Project protocol	
Title	Working with healthcare providers to optimize management of perioperative pain: a multi-centre project in 8 countries in Europe
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European Pain Federation (EFIC)	Task force on Improving Management of Perioperative Pain Task force chairs: (1) Winfried Meissner, MD (as above) (2) Elon Eisenberg, MD Professor of Neurology and Pain Medicine - Head, Pain Research Unit Rambam Health Care Campus Technion - Israel Institute of Technology - Israel
Study Design	Prospective anonymous pre/post questionnaire investigation
Background	Approximately 40 million surgical procedures are carried out every year in Europe. Pain-related patient reported outcomes (PROs) of patients undergoing surgery are generally poor and large variability in the processes of care that lead to these outcomes is apparent [1]. National and international efforts, employed over the last 50 years, to change this situation have not brought about sufficient progress [2]. These efforts include, among others, compiling evidence based clinical practice guidelines; establishing societies for professionals in the fields of pain, anaesthesiology and nursing; carrying out basic and clinical research and training teams of professionals to work in Acute Pain Services [3]. Furthermore, providers lack feedback about the care they provide to their patients and the associated patient reported outcomes [4]. The challenges associated with improving management of perioperative pain motivated the European Pain Federation (EFIC) (www.europeanpainfederation.eu) and PAIN OUT (www.pain-out.eu) to assess whether methods of Continuous Quality Improvement (CQI) could be used to advance this field in Europe. There is no single definition of CQI, however, it generally relates to using tools, such as feedback and benchmarking to identify barriers in care and work to optimize treatment processes to achieve better outcomes and to do so continuously, over time, in incremental steps [5]. This document outlines a program devised by EFIC and PAIN OUT whereby healthcare providers (HCP), anesthesiologists, surgeons or nurses in hospitals in 8 European countries, will join a 2-year program for assessing and optimizing management of pain in patients undergoing surgery in 1-2 wards in their hospital using methods of CQI. This is a pilot project, after which EFIC and PAIN OUT will establish and offer a longstanding program to interested HCP across Europe. Once developed, the program can be translated to other fields of pain, such as cancer or chronic pain. Countries participating in the project are: Austria, Belgium, France, Italy, Netherlands,

	Serbia, Spain, and Switzerland. Other than in Serbia, the project is funded by an educational grant from Grünenthal GmbH via its CHANGE PAIN initiative. EFIC provides funding for the project in Serbia. Participating sites will receive funding contributing to costs of running the project which includes remuneration for datasets collected, travel and accommodation at the workshops and 2 years of subscription to PAIN OUT. Receipt of funding is based on the principle of 'pay by performance', i. e. payment will be transferred to each hospital depending on fulfilling of obligations related to collecting data and submitting reports. The details are outlined in the contract each hospital signs with PAIN OUT. PAIN OUT (www.pain-out.eu) is an international quality improvement and research network focusing on perioperative pain management in adults and children in the clinical routine. It provides HCPs with standardized and validated tools to carry out web-based feedback and benchmarking of pain-related PROs and evaulation of management processes related to pain [6,7]. The PAIN OUT data base contains over 60,000 patient files from over 60 hospitals in Europe, USA, South East Asia and Africa. PAIN OUT was established during 2009-2012 with funding from the European Commission (FP7, Grant Agreement No. 223590). It now continues as an academic, not-for profit project. EFIC is a multidisciplinary professional organization in the field of pain science and medicine, made up of the 30 European Chapters of IASP (International Association for the Study of Pain). Established in 1993, EFIC's 30 constituent chapters represent 33 countries and close to 18,000 scientists, physicians, nurses, physiotherapists, psychologists and other healthcare professionals across Europe, who study pain and treat patients in pain. The EFIC task force, Improving Management of Perioperative Pain Management, is charged with overseeing the project described here. The task force is multi-discplinary, consists of 10 members, anesthesiologists, a surgeon, nurse, reseracher, representative from Grunenthal; 2 are members from PAIN OUT.
Overview of the project	The project described here will take place over a period of 2 years. This does not include the time required to join PAIN OUT which involves signing a contract; training surveyors and obtaining ethics approval for joining the project. This process typically requires up to 4 months, the duration is mostly determined by requirements from local ethics committees. Participants from hospitals (up to 10) in each country will form a '**national network'**. A healthcare provider from one of the hospitals will lead the national network and coordinate the project's activities with the EFIC taskforce and PAIN OUT (**'national network leader')**. The project in each hospital will be led by a **Principle Investigator (PI)**. The work in each national network will comprise of three national workshops and activities carried out within each hospital, relying on methodology developed by PAIN OUT. The following activities will be carried out in each network: **Kickoff workshop**: introduce the project and complete training of surveyors (2-3 in each hospital); **Baseline data** will be collected in each hospital, 130 datasets in 1 to 2 wards. The PI from each hospital will decide which wards will take part in the project. Analysis of findings according to a protocol provided by PAIN OUT; **Mid-term workshop** to review findings and plan improvement measures for each hospital; Participants from each hospital will then discuss the proposed improvement measures and select 1-2 which will be implemented and assessed by a second phase of data collection (130 datasets in 1 to 2 wards); **End of project workshop** to summarize findings and plan whether there is room to continue and upscale the project in the hospital / network and how to sustain findings.

Assessment schedule	(1) Recruitment: before surgery OR on the first post-operative day (POD1). (2) Assessment of patient reported outcomes (patient) and clinical variables (abstracted from the patient's medical file): POD1. Patients may carry out the assessments as inpatients or at home, after ambulatory surgery.
Study Duration	Approximately 2 years
Subject Population	Adult patients (in most countries ≥ 18 years old) undergoing surgery. The majority of sites will carry out the work with adult patients. PIs can select to work wards treating paediatric patients, 4 – 18 years. Questionnaires for assessing children have been developed and they from part of PAIN OUTinfant.
Inclusion criteria	(1) Patient is on the first post-operative day AND back on the ward from surgery ≥ 6 hrs (2) Patient is of consenting age / child (if paediatric patients are being assessed) (3) Patient (or parent) has given consent for participation in the survey. Consent can be oral or written, depending on requirements of the local ethics board All 3 criteria need to be fulfilled for a patient to be recruited
Exclusion criteria	Patient does not give consent for reasons such as being: too ill OR too tired OR it is not possible to communicate with the patient for reasons such as deafness / cognitive impairment / a patient outcomes questionnaire is not available in a language that the patient knows. Patients who are too ill or too tired can request help from the surveyor in filling in the questionnaire. For children: the parents or children do not wish to participate.
Variables assessed & method of filling in the patient outcomes questionnaire	**Patient Reported Outcomes** are assessed in a questionnaire consisting of 13 questions, with additional sub-questions. The questions address: severity of pain; its interference with activities in and out of bed; effect on affect (anxiety and helplessness); adverse effects related to anaesthesia and opioid treatment; whether the patient received information about management of pain, degree of satisfaction with treatment of pain, whether the patient wished for more treatment for pain; used or received non-pharmacological treatment; experienced chronic pain before surgery and its severity [6]. The questionnaire is validated in eight languages and now available in 18. Patients fill in the questionnaire in their native language, as much as is possible. Patients require 5 - 10 minutes to fill in the questionnaire. Patients may receive help from the surveyor in filling in the questionnaire, if they request this. Patients can fill in the questionnaire on paper or it will be sent electronically, as an email. The questionnaire may be sent to in-patients via a hospital email address or via a private email and to patients at home via a private email address. Patients agreeing to receive the questionnaire by email, will give an email address to the surveyor when giving consent to participation. **Demographics & clinical data** include the patient's gender, age (in decades), language in which the questionnaire is filled in; country where the assessment takes place; type of surgery using ICD9 codes, type of anaesthesia, analgesics given for pre-medication, intra-operatively, in recovery, on the ward. Blank fields may be used to collect data items which are interesting to the local site. This information is abstracted by the surveyor from the medical record.
Collection of data	Surveyors can be nurses, students (e.g. medical, nursing, or social sciences) or residents. Their role is to coordinate data collection – recruit patients and collect the demographic and clinical data and input findings into the web-based mask. As much as is possible, surveyors should not have clinical duties on the ward being surveyed. This is aimed so that patients do not feel obliged to please the surveyor in the answers they provide when filling the PRO questionnaire. Training for data collection consists of reviewing the PAIN OUT standard operating procedures, followed by a quiz. This requires approximately 3-4 hours. Once the quiz is

	successfully completed, surveyors are given access to the project's website and materials. They collect and input about 10 datasets into the web-based mask, which are reviewed for completeness and accuracy by the project coordinators. After approval, surveyors can begin collecting data routinely. Each PAIN OUT dataset (demographic and clinical variables and patient reported outcomes) takes approximately 20 minutes to collect and 5 minutes to enter the data into the web-based data entry mask The demographic and clinical data can be inputted directly into the web-based mask using a tablet PC. This requires having WiFi on the ward where the data is collected.
Safety	Patients are not exposed to any risks from the study. Data collected at baseline assesses management employed routinely on the ward; measures selected for the second phase of the study will be ones which are evidence-based and considerable experience gained with implementing them. Patient data in the PAIN OUT data base is anonymized. Participants receive feedback so that only their site is identified, other wards are anonymous.
Discontinuation Criteria	Patients may stop filling in the questionnaire at any point.
Sample Size Estimation and Statistical Analysis	The analysis strategy may change with experience gained and / or on request from participants. **Minimum number of cases for each ward:** The sample size is calculated for the logistic regression which is planned for the second phase of the project and aims to assess whether there is an association between change in PROs and the improvement measures (see below). In pilot work, the number of independent predictor variables used ranged from 6 -13. For a ratio of 1:20 (dependent: predictor) and for the maximal number of 13 predictor variables, each ward will require full data sets for at least 260 patients, n = 130 at baseline and n = 130 after the improvement measure is implemented. Approximately 20 – 30% of patients do not wish to participate in the project. Thus, to obtain a full data set of 260 patients, 312 – 346 patients \ ward should be approached for inclusion in the study. **Statistical analysis** Clinical users can access data from the repository either on- or off-line. **Online analysis** offers access to the patient reported outcomes, demographic variables and surgical procedure. This analysis is descriptive and is provided in a format of figures and tables, showing data from one's own site (identified) against the context of other wards in the same discipline (anonymized). **Offline analysis** offers users access to all the variables in the repository and is intended for research and in-depth analysis of the findings for quality assurance. Clinical users are able to download and carry out analysis of raw data collected in their site. They can submit a request to the project organizers to pool data from several centres and investigate a research question or topic related to quality assurance. In this study, analysis of the baseline data will consist of descriptive summaries of the outcome and process parameters of all patients, as mean ± standard deviation or proportions, based on the type of scale. Post implementation of improvement measures: The analysis will proceed in two steps. The first will determine whether the program has had a desirable effect on PROs. The second analysis will determine which processes might be associated with the effect. **(a) PROs:** Seven – eight independent (r2 ≤ .5) PROs will be selected. Each variable will require at least 20 subjects and the data will be analyzed using univariate general least squares statistics. Multivariate analysis of variance may be another option. The binary variable will be phase of project. Effect sizes will be assessed with Cohen's d. A medium or large effect

	size will be regarded as a clinically meaningful change. **(b) Process data:** Process data will be assessed using logistic regression. The binary variable will be phase of project. The predictor variables will be selected according to the type of surgery. Based on pilot work, the number of variables can range from 6 – 13. Effect sizes for individual variables will be assessed by odd ratios. A medium or large effect size will be regarded as a clinically meaningful change.
Health Risks and procedures in case of Emergency	Not applicable - the first phase of the study is observational; there will be no risks associated with the second phase as all measures will be ones used routinely for treating perioperative pain.
Risk-Benefit-Analysis	**Risk:** Patients participating in the survey are not exposed to any risk. They spend a short time (5-10 minutes) filling in the 13 questions in the patient outcomes questionnaire. Patients who are in too much pain or tired or feel otherwise unable to fill in the questionnaire independently can still participate, the surveyor will interview them and fill in the questionnaire based on their replies. A subset of the three most important questions can be marked out for patients who feel unable to fill in the complete questionnaire, independently or by interview. **Benefit**: While patients themselves will probably not benefit directly from participating in the survey, the information they provide should help to better understand strengths and weaknesses related to pain management on the ward, leading to change in practices, if and when necessary. This will be of benefit to future patients admitted to wards participating in the survey and possibly to other surgical wards in the same hospital, should PIs share the learnings they gain with other colleagues.
Simultaneous Enrolment in other studies	Patients participating in this survey are not restricted from participating in other studies.

Flow Chart for approaching patients on a given ward

	On the first post-operative day in hospital or at home, after ambulatory surgery
Evaluating patients for inclusion & exclusion criteria	**X**
Randomizing ward or which patients to approach (when necessary, the procedure is described in the PAIN OUT Standard Operating Procedures).	**X**
Providing patients with information about the survey and obtaining oral OR written informed consent (as determined by the local ethics committee).	**X**
Assessing pain related patient reported outcomes, demographics, type of surgery and peri-operative pain management.	**X**

Study phases in each national network

The timing and order of activities listed in this schedule may change.

Month	Activity
-4 – 0 **Will not be included in the time allocated for the project**	Administrative preparations for joining the project. This includes signing a contract with PAIN OUT, obtaining approval from the local ethics committee, training surveyors about the project's methodology, nominating the local multidisciplinary working group.
1 – 6	• **National Kickoff workshop** • Surveyors in each site collect patient and clinical data: 130 datasets in each participating ward. • Principle Investigators in each hospital carry out descriptive analysis of the findings (assisted by the national network leader, PAIN OUT, EFIC task force).
7	• **Mid term workshop**: 1-2 days reviewing the findings and inspection of the outcomes, led by the National network leader, members from the EFIC task force and PAIN OUT. • Problems in pain management tend to be similar, across disciplines and hospitals, thus, collaborators will benefit from carrying out analysis of the findings and inspection of the outcomes as a group. • Discuss concrete recommendations for improvement and for local improvement plans.
8-10	• Staff in each site present options for improvements to local working groups and select 1-2 measures for implementation and carry out the necessary preparations. • Obtain permission from local ethics committee (if necessary).
11 –	Implement the improvement measure(s).
12 – 18	• Surveyors in each site collect patient and clinical data (130 datasets) for each participating ward. • Principle Investigators in each hospital analyze findings, comparing data from the two phases of the project (assisted by the national network leader and PAIN OUT) and will prepare a report summarizing the work they carried out, with recommendations for future work in their hospital.
23 or 24	**Summary workshop**: 1-2 days reviewing findings from the network. The EFIC task force will prepare a report summarizing the project, with recommendations for future work associated with continuing the network and expanding it nationally and feasibility of creating new national networks in neighbouring countries. Collaborators will be encouraged to write up their findings for submisison at national and international pain, anaesthesia and surgical meetings.

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