	ctscan postvisit	1, Yes 🙀, No   3, Unsure	[image postvisit] = '1'
	In the last 1 year have you received diagnostic imaging for any pain complaint?	imaging1y_postvisit	1, Yes 🙆, No	
	X-ray (radiography) in the last 1 year?	xray_1yr	1, Yes 2, No   3, Unsure	[imaging1y_postvisit] = '1'
	Ultrasound scan in the last 1 year?	ultrasound_1yr	1, Yes 🔤, No   3, Unsure	[imaging1y_postvisit] = '1'
	MRI scan in the last 1 year?	mri_1yr	1, Yes 🕰 No   3, Unsure	[imaging1y_postvisit] = '1'
	CT scan in the last 1 year?	ctscan_1yr	1, Yes 😫, No   3, Unsure	[imaging1y_postvisit] = '1'
OVID-19 aspects	How is your quality of life at the moment compared to the time before the COVID-19 pandemic?	patient_cov_1	1, Betten 2, Similar   3, Worsened	
Collected 1 hour after initial	How are your physical activity habits at the moment compared to the time before the COVID-19			
assessment	pandemic?	pat_cov_2	1, Bette 2, Similar   3, Worsened	
	Have you been unable to seek planned or necessary medical treatment because of the COVID-19		1, Yes &, No	
	pandemic? What tracter and could you not mortisize to in because of the COVID-10 reademic?	pat_cov_3	I, Yes B, No	Frat. any. 21 - 11
	What treatment could you not participate in because of the COVID-19 pandemic? Would you be interested in receiving virtual or telehealth chiropractic sessions?	pat_cov_4		[pat_cov_3] = '1'
	would you be interested in receiving virtual or telehealth chiropractic sessions?	virtual	1, Yes,굲; No   3, Unsure	

38		BMJ Open	21-059380	
	1		9	
Construct	Item Content	Variable Code	→ Choices, Calculations, OR Slider Labels	Branching Logic
Orebro Musculoskeletal Pain			1, 0-1 weeks   2, 2-3 weeks   3, 4-5 weeks   4, 6-7 weeks   5, 8-9 weeks   6, 10-11	
Screening Questionnaire - Short Collected 1 hour after initial	How long have you had your current pain complaint?	omps_q1	weeks   7, 12-23 weeks   8, 24-35 weeks   9, 36-52 weeks   10, > 52 weeks 1, 0 No pain   2, 1   3, 2   4, 3   5, 4   6, 5   7, 6   8, 7   9, 8   10, 9   11, 10 = Pain as	
	How would you rate the pain that you have had during the past week?	omps_q2	bad $\mathbf{M}$ t could be	
ussessment	now would you rate the pain that you have had during the past week.	omps_q2	1, 0 Absolutely calm and relaxed $ 2, 1 3, 2 4, 3 5, 4 6, 5 7, 6 8, 7 9, 8 10, 9$	
	How tense or anxious have you felt in the past week?	omps_q5	$11, \mathbf{N} = $ As tense and anxious as I've ever felt	
		· - ·	1, 0 Not at all   2, 1   3, 2   4, 3   5, 4   6, 5   7, 6   8, 7   9, 8   10, 9   11, 10 =	
	How much have you been bothered by feeling depressed in the past week?	omps_q6	Extrepely	
			$1, 0 \ge No risk   2, 1   3, 2   4, 3   5, 4   6, 5   7, 6   8, 7   9, 8   10, 9   11, 10 = Very large$	
	In your view, how large is the risk that your current pain may become persistent?	omps_q7		
	In your estimation, what are the chances you will be working your normal duties in 3 months?	amps al	1, 0 No chance   2, 1   3, 2   4, 3   5, 4   6, 5   7, 6   8, 7   9, 8   10, 9   11, 10 = Very larger hance	
	in your estimation, what are the chances you will be working your normal duties in 5 months:	omps_q8	1, 0 Completely disagree $ 2, 1 3, 2 4, 3 5, 4 6, 5 7, 6 8, 7 9, 8 10, 9 11, 10$	
	An increase in pain is an indication that I should stop what I'm doing until the pain decreases.	omps_q9	= Completely as gree $(2, 1, 3, 2, 4, 5, 5, 4, 6, 5, 7, 5, 6, 7, 7, 5, 6, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7,$	
		1 _1	1, 0 $\stackrel{\text{O}}{=}$ Completely disagree   2, 1   3, 2   4, 3   5, 4   6, 5   7, 6   8, 7   9, 8   10, 9   11, 10	
	I should not do my normal work with my present pain.	omps_q10	= Completely agree	
			1, 0 Can't do it because of the pain problem   2, 1   3, 2   4, 3   5, 4   6, 5   7, 6   8, 7	
	I can do light work for an hour	omps_q3	9, 8 $10, 9 \mid 11, 10 = Can do it without pain being a problem$	
	I can sleep at night.	omps q4	1, 0 $\overrightarrow{c}$ an't do it because of the pain problem $ 2, 1 3, 2 4, 3 5, 4 6, 5 7, 6 8, 7 $ 9, 8 $\overrightarrow{d}$ 0, 9   11, 10 = Can do it without pain being a problem	
Follow-up Questionnaire: injury	In the last 2 wks / 4 wks / 6 wks have you had any follow-up visits with the chiropractor for your	onps_q4	9, 8 0, 9 11, 10 - Can do it without pain being a problem	
	pain complaint?	fu chiro 2wks / fu chiro 6wks / fu chiro 12wks	1, Y 2, No	
	t t			[fu_chiro_2wks] / [fu_chiro_6
Collected at 2-, 6-, and 12-wks	How many times have you seen your chiropractor in the last 2 wks / 4 wks / 6 wks?	nfu_chiro_2wks / nfu_chiro_6wks / nfu_chiro_12wks	1, Oree   2, 2-4 times   3, More than 4 times	[fu_chiro_12wks] = '1'
	In the last 2 wks / 4 wks / 6 wks have you visited another healthcare professional other than your		이 큰.	
	chiropractor for your pain complaint?	hc_2wks / hc_6wks / hc_12wks	1, Y 👩 2, No	
		nfu_otherhealth_2wks / nfu_otherhealth_6wks /		[hc_2wks] / [hc_6wks] / [hc_1
	How many times have you visited another healthcare professional in the last 2 wks / 4 wks / 6 wks?	nfu_otherhealth_12wks	1, Once   2, 2-4 times   3, More than 4 times	[hc_2wks] / [hc_6wks] / [hc_1
	Medical doctor visit in the last 2 wks / 4 wks / 6 wks for your pain complaint?	gp_2wks / gp_6wks / gp_12wks	1, Yes 2, No	= '1'
				[hc 2wks]/[hc 6wks]/[hc 1
	Physiotherapist visit in the last 2 wks / 4 wks / 6 wks for your pain complaint?	physo_2wks / physo_6wks / physo_12wks	1, Y 🛃 2, No	= '1'
			N 1, Yes 2, No	[hc_2wks] / [hc_6wks] / [hc_1
	Other healthcare professional seen in the last 2 wks / 4 wks / 6 wks for your pain complaint?	otherhealth_2wks / otherhealth_6wks / otherhealth_12wks		= '1'
		and the share of the second	20	[otherhealth_2wks] /
	Which other healthcare professional did you see?	specif_otherhealth_2wks / specif_otherhealth_6wks / specif_otherhealth_12wks	24	[otherhealth_6wks] / [otherhealth_12wks]= '1'
	Are you currently taking medication to reduce your pain?	medication 2wks / medication 6wks / medication 12wks	1, Y& prescription medication   2, Yes, non-prescription medication   3, No	[othernealth_12wks]- 1
	Have you missed any days of work due to your pain complaint in the last 2 wks / 4 wks / 6 wks?	sickleave 2wks/sickleave 6wks/sickleave 12wks		
	How many days of sick leave have you had in the last 2 wks / 4 wks / 6 wks due to your pain		1, Yes   2, No	[sickleave_2wks] / [sickleave_
	complaint?	n_sickleave_2wks / n_sickleave_6wks / n_sickleave_12wks	- Si	/ [sickleave_12wks] = '1'
	In the last 2 wks / 4 wks / 6 wks have you received any diagnostic imaging for your pain complaint?	imaging_2wks / imaging_6wks / imaging_12wks	1, Yes 2, No	
				[imaging_2wks] / [imaging_6w
	X-Ray (radiography) in the last 2 wks / 4 wks / 6 wks	xray_2wks / xray_6wks / xray_12wks	1, Y 🙀 2, No   3, Unsure	[imaging_12wks] = '1'
	Ultrasound scan in the last 2 wks / 4 wks / 6 wks	ultra 2wks/ultra 6wks/ultra 12wks	1, Y 🙀 2, No   3, Unsure	[imaging_2wks] / [imaging_6w [imaging_12wks] = '1'
	Unasound sean in the last 2 wks / 4 wks / 0 wks	ulua_2wks/ullra_0wks/ullra_12wks	$\Omega$	[imaging_12wks] = 1 [imaging_2wks] / [imaging_6v
	MRI scan in the last 2 wks / 4 wks / 6 wks	mri 2wks/mri 6wks/mri 12wks	1, Y 🚱 2, No   3, Unsure	[imaging_2wks] = '1'
				[imaging_2wks] / [imaging_6v
	CT scan in the last 2 wks / 4 wks / 6 wks	ct_2wks / ct_6wks / ct_12wks	1, Y 2, No   3, Unsure	[imaging 12wks] = '1'
Patients' Global Impression of	To what extent has your pain complaint changed when compared with the situation just before you		1, 1, 2 ompletely recovered   2, 2. Much improved   3, 3. Slightly improved   4, 4. Not	
Change (PGIC) scale Collected at 2-, 6-, and 12-wks	started chiropractic care?	pgic_q1_2wks / pgic_q1_6wks / pgic_q1_12wks	changed   5, 5. Slightly worsened   6, 6. Much worsened	
			7, 7 worse than ever	

STROBE Statement—checklist of items that should be included in reports of observational studies
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—chec		njopen-2021-05	Pag
Item No.	Recommendation	⁸⁰ ⁸⁰ ⁹ Page ⁹ No.	Relevant text from manuscript
1	( <i>a</i> ) Indicate the study's design with a commonly used term in the title or the abstract ( <i>b</i> ) Provide in the abstract an informative and balanced summary of what was done and what was found	Brage 1 and 2 July 2022. Downloaded from http://bmjopen.bmj.cc	"The Swiss chiropractic practice-based research network and musculoskeletal pain cohort pilot study: protocol of a nationwide resource to advance musculoskeletal health services research." (pg 1) "Phase 1 focuses on the development of the Swiss chiropractic PBRN, and will use a cross sectional design to collect information from chiropractic clinicians nationwide." (pg 2) "Phase 2 will recruit consecutive patients aged 18 years or older with MSK pain from community-based chiropractic practices participating in the PBRN into a prospective chiropractic cohort pilot study." (pg 2) "All data collection will occur through electronic surveys. Surveys will be provided to patients prior to initial assessment, 1-hour after assessment and
			at 2-, 6-, and 12-weeks after assessment."
	ľ Ob	Apri	"(c) 4 1 1 1 1 CMOV
2	Explain the scientific background and rationale for the investigation being reported	. <del></del>	"Given the high burden of MSK pain conditions, which are frequently managed by chiropractors, and limited practice-based evidence on the topic of chiropractic care for MSK conditions, particularly in Switzerland, this protocc outlines the creation of a nationwide PBRN and subsequent nested prospective cohort (Swiss ChiCo) pilot study for chiropractic patients with MSK pain."
3	State specific objectives, including any prespecified hypotheses	ected by co	"The main objectives of this report are to: 1) describe the development of a MSK focused PBRN and describe the enrolment of Swiss chiropractors into the PBRN; and 2) describe the methods of the first nested study to be conducted
	Item           No.           1	No.       Recommendation         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         2       Explain the scientific background and rationale for the investigation being reported	checklist of items that should be included in reports of observational studies           Image         Page           1         (a) Indicate the study's design with a commonly used term in the title or the abstract         Page 1 and 2           (b) Provide in the abstract an informative and balanced summary of what was done and what was found         Page 2           2         Explain the scientific background and rationale for the investigation being reported         Page 5

age 31 of 38	BMJ Open	6/bmjopen-20	
		n-2021-059380	within the PBRN – an observational prospective patient cohort pilot study."
Methods Study design	4 Present key elements of study design early in the paper	³⁸⁰ Page 6 13 July 2022.	"In phase 1, we will aim to develop the Swiss Chiropractic PBRN and describe the demographics of participating chiropractors at project initiation using a cross-sectional study design."
) 2 3 4 5		Downloadec	"In phase 2, we aim to launch a 12-week observational prospective Swiss chiropractic cohort (Swiss ChiCo) pilot study which will assess the feasibility for longitudinal data collection and describe the clinical course of patients with MSK pain presenting to Swiss chiropractors."
6 Setting 7 8	5 Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Page 8, 9, 12 and 13	"To aid with clinician recruitment, we plan to launch the PBRN development phase on September 9, 2021." (pg 8)
9 0 1		//bmjopen	"Clinician recruitment for the Swiss chiropractic PBRN will be scheduled to end on December 19, 2021." (pg 9)
2 3 4 5		ı.bmj.com/ o	"Clinicians participating in the Swiss chiropractic PBRN will be asked to fully complete 1 electronic survey of approximately 10 minutes duration." (pg 9)
6 7 8 9 0	5 Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	http://bmjopen.bmj.com/ on April 20, 2024 by gues	"We will hold pilot study introductory meetings with participant clinicians and clinical staff to reinforce study objectives, methods and procedures prior to the tentative date for initiation of the patient cohort pilot study
1 2 3 4 5 6 7		4 by guest. Protected	recruitment of April 01, 2022." (pg 12) "Subsequent questionnaires will take approximately 10-12 mins to complete and are emailed directly to patient participants 1 hour after (post-visit patient survey), and at 2-, 6-, and 12- weeks following completion of the pre- visit survey." (pg 13)
8 Participants 9 0	6 ( <i>a</i> ) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Page 8 and 11 CO PY NG Nt.	"All registered active chiropractor members (fully licensed chiropractors and postgraduate assistant chiropractors) of the Swiss Chiropractic Association
1 2 3 44 5 6	For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml	ght.	

Page 32 of 38

		BMJ Open	'bmjopen	Р
		<i>ntrol study</i> —Give the eligibility criteria, and the sources and methods of case ment and control selection. Give the rationale for the choice of cases and control selection.	n-2021 -059 rols	(ChiroSuisse) will be eligible and invited to participate." (pg 8)
		ctional study—Give the eligibility criteria, and the sources and methods of sel	ection of 80 on 13 July 2022.	"Patients will be eligible to participat they are 18 years of age or older; are seeking new conservative healthcare a MSK pain condition (new conservative healthcare seeking is operationalised as not having received (patient-reported) chiropractic care, physiotherapy, osteopathy or massage therapy for their current MSK compli- in the 1 month prior to their current initial visit to the chiropractor and no follow-up visit); consent to chiroprac
	(b) Coho unexpos	ort study—For matched studies, give matching criteria and number of exposed ed	and http://b	treatment; are able to respond to surv in German, French, Italian, or English have an active email account; and are willing and able to complete electron study questionnaires." (pg 11)
	-	ntrol study—For matched studies, give matching criteria and the number of con-	pen.	
Variables	-	lefine all outcomes, exposures, predictors, potential confounders, and effect m gnostic criteria, if applicable	odifiers. Enge 10 and	14 "The primary clinical outcome will b practitioner self-confidence in the clinical management of patients with low back pain (measured by practitic self-confidence scale). The second primary clinical outcome will be practitioner biomedical versus biopsychosocial MSK pain treatment orientation (as measured by the pain attitudes and beliefs scale, musculoskeletal version)." (pg 10)
			by guest. Protected by copyright	"The feasibility outcomes are 1) clinician participation proportion in to Swiss chiropractic PBRN will be assessed by reporting the proportion all eligible clinicians that enroll in th PBRN development phase using raw numbers and percentages; and 2) motivation for clinician participation the Swiss ChiCo pilot study will be assessed using a visual analog scale (VAS, 0-100), with higher scores reflecting higher motivation for participation." (pg 10)

33 of 38	BMJ Open	6/bmjopen-2021	
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	-059380 on 13 July 2022. Downlc	"The prespecified primary clinical outcomes will be: 1) change in musculoskeletal pain impact, as measured by the 3-item pain, enjoymen and general activity scale; and 2) chang in MSK health status, as measured by the musculoskeletal health questionnaire." (pg 14) "The primary feasibility outcomes will be: 1) the proportion of invited patients presenting to chiropractic practices who subsequently agree to participate in this study; and 2) change in patient participant follow-up and retention ove 12 weeks." (pg 14) "The PCS contains four items with a total score of 20. A score of 4 represent higher self-confidence in the management of patients with low back pain, while a score of 20 represents lower self-confidence." (pg 10) "The PABS-MSK contains two domains, with a higher score on either the domains (each 10-items, with a scor range of 10-60) representing higher biomedical and biopsychosocial MSK pain treatment orientation." (pg 10) "Motivation for clinician participation if the Swiss ChiCo pilot study will be assessed using a visual analog scale (VAS, 0-100), with higher scores reflecting higher motivation for participation." (pg 10) "3-item pain, enjoyment, and general activity scale (PEG scale, score range 0 10) with higher scores representing worse outcomes; and 2) change in MSF health status, as measured by the musculoskeletal health questionnaire (MSK-HQ, score range 0-56) with higher scores reflecting better health
Bias	9 Describe any efforts to address potential sources of bias	Bage 13 and 17 Boy Copyrig	status." (pg 14) "Patient participant surveys will be provided in English, German, French and Italian, with patients having the ability to choose their preferred language for completion. Validated, translated versions of the patient

	BM	J Open	6/bmiopen-2021-059380 on 13 July 2022. Downloaded from http://bmio	Page 3
			pen-2	
			021-05	reported outcome measures (PROM) will be used when possible." (pg 13)
			9380 0	"To limit this threat to external validity, the Swiss chiropractic PBRN will recruit
			on 13	clinicians through both online and in- person channels. In addition, chiropractic clinician recruitment for the
			July 2	Swiss ChiCo pilot study will be proportionally overweighted in French
			022.	and Italian language regions. These areas have shown lowered use eHealth
			Down	technology use when compared to the German speaking regions of Switzerland." (pg 17)
			loade	"To recruit a diverse group of patient
			d from	participants, clinicians will be asked to consecutively recruit eligible patients from private practice. Although
			http:	consecutive recruitment does not eliminate the threat of self-selection
			//bmio	bias, it ensures all eligible participants seeking chiropractic care will be aware of the study." (pg 17)
Study size	10 Explain how the study size was arrived at	erien op	on April 20, 2024 by quest.	"One-on-one meetings with Swiss chiropractors were carried out for the
		0	<u></u> . CO	purpose of understanding how best to integrate study processes into clinical practice settings. According to all
			n/ on	clinician advisors, the recruitment of approximately 5-10 consecutive patients
		$0_{\rm h}$	April	per clinical practice was feasible." (pg 7)
			20, 20	"Similar to other PBRNs within the scope of chiropractic and MSK health,
			24 bv	we hope to achieve a clinician participation proportion of approximately 50%." (pg 9)
			quest	"Based on this work, we will aim to
			. Prote	recruit at least 100 patient participants to enable a preliminary characterisation of the population, enabled by
			t. Protected by a	representative selection of chiropractic clinicians with respect to language region." (pg 12)
			copyright.	
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Page	35	of	38
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f 38		BMJ Open	/bmjopen-2	
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	6/bmjopen-2021-059380	"Participants who score 70 or more on the VAS will be defined as "highly motivated and described using raw numbers, proportions and 95% CIs." (pg 10)
Statistical methods	12	( <i>a</i> ) Describe all statistical methods, including those used to control for confounding	Page 10 and 14	"Both primary clinical outcomes will be reported as means and standard deviations (SDs), with 95% confidence intervals (CI calculated as appropriate." (pg 10) "Clinician participation proportion in the Swiss chiropractic PBRN will be assessed
			2. Download	reporting the proportion of all eligible clinicians that enroll in the PBRN development phase using raw numbers an percentages." (pg 10)
			13 July 2022. Downloaded from http://bmjopen.bmj.com	"Clinical outcomes of the PEG scale and MSK-HQ prior to initial chiropractic assessment will be reported as means, SD and 95% CIs; and clinical course of patien pain impact and MSK health status will b reported as a mean difference with SDs an 95% CIs as appropriate." (pg 14)
		ev.	njopen.bmj.com	"Invited patient participation will be report as raw numbers and proportions. Patient participant retention will be reported as the proportion of enrolled participants who complete follow-up surveys across 12- weeks." (pg 14)
		(b) Describe any methods used to examine subgroups and interactions	9 N/A	
		(c) Explain how missing data were addressed	April N/A	
		( <i>d</i> ) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed <i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy	n/A N/A 20, 2024 by guest	
		( <u>e</u> ) Describe any sensitivity analyses	N/A	
Results			Pro	
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	. Protected by N/A	
		(b) Give reasons for non-participation at each stage	N/A	
		(c) Consider use of a flow diagram	o N/A opy N/A	
			- igh:	

	BMJ Open	6/bm Page 36 Page 36 Page 36 N/A
		รก-20 <del>2</del>
Descriptive data 14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	1- N/A 59
	(b) Indicate number of participants with missing data for each variable of interest	80 N/A
	(c) Cohort study—Summarise follow-up time (eg, average and total amount)	N/A
Outcome data 15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time	⊆ N/A
	Case-control study-Report numbers in each exposure category, or summary measures of exposure	N/A
	Cross-sectional study-Report numbers of outcome events or summary measures	N/A N/A
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 included	. Downloaded the N/A
	(b) Report category boundaries when continuous variables were categorized	N/A
	(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time	S N/A
	period	http
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of 38		BMJ Open	6/bmjopen-2021	
Other analyses	17	Report other analyses done-eg analyses of subgroups and interactions, and sensitivity analyses	⊢ ^{N/A}	
Discussion			593	
Key results	18	Summarise key results with reference to study objectives	80 ⁻ 0age 16 73 July 2022.	"This project is designed to attract a large proportion of Swiss chiropractors into a nationwide PBRN and subsequently recru patients from participating clinics into a longitudinal cohort pilot study." "The unique collaboration with clinicians
		Kor.	Downloaded	advocacy groups and academicians, a growing trend in health care research, has to the promotion of research objectives which are clinically relevant and patient- centred, and a study implementation strat vetted by Swiss chiropractic primary care clinicians."
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	for age 17	"Typically, unequal access to technology resources and lack of digital literacy can to a young, well-educated, and high socio economic status study sample."
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	N/A bmjop	
Generalisability	21	Discuss the generalisability (external validity) of the study results	age Ph.bmj.com/ on April 20, 2024 by guest. P	"To limit this threat to external validity, t Swiss chiropractic PBRN will recruit clinicians through both online and in-per- channels. In addition, chiropractic clinici recruitment for the Swiss ChiCo pilot stu- will be proportionally overweighted in French and Italian language regions. The areas have shown lowered use eHealth technology use when compared to the German speaking regions of Switzerland recruit a diverse group of patient participants, clinicians will be asked to consecutively recruit eligible patients fro private practice. Although consecutive recruitment does not eliminate the threat self-selection bias, it ensures all eligible participants seeking chiropractic care wil aware of the study."
Other informati	on		rotec	
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	cred age 18 by copyright	"This work was internally supported by t Department of Chiropractic Medicine, Faculty of Medicine, at University of Zur and Balgrist University Hospital through funding from the Foundation for the Education of Chiropractors in Switzerlan

6/bmjopen-2021

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*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohord and cross-sectional studies.

, if applic. Ast item and gives methodolo, .alable on the Web sites of PLoS Meds. .cpidem.com/). Information on the STROBE Int. Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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#### The Swiss chiropractic practice-based research network and musculoskeletal pain cohort pilot study: protocol of a nationwide resource to advance musculoskeletal health services research

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<b>Primary Subject Heading</b> :	Epidemiology
Secondary Subject Heading:	Epidemiology, Complementary medicine, Health services research
Keywords:	Quality in health care < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Musculoskeletal disorders < ORTHOPAEDIC & TRAUMA SURGERY, EPIDEMIOLOGY, PRIMARY CARE
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#### SCHOLARONE[™] Manuscripts

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2 3	1	The Swiss chiropractic practice-based research network and musculoskeletal pain cohort
4 5		
6	2	pilot study: protocol of a nationwide resource to advance musculoskeletal health services
7 8 9	3	research
10 11	4	
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#### 

25	Abstract
25	Abstract

#### 26 Introduction

Musculoskeletal (MSK) pain conditions, a leading cause of global disability, are usually first managed in primary care settings such as medical, physiotherapy, and chiropractic community-based practices. While chiropractors often treat MSK conditions, there is limited real-world evidence on the topic of health service outcomes among patients receiving this type of care. A nationwide Swiss chiropractic practice-based research network (PBRN) and MSK pain patient cohort study will have potential to monitor the epidemiological trends of MSK pain conditions and contribute to health care quality improvement. The primary aims of this protocol are to 1) describe the development of a MSK focused PBRN within the Swiss chiropractic setting; and 2) describe the methodology of the first nested study to be conducted within the PBRN – an observational prospective patient cohort pilot study. 

#### 38 Methods and analysis

This initiative is conceptualized with two distinct phases. Phase 1 focuses on the development of the Swiss chiropractic PBRN, and will use a cross-sectional design to collect information from chiropractic clinicians nationwide. Phase 2 will recruit consecutive patients aged 18 years or older with MSK pain from community-based chiropractic practices participating in the PBRN into a prospective chiropractic cohort pilot study. All data collection will occur through electronic surveys offered in the three Swiss national languages (German, French, Italian) and English. Surveys will be provided to patients prior to initial assessment, 1-hour after assessment and at 2-, 6-, and 12-weeks after assessment. 

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#### 48 Ethics and dissemination

1 2		
3 4	49	Ethics approval has been obtained from the independent research ethics committee of Canton
5 6	50	Zurich (BASEC-Nr: 2021-01479). Informed consent will be obtained electronically from all
7 8 9	51	participants. Findings will be reported to stakeholders after each study phase, presented at local
9 10 11	52	and international conferences, and disseminated through peer-reviewed publications.
12 13	53	
14 15	54	Trial registration
16 17 18	55	Phase 1 – Swiss chiropractic PBRN (ClinicalTrials.gov identifier: NCT05046249);
19 20	56	Phase 2 – Swiss chiropractic cohort (Swiss ChiCo) pilot study (ClinicalTrials.gov identifier:
21 22	57	NCT05116020).
23 24 25	58	
25 26 27	59	Strengths and limitations of this study
28 29 30 31	60	• Use of a flexible practice-based research network model will allow for a diverse range of
	61	nested study design types as well as the future expansion of the network.
32 33 34	62	• Development of protocol methods is guided by patient and public involvement activities with
35 36	63	key stakeholders.
37 38 39	64	• Sole use electronic data capture methods may lead to selective participation of both clinician
40 41	65	and patient participants.
42 43	66	• Maintenance of the practice-based research network and subsequent expansion of the patient
44 45 46	67	cohort will depend on ongoing stakeholder support and involvement.
40 47 48	68	
49 50	69	Keywords: chiropractic, health care quality, musculoskeletal health, musculoskeletal pain,
51 52	70	manual medicine
53 54 55	71	
56 57	72	
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73 INTRODUCTION
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Musculoskeletal (MSK) pain conditions are the leading cause of disability worldwide, with low back pain being the largest single cause in over 160 countries, including Switzerland.[1, 2] This health burden translates to an economic cost of approximately 6.6 billion Euros or about 2% of Switzerland's total gross domestic product for low back pain alone.[3] Best practice recommendations and systematic reviews on MSK pain largely focus primarily on regional pain locations, such as low back pain or neck pain.[4-6] However, in the population and in primary care settings, it is common that those experiencing a MSK pain complaint also present with co-existing pain in another body region. [7, 8] There is increasing evidence suggesting that these pain conditions, although localized to different regions, share similarities with respect to the course of symptoms, prognostic factors, and clinical care recommendations.[9, 10] An entirely regional focus to MSK health may create gaps in patient centered research and difficulties with knowledge implementation in health care settings. Further contributing to practice gaps, is the lack of practice-based data collection in MSK health care research.[11] To help bridge the divide between research and practice, countries such as the UK, Denmark, Sweden, and Australia have engaged in practice-based research and worked with MSK-focused practice-based research networks (PBRNs).[12-14] A PBRN is a group of at least 15 primary-care settings united under a commitment to advance the science base of clinical care.[15] These "real world" clinical research environments allow for sustained collaborations between practitioners, patients, and academicians facilitating the co-creation of relevant research questions and production of clinically applicable results.[11, 15, 16] The chiropractic scope of practice in Switzerland includes the diagnosis and management of MSK pain conditions through manual medicine, prescription medication, and diagnostic imaging (radiography, ultrasound, CT, MRI). As of December 2021, there were approximately 

Page 5 of 39

#### **BMJ** Open

326 chiropractors practicing across Switzerland with the large majority providing care in community-based settings. MSK complaints such as low back pain and neck pain, which result in the largest burdens of disability are commonly seen in chiropractic practice.[17] Chiropractic health care centres may serve as useful settings to further investigate MSK pain conditions, to understand what role chiropractors play in the current management of these conditions, and to identify opportunities for Swiss MSK primary health care quality improvement. As management of MSK conditions moves away from traditional medical treatments and towards more physical and preventative approaches, there is a need to describe non-pharmacological treatment options to make informed decisions on how best to use this capacity in the current health care system. [4, 18] Given the high burden of MSK pain conditions, which are frequently managed by chiropractors, and limited practice-based evidence on the topic of chiropractic care for MSK conditions, particularly in Switzerland, this protocol report outlines the creation of a nationwide PBRN and subsequent nested prospective cohort (Swiss ChiCo) pilot study for chiropractic patients with MSK pain. Once established, this PBRN will provide the framework to help monitor the epidemiological trends of MSK pain in primary care settings, contribute to MSK health care quality improvement, and support future development and growth of practice-based MSK clinical research. The main objectives of this protocol report are to: 1) describe the development of a MSK focused PBRN and describe the enrolment of Swiss chiropractors into the PBRN; and 2) describe the methods of the first nested study to be conducted within the PBRN - an observational prospective patient cohort pilot study. **METHODS AND ANALYSIS** 

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121 Study design

The Swiss chiropractic PBRN will use a substudy PBRN model, similar to that of the Australian
Chiropractic Research Network (ACORN).[12, 19, 20] In substudy PBRN models, data is
initially collected from participating clinicians/clinical practices through self-report to first
establish and describe characteristics of the PBRN. Following development, nested substudies
may be performed using this PBRN framework.

The current project will consist of two phases. Each project phase will have a specific aim and report on two primary feasibility and clinical outcomes related to this aim. In phase 1, we aim to develop the Swiss chiropractic PBRN and describe the demographics of participating chiropractors at project initiation using a cross-sectional study design (ClinicalTrials.gov identifier: NCT05046249). In phase 2, we aim to launch a 12-week observational prospective Swiss chiropractic cohort (Swiss ChiCo) pilot study which will assess the feasibility for longitudinal data collection and describe the clinical course of patients with MSK pain presenting to Swiss chiropractors. (ClinicalTrials.gov identifier: NCT05116020). Figure 1 provides an overview of the two nested phases of this project. 

0 137 Patient and public involvement

To guide development of this project, we hosted several events to gather information from key
stakeholders. Key stakeholders identified include the Swiss Chiropractic Association
(ChiroSuisse), the Swiss Chiropractic Patient Association (Pro Chiropractic Switzerland), Swiss
chiropractors, and an international group of researchers with experience in practice-based
research. Participatory engagement activities were first performed collaboratively with all
stakeholders and focused on study relevance, team building, project infrastructure development
and the collaborative creation of relevant research questions. A consensus-based understanding

Page 7 of 39

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2		
3 4	145	was reached by all members which outlined the need for more clinical MSK research within the
5 6	146	Swiss setting and a pledge to provide support to achieve this project goal. Other
7 8 9	147	recommendations included the practicality to start with a small cohort study to first test data
10 11	148	collection methods, as well to explore both clinical and feasibility related objectives to help drive
12 13	149	recruitment from community-based chiropractors and patients.
14 15	150	Individualized one-on-one meetings were subsequently conducted to discuss specific
16 17 18	151	project methods with each stakeholder group. Recommendations provided by ChiroSuisse and
19 20	152	Pro Chiropractic Switzerland included the addition of several questions to the Swiss ChiCo pilot
21 22	153	study patient participant questionnaires. Consequently, questions relating to patient work status,
23 24 25	154	past use of chiropractic care, and use of other healthcare in MSK pain management were added.
26 27	155	Both associations also recommended increasing patient participant recruitment weighting for the
28 29	156	Swiss ChiCo pilot study in the French and Italian language regions of Switzerland by 5% from
30 31 32	157	what was initially proposed.
32 33 34	158	One-on-one meetings with Swiss chiropractors were carried out for the purpose of
35 36	159	understanding how best to integrate study processes into clinical practice settings. According to
37 38	160	all clinician advisors, the recruitment of approximately 5-10 consecutive patients per clinical
39 40 41	161	practice was feasible. Outside of clinical workflow processes, patient participant inclusion
42 43	162	criteria were revised from new healthcare seeking for a MSK pain condition (operationalized as
44 45	163	not having received any (patient-reported) health care for current MSK complaint) to new
46 47 48	164	conservative healthcare seeking for a MSK complaint (not having received any (patient-reported)
49 50	165	chiropractic, physiotherapy, osteopathy, or massage therapy for current MSK complaint in the
51 52	166	last 1 month, and not a follow-up visit). Many clinician advisors recommended this change based
53 54 55 56	167	on the clinical profile of their patients and insurance coverage practices in Switzerland (where

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3 4	168	chiropractic care typically follows an initial visit with a primary care physician or general
5 6	169	practitioner).
7 8 9	170	Participatory engagement is an iterative process and requires continuous reflection of
10 11	171	previous project processes and results to inform subsequent phases (action-reflection
12 13	172	process).[21] Following completion of each project phase, individual meetings with each
14 15	173	stakeholder group will be scheduled to disseminate findings, discuss how best to generate future
16 17 18	174	PBRN growth, and explore ways to expand the MSK clinical cohort study.
19 20	175	
21 22	176	Phase 1 – Development of the Swiss chiropractic PBRN
23 24 25	177	Participants
25 26 27	178	All registered active chiropractor members (fully licensed chiropractors and postgraduate
28 29	179	assistant chiropractors) of ChiroSuisse will be eligible and invited to participate. Approximately
30 31 32	180	98% of all practicing Swiss chiropractors hold an active membership with ChiroSuisse (personal
32 33 34	181	communication, April 22, 2021).
35 36	182	
37 38	183	Recruitment
39 40 41	184	To aid with clinician recruitment, we plan to launch the PBRN development phase on September
42 43	185	9, 2021 at the annual ChiroSuisse Continuing Education (CE) Convention 2021 (Lausanne,
44 45	186	September 9-11, 2021). Clinicians will have the opportunity to ask questions directly of the
46 47 48	187	project team, test electronic study methods, sign up as a clinician member of the PBRN, and
49 50	188	provide input and feedback for the subsequent Swiss ChiCo pilot study. Those interested, will be
51 52	189	invited to join the Swiss chiropractic PBRN by scanning a quick response (QR) code and
53 54	190	completing the linked clinician entry survey using personal mobile devices. For those who do not
55 56 57	191	attend the conference, we plan to use electronic email invitations containing the Research
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Page 9 of 39

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3 4	192	Electronic Data Capture (REDCap) PBRN entry survey link. This invitation will be paired with
5 6 7	193	an information sheet outlining project goals, good conduct procedures for the PBRN and
7 8 9	194	subsequent substudy involvement, and risks and benefits for participation. Clinician recruitment
10 11	195	for the Swiss chiropractic PBRN will be scheduled to end on December 19, 2021. Similar to
12 13 14	196	other PBRNs within the scope of chiropractic and MSK health, we hope to achieve a clinician
14 15 16	197	participation proportion of approximately 50%.[19, 22]
17 18	198	
19 20 21	199	Data collection procedures and variables
22 23	200	All data acquisition will occur electronically using the REDCap web application platform.[23]
24 25	201	Clinicians participating in the Swiss chiropractic PBRN will be asked to fully complete 1
26 27 28	202	electronic survey of approximately 10 minutes duration. Clinician surveys will only be provided
29 30	203	in English as this is the official language used for communication by ChiroSuisse. Table 1
31 32 33	204	outlines the specific data which will be collected from clinicians for the development of the
34 35	205	Swiss chiropractic PBRN. Supplementary file 1 provides the data dictionary and specific
36 37	206	response options which will be used for the Swiss chiropractic PBRN.
38 39 40	207	
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215	Table 1. Outcome measures to be collected for description of the Swiss chiropractic PH	BRN
	1 1	

	Construct	Measurement method / instrument	Inception	
	Demographics	Gender, age, year of graduation	Х	
	Practice	Number of years in practice, location of practice	Х	
	Characteristics	Primary language used in practice	X	
		Number of healthcare practitioners involved in practice	Х	
		Type of healthcare offered	Х	
		Average number of patients seen per week	Х	
		Types of patients seen within practice	X	
	a	Frequency of complaints seen within practice	X	
	Confidence	Practitioner self-confidence scale (PCS) [24]	X	
	Beliefs and Attitudes	Pain attitudes and beliefs scale – Musculoskeletal (PABS-MSK) [25]	X	
		Level of motivation to be involved in the Swiss ChiCo pilot	X	
	Digitalization of	Electronic patient record system in practice Encrypted email use in practice	X X	
	chiropractic practices	Offering virtual care in practice	X X	
	COVID-19	Change in quality of life, change in patient numbers, change in work hours, change in use		
	aspects	of telehealth/e-health services.	Х	
216				
217	Main outcome	es and analysis		
218	The first	st primary clinical outcome will be practitioner self-confidence in the c	linical	
219	management of patients with low back pain (as measured by the practitioner self-confidence			
220	scale (PCS)).[24] The PCS contains four items with a total score of 20. A score of 4 represents			
221	higher self-confidence in the management of patients with low back pain, while a score of 20			
222	represents lower self-confidence. The second primary clinical outcome will be practitioner			
223	biomedical versus biopsychosocial MSK pain treatment orientation (as measured by the pain			
224	attitudes and beliefs scale, musculoskeletal version (PABS-MSK)).[25] The PABS-MSK			
225	contains two domains, with a higher score on either the domains (each 10-items, with a score			
226	range of 10-60) representing higher biomedical and biopsychosocial MSK pain treatment			
227	orientation. Th	e order of 20 items of the PABS-MSK will be randomized using the		
228	"randomizeR"	package in RStudio and administered as a single questionnaire so as to	) mask	
229	respondents to	the specific treatment orientation domains. Both primary clinical outco	omes will	
230	be reported as	means and standard deviations (SDs), with 95% confidence intervals (	CIs)	
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Page 11 of 39

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231	calculated as appropriate. Primary feasibility outcomes of 1) clinician participation proportion in
232	the Swiss chiropractic PBRN will be assessed by reporting the proportion of all eligible
233	clinicians that enroll in the PBRN development phase using raw numbers and percentages; and
234	2) motivation for clinician participation in the Swiss ChiCo pilot study will be assessed using a
235	visual analog scale (VAS, 0-100), with higher scores reflecting higher motivation for
236	participation. Level of motivation to participate in the Swiss ChiCo pilot study will be reported
237	as means, SDs, and with 95% CIs calculated as appropriate. Participants who score 70 or more
238	on the VAS will be defined as "highly motivated", and described using raw numbers, proportions
239	and 95% CIs.
240	
241	Phase 2 – The Swiss chiropractic cohort (Swiss ChiCo) pilot study
242	Participants
242 243	Participants Patients will be eligible to participate if they are 18 years of age or older; are seeking new
243	Patients will be eligible to participate if they are 18 years of age or older; are seeking new
243 244	Patients will be eligible to participate if they are 18 years of age or older; are seeking new conservative healthcare for a MSK pain condition (new conservative healthcare seeking is
243 244 245	Patients will be eligible to participate if they are 18 years of age or older; are seeking new conservative healthcare for a MSK pain condition (new conservative healthcare seeking is operationalised as not having received (patient-reported) chiropractic care, physiotherapy,
243 244 245 246	Patients will be eligible to participate if they are 18 years of age or older; are seeking new conservative healthcare for a MSK pain condition (new conservative healthcare seeking is operationalised as not having received (patient-reported) chiropractic care, physiotherapy, osteopathy or massage therapy for their current MSK complaint in the 1 month prior to their
243 244 245 246 247	Patients will be eligible to participate if they are 18 years of age or older; are seeking new conservative healthcare for a MSK pain condition (new conservative healthcare seeking is operationalised as not having received (patient-reported) chiropractic care, physiotherapy, osteopathy or massage therapy for their current MSK complaint in the 1 month prior to their current initial visit to the chiropractor and not a follow-up visit); consent to chiropractic
243 244 245 246 247 248	Patients will be eligible to participate if they are 18 years of age or older; are seeking new conservative healthcare for a MSK pain condition (new conservative healthcare seeking is operationalised as not having received (patient-reported) chiropractic care, physiotherapy, osteopathy or massage therapy for their current MSK complaint in the 1 month prior to their current initial visit to the chiropractor and not a follow-up visit); consent to chiropractic treatment; are able to respond to surveys in German, French, Italian, or English; have an active
243 244 245 246 247 248 249	Patients will be eligible to participate if they are 18 years of age or older; are seeking new conservative healthcare for a MSK pain condition (new conservative healthcare seeking is operationalised as not having received (patient-reported) chiropractic care, physiotherapy, osteopathy or massage therapy for their current MSK complaint in the 1 month prior to their current initial visit to the chiropractor and not a follow-up visit); consent to chiropractic treatment; are able to respond to surveys in German, French, Italian, or English; have an active email account; and are willing and able to complete electronic study questionnaires. Patient
243 244 245 246 247 248 249 250	Patients will be eligible to participate if they are 18 years of age or older; are seeking new conservative healthcare for a MSK pain condition (new conservative healthcare seeking is operationalised as not having received (patient-reported) chiropractic care, physiotherapy, osteopathy or massage therapy for their current MSK complaint in the 1 month prior to their current initial visit to the chiropractor and not a follow-up visit); consent to chiropractic treatment; are able to respond to surveys in German, French, Italian, or English; have an active email account; and are willing and able to complete electronic study questionnaires. Patient participants will be excluded if they present to clinician practices with red flag symptoms (i.e.,
243 244 245 246 247 248 249 250 251	Patients will be eligible to participate if they are 18 years of age or older; are seeking new conservative healthcare for a MSK pain condition (new conservative healthcare seeking is operationalised as not having received (patient-reported) chiropractic care, physiotherapy, osteopathy or massage therapy for their current MSK complaint in the 1 month prior to their current initial visit to the chiropractor and not a follow-up visit); consent to chiropractic treatment; are able to respond to surveys in German, French, Italian, or English; have an active email account; and are willing and able to complete electronic study questionnaires. Patient participants will be excluded if they present to clinician practices with red flag symptoms (i.e., saddle anesthesia, loss of bowel and/or bladder control, history of major trauma, fracture, fever,

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non-MSK based pain condition based on the chiropractor's clinical suspicion that symptoms relate to a systemic disease.

#### Recruitment

Following the development of the Swiss chiropractic PBRN, we plan to recruit a subset of clinicians to participate in the Swiss ChiCo pilot study. Chiropractors will be recruited through general interest, VAS motivation score ( $\geq$ 70) on the PBRN entry questionnaire, and using a purposeful sampling approach based on Swiss chiropractic clinician distribution across German, French, and Italian language regions of Switzerland (55% DE, 35% FR, 10% IT). The Swiss ChiCo pilot study aims to recruit at least 20 chiropractors. Participating chiropractors will be asked to recruit new consecutive patient participants from their clinical practices. We will hold pilot study introductory meetings with participant clinicians and clinical staff to reinforce study objectives, methods and procedures prior to the tentative date for initiation of the patient cohort pilot study recruitment of April 01, 2022. During previous patient and public involvement work, Swiss chiropractors described the recruitment of 5 to 10 consecutive patients with new conservative onset MSK pain as feasible. Based on this work, we will aim to recruit at least 100 patient participants to enable a preliminary characterisation of the population, enabled by representative selection of chiropractic clinicians with respect to language region. A stopping point for recruitment will be considered at 200 patients.

Potentially eligible patients visiting a participating clinician will be first provided a study flyer, which will briefly outline the study objectives and participation requirements. Patients will then be asked to rate their initial level of interest to participate using a brief electronic survey. Those not interested will be prompted to provide reasons for non-participation. Patients

expressing interest in participation will be forwarded to the full study information form and electronic informed consent procedure. This in-clinic patient participant procedure was developed in consultation with Swiss chiropractic clinicians (both women and men) across all language regions. To aid with workflow, clinicians expressed interest in asking new patients to arrive approximately 20 minutes prior to their appointment to complete electronic study forms. Clinicians also recommended adding "disruption to clinic workflow" as an option for eligible patient non-participation. This survey option would be selected by clinical staff when patient participant recruitment may greatly impact clinical workflow (e.g., patient was late for visit, emergency visit). Figure 2 outlines the in-clinic patient recruitment procedure. Data collection procedures and variables 

# Immediately following completion of the in-clinic recruitment procedure, study participants will be forwarded to the first patient survey (pre-visit patient survey) on an electronic device (mobile phone or tablet). This pre-visit initial patient survey will collect information on clinical measures that are likely to be influenced by the first visit (i.e., pain impact, musculoskeletal health status, illness perception).[26-28] The pre-visit patient survey will take approximately 5 minutes to complete and is the only survey that is completed at clinical practices. Subsequent questionnaires will take approximately 10-12 mins to complete and are emailed directly to patient participants 1 hour after (post-visit patient survey), and at 2-, 6-, and 12-weeks following completion of the pre-visit survey. REDCap will be used for longitudinal data collection, with survey data transmitted automatically to the research team at Balgrist University Hospital and the University of Zurich. Similar administration procedures were performed for the Danish chiropractic low back pain cohort study.[29] Patient participant surveys will be provided in English, German, French and Italian, with patients having the ability to choose their preferred language for

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completion. Validated, translated versions of the patient reported outcome measures (PROMs)
will be used when possible.[30-37] If not available, translation of the PROMs by a native
speaker will be performed. Table 2 outlines specific outcome measures and timing of data
collection for the Swiss ChiCo pilot study. Supplementary file 2 provides the data dictionary
and specific response options to be used.

Table 2. Outcome measures and timing of data collection for the Swiss ChiCo patient pilot study

Construct	Measurement method / instrument	Pre- visit	Post- visit	Wk 2	Wk 6	Wk 12
Clinic	Clinic name, clinician	Х				
Demographics	Gender, age, nationality, level of education, smoking status		х			
	Work status, time lost from work due to pain complaint		х	X	Х	Х
Injury characteristics	Naïve to chiropractic care		х			
	Duration of complaint		х			
	Location of pain complaint		Х			
	Pain, enjoyment, general activity (PEG) scale[26]	Х	Х	Х	Х	Х
	Other healthcare professional involved in care		Х	Х	Х	Х
	Number of chiropractic visits since initial visit			х	Х	Х
Pain medication use	Medication use for pain reduction (prescription or non- prescription)		X	X	X	x
Imaging use	Diagnostic imaging use for this specific MSK complaint			Х	Х	X
	Diagnostic imaging received in the past year for other complaint		х			
Psychosocial profile	Örebro Musculoskeletal Pain Screening Questionnaire – Short Form (ÖMPSQ short)[38]		X			
COVID-19 aspects	Quality of life now compared to before COVID-19		х			
	Activity compared to before COVID-19		x			
	Cancelled medical treatment due to COVID-19		х			
MSK health status	Musculoskeletal health questionnaire (MSK-HQ)[27]	x 🔷	x	х	Х	Х
	Brief illness perception questionnaire (Brief IPQ, Question 9)[28]	X				
Illness perception						Х

308 Main outcomes and analysis

The prespecified primary clinical outcomes will be: 1) change in musculoskeletal pain impact, as
measured by the 3-item pain, enjoyment, and general activity scale (PEG scale, score range 0-

311 10)[26] with higher scores representing worse outcomes; and 2) change in MSK health status, as

Page 15 of 39

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312	measured by the musculoskeletal health questionnaire (MSK-HQ, score range 0-56)[27] with
313	higher scores reflecting better health status. Clinical outcomes of the PEG scale and MSK-HQ
314	prior to initial chiropractic assessment will be reported as means, SDs, and 95% CIs; and clinical
315	course of patient pain impact and MSK health status will be reported as a mean difference with
316	SDs and 95% CIs as appropriate. The primary feasibility outcomes will be: 1) the proportion of
317	invited patients presenting to chiropractic practices who subsequently agree to participate in this
318	study; and 2) change in patient participant follow-up and retention over 12 weeks. Invited patient
319	participation will be reported as raw numbers and proportions. Patient participant retention will
320	be reported as the proportion of enrolled participants who complete follow-up surveys across 12-
321	weeks. Based on the definition of a PBRN from the Agency for Healthcare Research and Quality
322	(AHRQ),[15] it will be deemed feasible to initiate the Swiss chiropractic PBRN and expand the
323	Swiss ChiCo pilot study if at least 15 clinical practices agree to participate in the Swiss
324	chiropractic PBRN and each recruit at least 5 patients for enrolment in the Swiss ChiCo pilot
325	study.

#### Ethics and dissemination

The Swiss chiropractic PBRN and Swiss ChiCo pilot study have been reviewed and jointly approved by the independent research ethics committee of Canton Zurich (BASEC-Nr: 2021-01479). Informed consent will be obtained from both clinician and patient participants electronically upon entry into the Swiss chiropractic PBRN and the Swiss ChiCo pilot study. Clinician responses for PBRN development will be stored securely within REDCap, but not anonymous due to necessity of identifying clinicians to participate in future nested research projects. Data collected for PBRN development and for the Swiss ChiCo pilot study will be 

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stored as two separate projects within REDCap. Individual-level data will not be shared withstudy stakeholders.

The findings from the Swiss chiropractic PBRN and the Swiss ChiCo pilot study will be
disseminated first to the various stakeholder groups involved in study development through
individual meetings. Findings will also be presented through abstract and poster presentations at
academic conferences and fully reported in peer-reviewed publications.

# 342 Availability of data and materials

343 Data from this work will be made available for research purposes. Requests, including a synopsis344 of the study proposal, can be addressed to the corresponding author.

## **DISCUSSION**

This project is designed to attract a large proportion of Swiss chiropractors into a nationwide PBRN and subsequently recruit patients from participating clinics into a longitudinal cohort pilot study. This approach combines a substudy PBRN model, with longitudinal electronic capture more readily seen in register-based approaches. The unique collaboration with clinicians, advocacy groups and academicians, a growing trend in health care research, has led to the promotion of research objectives which are clinically relevant and patient-centred, and a study implementation strategy vetted by Swiss chiropractic primary care clinicians. Traditional health care research approaches typically face challenges with regards to study relevance, patient recruitment, and knowledge translation.[11, 40] The use of a participatory research approach can help overcome such challenges by integrating the diverse knowledge, values, and preferences of non-academics into the research process. An example of a longitudinal register-based study successfully implementing this approach is the Swiss Multiple

Page 17 of 39

#### **BMJ** Open

	359	Sclerosis Registry (SMSR).[41] This project was designed in collaboration with the Multiple
	360	Sclerosis (MS) community in Switzerland to tackle the lack of epidemiological data and to
	361	promote patient-perspectives in MS research. Participatory elements of the SMSR include a
)	362	flexible approach to study involvement based on participant comfort, involvement of patients in
<u>2</u> 3	363	the study design and execution, and data feedback to provide ongoing results to participants. Due
1 5	364	to such efforts, recruitment for the SMSR exceeded expectations; with the goal of 400
2 7 2	365	participants achieved in under 20 days.[42] A second example of a participatory research
)	366	approach driving recruitment are the recently established national osteopathy PBRNs of
 <u>2</u>	367	Australia (ORION) and New Zealand (ORC-NZ).[22] Here, the project team engaged with both
3 1 -	368	osteopathic communities for 12 months prior to clinician recruitment. Today, these two PBRNs
, 5 7	369	represent the largest coverage of any voluntary health profession PBRN, with 43.5% of all
3	370	registered osteopaths in Australasia. The Swiss chiropractic PBRN has followed a similar
)	371	approach, with community outreach and promotion efforts lasting 12 months prior to clinician
<u>/</u> } ↓	372	recruitment.
5	373	What remains unclear is if early engagement of stakeholders can overcome the unique

What remains unclear is if early engagement of stakeholders can overcome the unique 3/3 limitations of electronic observational studies. Typically, unequal access to technology resources and lack of digital literacy can lead to a young, well-educated, and high socio-economic status study sample. For example, participants in the SMSR who opt for physical forms are older, show increased care-seeking behaviour, and suffer from more progressive illness compared to those using electronic forms. This trend also extends to clinician participants, as our own 2019 survey on eHealth technology use among Swiss chiropractors showed clinicians 65 years and over were 74% less likely to use electronic health records (EHRs) when compared to the those under 40 years.[43] To limit this threat to external validity, the Swiss chiropractic PBRN will recruit clinicians through both online and in-person channels. In addition, chiropractic clinician

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56 57 58	406	participatory activities. RL and CAH led the drafting of the protocol manuscript. All authors
55 54 55	405	design of the protocol. RL and CAH designed, undertook, and coordinated stakeholder
51 52 53	404	CAH and RL conceived the project idea. RL, CAH, AK, VvW, MAP, and LH contributed to the
49 50	403	AUTHOR CONTRIBUTIONS
46 47 48	402	
44 45	401	engagement and support.
42 43	400	and Swiss chiropractic clinicians involved in this project for their continued participatory
39 40 41	399	The authors would like to acknowledge members of ChiroSuisse, Pro Chiropractic Switzerland,
37 38	398	ACKNOWLEDGEMENTS
35 36	397	
32 33 34	396	Figure 2. Summary of the Swiss ChiCo pilot study in-clinic patient participant recruitment
29 30 31	395	- gare in contra accign of the Swiss enhopitude r Dict and the Swiss enhot phot study
27 28	393 394	Figure 1. Nested design of the Swiss chiropractic PBRN and the Swiss ChiCo pilot study
24 25 26		research questions in the field of MSK primary health care.
22 23 24	391 392	
20 21		research network. Once complete, this PBRN will serve as a platform for answering important
17 18 19	390	study presents a model for PBRN development and rapid engagement of a newly created clinical
15 16 17	388 389	ensures all eligible participants seeking chiropractic care will be aware of the study and invited to participate in a nonselective manner. The Swiss chiropractic PBRN and Swiss ChiCo pilot
13 14	387	practice. Although consecutive recruitment does not eliminate the threat of self-selection bias, it
10 11 12	386	participants, clinicians will be asked to consecutively recruit eligible patients from private
8 9	385	compared to the German speaking regions of Switzerland. To recruit a diverse group of patient
6 7	384	Italian language regions. These areas have shown lowered use eHealth technology use when
3 4 5	383	recruitment for the Swiss ChiCo pilot study will be proportionally overweighted in French and
2		

gave important intellectual input and provided critical review of the protocol manuscript and

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approved the final version of the manuscript. CAH obtained funding. RL and CAH are the guarantors of this manuscript. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted. **FUNDING** This work was internally supported by the Department of Chiropractic Medicine, Faculty of Medicine, at University of Zurich and Balgrist University Hospital through funding from the Foundation for the Education of Chiropractors in Switzerland. The funder had no role in considering the research questions, study design, protocol methods or analysis, or in writing of the protocol manuscript, or the decision to submit the article for publication. **COMPETING INTERESTS** The authors declare that they have no competing interests. **REFERENCES:** Vos T, Abajobir AA, Abate KH, et al. Global, regional, and national incidence, prevalence, and years 1. lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet. 2017;390(10100):1211-1259. doi:10.1016/S0140-6736(17)32154-2 2. Murray CJL, Vos T, Lozano R, et al. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet. 2012;380(9859):2197-2223. doi:10.1016/S0140-6736(12)61689-4 3. Wieser S, Horisberger B, Schmidhauser S, et al. Cost of low back pain in Switzerland in 2005. Eur J Health Econ. 2011;12(5):455-467. doi:10.1007/s10198-010-0258-y Qaseem A, Wilt TJ, McLean RM, et al, for the Clinical Guidelines Committee of the American 4. College of Physicians. Noninvasive treatments for acute, subacute, and chronic low back pain: a clinical practice guideline from the American College of Physicians. Ann Intern Med. 2017;166(7):514. doi:10.7326/M16-2367

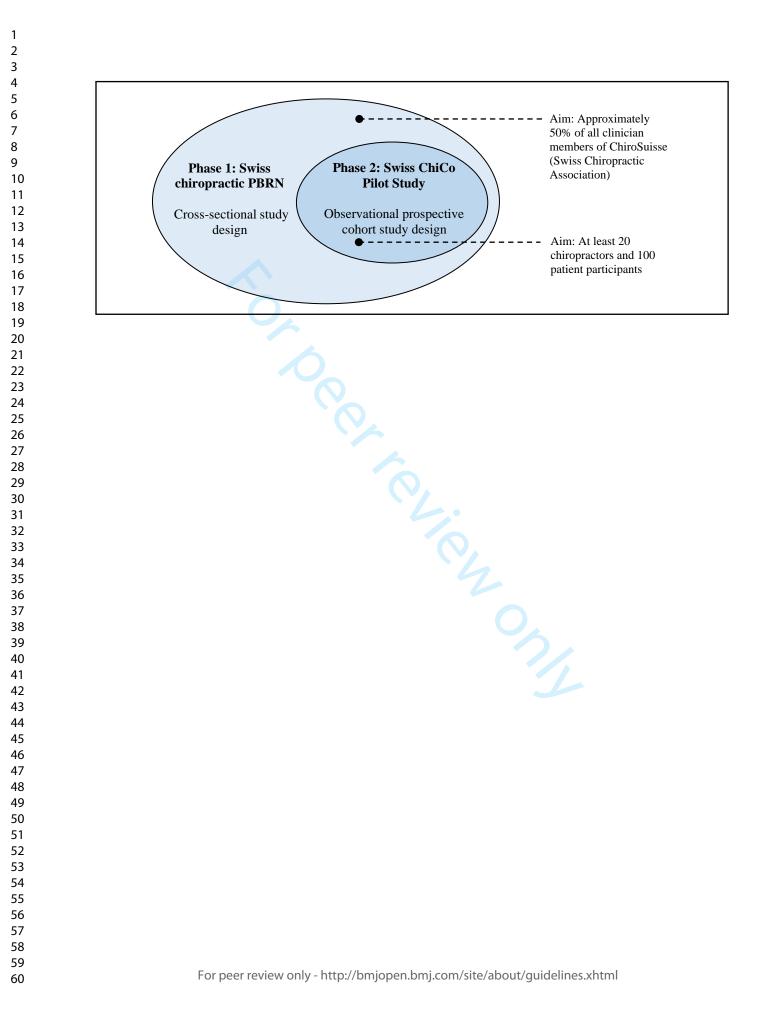
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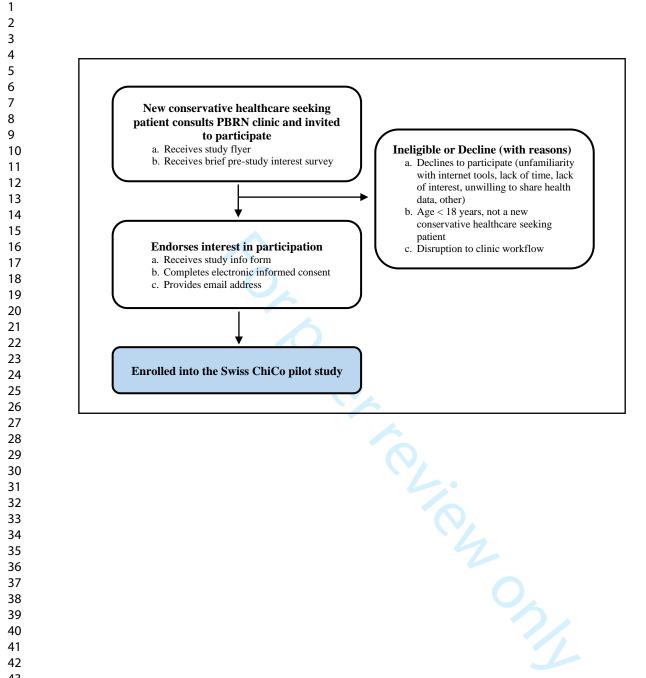
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# BMJ Open Supplementary material 1. Clinician reported-variables captured in the Swiss chiropractic practice-based research network

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			ے کے Choices, Calculations, OR Slider Labels	
Construct	Item Content	Variable Code		Branching Logic
dentification	Record ID	record_id	1, Yes   2, No	
	I consent to participate in the Swiss ChiCo study clinician survey	clin_consent		
	Clinic name:	clinic_name	20	
	Clinic address:	clinic_address		
emographics	Sex	sex	1, Male   2, Fennade	
		1 1.	1, Assistant / Recident, first year   2, Assistant / Resident, second year   3, Fully licensed	
	ChiroSuisse member classification	membership	chiropractor Q	
	Years of chiropractice	practice_years		
	Average number of patients seen per week over the last 3 months	n_patients	$1, < 50 \mid 2, 50 \mid 97$ 3, 100-149 $\mid 4, 150 \mid 99 \mid 5, 200 \mid 249 \mid 6, \ge 250$	
	Average number of new patients seen per week over the last 3 months	n_new	1, 0   2, 1-3   3, $\mathbf{\hat{\omega}}_{0}$ 6   4, 7-9   5, 10-12   6, 13-15   7, 16-20   8, > 20	
	How many chiropractors work at your clinic?	n_chiros	$1, 1 \mid 2, 2 \mid 3, 3 = 4 \mid 5, 5 \mid 6, 6 \text{ or more}$	
	Do you work with other healthcare professionals besides chiropractors?	other_health	1, Yes   2, No <b>Q</b>	
	How many other healthcare professionals work at your clinic?	n_otherhealth	1, 1   2, 2   3, 3 3, 4   5, 5   6, 6 or more	[other_health] = '1'
			1, Physiotherap $[3, Medical doctor   4, Acupuncturist   5, Nutritionist   6, ]$	
	Other healthcare practitioners involved in the practice (select all that apply)	specify_otherhealth	Other {specify_otherhealth2}	[other_health] = '1'
		specify_otherhealth2	E E E E E E E E E E E E E E E E E E E	[specify_otherhealth(6)]
	What language do you primarily use in your practice?	lang	1, Deutsch   2, Français   3, Italiano   4, Romansh   5, English   6, Other {otherlang}	
		otherlang	<u> </u>	[lang] = '6'
requency with which each condition is managed in your practic		msk_1	1, Often   2, Sometimes   3, Rarely   4, Never	
	Neck pain with arm pain	msk_2	1, Often   2, Sometimes   3, Rarely   4, Never	
	Neck pain with headache	msk_3	1, Often   2, Sometimes   3, Rarely   4, Never	
	Thoracic spine and rib pain	msk_4	1, Often   2, Sometimes   3, Rarely   4, Never	
	Low back pain without leg pain	msk_5	1, Often   2, Sorgetimes   3, Rarely   4, Never	
	Low back pain with leg pain	msk_6	1, Often   2, Sometimes   3, Rarely   4, Never	
	Shoulder pain	msk_7	1, Often   2, Sometimes   3, Rarely   4, Never	
	Elbow pain	msk_8	1, Often   2, Sometimes   3, Rarely   4, Never	
	Wrist and hand pain	msk_9	1, Often   2, Sometimes   3, Rarely   4, Never	
	Hip pain	msk_10	1, Often   2, Sometimes   3, Rarely   4, Never	
	Knee pain	msk_11	1, Often   2, Somstimes   3, Rarely   4, Never	
	Ankle and foot pain	msk_12	1, Often   2, Sometimes   3, Rarely   4, Never	
	Jaw pain / TMJ pain	msk_13	1, Often   2, Sometimes   3, Rarely   4, Never	
	Degenerative spine disorders	msk_14	1, Often   2, Son times   3, Rarely   4, Never	
	Other degenerative joint disorders	msk_15	1, Often   2, Sometimes   3, Rarely   4, Never	
	Postural disorders	msk_16	1, Often   2, Sourcetimes   3, Rarely   4, Never	
	Headaches	msk_17	1, Often   2, Sonetimes   3, Rarely   4, Never	
	Tendinopathy	msk_18	1, Often   2, Sometimes   3, Rarely   4, Never	
	Chronic pain	msk_19	1, Often   2, Sometimes   3, Rarely   4, Never	
	Spinal health maintenance	msk_20	1, Often   2, Soffeetimes   3, Rarely   4, Never	
	Non MSK complaints	msk_21	1, Often   2, Sometimes   3, Rarely   4, Never	
requency with which each patient type is managed in your			st.	
ractice	Children (0-3 years of age)	patient_type1	1, Often   2, Sometimes   3, Rarely   4, Never	
	Children (4-18 years of age)	patient_type2	1, Often   2, Sometimes   3, Rarely   4, Never	
	Older persons ( $\geq 65$ years of age)	patient_type3	1, Often   2, Sometimes   3, Rarely   4, Never	
	Pregnant women	patient_type4	1, Often   2, Sor times   3, Rarely   4, Never	
	Motor-vehicular accident injuries	patient_type5	1, Often   2, Son etimes   3, Rarely   4, Never	
	Work-related injuries	patient_type6	1, Often   2, Sometimes   3, Rarely   4, Never	
	Sport-related injuries	patient_type7	1, Often   2, Sometimes   3, Rarely   4, Never	
	Post surgical care and rehabilitation	patient_type8	1, Often   2, Sorpetimes   3, Rarely   4, Never	
	Ethnic and minority groups	patient_type9	1, Often   2, Sometimes   3, Rarely   4, Never	
ractitoner confidence scale (PCS)	I lack the diagnostic tools or knowledge needed to effectively assess patients with low back pain	pcs 1	1, 1. Strongly agree   2, 2. Agree   3, 3. Not sure   4, 4. Disagree   5, 5. Strongly disagree	
	I know exactly what to do to effectively treat patients with low back pain	pcs_2	1, 1. Strongly are   2, 2. Agree   3, 3. Not sure   4, 4. Disagree   5, 5. Strongly disagree	
	I am very comfortable treating patients with low back pain	pcs_2 pcs_3	1, 1. Strongly agree   2, 2. Agree   3, 3. Not sure   4, 4. Disagree   5, 5. Strongly disagree	
	How well prepared to manage low back pain are you?	ncs 4	1 1 Very well 2 2 Well 3 3 Adequately 4 4 Poorly 5 5 Very poorly	
	I feel confident using psychological and behavioural elements in the treatment of dow back pain	· /·, / ·		
	atients	nj.com/site/abo	DUT/QUICEINES.Xhtml II. I. Strongly agree 2.2. Agree 3.3. Not Sure 4.4. Disagree 5.5. Strongly Disagree	
	I feel confident working with a patient with low back pain not basing this on a structural diagnosis	pcs_5 pcs_6	1, 1. Strongly agree   2, 2. Agree   3, 3. Not sure   4, 4. Disagree   5, 5. Strongly disagree	

# Page 27 of 39

21 22

33 34

36 37

39 40

39	BMJ Oper	ו	-0 59	
			93	
Construct	Item Content	Variable Code	Choices & alculations, OR Slider Labels	Branching Logic
ain Attitudes and Beliefs Musculoskeletal (PABS-MSK)		pabs_med_1 (randomized	1, Totallodisagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
Questionnaire - Biomedical	Pain is a nociceptive stimulus, indicating tissue damage	to Q17)	5, Large 🛱 agree   6, Totally agree	
		pabs_med_2 (randomized	1, Totally disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	Patients with musculoskeletal pain should preferably practice only pain free movements	to Q7)	5, Largely agree   6, Totally agree	
		pabs_med_3 (randomized	1, Totall disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	Musculoskeletal pain indicates the presence of organic injury	to Q18)	5, Largely agree   6, Totally agree	
	If musculoskeletal pain increases in severity, I immediately adjust the intensity of treatment	pabs_med_4 (randomized	1, Totall Blisagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	accordingly	to Q2)	5, Large agree   6, Totally agree	
	If therapy does not result in a reduction in pain, there is a high risk of severe restrictions in the	pabs_med_5 (randomized	1, Totally disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	long term	to Q6)	5, Largewagree   6, Totally agree	
		pabs_med_6 (randomized	1, Totall disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	Pain reduction is a precondition for the restoration of normal functioning	to Q16)	5, Large 🗊 agree   6, Totally agree	
		pabs_med_7 (randomized	1, Totall disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	Increased pain indicates new tissue damage or the spread of existing damage	to Q3)	5, Large agree   6, Totally agree	
		pabs_med_8 (randomized	1, Totall disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	If patients complain of pain during exercise, I worry that damage is being caused	to Q9)	5, Largely agree   6, Totally agree	
			1, Totallodisagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	The severity of tissue damage determines the level of pain	to Q11)	5, Largen agree   6, Totally agree	
	In the long run, patients with musculoskeletal pain have a higher risk of developing functional	pabs med 10 (randomized	1, Totallydisagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	impairments	to Q15)	5, Largen agree   6, Totally agree	
ain Attitudes and Beliefs Musculoskeletal (PABS-MSK)		pabs biopsyc 1	1, Totally disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
Juestionnaire - Biopsychosocial	Biological, psychological and social factors should be included in the clinical assessment	(randomized to Q19)	5, Large agree   6, Totally agree	
		pabs_biopsyc_2	1, Total disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	How a patient currently copes with their pain problem must be assessed	(randomized to Q13)	5, Large agree   6, Totally agree	
	······································	pabs_biopsyc_3	1, Totall@disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	The reaction of a patient's family and friends will promote recovery	(randomized to Q5)	5, Largely agree   6, Totally agree	
		pabs biopsyc 4	1, Totally disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	A patient's beliefs about the cause of their musculoskeletal pain must be understood	(randomized to Q1)	5, Largery agree   6, Totally agree	
		pabs biopsyc 5	1, Totally disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	Specific and realistic goals for treatment must be agreed	(randomized to Q4)	5, Largely agree   6, Totally agree	
	specific and realistic gould for dealifent must be agreed	pabs_biopsyc_6	1, Totally disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	A patients perceived barriers to work must be assessed	(randomized to Q10)	5, Large agree   6, Totally agree	
	A patients perceived barriers to work must be assessed	pabs biopsyc 7	1, Totall disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	A patient's expectations about treatment for musculoskeletal pain affect their outcome	(randomized to Q14)	5, Large agree   6, Totally agree	
	r parent's expectations about treatment for museuroscerear part affect then outcome	pabs biopsyc 8	1, Totally disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	I consider a patient's social support network in my clinical management		5, Large Bagree   6, Totally agree	
	A patient's physical activity level should be considered in the management of their	pabs biopsyc 9		
	musculoskeletal pain problem	(randomized to Q12)	1, Totally disagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent 5, Largely agree   6, Totally agree	
	museuroskeretar parii provieni	pabs biopsyc 10	1, Totall Rdisagree   2, Largely disagree   3, Disagree to some extent   4, Agree to some extent	
	Reducing a patient's fear is essential to the treatment process	(randomized to Q8)	5, Large Hagree   6, Totally agree	
Digitalization of clinics	Do you use an electronic patient record (EPR) system for clinical record keeping in your practice?		1, Yes. Kise only an EPR system   2, Partially. I use a mix of an EPR and paper	
rgitalization of Chilles	by you use an electronic patient record (Er K) system for ennical record keeping in your practice.	cpi_use	3, No. I Ge a paper-based system, but am considering switching   4, No. I use only a paper-	
	Please indicate the Manufacturer Name and Product Name for the EPR information system that		based sympern	[onr uso] = '1' or [or
		enr manu prod		[epr_use] = '1' or [epr
	you use in practice. Please indicate the Manufacturer Name and Product Name for the EPR information system that	epr_manu_prod epr_manu_prod_considerin	Prote	2
		cpr_manu_prod_considerin	<u> </u>	[epr_use] = '3'
	you are considering to use in practice Do you use a secure/encrypted email system for patient communication in your practice (e.g.,	s	ec	[cpi_use] = 5
	Do you use a secure/encrypted email system for patient communication in your practice (e.g., HIN or ProtonMail)?	secure email use		
	/	secure_email_use	1, Yes   🖺 No	[coouro omoil us ]
	Please indicate the Product Name for the secure/encrypted email system you use in practice.	email_manu_prod	p j	[secure_email_use] =
	How would you compare your quality of life now, when compared to before the COVID-19	aay alin 1	1 Patter 02 Similar 2 Warsanad	
	pandemic? User have a structure have been effected in a the test of the COVID-10 and min2.	cov_clin_1	1, Better 2, Similar   3, Worsened	
	How have your patient numbers been affected since the start of the COVID-19 pandemic?	cov_clin_2	1, Increased   2, Unchanged   3, Decreased	
	Have you changed your work hours since the start of the COVID-19 pandemic?	cov_clin_3	1, Increased   2, Unchanged   3, Decreased	
	Does your clinic offer telehealth/virtual care services?	cov_clin_4	1, Yes   No   3, No, but I am considering integrating it into my practice	
	How has patient use of telehealth or virtual care services changed since the start of the COVID-19			
	pandemic?	telehealth	1, Increased use   2, Unchanged   3, Decreased use	$[cov_clin_4] = '1'$
	On a scale from 0 to 100 how motivated are you to participate in the patient cohort phase of the . swiss ChiCo study? FOT PEET REVIEW ONLY - http://bmjopen.bmj			1

21-059380 on

# Supplementary material 2. Patient-reported variables captured in the Swiss ChiCo pilot patient cohort

Construct	Item Content	Variable Code	Δ Choices, Calculations, OR Slider Labels	Branching Log
easons for non-participation	Record ID	record_id		
ollected at in-clinic recruitment	Are you interested in participating in this study?	chico_interest	1, Y 🔄 2, No	
			1, No mail address   2, Unfamiliar with electronic or internet tools   3, Lack of time	
	Reasons for not participating	nonparticipation	4, La nof interest in the study   5, Data privacy concerns   6, Other	[chico_interest] = '2'
	Other reason for not participating	nonparticipation_other	N.	[nonparticipation(6)] = '1'
	For clinic staff only	clinic_disrup	1, Disption to clinic workflow	[nonparticipation(6)] = '1'
ain, enjoyment and general		peg_q1_beforetx / peg_q1 / peg_q1_2wks / peg_q1_6wks /	1, 0 🗣 o pain   2, 1   3, 2   4, 3   5, 4   6, 5   7, 6   8, 7   9, 8   10, 9   11, 10 = Pain as	
ctivity (PEG) scale	What number best describes your pain on average in the past week?	peg_q1_12wks	bad a 🚽 you can imagine	
Collected at baseline, 1 hour, 2-, 6-	What number best describes how, during the past week, pain has interfered with your enjoyment of	peg_q2_beforetx / peg_q2 / peg_q2_2wks / peg_q2_6wks /	1, 0 = oes not interfere   2, 1   3, 2   4, 3   5, 4   6, 5   7, 6   8, 7   9, 8   10, 9   11, 10 =	
and 12-wks	life?	peg_q2_12wks	Competely interferes	
	What number best describes how, during the past week, pain has interfered with your general activity	peg_q3_beforetx / peg_q3 / peg_q3_2wks / peg_q3_6wks /	1, 0 = oes not interfere   2, 1   3, 2   4, 3   5, 4   6, 5   7, 6   8, 7   9, 8   10, 9   11, 10 =	
	?	peg_q3_12wks	Completely interferes	
usculoskeletal health			To	
uestionnaire (MSK-HQ)	1. Pain/stiffness during the day			
collected at baseline, 1 hour, 2-, 6-	How severe was your usual joint or muscle pain and/or stiffness overall during the day in the last 2	mskhq_q1_beforetx / mskhq_q1 / mskhq_q1_2wks /	5	
and 12-wks	weeks	mskhq_q1_6wks / mskhq_q1_12wks	1, Notet all   2, Slightly   3, Moderately   4, Fairly severe   5, Very severe	
	2. Pain/stiffness during the night			
	How severe was your usual joint or muscle pain and/or stiffness overall during the night in the last 2	mskhq_q2_beforetx / mskhq_q2 / mskhq_q2_2wks /	ੂ ਰੇ	
	weeks?	mskhq_q2_6wks / mskhq_q2_12wks	1, Notet all   2, Slightly   3, Moderately   4, Fairly severe   5, Very severe	
	3. Walking	mskhq_q3_beforetx / mskhq_q3 / mskhq_q3_2wks /	8	
	How much have your symptoms interfered with your ability to walk in the last 2 weeks?	mskhq_q3_6wks / mskhq_q3_12wks	1, Notat all   2, Slightly   3, Moderately   4, Severely   5, Unable to walk	
	4. Washing/Dressing			
	How much have your symptoms interfered with your ability to wash or dress yourself in the last 2	mskhq_q4_beforetx / mskhq_q4 / mskhq_q4_2wks /	1, No at all   2, Slightly   3, Moderately   4, Severely   5, Unable to wash or dress	
	weeks?	mskhq q4 6wks/mskhq q4 12wks	mysen.	
	5. Physical activity levels			
	How much has it been a problem for you to do physical activities (e.g. going for a walk or jogging)	mskhq q5 beforetx / mskhq q5 / mskhq q5 2wks /	1, Notat all   2, Slightly   3, Moderately   4, Very much   5, Unable to do physical	
	to the level you want because of your joint or muscle symptoms in the last 2 weeks?	mskhq q5 6wks / mskhq q5 12wks	activities	
	6. Work/daily routine		activilies O	
	How much have your joint or muscle symptoms interfered with your work or daily routine in the last	mskhq_q6_beforetx / mskhq_q6 / mskhq_q6_2wks /		
	2 weeks (including work & jobs around the house)?	mskhq q6 6wks / mskhq q6 12wks	1, Note at all   2, Slightly   3, Moderately   4, Severely   5, Extremely	
	7. Social activities and hobbies			
	How much have your joint or muscle symptoms interfered with your social activities and hobbies in	mskhq_q7_beforetx / mskhq_q7 / mskhq_q7_2wks /	20	
	the last 2 weeks?	mskhq q7 6wks/mskhq q7 12wks	1, Not at all   2, Slightly   3, Moderately   4, Severely   5, Extremely	
	8. Needing Help			
	How often have you needed help from others (including family, friends or carers) because of your	mskhq_q8_beforetx / mskhq_q8 / mskhq_q8_2wks /	02	
	joint or muscle symptoms in the last 2 weeks?	mskhq_q8_6wks / mskhq_q8_12wks	1, Not at all   2, Rarely   3, Sometimes   4, Frequently   5, All the time	
	9. Sleep		V V V V V V V V V V V V V V V V V V V	
	How often have you had trouble with either falling asleep or staying asleep because of your joint or	mskhq_q9_beforetx / mskhq_q9 / mskhq_q9_2wks /	Q	
	muscle symptoms in the last 2 weeks?	mskhq_q9_6wks / mskhq_q9_12wks	1, No Fat all   2, Rarely   3, Sometimes   4, Frequently   5, Every night	
	10. Fatigue or low energy	mskhq_q10_beforetx / mskhq_q10 / mskhq_q10_2wks /	i și	
	How much fatigue or low energy have you felt in the last 2 weeks?	mskhq_q10_6wks / mskhq_q10_12wks	1, Not at all   2, Slight   3, Moderate   4, Severe   5, Extreme	
	11. Emotional well-being			
	How much have you felt anxious or low in your mood because of your joint or muscle symptoms in	mskhq_q11_beforetx / mskhq_q11 / mskhq_q11_2wks /	) de	
	the last 2 weeks?	mskhq_q11_6wks / mskhq_q11_12wks	1, Notat all   2, Slightly   3, Moderately   4, Severely   5, Extremely	
	12. Understanding of your condition and any current treatment		ed fed	
	Thinking about your joint or muscle symptoms, how well do you feel you understand your condition	mskhq_q12_beforetx / mskhq_q12 / mskhq_q12_2wks /		
	and any current treatment (including your diagnosis and medication)?	mskhq_q12_6wks / mskhq_q12_12wks	1, Completely   2, Very well   3, Moderately   4, Slightly   5, Not at all	
	13. Confidence in being able to manage your symptoms			
	How confident have you felt in being able to manage your joint or muscle symptoms by yourself in	mskhq_q13_beforetx / mskhq_q13 / mskhq_q13_2wks /	сор	
	the last 2 weeks (e.g. medication, changing lifestyle)?	mskhq_q13_6wks / mskhq_q13_12wks	1, Excemely   2, Very   3, Moderately   4, Slightly   5, Not at all	
	14. Overall Impact	mskhq_q14_beforetx / mskhq_q14 / mskhq_q14_2wks /	Ū	
	How much have your joint or muscle symptoms bothered you overall in the last 2 weeks?	mskhq_q14_6wks / mskhq_q14_12wks	1, Notat all   2, Slightly   3, Moderately   4, Very much   5, Extremely	
	Physical activity Levels	mskhq activity beforetx / mskhq activity /		
		mskhq activity 2wks / mskhq activity 6wks /		
	In the past week, on how many days have you done a total of 30 militak past is the start with a start we have been a start of the start week.	http://bmiopen.bmi.com/site/about/c	ULCRIACS.KATA 2 days 4 3 days 5 4 days 6 5 days 7 6 days 8 7 days	1

Page 29 of 39

39 40 41 BMJ Open

21-059380 on

Construct	Item Content	Variable Code	ω Choices, Calculations, OR Slider Labels	Branching Logic
	Please list in rank-order the three most important factors that you believe caused your current pain		L V V	
Brief illness perception (IPQ brief)	complaint	briefillness	<u>र</u>	
Collected at baseline	1	ipq_q1	N	
	2	ipq_q2	20222	
	3	ipq_q3		
Demographics	Sex	sex_p	1, Malett, Female	
Collected 1 hour after initial				
assessment	Nationality	nationality	1, Swiss 2, Non-Swiss	
	Highest level of education	education Job	1, Comprisory   2, Secondary   3, Tertiary	
	At present, are you working	JOD	1, Full <b>time</b> at your usual job   2, Full time at a lighter job   3, Part time   4, Not	
			working disability   5, Not working - IV/pensioner applicant	
			6, Housewife/Househusband   7, Retired (not disability)   8, Unemployed   9,	
			Student	
				[job] = '1' or [job] = '2' or [jo
	How would you describe the total physical strain caused by your work?	workstrain	1, Very Light   2, Light   3, Somewhat strenuous   4, Strenuous   5, Very strenuous	or [job] = '6' or [job] = '9'
	Have you missed any days of work due to your current pain complaint?	sick_leave	1, Yes 🛱 No	
	How many days of sick leave have you had in the last 2 weeks ?	n_sickleave		[sick_leave] = '1'
	Smoking Status	smoking	1, Current smoker   2, Previous smoker   3, Never smoker	
	How much do you smoke on average per day?	n_cigarettes		[smoking] = '1'
	Have you visited a chiropractor before?	newpatient	1, I am new to chiropractic   2, I have visited a chiropractor before	
njury Characteristics	Have you visited a medical doctor for your current pain complaint?	md_currentpain	1, Yes 🔂, No	
Collected 1 hour after initial				
assessment	Were you referred to chiropractic care for your pain complaint from a healthcare professional?	referral_source	1, Yes 9, No	
			1, Other hiropractor   2, Family practitioner   3, Internist   4, Orthopaedic surgeon	
	Which healthcare professional referred you to chiropractic care?	hcrefer_specify	5, Physical therapist   6, Massage therapist   7, Other	[referral_source] = '1'
	Please specify which healthcare professional referred you to chiropractic care.	hc_refer_other	i i i i i i i i i i i i i i i i i i i	[hcrefer_specify] = '7'
			1, 1-2 days   2, 3-7 days   3, 1-2 weeks   4, 2-4 weeks   5, 1-3 months   6, 4-12 month	is
	How long has it been since your current pain complaint began?	date_of_inj	7, Mog than 12 months	
	Main location of pain complaint	pain_complaint	1, Low back pain   2, Low back pain with leg pain   3, Neck pain   4, Neck pain with	L L L L L L L L L L L L L L L L L L L
			arm part 5, Middle back pain   6, Headache   7, Shoulder pain   8, Hip pain   9,	
			Knee pain   10, Pain in multiple areas   11, Other	
	Please specify the main location of your pain complaint	pain_complaint_other	1, Yes, prescription medication   2, Yes, non-prescription medication   3, No	[pain_complaint] = '11'
	Are you currently taking medication to reduce your pain?	medication		
Imaging Use	In the last 1 month have you received any diagnostic imaging for your current pain complaint?	image_postvisit	1, Yes 🛛 No	
Collected 1 hour after initial			1. Yes $\stackrel{\mathbf{N}}{\rightarrow}$ No   3. Unsure	
assessment	X ray (radiography) in the last 1 month?	xray_postvisit		[image_postvisit] = '1'
	Ultrasound scan in the last 1 month?	ultra_postvisit	1, Yes Z, No   3, Unsure	[image_postvisit] = '1'
	MRI scan in the last 1 month?	mri_postvisit	1, Yes , No   3, Unsure	[image_postvisit] = '1'
	CT scan in the last 1 month?	ctscan_postvisit	1, Yes 🛱, No   3, Unsure	[image_postvisit] = '1'
	In the last 1 year have you received diagnostic imaging for any pain complaint?	imaging1y_postvisit	1, Yes ( <b>2</b> , No	
	X-ray (radiography) in the last 1 year?	xray_1yr	1, Yes 2, No   3, Unsure 1, Yes 2, No   3, Unsure	[imaging1y_postvisit] = '1'
	Ultrasound scan in the last 1 year?	ultrasound_1yr		[imaging1y_postvisit] = '1'
	MRI scan in the last 1 year?	mri_1yr	1, Yes <b>9</b> , No   3, Unsure	[imaging1y_postvisit] = '1'
COULD 10	CT scan in the last 1 year?	ctscan_1yr	1, Yes (2, No   3, Unsure	[imaging1y_postvisit] = '1'
COVID-19 aspects	How is your quality of life at the moment compared to the time before the COVID-19 pandemic?	patient_cov_1	1, Better 2, Similar   3, Worsened	
Collected 1 hour after initial	How are your physical activity habits at the moment compared to the time before the COVID-19			
assessment	pandemic?	pat_cov_2	1, Bette 2, Similar   3, Worsened	
	Have you been unable to seek planned or necessary medical treatment because of the COVID-19		1, Yes A, No	
	pandemic?	pat_cov_3	l, Yes B, No	
	What treatment could you not participate in because of the COVID-19 pandemic?	pat_cov_4		[pat_cov_3] = '1'
	Would you be interested in receiving virtual or telehealth chiropractic sessions?	virtual	1, Yes 🔁; No   3, Unsure	

		BMJ Open	21-059380	
Construct	Item Content	Variable Code	S Choices, Calculations, OR Slider Labels	Branching Logic
Orebro Musculoskeletal Pain		variable Code	1, 0-1 weeks   2, 2-3 weeks   3, 4-5 weeks   4, 6-7 weeks   5, 8-9 weeks   6, 10-11	Branching Logic
	How long have you had your current pain complaint?	omps_q1	weeks $[7, 12-23 \text{ weeks } ] 3, 55 \text{ weeks } ] 3, 65 \text{ weeks } ] 3, 65 \text{ weeks } ] 5, 95 \text{ weeks } ] 6, 105 \text{ weeks } ] 10, 52 \text{ weeks } ]$	
assessment	How would you rate the pain that you have had during the past week?	omps_q2	bad <b>A</b> t could be 1, 0 <b>A</b> bsolutely calm and relaxed  2, 1   3, 2   4, 3   5, 4   6, 5   7, 6   8, 7   9, 8   10, 9	
	How tense or anxious have you felt in the past week?	omps_q5	11, 10 = As tense and anxious as I've ever felt  1, 0 = As tense and $ 2, 1   3, 2   4, 3   5, 4   6, 5   7, 6   8, 7   9, 8   10, 9   11, 10 = 10$	
	How much have you been bothered by feeling depressed in the past week?	omps_q6	Extrogely 1, 0 No risk   2, 1   3, 2   4, 3   5, 4   6, 5   7, 6   8, 7   9, 8   10, 9   11, 10 = Very large	
	In your view, how large is the risk that your current pain may become persistent?	omps_q7	risk $\overleftarrow{o}$ 1. 0 No chance   2. 1   3. 2   4. 3   5. 4   6. 5   7. 6   8. 7   9. 8   10. 9   11. 10 = Very	
	In your estimation, what are the chances you will be working your normal duties in 3 months?	omps_q8	$\begin{array}{c} 1, 0 \\ \hline \\ 0 \\ 0$	
	An increase in pain is an indication that I should stop what I'm doing until the pain decreases.	omps_q9	$ \begin{array}{c} \text{Completely area} \\ \text{I, 0} = \text{Completely area} \\ \text{I, 0} = \text{Completely disagree} \\ \text{I, 0} = Completely dis$	
	I should not do my normal work with my present pain.	omps_q10	= Completely agree 1, 0 $\equiv$ Can't do it because of the pain problem   2, 1   3, 2   4, 3   5, 4   6, 5   7, 6   8, 7	
	I can do light work for an hour	omps_q3	9, 8 10, 9   11, 10 = Can do it without pain being a problem 1, 0 Can't do it because of the pain problem   2, 1   3, 2   4, 3   5, 4   6, 5   7, 6   8, 7	
	I can sleep at night.	omps q4	9, 8 $\overrightarrow{=}$ 0, 9   11, 10 = Can do it without pain being a problem	
collected at 2-, 6-, and 12-wks	pain complaint? How many times have you seen your chiropractor in the last 2 wks / 4 wks / 6 wks? In the last 2 wks / 4 wks / 6 wks have you visited another healthcare professional other than your chiropractor for your pain complaint?	fu_chiro_2wks / fu_chiro_6wks / fu_chiro_12wks nfu_chiro_2wks / nfu_chiro_6wks / nfu_chiro_12wks hc_2wks / hc_6wks / hc_12wks	1, Y 2   2, No 1, Okce   2, 2-4 times   3, More than 4 times 1, Y 6   2, No	[fu_chiro_2wks] / [fu_chiro_6wl [fu_chiro_12wks] = '1'
	How many times have you visited another healthcare professional in the last 2 wks / 4 wks / 6 wks?	nfu_otherhealth_2wks / nfu_otherhealth_6wks / nfu_otherhealth_12wks	1, Offee   2, 2-4 times   3, More than 4 times	[hc_2wks] / [hc_6wks] / [hc_12w = '1'
	Medical doctor visit in the last 2 wks / 4 wks / 6 wks for your pain complaint?	gp_2wks / gp_6wks / gp_12wks	1, Yes 2, No	[hc_2wks] / [hc_6wks] / [hc_12v = '1' [hc_2wks] / [hc_6wks] / [hc_12v
	Physiotherapist visit in the last 2 wks / 4 wks / 6 wks for your pain complaint?	physo_2wks/physo_6wks/physo_12wks	1, Y 🛃 2, No	$[hc_2wks] / [hc_6wks] / [hc_12]$ = '1' $[hc_2wks] / [hc_6wks] / [hc_12]$
	Other healthcare professional seen in the last 2 wks / 4 wks / 6 wks for your pain complaint?	otherhealth_2wks / otherhealth_6wks / otherhealth_12wks	1, Yes 2, No	= '1' [otherhealth 2wks] /
	Which other healthcare professional did you see? Are you currently taking medication to reduce your pain? Have you missed any days of work due to your pain complaint in the last 2 wks / 4 wks / 6 wks?	specif_otherhealth_2wks / specif_otherhealth_6wks / specif_otherhealth_12wks medication_2wks / medication_6wks / medication_12wks sickleave 2wks / sickleave 6wks / sickleave 12wks	1, Y.Z. prescription medication   2, Yes, non-prescription medication   3, No	[otherhealth_6wks] / [otherhealth_12wks]= '1'
	How many days of sick leave have you had in the last 2 wks / 4 wks / 6 wks i complaint? In the last 2 wks / 4 wks / 6 wks have you received any diagnostic imaging for your pain complaint?	n_sickleave_2wks / n_sickleave_6wks / n_sickleave_12wks	1, Y ₀₅   2, No C J, Yes   2, No	[sickleave_2wks] / [sickleave_6 / [sickleave_12wks] = '1'
	X-Ray (radiography) in the last 2 wks / 4 wks / 6 wks	xray_2wks / xray_6wks / xray_12wks	1, Y 🙀 2, No   3, Unsure	[imaging_2wks] / [imaging_6wk [imaging_12wks] = '1'
	Ultrasound scan in the last 2 wks / 4 wks / 6 wks	ultra_2wks / ultra_6wks / ultra_12wks	1, Y 😽 2, No   3, Unsure	[imaging_2wks] / [imaging_6wk [imaging_12wks] = '1'
	MRI scan in the last 2 wks / 4 wks / 6 wks	mri_2wks / mri_6wks / mri_12wks	1, Y 2, No   3, Unsure	[imaging_2wks] / [imaging_6wk [imaging_12wks] = '1'
	CT scan in the last 2 wks / 4 wks / 6 wks	ct 2wks/ct 6wks/ct 12wks	1, Y 🚱   2, No   3, Unsure	[imaging_2wks] / [imaging_6wl [imaging_12wks] = '1'
	or beam in the more made a way of was	et 20 kb / et 00 kb / et 12 kb	1, 1 Completely recovered   2, 2. Much improved   3, 3. Slightly improved   4, 4. Not	[magnig 12wks] = 1

Page	31	of	39
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44 45

STROBE Statement—checklist of items that should be included in reports of observation	al studies
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STROBE Statemen	t—cheo	cklist of items that should be included in reports of observational studies	6/bmjopen-2021-059380 on	
	Item No.	Recommendation	110.	Relevant text from manuscript
Title and abstract	1	( <i>a</i> ) Indicate the study's design with a commonly used term in the title or the abstract ( <i>b</i> ) Provide in the abstract an informative and balanced summary of what was done and what was	Grage 1 and 2 Guy 2022. Downloaded from http://bmjopen.br	"The Swiss chiropractic practice-base research network and musculoskeletal pain cohort pilot study: protocol of a nationwide resource to advance musculoskeletal health services research." (pg 1) "Phase 1 focuses on the development the Swiss chiropractic PBRN, and wil use a cross sectional design to collect information from chiropractic clinicia nationwide." (pg 2) "Phase 2 will recruit consecutive patients aged 18 years or older with MSK pain from community-based chiropractic practices participating in the PBRN into a prospective chiropractic cohort pilot study." (pg 2 "All data collection will occur througj electronic surveys. Surveys will be
		found	Page 2 	provided to patients prior to initial assessment, 1-hour after assessment a at 2-, 6-, and 12-weeks after assessment."
Introduction			Ap	
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	n April 20, 2024 by guest. Prote	"Given the high burden of MSK pain conditions, which are frequently managed by chiropractors, and limite practice-based evidence on the topic of chiropractic care for MSK conditions particularly in Switzerland, this proto outlines the creation of a nationwide PBRN and subsequent nested prospective cohort (Swiss ChiCo) pil- study for chiropractic patients with MSK pain."
Objectives	3	State specific objectives, including any prespecified hypotheses	Protected by copyright.	"The main objectives of this report an to: 1) describe the development of a MSK focused PBRN and describe the enrolment of Swiss chiropractors into the PBRN; and 2) describe the metho of the first nested study to be conduct

		BMJ Open	6/bmjopen-2021	Ра
			1-2021-0 <del>5</del> 9	within the PBRN – an observational prospective patient cohort pilot study.
Methods Study design	4	Present key elements of study design early in the paper	-059380 0 n Page 6 13 July	"In phase 1, we will aim to develop th Swiss Chiropractic PBRN and describ the demographics of participating chiropractors at project initiation using cross-sectional study design."
		For	13 July 2022. Downloaded 1	"In phase 2, we aim to launch a 12-we observational prospective Swiss chiropractic cohort (Swiss ChiCo) pil- study which will assess the feasibility for longitudinal data collection and describe the clinical course of patients with MSK pain presenting to Swiss chiropractors."
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Page 8, 9, 12 and 13 http://bmjopeg	"To aid with clinician recruitment, we plan to launch the PBRN developmen phase on September 9, 2021." (pg 8) "Clinician recruitment for the Swiss chiropractic PBRN will be scheduled end on December 19, 2021." (pg 9)
			ı.bmj.com/ on /	"Clinicians participating in the Swiss chiropractic PBRN will be asked to fu complete 1 electronic survey of approximately 10 minutes duration." 9)
			http://bmjopen.bmj.com/ on April 20, 2024 by gues	"We will hold pilot study introductor meetings with participant clinicians a clinical staff to reinforce study objectives, methods and procedures prior to the tentative date for initiatio of the patient cohort pilot study recruitment of April 01, 2022." (pg 1
			t. Protected	"Subsequent questionnaires will take approximately 10-12 mins to complet and are emailed directly to patient participants 1 hour after (post-visit patient survey), and at 2-, 6-, and 12- weeks following completion of the pr visit survey." (pg 13)
Participants	6	( <i>a</i> ) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	Page 8 and 11 COPY	"All registered active chiropractor members (fully licensed chiropractors and postgraduate assistant chiropractor of the Swiss Chiropractic Association

ge 33 of 39	BMJ Open	:/bmjope	
	Case-control study—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants (b) Cohort study—For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per	6/bmjopen-2021-059380 on 13 July 2022. Downloaded from http://bmjopen	(ChiroSuisse) will be eligible and invited to participate." (pg 8) "Patients will be eligible to participate if they are 18 years of age or older; are seeking new conservative healthcare for a MSK pain condition (new conservative healthcare seeking is operationalised as not having received (patient-reported) chiropractic care, physiotherapy, osteopathy or massage therapy for their current MSK complain in the 1 month prior to their current initial visit to the chiropractor and not a follow-up visit); consent to chiropractic treatment; are able to respond to surveys in German, French, Italian, or English; have an active email account; and are willing and able to complete electronic study questionnaires." (pg 11)
Variables	<ul> <li>Case</li> <li>7 Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable</li> </ul>	pen.beag.com/ on April 20, 2024 by guest. Protected by copyright.	"The primary clinical outcome will be practitioner self-confidence in the clinical management of patients with low back pain (measured by practitioner self-confidence scale). The second primary clinical outcome will be practitioner biomedical versus biopsychosocial MSK pain treatment orientation (as measured by the pain attitudes and beliefs scale, musculoskeletal version)." (pg 10) "The feasibility outcomes are 1) clinician participation proportion in the Swiss chiropractic PBRN will be assessed by reporting the proportion of all eligible clinicians that enroll in the PBRN development phase using raw numbers and percentages; and 2) motivation for clinician participation in the Swiss ChiCo pilot study will be assessed using a visual analog scale (VAS, 0-100), with higher scores reflecting higher motivation for participation." (pg 10)

Page 34 of 39

		BMJ Open	6/bmjopen-20	Pag
			21-059380 on 13 July 2022. Downlc	"The prespecified primary clinical outcomes will be: 1) change in musculoskeletal pain impact, as measured by the 3-item pain, enjoyment and general activity scale; and 2) change in MSK health status, as measured by the musculoskeletal health questionnaire." (pg 14) "The primary feasibility outcomes will be: 1) the proportion of invited patients presenting to chiropractic practices who subsequently agree to participate in this study; and 2) change in patient participant follow-up and retention over 12 weeks." (pg 14)
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	d Bage 10 and 14 from http:	"The PCS contains four items with a total score of 20. A score of 4 represents higher self-confidence in the management of patients with low back pain, while a score of 20 represents lower self-confidence." (pg 10)
		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	from http://bmjopen.bmj.com/ on April 20, 2024 by guest	"The PABS-MSK contains two domains, with a higher score on either the domains (each 10-items, with a scor range of 10-60) representing higher biomedical and biopsychosocial MSK pain treatment orientation." (pg 10)
			m⁄ on April 20, 2	"Motivation for clinician participation i the Swiss ChiCo pilot study will be assessed using a visual analog scale (VAS, 0-100), with higher scores reflecting higher motivation for participation." (pg 10)
			024 by guest. Protect	"3-item pain, enjoyment, and general activity scale (PEG scale, score range 0 10) with higher scores representing worse outcomes; and 2) change in MSK health status, as measured by the musculoskeletal health questionnaire (MSK-HQ, score range 0-56) with higher scores reflecting better health status." (pg 14)
Bias	9	Describe any efforts to address potential sources of bias	Bage 13 and 17 Bage 13 and 17 COPYTIGE	"Patient participant surveys will be provided in English, German, French and Italian, with patients having the ability to choose their preferred language for completion. Validated, translated versions of the patient

35 of 39	BMJ Open	6/bmjc	
		6/bmjopen-20	
Study size	10 Explain how the study size was arrived at	021-059380 on 13 July 2022. Downloaded from http://bmjopege 7, 9 and 12 021-059380 on 2010 converted by copy	reported outcome measures (PROM) will be used when possible." (pg 13) "To limit this threat to external validity, the Swiss chiropractic PBRN will recruit clinicians through both online and in- person channels. In addition, chiropractic clinician recruitment for the Swiss ChiCo pilot study will be proportionally overweighted in French and Italian language regions. These areas have shown lowered use eHealth technology use when compared to the German speaking regions of Switzerland." (pg 17) "To recruit a diverse group of patient participants, clinicians will be asked to consecutively recruit eligible patients from private practice. Although consecutive recruitment does not eliminate the threat of self-selection bias, it ensures all eligible participants seeking chiropractic care will be aware of the study." (pg 17) "One-on-one meetings with Swiss chiropractors were carried out for the purpose of understanding how best to integrate study processes into clinical practice settings. According to all clinician advisors, the recruitment of approximately 5-10 consecutive patients per clinical practice and MSK health, we hope to achieve a clinician participation proportion of approximately 50%." (pg 9) "Based on this work, we will aim to recruit at least 100 patient participants to enable a preliminary characterisation of the population, enabled by representative selection of chiropractic clinicians with respect to language region." (pg 12)
		pyright.	

		BMJ Open	6/bmjopen-2021-05938Φ	Page
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	02 1-Page 10 59380	"Participants who score 70 or more on the VAS will be defined as "highly motivated", and described using raw numbers, proportions and 95% CIs." (pg 10)
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	Page 10 and 14 Page 13 July 2022. Downloaded from http://bmjopen.bmj.com	"Both primary clinical outcomes will be reported as means and standard deviations (SDs), with 95% confidence intervals (CIs) calculated as appropriate." (pg 10) "Clinician participation proportion in the Swiss chiropractic PBRN will be assessed by reporting the proportion of all eligible clinicians that enroll in the PBRN development phase using raw numbers and percentages." (pg 10) "Clinical outcomes of the PEG scale and MSK-HQ prior to initial chiropractic assessment will be reported as means, SDs, and 95% CIs; and clinical course of patient pain impact and MSK health status will be reported as a mean difference with SDs and 95% CIs as appropriate." (pg 14) "Invited patient participation will be reported as raw numbers and proportions. Patient participant retention will be reported as the
			~ ~	proportion of enrolled participants who complete follow-up surveys across 12- weeks." (pg 14)
		(b) Describe any methods used to examine subgroups and interactions	S N/A	
		(c) Explain how missing data were addressed		
		( <i>d</i> ) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed <i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy	April 20, 2024 by gues	
		( <u>e</u> ) Describe any sensitivity analyses	ues N/A	
Results			. Pro	
Participants 13	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	Protected	
		(b) Give reasons for non-participation at each stage	y N/A	
		(c) Consider use of a flow diagram	oopynight.	
			ndbi.	

# Page 37 of 39

## BMJ Open

f 39	BMJ Open	6/bmjopen-
Descriptive data 14	<ul> <li>(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders</li> </ul>	- <u>207</u> - <u>1</u> -07 -0593
	(b) Indicate number of participants with missing data for each variable of interest	N/A
	(c) Cohort study—Summarise follow-up time (eg, average and total amount)	n 1 N/A
Outcome data 15	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time	з С N/A
	Case-control study—Report numbers in each exposure category, or summary measures of exposure	iy _{N/A} N/A N/A
	Cross-sectional study—Report numbers of outcome events or summary measures	O N N/A
Main results 10	(eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	. D N/A Ownload
	(b) Report category boundaries when continuous variables were categorized	N/A
	(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
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		BMJ Open	6/bmjopen-2021	Pa
Other analyses	17	Report other analyses done-eg analyses of subgroups and interactions, and sensitivity analyses	L N/A	
Discussion			593	
Key results	18	Summarise key results with reference to study objectives	059380 [°] on 13 July 2022.	"This project is designed to attract a large proportion of Swiss chiropractors into a nationwide PBRN and subsequently recru patients from participating clinics into a longitudinal cohort pilot study."
		Kor.	Downloaded	"The unique collaboration with clinicians, advocacy groups and academicians, a growing trend in health care research, has to the promotion of research objectives which are clinically relevant and patient- centred, and a study implementation strate vetted by Swiss chiropractic primary care clinicians."
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	fæage 17 m http	"Typically, unequal access to technology resources and lack of digital literacy can be to a young, well-educated, and high socio- economic status study sample."
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	://bmj	
Generalisability	21	Discuss the generalisability (external validity) of the study results	opeff.bmj.com/ on April 20, 2024 by guest. P	"To limit this threat to external validity, the Swiss chiropractic PBRN will recruit clinicians through both online and in-persi- channels. In addition, chiropractic clinician recruitment for the Swiss ChiCo pilot stude will be proportionally overweighted in French and Italian language regions. Thes areas have shown lowered use eHealth technology use when compared to the German speaking regions of Switzerland. recruit a diverse group of patient participants, clinicians will be asked to consecutively recruit eligible patients from private practice. Although consecutive recruitment does not eliminate the threat of self-selection bias, it ensures all eligible participants seeking chiropractic care will aware of the study."
Other informat	ion		rote	
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	cred by copyright.	"This work was internally supported by th Department of Chiropractic Medicine, Faculty of Medicine, at University of Zuri and Balgrist University Hospital through funding from the Foundation for the Education of Chiropractors in Switzerland

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*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohore and cross-sectional studies.

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 ... is them and gives methodolog.

 ... is lable on the Web sites of PLoS Medic.

 ... pridem.com/). Information on the STROBE Init.

 Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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