Perioperative caesarean section pain management at Groote Schuur Hospital – An audit

Daniel Giles

Thesis Presented for the Degree of
Master of Medicine (MMed) in Anaesthesia
In the Department of Anaesthesia and Perioperative Medicine
Faculty of Health Sciences
UNIVERSITY OF CAPE TOWN

Supervisors:

Professor Romy Parker

Dr Alma De Vaal

Declaration

I, Daniel Giles, hereby declare that the work on which this dissertation is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor part of it has been, is being, or is to be submitted for another degree in University of Cape Town or any other university.

This dissertation has been submitted to the Turnitin module (or equivalent similarity and originality checking software) and I confirm that my supervisor has seen my report and any concerns revealed by such have been resolved with my supervisor.

This thesis is presented in fulfilment of the requirements for the degree of MMed (Anaesthesia)

I empower the University of Cape Town to reproduce, for the purposes of research, either the whole or any portion of the contents in any manner whatsoever.

Daniel Giles

Signed by candidate

_____

Date:
2024-02-22

_____

Acknowledgments, format and contributions

This work has been prepared for submission to the Southern African Journal of Anaesthesia and Analgesia. As per their requirements it has been completed in the Microsoft Word document format. Text is 1.5-spaced, in 12-point Times New Roman font. Referencing uses the Vancouver-superscript format.

The author would like to acknowledge both Professor Romy Parker and Doctor Alma De Vaal. They guided not only the choice of patient cohort to audit, the design of audit collection (using the PAINOUT study design) and the idea to compare the current perioperative analgesia plan to that of the updated PROSPECT guidelines for caesarean section.

Contents

List of Tables

List of Figures

Abstract

Title: Perioperative caesarean section pain management at Groote Schuur Hospital – An audit

Author(s): Dr Daniel Giles, Dr Alma de Vaal, Prof. Romy Parker

Date: 22 February 2024

Key words: Pain; caesarean section; perioperative pain management; PROSPECT guidelines

Background: Caesarean section is one of the commonest surgeries performed resulting in moderate-to-severe pain in a significant proportion of women. The PROSPECT (procedure specific postoperative pain management) group includes surgeons and anaesthetists who develop procedure-specific consensus recommendations on managing postoperative pain. Our audit compared current clinical practice to that recommended by the updated PROSPECT guidelines for caesarean section from 2020.

Methods: A cross-sectional observational study was conducted using the PAIN OUT standard operating procedures. The data were collected between 11 February and 5 March 2022 and uploaded onto the PAIN OUT registry. The appropriate data were extracted and used to describe the current standard of care directly against each of the nine interventions recommended by the PROSPECT guidelines.

Results: A total of 84 patients were included in the audit. Five of the recommended interventions were not done at all (intrathecal long-acting opioid, preoperative oral paracetamol, intraoperative and postoperative NSAID, intraoperative intravenous dexamethasone), two intraoperative interventions were done poorly (intravenous paracetamol 15.5%, local anaesthetic 15.5%) and two postoperative interventions were done well (oral paracetamol 89.3%, intramuscular morphine 100%).

Conclusion: Current clinical practice for the perioperative pain management of caesarean sections at this hospital falls short of best practice as outlined in the PROSPECT guidelines. The introduction of a perioperative protocol, and continuing education of doctors, nurses and patients on pain and its management may be effective ways to improve practice.

Introduction

In South Africa caesarean sections (CS) are one of the more ubiquitous surgeries performed.[1] Postoperative pain is moderate-to-severe in a significant proportion of these women. Adequate pain control is vital for the obstetric patient who has different recovery objectives from other postsurgical patients including caring for a newborn. Added to this is the concern of increased risk of persistent pain in patients who deliver via CS versus vaginally.[2]

In 2002, The European Society of Regional Anaesthesia and Pain Therapy (ESRA) established a procedure specific consensus guideline called PROSPECT aimed at managing peri-operative pain.[3] An initial systematic review in 2014 resulted in the first guidelines for elective CS. This guideline was updated in 2020 considering new techniques and protocols, utilising the same PROSPECT methodology.[4] The aim of the guideline is "to provide clinicians with updated evidence for optimal pain management."[5]

The PROSPECT guidelines are designed from a high-income country vantage point. It is worth considering if these guidelines are applicable in a resource poor setting such as South Africa. Groote Schuur Hospital (GSH) is arguably one of South Africa's premier tertiary hospitals with a relative abundance of resources compared to most in the country. One would not expect resource limitation to be an obstacle in providing optimal care to its patients. By doing an audit against the 'benchmark' of care we can evaluate our current practice, identifying barriers that prevent improvement and develop future protocols that will optimise our pain management for women undergoing CS.

Objectives

To extract from the PAIN OUT registry data applicable to the PROSPECT guidelines. To use this to compare perioperative analgesic management in patients post CS at GSH maternity with those recommended by the PROSPECT guidelines as outlined in Table 1.

Table 1: Perioperative interventions recommended in the PROSPECT guidelines.

Preoperative interventions
• Intrathecal long-acting opioid (morphine)
• Oral paracetamol
Intraoperative interventions
• Intravenous paracetamol (if not administered preoperatively)
• Intravenous non-steroidal anti-inflammatory drugs
• Intravenous dexamethasone
• Local anaesthetic (single-shot, wound infusion catheter or regional technique)
Postoperative interventions
• Oral or intravenous paracetamol
• Oral or intravenous non-steroidal anti-inflammatory drugs
• Opioid for rescue or when other recommended strategies are not possible

[5]

Methodology

Research design

PAIN OUT[6] is an international quality improvement and registry project aimed at improving postoperative pain. All data from a baseline cohort of patients were collected by a single surveyor at GSH following the PAIN OUT standard operating procedures between 11 February 2022 and 05 March 2022. All data were captured onto the online registry (HREC Ref: R042/2021; 740/2022). Data were extracted from the registry to measure the performance of perioperative analgesic management as compared to the standard of care laid out in the PROSPECT guidelines.

Participants

Patients were included if they had undergone a caesarean section in the previous 24hours and had been back in the wards for ≥6 hrs after surgery and consented to participate. The PAIN OUT standard operating procedures were followed including inclusion and exclusion criteria (Table 2).

Table 2: Inclusion and exclusion criteria set by the PAIN OUT registry standard operating procedures.

Inclusion Criteria:	**Exclusion Criteria:**
Patient is on the first postoperative day AND back in the ward for ≥ 6 hrs after surgery.	Patients refusing to consent to participation in the PAIN OUT registry.
Patient is of consenting age (> 18years).	Patients unable to give consent for entry into the registry.
Patient has given consent for participation in the survey.	

Sample Size Estimation

GSH is a participating hospital in the ongoing PAIN OUT registry project. This study forms part of a larger quality improvement initiative with this data set forming the baseline. In audit cycles, two months is regarded as an adequate time-period in which to collect baseline data to evaluate normal clinical practice with a minimum of 80-120 patients recommended by PAIN OUT as sufficient to detect changes between baseline and after a quality improvement intervention (phases two and three of an audit cycle).[7] Therefore, data from a minimum of 80 to a maximum of 120 patients treated at GSH over a two-month period would be included in this study (one tailed, alpha error probability = 0.05; power = 0.8).

Measurement instrument

All data were collected and entered on the PAIN OUT registry following the standard operating procedures. This involved completing both a patient outcome questionnaire and a process questionnaire for each patient included. The data of interest for this study were exclusively from the process questionnaire describing clinical processes documented in the medical records in the preoperative, intraoperative and postoperative periods (Appendix B).

Data analysis

From the entered data, nine perioperative interventions were investigated for each participant. Collectively the results were tabulated (Table 4) showing how many of the participants received each given intervention as an absolute number and a percentage of the total. These results were grouped into 'All participants' as well as 'Elective CS' and 'Emergency CS' as the PROSPECT guidelines are recommendations for elective caesarean. Having these three groups of results allows for direct comparison between the PROSPECT guidelines and the participants undergoing elective CS as well as to compare differences between the elective and emergency groups. The PAIN OUT process questionnaire allowed for the capture of the total amounts of each analgesic administered to each patient. Average analgesic doses patients received were calculated.

Results

Between 11 February and 5 March 2022, 89 women were approached to participate in the study, 84 consented to have their data entered into the database and completed the full

instrument (Figure 1). The women were 31.5 years-old (IQR 28-36 years-old) and had all undergone CS at GSH.

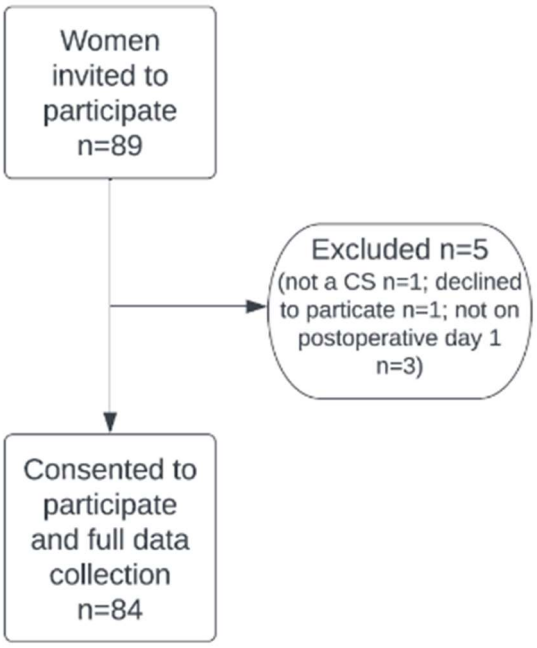


Figure 1: Flow chart of participant recruitment.

Of the 84 patients in the cohort, the most common complications/comorbidities were hypertensive disease, diabetes, HIV, and obstructive airways disease (Table 3).

Table 3: Frequency of conditions suffered by the women undergoing CS (n=84)

	Number (%)
Hypertensive disease	**40 (47.6)**
Chronic Hypertension	13 (15.5)
Gestational Hypertension	4 (4.8)
Gestational Proteinuric Hypertension	23 (27.4)
Diabetes	**25 (29.8)**
Type II Diabetes Mellitus	5 (6)
Gestational Diabetes Mellitus	20 (23.8)
HIV	**12 (14.3)**
Asthma	**4 (4.8)**
Rheumatoid arthritis	**2 (2.4)**
Epilepsy	**2 (2.4)**
Polycystic ovarian syndrome	**2 (2.4)**
Graves' disease	**1 (1.2)**
Cervical carcinoma	**1 (1.2)**
Sickle cell disease	**1 (1.2)**
Depression	**1 (1.2)**

Note that total is >84 as several participants suffered from more than one condition

The duration of the CS surgery was a median of 42mins (IQR 30-54mins). The women were interviewed a median of 21.7h (IQR17.8-25.5h) post-surgery.

Alignment to PROSPECT guidelines for pain management

The number and percentage of women who received treatment as recommended by the PROSPECT guidelines in the preoperative, intraoperative, and postoperative periods are summarised in Table 4. No patients received a neuraxial technique utilising a long-acting opioid; preoperative paracetamol; intraoperative dexamethasone or any NSAID either intraoperatively or postoperatively. Close to 90% received postoperative paracetamol and all received postoperative opioids (predominantly intramuscular (IM) morphine).

Table 4: Number of women receiving treatment recommended by the PROSPECT guidelines (n=84)

PROSPECT guideline recommendation	All participants (n=84) (100%)	Elective CS (n=32) (38.1%)	Emergency CS (n=52) (61.9%)
Preoperative			
Intrathecal long-acting opioid (morphine)	0 (0)	0 (0)	0 (0)
Oral paracetamol	0 (0)	0 (0)	0 (0)
Intraoperative			
Intravenous paracetamol	13 (15.5)	5 (15.6)	8 (15.4)
Intravenous non-steroidal anti-inflammatory drugs	0 (0)	0 (0)	0 (0)
Intravenous dexamethasone	0 (0)	0 (0)	0 (0)
Local anaesthetic (single-shot, wound infusion catheter or regional technique)	13 (15.5)	5 (15.6)	8 (15.4)
Postoperative			
Oral or intravenous paracetamol	75 (89.3)	27 (84.4)	48 (92.3)
Oral or intravenous non-steroidal anti-inflammatory drugs	0 (0)	0 (0)	0 (0)
Opioid	84 (100)	32 (100)	52 (100)

Discussion

The aim of this audit was to compare perioperative analgesic management in patients post CS at GSH maternity with those recommended by the PROSPECT guidelines. The PROSPECT guidelines were developed to guide elective CS conducted under neuraxial anaesthesia.[5] Although there is a small low risk patient population that are admitted and treated at GSH maternity as their drainage hospital, most other patients are referred in as 'high risk' to GSH as it is a tertiary academic hospital. 'High risk' referrals can be for either maternal or foetal risk factors including, but not limited to those listed in Table 5.

Table 5: Conditions which classify mothers-to-be as 'high-risk' requiring referral to GSH tertiary hospital.

Early onset gestational proteinuric hypertension
Gestational proteinuric hypertension complicated by: clotting defects, kidney failure, pulmonary oedema or HELLP syndrome
Eclampsia with or without organ failure
Extra-uterine pregnancy
Any pregnancy complicated by deep vein thrombosis and/or pulmonary embolus
Anti-coagulation therapy for any reason
Placenta previa major (Grade III/IV)
Post-partum haemorrhage with shock, requiring blood transfusion
Abruptio placenta with intra-uterine death, DIC or kidney failure
Any maternal patient with respiratory distress (excluding terminal HIV cases)
Any pregnant patient with jaundiced or suspected hepatitis
Pregnancy complicated by cerebrovascular accident
Comatose patient
Status epilepticus
Preterm labour <30 weeks
Preterm rupture of membranes <30 weeks
Severe intra-uterine growth restriction

The majority of surgeries in this study were emergency CS (61.9%). This rate is similar to the emergency CS rate reported at a district level hospital in South Africa where 61.7% of the 1064 CS conducted in a 12-month period were emergency cases.[9] At GSH, there were 52 emergency and 32 elective CS. Of the 52 emergency CS 42 were conducted under neuraxial anaesthesia with 10 being under general anaesthesia. In the elective CS cases, 28 were conducted using neuraxial anaesthesia and four were conducted under general anaesthetic (GA). Thus only 28 (33%) cases met the criteria for the recommendations in the PROSPECT guidelines i.e. were elective CS conducted under neuraxial anaesthesia. However, it is reasonable that for every obstetric CS case all the recommendations should be considered and applied in a pragmatic fashion considering the patient-specific risks and benefits.

When looking at the results there are three groups of findings. Five of the interventions were not done at all (intrathecal long-acting opioid, preoperative oral paracetamol, intraoperative and postoperative NSAID, intraoperative intravenous dexamethasone), two intraoperative interventions were done poorly (intravenous paracetamol 15.5%, local anaesthetic 15.5%) and two postoperative interventions were done well (oral paracetamol 89.3%, intramuscular morphine 100%)

The Society of Obstetric Anaesthesia and Perinatology (SOAP) has outlined monitoring recommendations with the use of neuraxial morphine.[10] In resource-poor settings, logistical barriers (specifically staffing and availability of monitoring equipment) make this intervention

challenging to implement at scale. Neuraxial morphine is safe in a healthy obstetric population, however it is recommended that any dose greater than 50ug intrathecal morphine and/or patients with certain risk factors (e.g. cardiovascular, neurological comorbidity, BMI >40, hypertension, magnesium administration)[10] require monitoring above the standard currently practiced in the general postnatal wards at GSH. Specifically respiratory rate and sedation assessments should be conducted hourly or two hourly for up to 24 hours. Given the patient profile the majority would fall into a category warranting additional monitoring. At GSH there are currently only three beds that could accommodate monitoring of that frequency. These beds are needed to monitor and manage, the not infrequently, complex peripartum obstetric patient cared for at GSH. Given current constraints on staffing, the obstetric department and nursing teams have reported not being able to expand this capacity. Therefore, this recommendation is not feasible, as a standard of care, in this setting suggesting that the PROSPECT guidelines may need to be adapted for implementation in resource poor settings.

Currently there is no protocol in place at GSH to prescribe oral paracetamol preoperatively. This appears to be an institutional barrier. Possible reasons include unfamiliarity with PROSPECT guidelines or logistical barriers or even false beliefs around safety of allowing oral medications when a patient is being kept 'nil per mouth'. A simple solution would be to administer the oral paracetamol upon arrival at theatre with consumption of the sodium citrate, which is administered for aspiration prophylaxis. Another solution might be administering the preoperative dose in the ward. Trying to coordinate correct timing of the preoperative dose with an ever-changing theatre list would be a challenge. Theoretically another concern might be delayed gastric emptying, particularly during labour. However, it has been shown in both non-obese and obese non-labouring patients there is no delay in gastric emptying of water of up to 300ml.[11,12] As paracetamol is primarily absorbed in the small intestine consideration around the timing of the preoperative dose would be needed. Delayed gastric emptying affects time to peak effect. Both the American Society of Anesthesiologists and SOAP agree with fasting guidelines of six and two hours for light meals and clear fluids respectively.[13,14] Several studies in non-obstetric cases have established the benefit of administering paracetamol orally up to 30minutes prior to induction without any risk to the patient.[15,16] Another study comparing oral, rectal and IV paracetamol efficacy in obstetric cases administered oral paracetamol 20minutes prior to arrival in theatre without increased risk.[17] A simple solution would be to administer every elective patient a morning oral dose. Those patients still waiting six hours later could receive an additional dose. Given

oral paracetamol's half-life of roughly 2.5-3 hours it would allow the majority to have some its analgesic benefit at the time of surgery.[18]

As with preoperative paracetamol, when looking at other centres or regions, intraoperative paracetamol does not appear to be used or, at least when describing their practice, it is not mentioned.[19–24] An audit in the UK re-evaluating implementation following recent changes to the PROPSECT guidelines found they administered intraoperative paracetamol to 80% of patients.[25] At GSH this intervention was poorly implemented with no observable consistency. It was used with more frequency in those patients who underwent a GA (8 out of 14 cases). The inconsistent use of paracetamol is surprising as the cost per unit of IV paracetamol has significantly reduced over time. A historical, unwritten policy restricting the number of units delivered by pharmacy each week to the unit was adopted to limit use due to costs. However, this practice does not seem to have changed despite the significant reductions in costs (from over R300 to R11.86).

No patients received NSAID at any point in the perioperative period. Currently the PROSPECT guidelines and ERAS recommendations by SOAP advocate for the use of multimodal analgesia including NSAIDs.[5,14] At GSH the administration of NSAID in this population is an institutional barrier with NSAIDs intentionally not available in the maternity theatre complex. Anecdotally, the obstetric department has provided two reasons to restrict the use of NSAIDs. Firstly, the patients referred to this unit are primarily high-risk and frequently have relative or absolute contraindications to NSAID use. Specifically, those patients with hypertensive disease, renal impairment/disease, thrombocytopenia, and coagulation disorders. Incorrect administration could result in unnecessary morbidity. Secondly there is a concern around the link between NSAID use and surgical site infection.[26]

The PROSPECT guidelines recommend the use of NSAIDs as part of multimodal analgesia. These are to be initiated intraoperatively and continued postoperatively unless there are contraindications such as renal impairment, compromised cardiac function, hypertension, bleeding disorders, asthma.[27] A meta-analysis of NSAID analgesic efficacy in CS found significantly lower pain scores, less opioid consumption, and less drowsiness/sedation.[28] Importantly when thinking about ERAS programs this lower pain score was also recorded with movement at 24hrs. It was also noted that the general view that NSAIDs are weak analgesics

is not upheld. They are potent, with comparable efficacy to opioids.[28] In this study cohort there were a total of 40 (47.6%) patients with hypertensive disease (chronic, gestational hypertension and gestational proteinuric hypertension). The concern in this group of conditions is the impact a NSAID would have on blood pressure control. A double blind RCT of paracetamol versus ibuprofen as a first line analgesic found no prolonging of the duration of severe range hypertension with ibuprofen, even in women with hypertensive disease with severe symptoms.[29] This was also the conclusion on a meta-analysis of the current evidence; however, it did note that the data were of very low quality and recommended large scale RCTs to verify their safety.[30]

The link between NSAID use and surgical site infection has no consensus view. In certain countries a contraindication to ibuprofen use is proven or suspected infection that is untreated.[31] There are numerous cases and case series concerned about the potential link between NSAID use and risk for severe bacterial infections in general and Group A Streptococcal (GAS) infections in particular.[26,32,33] A murine based study looking at NSAID and antibiotic efficacy did seem to suggest that in situations with existing GAS infection the use of a non-selective NSAID worsened severity and progression of infection and decreased antibiotic efficacy. However, when looking at COX-1 NSAID and COX-2 NSAID use, the findings were not as clear cut. Without antibiotic treatment COX-1 had no effect on clinical course while COX-2 shortened time to mortality. When used in combination with antibiotics COX-2 NSAID use had no change in clinical course while any change with COX-1 use was not of statistical significance.[34] Based on the above literature, there are certainly reasons why NSAIDSs cannot be applied to all cases, specifically at this institution. However, one of the commoner contraindications (hypertensive disease) might appear to be more of a relative, rather than absolute contraindication. The discussion around NSAIDs and surgical site infection certainly has numerous caveats. Specifically, when looking at the case series from GSH from 1991[26] (cited by the GSH obstetric department as a reason for complete avoidance of NSAIDs) there are important differences between those cases and current standard perioperative management. In that case series, prophylactic preoperative antibiotics can be assumed to have been given (although this was not specifically stated). Another important difference would have been about timing of the antibiotic dose. The 2015 WHO recommendations for prevention and treatment of maternal peripartum infections recommended maximal benefit of antibiotic prophylaxis when administered 30-60 minutes prior to skin incision.[35] Prior to this recommendation, antibiotic administration was commonly delayed until umbilical cord clamping. In that case

series, it is also possible that postoperative NSAIDs were started to manage what was thought to be uncontrolled postoperative pain but what may have been the initial symptoms of surgical site infection. Importantly NSAID use preceded antibiotic management in all three of the cases described.

The PROSPECT guidelines recommend that those patients not receiving intrathecal morphine receive local anaesthetic as a single shot, wound infusion, or regional technique. This recommendation is not widely practised, and its application is inconsistent. Given that a neuraxial technique provides sensory blockade at the incision site one might expect that it was more commonly performed in those patients undergoing a GA. However, there was no clear pattern of favouring use during a GA. There is no protocol in place to guide practice on this recommendation. All 84 patients could have received this intervention. When looking at other centres and regions the majority are not clear about the use of this intervention. It was part of the ERAS program in Bhutan,[36] and noted to be used specifically when intrathecal morphine was not given by Tepper et al in Pennsylvania USA.[37] At the other centres and regions looked at intrathecal long-acting opioids were utilised, which negated the indication for local anaesthetic use in their ERAS programs.[19,20,23–25] The perception might be for those patients who received a neuraxial technique that local infiltration is unnecessary. This would be a combination of physician (both anaesthetist and surgeon involved) and institutional barrier where advisable protocols have not been established.

The results of this audit indicate that the two postoperative interventions (paracetamol and morphine) were implemented well. Paracetamol was administered to 89.3% of patients in the postoperative period, with the average patient receiving 621mg out of their scheduled 1000mg every six hours (62.1%). In comparison Lesch et al in Surrey documented that in their audit of the PROSPECT implementation in 2021 that 57% of patients received all their scheduled paracetamol doses.[25] Morphine was administered to every patient postoperatively. Looking closer the PROSPECT guidelines emphasise that provision of basic analgesia (specifically paracetamol and NSAIDs) be scheduled and given regularly to limit the need for rescue opioid analgesia. [5] At GSH morphine is not prescribed for break-through pain but as scheduled analgesia. When looking at other centres and regions there is a very clear attempt to limit opioids postoperatively. Most studies clearly state opioids are only administered if: analgesia was insufficient; break-through pain; prn; intermittently as opposed to scheduled.[19,20,22–24,36,37] A significant change in departmental standard operating procedures will need to take place to

integrate the use of NSAIDs. . For this cohort the average patient received 11mg morphine every 6 hours (in contrast to what is routinely scheduled as 10mg every six hours). This suggests that the current analgesic plan is inadequate, and patients are requiring/requesting more analgesia. Increased reliance on opioids comes with their increased risk of side effects (dizziness, drowsiness, pruritus and nausea) and their impact on the patient experience and ability to nurse their child postoperatively.

Strengths of this audit are that it used an existing guideline devised by an organisation (ESRA) that has decades of experience. It used data that had been collected as part of the PAIN OUT registry that was of relevance to the audit. This will mean that after a new protocol of care has been established future audits can be done to allow for direct comparison. Limitations might be the small sample size. However, this is only a baseline audit and given the starkness of the findings a larger sample size would not have revealed a different result. Another limitation would be that this is only a single centre. There are other centres in South Africa using the PAIN OUT registry who are collecting obstetric data which will be pooled in the future to provide wider representation of practice in the country.

Recommendation

The PROSPECT guidelines are the current best practice with regards to optimising pain for patients post CS. The results of this audit clearly identify areas for improvement at this hospital.

In the immediate future there should be two priorities. Firstly, establish a new agreed upon perioperative protocol such as that suggested in Table 6 which is explained to all relevant parties (nursing, anaesthetic, and obstetric departments) that could be implemented. This is a deviation from the PROSPECT guidelines but includes many valuable aspects of it.

Table 6: Suggested perioperative caesarean section pain management protocol.

1. Preoperative oral paracetamol	• To be given at scheduled times of the day to those patients on the elective CS list • To be given, where possible, with a sip of water 30 minutes prior to those patients booked for an emergency CS.
2. Intraoperative IV paracetamol	• To be administered to any patient who has not received a preoperative oral dose.
3. Intraoperative IV dexamethasone	• If no contraindications
4. Intraoperative bupivacaine at the incision site	• Either as wound infiltration or transabdominal plane block under direct vision by surgeon
5. Postoperative paracetamol	• Continued scheduled administration.

6. Postoperative morphine	• Continued scheduled administration.

Secondly, along with education about the new protocol, there should be continued education about the importance of analgesic management to the doctors and nursing team with improved education to patients about pain to minimise the number of patients declining/refusing an intervention.

Finally, the elements of the PROSPECT guidelines that cannot be implemented in the immediate future (i.e. intrathecal morphine, intra and postoperative NSAID use) can be targeted for longer term implementation. Regarding intrathecal long-acting opioids, engagement with the obstetric team to discuss methods to identify patients who would benefit the most from this intervention may be a useful initial strategy. The obstetric department has its current concerns around NSAID use. To engage further with these concerns, PAINOUT data from several other centres and specifically obstetric units, can be explored to determine not only the benefits of NSAID use but also if it is safe to do so in patient cohorts that more closely resemble those managed at GSH.

References

1. Biccard BM, Madiba TE, Kluyts HL, Munlemvo DM, Madzimbamuto FD, Basenero A, et al. Perioperative patient outcomes in the African Surgical Outcomes Study: a 7-day prospective observational cohort study. The Lancet. 2018 Apr 21;391(10130):1589–98.
2. Kainu JP; HE; KKT; SPJ. Persistent Pain After Cesarean Delivery and Vaginal Delivery: A Prospective Cohort Study. Anesth Analg. 2016;1535–45.
3. ESRA Europe [Internet]. [cited 2022 Sep 4]. Available from: https://esraeurope.org/
4. Joshi GP, van de Velde M, Kehlet H, Pogatzki-Zahn E, Schug S, Bonnet F, et al. Development of evidence-based recommendations for procedure-specific pain management: PROSPECT methodology. Anaesthesia. 2019 Oct 1;74(10):1298–304.
5. Roofthooft E, Joshi GP, Rawal N, Van de Velde M, Joshi GP, Pogatzki-Zahn E, et al. PROSPECT guideline for elective caesarean section: updated systematic review and procedure-specific postoperative pain management recommendations. Anaesthesia. 2021 May 1;76(5):665–80.
6. pain-out.med.uni-jena.de [Internet]. [cited 2022 Sep 4]. Available from: http://pain-out.med.uni-jena.de/
7. National Institute for Clinical Excellence (Great Britain). Principles for best practice in clinical audit. Radcliffe Medical Press; 2002. 196 p.
8. Solanki GC, Cornell JE, Daviaud E, Fawcus S. Caesarean section rates in South Africa: A case study of the health systems challenges for the proposed National Health Insurance. South African Medical Journal. 2020 Aug 1;110(8):747–50.
9. Govender I, Steyn C, Maphasha O, Abdulrazak AT. A profile of Caesarean sections performed at a district hospital in Tshwane, South Africa. South African Family Practice. 2019 Nov 18;61(6):246–51.
10. Bauchat JR, Weiniger CF, Sultan P, Habib AS, Ando K, Kowalczyk JJ, et al. Society for Obstetric Anesthesia and Perinatology Consensus Statement: Monitoring Recommendations for Prevention and Detection of Respiratory Depression Associated With Administration of Neuraxial Morphine for Cesarean Delivery Analgesia. Anesth Analg. 2019 Aug 1;129(2):458–74.
11. Wong CA, Loffredi M, Ganchiff JN, Zhao J, Wang Z, Avram MJ. Gastric Emptying of Water in Term Pregnancy [Internet]. Vol. 96, Anesthesiology. 2002. Available from: http://pubs.asahq.org/anesthesiology/article-pdf/96/6/1395/334412/0000542-200206000-00019.pdf
12. Wong CA, McCarthy RJ, Fitzgerald PC, Raikoff K, Avram MJ. Gastric emptying of water in obese pregnant women at term. Anesth Analg. 2007 Sep;105(3):751–5.
13. Practice Guidelines for Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration: Application to Healthy Patients Undergoing Elective Procedures. Anesthesiology. 2017 Mar 1;126(3):376–93.

14. Bollag L, Lim G, Sultan P, Habib AS, Landau R, Zakowski M, et al. Society for Obstetric Anesthesia and Perinatology: Consensus Statement and Recommendations for Enhanced Recovery after Cesarean. Anesth Analg. 2021 May 1;1362–77.
15. Hickman SR, Mathieson KM, Bradford LM, Garman CD, Gregg RW, Lukens DW. Randomized trial of oral versus intravenous acetaminophen for postoperative pain control. American Journal of Health-System Pharmacy. 2018 Mar 15;75(6):367–75.
16. Nimmaanrat S, Jongjidpranitarn M, Prathep S, Oofuvong M. Premedication with oral paracetamol for reduction of propofol injection pain: A randomized placebo-controlled trial. BMC Anesthesiol. 2019 Jun 11;19(1).
17. Mahajan L, Mittal V, Gupta R, Chhabra H, Vidhan J, Kaur A. Study to compare the effect of oral, rectal, and intravenous infusion of paracetamol for postoperative analgesia in women undergoing cesarean section under spinal anesthesia.
18. Prescott L. Kinetics and metabolism of paracetamol and phenacetin. Vol. 10, British Journal of Clinical Pharmacology. 1980. p. 291S-298S.
19. Deniau B, Bouhadjari N, Faitot V, Mortazavi A, Kayem G, Mandelbrot L, et al. Evaluation of a continuous improvement programme of enhanced recovery after caesarean delivery under neuraxial anaesthesia. Anaesth Crit Care Pain Med. 2016 Dec 1;35(6):395–9.
20. Baluku M, Bajunirwe F, Ngonzi J, Kiwanuka J, Ttendo S. A randomized controlled trial of enhanced recovery after surgery versus standard of care recovery for emergency cesarean deliveries at Mbarara Hospital, Uganda. Anesth Analg. 2020 Mar 1;769–76.
21. Hochstätter R, Schütz AM, Taumberger N, Bornemann-Cimenti H, Oppelt P, Fazelnia C, et al. Enhanced recovery after cesarean section (ERAC): Where are we in Austria? European Journal of Obstetrics and Gynecology and Reproductive Biology. 2023 Jun 1;285:81–5.
22. Sordia-Pineyro MO, Villegas-Cruz C, Hernandez-Bazaldua M, Pineyro-Cantu A, Gaston-Locsin T, Sordia-Hernandez LH. Effect of the implementation of an enhanced recovery after surgery protocol (ERAS) in patients undergoing an elective cesarean section. Ginekol Pol. 2023;94(2):141–5.
23. Wrench IJ, Allison A, Galimberti A, Radley S, Wilson MJ. Introduction of enhanced recovery for elective caesarean section enabling next day discharge: A tertiary centre experience. Int J Obstet Anesth. 2015 May 1;24(2):124–30.
24. Kleiman AM, Chisholm CA, Dixon AJ, Sariosek BM, Thiele RH, Hedrick TL, et al. Evaluation of the impact of enhanced recovery after surgery protocol implementation on maternal outcomes following elective cesarean delivery. Int J Obstet Anesth. 2020 Aug 1;43:39–46.
25. Lesch D, Gostelow N, Yeow D, Milewczyk S. P.124 Analgesia post caesarean section: a fifth local re-audit of obstetric anaesthetic service and implementation of PROSPECT guidelines. Int J Obstet Anesth. 2022 May;50:66–7.
26. P.M. Van Ammers, P.J. Moore, H. Sacho. Necrotising fasciitis after caesarean section - association with non-steroidal anti-inflammatory drugs. Vol. 80. 1991. p. 203–4.

27. Ed. Rossiter D. South African Medical Formulary - 12th Edition. 12th ed. Rossiter D, editor. Cape Town: Health and Medical Pub. Group of the South African Medical Association; 2016. 396–400 p.
28. Zeng AM, Nami NF, Wu CL, Murphy JD. The Analgesic Efficacy of Nonsteroidal Anti-inflammatory Agents (NSAIDs) in Patients Undergoing Cesarean Deliveries: A Meta-Analysis. Reg Anesth Pain Med. 2016 Nov 1;41(6):763–72.
29. Blue NR, Murray-Krezan C, Drake-Lavelle S, Weinberg D, Holbrook BD, Katukuri VR, et al. Effect of ibuprofen vs acetaminophen on postpartum hypertension in preeclampsia with severe features: a double-masked, randomized controlled trial. Am J Obstet Gynecol. 2018 Jun 1;218(6):616.e1-616.e8.
30. Bellos I, Pergialiotis V, Antsaklis A, Loutradis D, Daskalakis G. Safety of non-steroidal anti-inflammatory drugs in postpartum period in women with hypertensive disorders of pregnancy: systematic review and meta-analysis. Vol. 56, Ultrasound in Obstetrics and Gynecology. John Wiley and Sons Ltd; 2020. p. 329–39.
31. Ibuprofen: Drug information [Internet]. UpToDate. 2023 [cited 2024 Sep 18]. Available from: https://www.uptodate.com/contents/ibuprofen-drug-information?search=ibuprofen&source=panel_search_result&selectedTitle=1%7E150&usage_type=panel&kp_tab=drug_general&display_rank=1
32. Hamilton SM, Bayer CR, Stevens DL, Lieber RL, Bryant AE. Muscle injury, vimentin expression, and nonsteroidal anti-inflammatory drugs predispose to cryptic group A streptococcal necrotizing infection. Journal of Infectious Diseases. 2008 Dec 1;198(11):1692–8.
33. Aronoff DM, Bloch KC. Assessing the relationship between the use of nonsteroidal antiinflammatory drugs and necrotizing fasciitis caused by group A streptococcus. Medicine. 2003;82(4):225–35.
34. Hamilton SM, Bayer CR, Stevens DL, Bryant AE. Effects of selective and nonselective nonsteroidal anti-inflammatory drugs on antibiotic efficacy of experimental group A streptococcal myonecrosis. Journal of Infectious Diseases. 2014 May 1;209(9):1429–35.
35. Currie S, Survival Program C. WHO Recommendations for Prevention and Treatment of Maternal Peripartum Infections [Internet]. 2015. Available from: www.mcsprogram.org
36. Tamang T, Wangchuk T, Zangmo C, Wangmo T, Tshomo K. The successful implementation of the Enhanced Recovery After Surgery (ERAS) program among caesarean deliveries in Bhutan to reduce the postoperative length of hospital stay. BMC Pregnancy Childbirth. 2021 Dec 1;21(1).
37. Tepper JL, Harris OM, Triebwasser JE, Ewing SH, Mehta AD, Delaney EJ, et al. Implementation of an Enhanced Recovery after Surgery Pathway to Reduce Inpatient Opioid Consumption after Cesarean Delivery. Am J Perinatol. 2021;

Appendix A: Letters of Ethical Approval

UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
Human Research Ethics Committee

Room 45 E-52-E-Floor- Old Main Building
Groote Schuur Hospital
Observatory 7925
Telephone [021] 406 6492
Email: hrec-submissions@uct.ac.za
Website: https://health.uct.ac.za/home/human-research-ethics

17 November 2022

HREC REF: 740/2022

Prof R Parker
Division of Anaesthesia & Perioperative Medicine
D-23 NGSH
Email: romy.parker@uct.ac.za
Student: drdangiles@gmail.com

Dear Prof Parker

PROJECT TITLE: PERIOPERATIVE CAESAREAN SECTION PAIN MANAGEMENT AT GROOTE SCHUUR HOSPITAL – AN AUDIT"-SUB-STUDY LINKED TO R042/2021- (MMED CANDIDATE-DR DANIEL GILES)

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee (HREC) for review.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

Approval is granted for one year until the 30 November 2023.

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.
(Forms can be found on our website: www.health.uct.ac.za/fhs/research/humanethics/forms)

The HREC acknowledge that the student: Dr Daniel Giles will also be involved in this study.

Please quote the HREC REF 740/2022 in all your correspondence.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please note that for all studies approved by the HREC, the principal investigator **must** obtain appropriate institutional approval, where necessary, before the research may occur.

Yours sincerely

PROFESSOR M BLOCKMAN
CHAIRPERSON, FACULTY OF HEALTH SCIENCES HUMAN RESEARCH ETHICS COMMITTEE

Federal Wide Assurance Number: FWA00001637. Institutional Review Board (IRB) number: IRB00001938 NHREC-registration number: REC-210208-007
This serves to confirm that the University of Cape Town Human Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use: Good Clinical Practice (ICH GCP), South African Good Clinical Practice Guidelines (DoH 2020), based on the Association of the British Pharmaceutical Industry Guidelines (ABPI), and Declaration of Helsinki (2013) guidelines. The Human Research Ethics Committee granting this approval is in compliance with the ICH Harmonised Tripartite Guidelines E6: Note for Guidance on Good Clinical Practice (CPMP/ICH/135/95) and FDA Code Federal Regulation Part 50, 56 and 312.

UNIVERSITY OF CAPE TOWN

FACULTY OF HEALTH SCIENCES
Human Research Ethics Committee

FHS016: Annual Progress Report / Renewal

HREC office use only (FWA00001637; IRB00001938)			
This serves as notification of annual approval, including any documentation described below.			
☑ Approved	Annual progress report	Approved until/next renewal date	30.01.2025
☐ Not approved	See attached comments		
Signature Chairperson of the HREC/ Designee		Date Signed	24/1/2024

Note: Please email this form and supporting documents (if applicable) in a combined pdf-file to:
lnec-enquiries@uct.ac.za
Please clarify your plan for research-related activities during COVID-19 lockdown.
Please use the latest form found on our website:
http://www.health.uct.ac.za/fhs/research/humanethics/forms

FACULTY OF HEALTH SCIENCES HUMAN RESEARCH ETHICS COMMITTEE 18 JAN 2024 UNIVERSITY OF CAPE TOWN

Comments to PI from the HREC
Thank you for your Study Deviation
HREC Chair Signature: Date: 24/1/2024

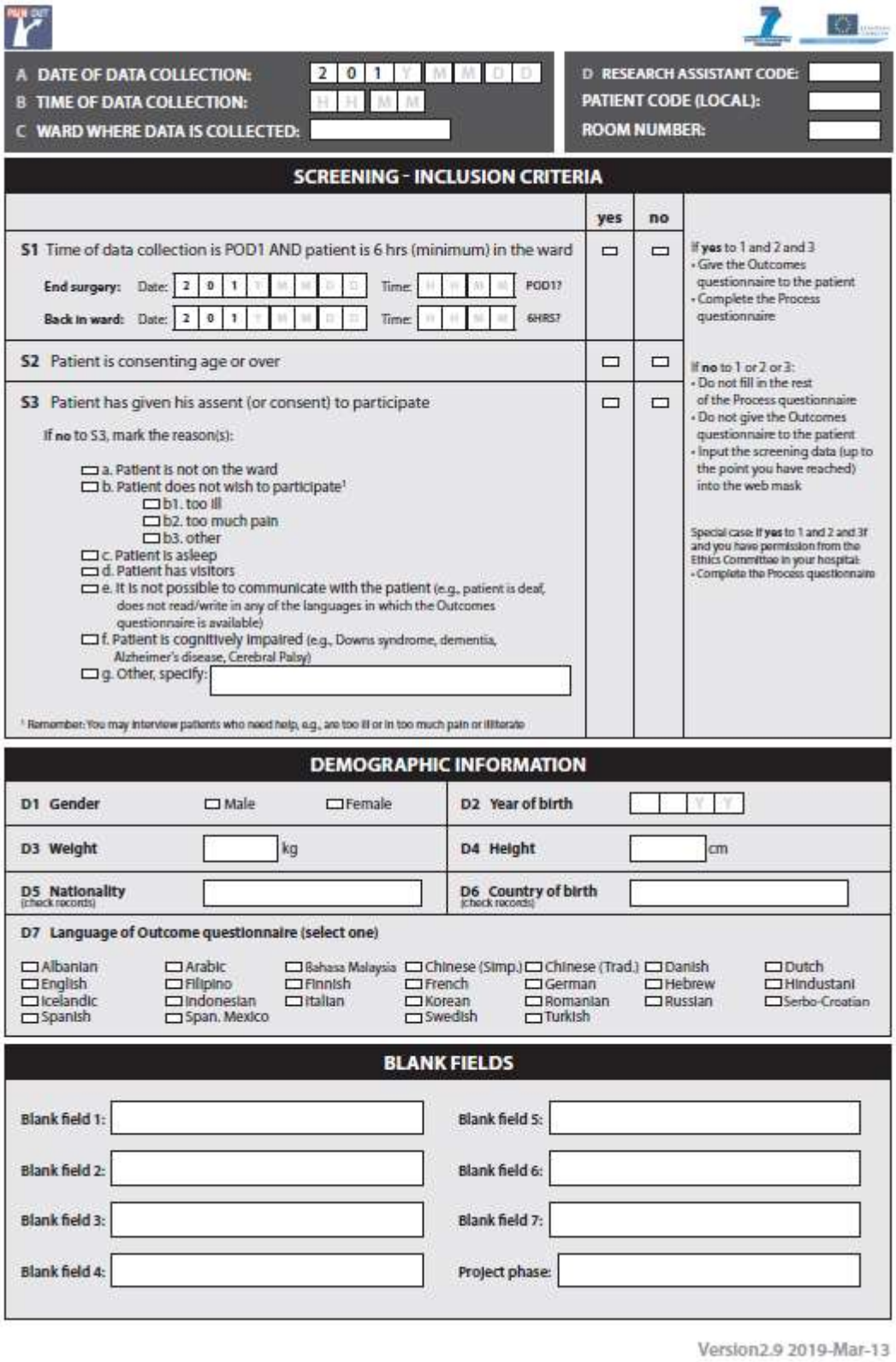
Principal Investigator to complete the following:

1. Protocol information

Date (when submitting this form)	18-01-2024		
HREC REF Number	740/2022	Current Ethics Approval was granted until	30-11-2023
Protocol title	Perioperative caesarean section pain management at Groote Schuur Hospital – An audit		
Protocol number (if applicable)			
Are there any sub-studies linked to this study?		☐ Yes	X No
If yes, could you please provide the HREC Reference number for all sub-studies? Note: A separate FHS016 must be submitted for each sub-study			
Principal investigator	Professor Romy Parker		

(Note: Please complete the Closure form (FHS010) if the study is completed within the approval period)

Appendix B: Data Collection Documents



A DATE OF DATA COLLECTION: 2 0 1 Y M M D D
B TIME OF DATA COLLECTION: H H M M
C WARD WHERE DATA IS COLLECTED:

D RESEARCH ASSISTANT CODE:
PATIENT CODE (LOCAL):
ROOM NUMBER:

SCREENING - INCLUSION CRITERIA

	yes	no	
S1 Time of data collection is POD1 AND patient is 6 hrs (minimum) in the ward End surgery: Date: 2 0 1 Y M M D D Time: H H M M POD1? Back in ward: Date: 2 0 1 Y M M D D Time: H H M M 6HRS?	☐	☐	If **yes** to 1 and 2 and 3 • Give the Outcomes questionnaire to the patient • Complete the Process questionnaire
S2 Patient is consenting age or over	☐	☐	If **no** to 1 or 2 or 3: • Do not fill in the rest of the Process questionnaire • Do not give the Outcomes questionnaire to the patient • Input the screening data (up to the point you have reached) into the web mask
S3 Patient has given his assent (or consent) to participate If **no** to S3, mark the reason(s): ☐ a. Patient is not on the ward ☐ b. Patient does not wish to participate[1] ☐ b1. too ill ☐ b2. too much pain ☐ b3. other ☐ c. Patient is asleep ☐ d. Patient has visitors ☐ e. It is not possible to communicate with the patient (e.g., patient is deaf, does not read/write in any of the languages in which the Outcomes questionnaire is available) ☐ f. Patient is cognitively impaired (e.g., Downs syndrome, dementia, Alzheimer's disease, Cerebral Palsy) ☐ g. Other, specify:	☐	☐	Special case: If **yes** to 1 and 2 and 3 and you have permission from the Ethics Committee in your hospital: • Complete the Process questionnaire

[1] Remember: You may interview patients who need help, e.g., are too ill or in too much pain or illiterate

DEMOGRAPHIC INFORMATION

D1 Gender	☐ Male ☐ Female	**D2 Year of birth**	Y Y
D3 Weight	kg	**D4 Height**	cm
D5 Nationality (check records)		**D6 Country of birth** (check records)	

D7 Language of Outcome questionnaire (select one)

☐ Albanian	☐ Arabic	☐ Bahasa Malaysia	☐ Chinese (Simp.)	☐ Chinese (Trad.)	☐ Danish	☐ Dutch
☐ English	☐ Filipino	☐ Finnish	☐ French	☐ German	☐ Hebrew	☐ Hindustani
☐ Icelandic	☐ Indonesian	☐ Italian	☐ Korean	☐ Romanian	☐ Russian	☐ Serbo-Croatian
☐ Spanish	☐ Span. Mexico		☐ Swedish	☐ Turkish		

BLANK FIELDS

Blank field 1:		Blank field 5:	
Blank field 2:		Blank field 6:	
Blank field 3:		Blank field 7:	
Blank field 4:		Project phase:	

Version2.9 2019-Mar-13

Page 2

Mark medications *given* to patient; record *cumulative* doses. **PATIENT CODE:** ☐

MEDICAL HISTORY

H1 Comorbidities

☐ yes ☐ no ☐ not possible to obtain the information — If yes, which (multiple answers possible):

Cancer	☐ **Cancer**
Renal	☐ **Renal** insufficiency or disease **without dialysis** ☐ **Renal** disease **requiring dialysis**
Diabetes	☐ **Diabetes Type I** ☐ **Diabetes Type II** ☐ **Diabetes Type unknown**
Psychiatric	☐ **Affective disorders** (depression, anxiety, phobia, PTSD, bipolar disorder) ☐ **Schizophrenia** ☐ **Alcohol** use disorder ☐ Current **smoker** ☐ **Substance abuse** of drugs (legal and illegal)
Cardiovascular	☐ **Hypertension** ☐ **Coronary artery** disease or **myocardial infarction** or **cerebral vascular accident**
Hematology	☐ **Sickle cell disease**
GI disease	☐ **Liver Cirrhosis** ☐ History or current upper or lower **GI ulcer** (peptic or duodenal ulcer disease) ☐ **Irritable bowel disease** (Crohn's disease, ulcerative colitis)
Pulmonary disease	☐ **Asthma** ☐ **Sleep apnea** ☐ Chronic Obstructive Pulmonary Disease (**COPD**)
Neurologic	☐ **Fibromyalgia**
Steroid use	☐ Regular administration of **oral or parenteral corticosteroid** medications
Musculoskeletal	☐ **Osteoarthritis** ☐ **Rheumatoid arthritis**
Multiple trauma	☐ At least 1 **fracture**(s) / **laceration**(s) / **tissue damage** in addition to the current reason for surgery
Other surgery	☐ Patient has already undergone **another surgery** during current hospitalization
	☐ **Other**, specify:

H2 Existing condition (check medical record)

☐ Pregnancy, Week: ☐☐ ☐ not relevant ☐ not possible to obtain the information

☐ Lactation ☐ not relevant ☐ not possible to obtain the information

H3 Did the patient receive any opioid(s) before the current admission?

☐ yes ☐ no ☐ not possible to obtain the information — If yes, which (multiple answers possible):

	Immediate release (PO & other)	Controlled release; (PO & other)
Buprenorphine	☐ mg\day	☐ µg\hr (transdermal)
Codeine	☐ mg\day	☐ mg\day
Fentanyl	☐ µg\hr (transmucosal / intranasal)	☐ µg\hr (transdermal)
Hydrocodone	☐ mg\day	☐ mg\day
Hydromorphone	☐ mg\day	☐ mg\day
Morphine	☐ mg\day	☐ mg\day
Oxycodone	☐ mg\day	☐ mg\day
Oxycodone (with Naloxon)	☐ mg\day	☐ mg\day
Pethidine (Meperidine)	☐ mg\day	☐ mg\day
Tapentadol	☐ mg\day	☐ mg\day
Tilidin (with Naloxon)	☐ mg\day	☐ mg\day
Tramadol	☐ mg\day	☐ mg\day
Other, specify:	☐	☐
Other, specify:	☐	☐

Page 3

Mark medications *given* to patient; record *cumulative* doses. PATIENT CODE:

PRE - MEDICATION

M1 Sedatives (pre-medication)

☐ yes ☐ no ☐ not possible to obtain the information If yes, which (multiple answers possible):

	p.o.	i.v.	i.m.
Diazepam	☐ mg	☐ mg	☐ mg
Clorazepate dipotassium	☐ mg	☐ mg	☐ mg
Haloperidol	☐ mg	☐ mg	☐ mg
Lorazepam	☐ mg	☐ mg	☐ mg
Midazolam	☐ mg	☐ mg	☐ mg
Promethazine	☐ mg	☐ mg	☐ mg
Other, specify:	☐ mg	☐ mg	☐ mg

M2 Non-opioids (pre-medication)

☐ yes ☐ no ☐ not possible to obtain the information If yes, which (multiple answers possible):

	p.o.	i.v.	i.m.	supp.
Celecoxib	☐ mg	☐ mg	☐ mg	☐ mg
Dexamethasone	☐ mg	☐ mg	☐ mg	☐ mg
Dexketoprofen	☐ mg	☐ mg	☐ mg	☐ mg
Diclofenac	☐ mg	☐ mg	☐ mg	☐ mg
Etoricoxib	☐ mg	☐ mg	☐ mg	☐ mg
Flurbiprofen	☐ mg	☐ mg	☐ mg	☐ mg
Gabapentin	☐ mg	☐ mg	☐ mg	☐ mg
Ibuprofen	☐ mg	☐ mg	☐ mg	☐ mg
Ketoprofen	☐ mg	☐ mg	☐ mg	☐ mg
Ketorolac	☐ mg	☐ mg	☐ mg	☐ mg
Metamizol	☐ mg	☐ mg	☐ mg	☐ mg
Naproxen	☐ mg	☐ mg	☐ mg	☐ mg
Nefopam	☐ mg	☐ mg	☐ mg	☐ mg
Paracetamol (Acetaminophen)	☐ mg	☐ mg	☐ mg	☐ mg
Parecoxib	☐ mg	☐ mg	☐ mg	☐ mg
Pregabalin	☐ mg	☐ mg	☐ mg	☐ mg
Other, specify:	☐	☐	☐	☐

Page 4

Mark medications *given* to patient; record *cumulative* doses. **PATIENT CODE:**

PRE - MEDICATION

M3 Opioids (pre-medication)

☐ yes ☐ no ☐ not possible to obtain the information If yes, which (multiple answers possible):

	Immediate release (PO & other)	Controlled release (PO & other)	i.v.	i.m.	supp.	s.c.
Buprenorphine	☐ mg	☐ µg\hr	☐ µg	☐ µg	☐ µg	☐ µg
Codeine	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg
Dezocine	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg
Fentanyl	☐ µg transmucosal	☐ µg\hr transdermal	☐ µg	☐ µg	☐ µg	☐ µg
Hydrocodone	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg
Hydromorphone	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg
Morphine	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg
Nalbuphine	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg
Oxycodone	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg
Oxycodone with Naloxon	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg
Pethidine (Meperidine)	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg
Piritramide	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg
Sufentanil	☐ µg	☐ µg	☐ µg	☐ µg	☐ µg	☐ µg
Tapentadol	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg
Tilidin (+/-w/o Naloxon)	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg
Tramadol	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg
Other, specify:	☐	☐	☐	☐	☐	☐

SURGICAL PROCEDURE(S)

P1 Surgical procedure(s)

use ICD-9 codes link **http://icd9cm.chrisendres.com/index.php?action=procslist**

	ICD-9 Procedure Code		Text (only for your notes, not necessary for mask)
1		1	
2		2	
3		3	
4		4	

P2 Duration of surgery

Start surgery: Date: 2 0 1 Y M M D D Time: H H M M

End surgery: Date: 2 0 1 Y M M D D Time: H H M M

Page 5

Mark medications *given* to patient; record *cumulative* doses. **PATIENT CODE:**

INTRA-OPERATIVE

M4 General anaesthesia (Intra-op)

☐ yes ☐ no ☐ not possible to obtain the information If yes, which (multiple answers possible):

☐ Inhalational	☐ IV

M5 Regional anaesthesia (RA) (Intra-op)

☐ yes ☐ no ☐ not possible to obtain the information If yes, which (multiple answers possible):

☐ Epidural	☐ Spinal	☐ Brachial plexus	☐ Femoral
☐ Sciatic	☐ Paravertebral	☐ Transv. Abdom. Plane (TAP)	☐ Other:

In M8: Mark the RA medication(s) given in the RA column

M6 Non-opioids (Intra-op)

☐ yes ☐ no ☐ not possible to obtain the information If yes, which (multiple answers possible):

	i.v.	i.m.	supp.
Clonidine	☐ mg	☐ mg	☐ mg
Dexamethasone	☐ mg	☐ mg	☐ mg
Dexketoprofen	☐ mg	☐ mg	☐ mg
Diclofenac	☐ mg	☐ mg	☐ mg
Flurbiprofen	☐ mg	☐ mg	☐ mg
Ibuprofen	☐ mg	☐ mg	☐ mg
Ketamine	☐ mg	☐ mg	☐ mg
Ketoprofen	☐ mg	☐ mg	☐ mg
Ketorolac	☐ mg	☐ mg	☐ mg
Metamizol	☐ mg	☐ mg	☐ mg
Naproxen	☐ mg	☐ mg	☐ mg
Nefopam	☐ mg	☐ mg	☐ mg
Paracetamol (Acetaminophen)	☐ mg	☐ mg	☐ mg
Parecoxib	☐ mg	☐ mg	☐ mg
Other, specify:	☐	☐	☐
Other, specify:	☐	☐	☐
	i.v.	i.m.	supp.

Page 6

Mark medications *given* to patient; record *cumulative* doses. PATIENT CODE:

INTRA-OP

M7 Wound infiltration (intra-op)

☐ yes ☐ no ☐ not possible to obtain the information

If yes, which (multiple answers possible; analgesic is not recorded):

☐ Single shot by surgeon ☐ Indwelling catheter ☐ Other, specify: ☐ Other, specify:

M8 Opioids & local anaesthetics (intra-op)

☐ yes ☐ no ☐ not possible to obtain the information If yes, which (multiple answers possible):

	RA (see M5)	i.v.	i.m.	s.c.
Alfentanil	☐ mg	☐ mg	☐ mg	☐ mg
Buprenorphine	☐ µg	☐ µg	☐ µg	☐ µg
Codeine	☐ mg	☐ mg	☐ mg	☐ mg
Dezocine	☐ mg	☐ mg	☐ mg	☐ mg
Fentanyl	☐ µg	☐ µg	☐ µg	☐ µg
Hydrocodone	☐ mg	☐ mg	☐ mg	☐ mg
Hydromorphone	☐ mg	☐ mg	☐ mg	☐ mg
Morphine	☐ mg	☐ mg	☐ mg	☐ mg
Nalbuphin	☐ mg	☐ mg	☐ mg	☐ mg
Oxycodone	☐ mg	☐ mg	☐ mg	☐ mg
Pethidine (Meperidine)	☐ mg	☐ mg	☐ mg	☐ mg
Piritramid	☐ mg	☐ mg	☐ mg	☐ mg
Remifentanil	☐ mg	☐ mg	☐ mg	☐ mg
Sufentanil	☐ µg	☐ µg	☐ µg	☐ µg
Tramadol	☐ mg	☐ mg	☐ mg	☐ mg
Bupivacaine	☐	☐	☐	☐
Levobupivacaine	☐	☐	☐	☐
Lidocaine	☐	☐	☐	☐
Prilocaine	☐	☐	☐	☐
Ropivacaine	☐	☐	☐	☐
Other, specify:	☐	☐	☐	☐
Other, specify:	☐	☐	☐	☐
	RA	i.v.	i.m.	s.c.

Mark medications *given* to patient; record *cumulative* doses. PATIENT CODE: ☐

RECOVERY ROOM

M9 Non-opioids (recovery room)

☐ yes ☐ no ☐ not possible to obtain the information If yes, which (multiple answers possible):

	p.o.	i.v.	i.m.	supp.
Celecoxib	☐ mg	☐ mg	☐ mg	☐ mg
Clonidine	☐ mg	☐ mg	☐ mg	☐ mg
Dexamethasone	☐ mg	☐ mg	☐ mg	☐ mg
Dexketoprofen	☐ mg	☐ mg	☐ mg	☐ mg
Diclofenac	☐ mg	☐ mg	☐ mg	☐ mg
Etoricoxib	☐ mg	☐ mg	☐ mg	☐ mg
Flurbiprofen	☐ mg	☐ mg	☐ mg	
Gabapentin	☐ mg	☐ mg	☐ mg	☐ mg
Ibuprofen	☐ mg	☐ mg	☐ mg	☐ mg
Ketamine	☐ mg	☐ mg	☐ mg	☐ mg
Ketoprofen	☐ mg	☐ mg	☐ mg	☐ mg
Ketorolac	☐ mg	☐ mg	☐ mg	☐ mg
Metamizol	☐ mg	☐ mg	☐ mg	☐ mg
Naproxen	☐ mg	☐ mg	☐ mg	☐ mg
Nefopam	☐ mg	☐ mg	☐ mg	☐ mg
Paracetamol (Acetaminophen)	☐ mg	☐ mg	☐ mg	☐ mg
Parecoxib	☐ mg	☐ mg	☐ mg	☐ mg
Pregabalin	☐ mg	☐ mg	☐ mg	☐ mg
Other, specify:	☐	☐	☐	☐
Other, specify:	☐	☐	☐	☐

M10 Regional analgesia (recovery room)

☐ yes ☐ no ☐ not possible to obtain the information If yes, which (multiple answers possible):

☐ Epidural	☐ Spinal	☐ Brachial plexus	☐ Femoral
☐ Sciatic	☐ Paravertebral	☐ Transv. Abdom. Plane (TAP)	☐ Other:

In M11: (1) Mark the RA medication(s) given in the RA column
(2) If the medication was given as PCA, tick appropriate box in the PCA column

Page 8

Mark medications *given* to patient; record *cumulative* doses. PATIENT CODE:

RECOVERY ROOM

M11 Opioids & local anaesthetics (recovery room)

☐ yes ☐ no ☐ not possible to obtain the information If yes, which (multiple answers possible):

	Immediate release (PO & other)	Controlled release (PO & other)	RA (see M10)	I.v.	I.m.	supp.	s.c.	PCA (see M10)
Buprenorphine	☐ mg	☐ µg\hr	☐ µg	☐ µg	☐ µg	☐ µg	☐ µg	☐
Codeine	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Dezocine	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Fentanyl	☐ µg transmucosal	☐ µg\hr transdermal	☐ µg	☐ µg	☐ µg	☐ µg	☐ µg	☐
Hydrocodone	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Hydromorphone	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Morphine	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Nalbuphin	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Oxycodone	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Oxycodone (with Naloxone)	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Pethidine (Meperidine)	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Piritramid	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Sufentanil	☐ µg	☐ µg	☐ µg	☐ µg	☐ µg	☐ µg	☐ µg	☐
Tapentadol	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Tilidin (w/wo Naloxon)	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Tramadol	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Bupivacaine	☐	☐	☐	☐	☐	☐	☐	☐
Levobupivacaine	☐	☐	☐	☐	☐	☐	☐	☐
Lidocaine	☐	☐	☐	☐	☐	☐	☐	☐
Prilocaine	☐	☐	☐	☐	☐	☐	☐	☐
Ropivacaine	☐	☐	☐	☐	☐	☐	☐	☐
Other, specify:	☐	☐	☐	☐	☐	☐	☐	☐
Other, specify:	☐	☐	☐	☐	☐	☐	☐	☐
Naloxone (only as an antagonist for respiratory depression)	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
	Immediate release (PO & other)	Controlled release (PO & other)	RA	I.v.	I.m.	supp.	s.c.	PCA

Version2.6 140212

Mark medications *given* to patient; record *cumulative* doses. **PATIENT CODE:**

WARD

M12 Non-opioids (ward)

☐ yes ☐ no ☐ not possible to obtain the information If yes, which (multiple answers possible):

	p.o.	i.v.	i.m.	supp.
Celecoxib	☐ mg	☐ mg	☐ mg	☐ mg
Clonidine	☐ mg	☐ mg	☐ mg	☐ mg
Dexamethasone	☐ mg	☐ mg	☐ mg	☐ mg
Dexketoprofen	☐ mg	☐ mg	☐ mg	☐ mg
Diclofenac	☐ mg	☐ mg	☐ mg	☐ mg
Etoricoxib	☐ mg	☐ mg	☐ mg	☐ mg
Flurbiprofen	☐ mg	☐ mg	☐ mg	☐ mg
Gabapentin	☐ mg	☐ mg	☐ mg	☐ mg
Ibuprofen	☐ mg	☐ mg	☐ mg	☐ mg
Ketamine	☐ mg	☐ mg	☐ mg	☐ mg
Ketoprofen	☐ mg	☐ mg	☐ mg	☐ mg
Ketorolac	☐ mg	☐ mg	☐ mg	☐ mg
Metamizol	☐ mg	☐ mg	☐ mg	☐ mg
Naproxen	☐ mg	☐ mg	☐ mg	☐ mg
Nefopam	☐ mg	☐ mg	☐ mg	☐ mg
Paracetamol (Acetaminophen)	☐ mg	☐ mg	☐ mg	☐ mg
Parecoxib	☐ mg	☐ mg	☐ mg	☐ mg
Pregabalin	☐ mg	☐ mg	☐ mg	☐ mg
Other, specify:	☐	☐	☐	☐

M13 Regional analgesia (ward)

☐ yes ☐ no ☐ not possible to obtain the information If yes, which (multiple answers possible):

☐ Epidural	☐ Spinal	☐ Brachial plexus	☐ Femoral
☐ Sciatic	☐ Paravertebral	☐ Transv. Abdom. Plane (TAP)	☐ Other:

In M14: (1) Mark the RA medication(s) given in the RA column
(2) If the medication was given as PCA, tick appropriate box in the PCA column

Page 10

Mark medications *given* to patient; record *cumulative* doses. **PATIENT CODE:**

WARD

M14 Opioids & local anaesthetics (ward)

☐ yes ☐ no ☐ not possible to obtain the information If yes, which (multiple answers possible):

	Immediate release (PO & other)	Controlled release (PO & other)	RA (see M13)	I.v.	I.m.	supp.	s.c.	PCA (see M13)
Buprenorphine	☐ mg	☐ µg\hr	☐ µg	☐ µg	☐ µg	☐ µg	☐	☐
Codeine	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Dezocine	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Fentanyl	☐ µg transmucosal	☐ µg\hr transdermal	☐ µg	☐ µg	☐ µg	☐ µg	☐ µg ☐ µg	☐
Hydrocodone	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Hydromorphone	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Morphine	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Nalbuphin	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Oxycodone	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Oxycodone (with Naloxone)	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Pethidine (Meperidine)	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Piritramid	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Sufentanil	☐ µg	☐ µg	☐ µg	☐ µg	☐ µg	☐ µg	☐ µg	☐
Sufentanil sublingual (Zalviso)		☐ µg						☐
Tapentadol	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Tilidin (with Naloxon)	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Tramadol	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐
Bupivacaine	☐	☐	☐	☐	☐	☐	☐	☐
Levobupivacaine	☐	☐	☐	☐	☐	☐	☐	☐
Lidocaine	☐	☐	☐	☐	☐	☐	☐	☐
Prilocaine	☐	☐	☐	☐	☐	☐	☐	☐
Ropivacaine	☐	☐	☐	☐	☐	☐	☐	☐
Other, specify: ☐	☐	☐	☐	☐	☐	☐	☐	☐
Naloxone (only as an antagonist for respiratory depression)	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐ mg	☐

M15 Measurement of pain:

a) Since the patient returned from surgery, how many times was pain assessed and this was recorded?

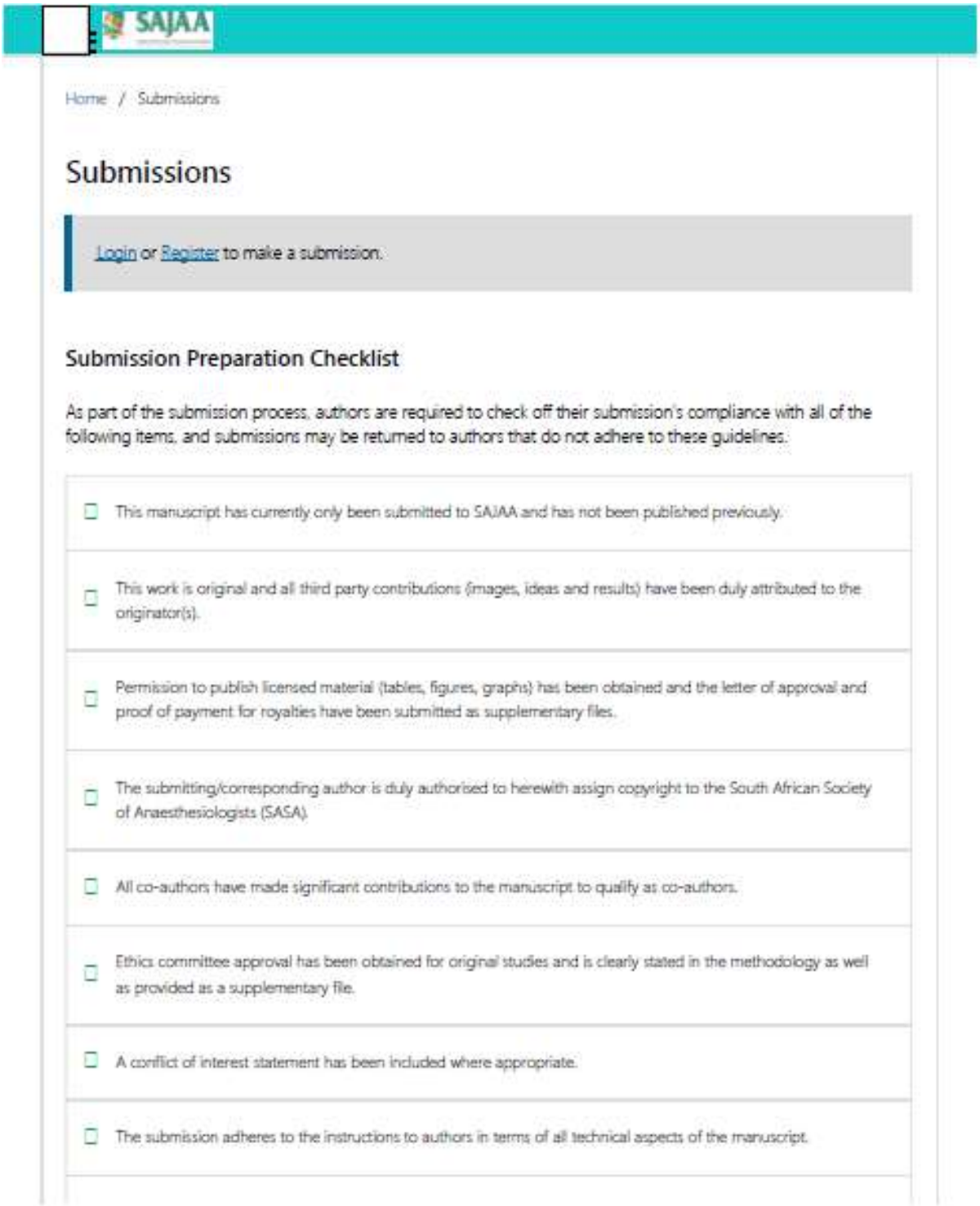
☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐>9 times ☐not possible to obtain the information

b) After treatment with an analgesic, was the pain re-assessed within 60 minutes?

☐ no analgesic was given

☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐>9 times ☐not possible to obtain the information

Appendix C: Instructions to authors



SAJAA

Home / Submissions

Submissions

Login or Register to make a submission.

Submission Preparation Checklist

As part of the submission process, authors are required to check off their submission's compliance with all of the following items, and submissions may be returned to authors that do not adhere to these guidelines.

- ☐ This manuscript has currently only been submitted to SAJAA and has not been published previously.
- ☐ This work is original and all third party contributions (images, ideas and results) have been duly attributed to the originator(s).
- ☐ Permission to publish licensed material (tables, figures, graphs) has been obtained and the letter of approval and proof of payment for royalties have been submitted as supplementary files.
- ☐ The submitting/corresponding author is duly authorised to herewith assign copyright to the South African Society of Anaesthesiologists (SASA).
- ☐ All co-authors have made significant contributions to the manuscript to qualify as co-authors.
- ☐ Ethics committee approval has been obtained for original studies and is clearly stated in the methodology as well as provided as a supplementary file.
- ☐ A conflict of interest statement has been included where appropriate.
- ☐ The submission adheres to the instructions to authors in terms of all technical aspects of the manuscript.

☐ Plagiarism: The submitting author acknowledges that the Editorial Board reserves the right to use plagiarism detection software on any submitted material.

Author Guidelines

Submitted manuscripts that are not in the correct format and without the required supporting documentation specified in these guidelines will be returned to the author(s) for correction and will delay publication.

AUTHORSHIP

All named authors must consent to publication **by signing a covering letter** which should be submitted as a supplementary file. Authorship should be based on substantial contribution to:

1. conception, design, analysis and interpretation of data;
2. drafting or critical revision for important intellectual content; and
3. approval of the version to be published. These conditions must all be met (uniform requirements for manuscripts submitted to biomedical journals; refer to icmje.org); and
4. exact contribution of each author must be stated.

MANUSCRIPT PREPARATION

Refer to articles in recent issues for the presentation of headings and subheadings. If in doubt, refer to 'uniform requirements' - www.icmje.org. Manuscripts must be provided in **UK English**. The manuscript and supporting documentation should be submitted as follows:

Manuscript

The manuscript must contain the title, abstract, keywords (5), body text and references as specified below:

Categories of submissions

Shorter items are more likely to be accepted for publication, owing to space constraints and reader preferences.

Original articles

Original articles on research relevant to anaesthesia and analgesia should not exceed 3 200 words, no more than 30 references, with up to 6 tables or figures. A structured abstract under the following headings: Background, Methods, Results, and Conclusion is a requirement and should not exceed 300 words.

Clinical Review articles

Review articles relevant to anaesthesia and analgesia should not exceed 2 400 words, with a maximum of 20 references and no more than 6 tables or figures. A summary of 300 words or less is required.

Case reports

Case reports should not exceed 1 800 words with no more than 10 references. Figures are limited to 2 figures and may include images or photographs. The case report should have three headings: Summary (not exceeding 100 words), Case report (with no introduction) and Discussion.

Scientific Letters

Scientific Letters should not exceed 2 400 words with a maximum of 10 references. Only one table or illustration is permissible. A structured abstract under the following headings: Background, Methods, Results, and Conclusions, is a requirement and should not exceed 250 words.

Letters to the editor

Letters to the editor should be 800 words or less with only one image or table.

Title Page:

The title page should include:

1. Article Title
2. Authors Details: Qualification and affiliation (department and place of work), email addresses of all authors, ORCID number of **ALL** authors must be provided – if authors do not have ORCID, please register at https://orcid.org/
3. Corresponding author's information.
4. The following declarations must be included on the title page:

Declaration of conflict of interest

Authors must declare all sources of support for the research and any association with a product or subject that may constitute a conflict of interest. If there is no conflict of interest to declare please include the following statement: The authors declare no conflict of interest.

A conflicting interest exists when professional judgement concerning a primary interest (such as patient's welfare or the validity of research) may be influenced by a secondary interest (such as financial gain or personal rivalry). It represents a situation in which financial or other personal considerations from authors, reviewers or editors have the potential to compromise or bias professional judgment and objectivity. It may arise for the authors when they have financial interest that may influence their interpretation of their results or those of others. Examples of potential conflicts of interest include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. All potential conflicts of interest need to be declared. The

conflict of interest statement should list each author separately by name, i.e.

"John Smith declares that he has no conflict of interest. Paula Taylor has received research grants from Drug Company A. Mike Schultz has received a speaker honorarium from Drug Company B and owns stock in Drug Company C."

Funding source

All sources of funding should be declared. Also define the involvement of study sponsors in the study design, collection, analysis and interpretation of data; the writing of the manuscript; the decision to submit the manuscript for publication. If the study sponsors had no such involvement, this should be stated as follows: No funding source to be declared.

Research Ethics Committee Approval

The submitting author must provide written confirmation of Research Ethics Committee approval for all studies including case reports. The ethics committee as well as the approval number should be included.

Compliance with ethical guidelines

For all publications:

"The author/s declare that this submission is in accordance with the principles laid down by the Responsible Research Publication Position Statements as developed at the 2nd World Conference on Research Integrity in Singapore, 2010."

Available from: http://publicationethics.org/resources/international-standards-for-editors-and-authors

Institutional Review Board (IRB) ethical approval must have been given if the study involves human subjects or animals. Please provide the approval number as well as the approval letter.

"Prior to commencement of the study ethical approval was obtained from the following ethical review board: *Provide name and reference number*"

For studies with human subjects include the following:

"All procedures were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008."

"Informed written consent was or was not obtained from all patients for being included in the study."

For studies with animals include the following sentence:

"All institutional and national guidelines for the care and use of laboratory animals were followed."

For articles that do not contain studies with human or animal subjects:

"This article does not contain any studies with human or animal subjects."

If doubt exists whether the research was conducted in accordance with the Helsinki Declaration, the authors must explain the rationale for their approach, and demonstrate that the institutional review body explicitly approved the doubtful aspects of the study. If any identifying information about patients is included in the article, the following sentence should also be included: Additional informed consent was obtained from all patients for which identifying information is included in this article. The Helsinki Declaration 2008 can be found at http://www.wma.net/en/30publications/10policies/b3/

The submitting author must provide written confirmation of Research Ethics Committee approval for all studies including case reports. The ethics committee as well as the approval number should be included.

Authorship

The authors confirm that all authors have made substantial contributions to all of the following:

- The conception and design of the study, or acquisition of data, or analysis and interpretation of data.
- Drafting the article or revising it critically for important intellectual content.
- Final approval of the version to be submitted.
- Sound scientific research practice

The authors further confirm that:

- The manuscript, including related data, figures and tables has not been previously published and is not under consideration elsewhere
- No data have been fabricated or manipulated (including images) to support your conclusions
- This submission does not represent a part of single study that has been split up into several parts to increase the quantity of submissions and submitted to various journals or to one journal over time (e.g. "salami-publishing").

Plagiarism:

- The authors confirm that the work submitted is original and does not transgress the plagiarism policy of the journal.
- No data, text, or theories by others are presented as if they were the author's own.
- Proper acknowledgements of other's work has been given (this includes material that is closely copied, summarized and/or paraphrased), quotation marks are used for verbatim copying of material.
- Permissions have been secured for material that is copyrighted.

Acknowledgements

General Information

Abbreviations

All abbreviations should be spelt out when first used and thereafter used consistently, e.g. 'intravenous (IV)' or 'Department of Health (DoH)'.

Scientific measurements

Scientific measurements must be expressed in SI units except blood pressure (mmHg) and haemoglobin (g/dl). Litres is denoted with a lowercase 'l' e.g. 'ml' for millilitres). Units should be preceded by a space (except for %), e.g. '40 kg' and '20 cm' but '50%'. Greater/smaller than signs (> and 40 years of age) should also be preceded by a space e.g. > 20 years. No spaces should precede ± and °, i.e. '35±6' and '19°C'.

Numbers should be written as grouped per thousand-units, i.e. 4 000, 22 160...

Quotes should be placed in single quotation marks: i.e. The respondent stated: '...' Round **brackets** (parentheses) should be used, as opposed to square brackets, which are reserved for denoting concentrations or insertions in direct quotes.

Formatting

The manuscript must be in Microsoft Word document format. Text must be 1,5-spaced, in 12-point Times New Roman font, and contain no unnecessary formatting (such as text in boxes, except for Tables). *The manuscript must be free of track changes.*

ILLUSTRATIONS AND TABLES

If tables or illustrations submitted have been published elsewhere, the author(s) should provide consent to republication obtained from the copyright holder.

Tables may be embedded in the manuscript file **and** must be provided as '**supplementary files**'. They must be numbered in Roman numerals (I, II, III, etc.) and referred to consecutively in the text (e.g. 'Table I'). Tables should be constructed carefully and simply for intelligible data representation. Unnecessarily complicated tables are strongly discouraged. Tables must be cell-based (i.e. not constructed with text boxes, tabs or enters, and NOT supplied as an image) and accompanied by a concise title and column headings. Footnotes must be indicated with consecutive use of the following symbols: * † ‡ § ¶ ‖ then ** †† ‡‡ etc.

Figures must be numbered in Arabic numerals and referred to in the text e.g. '(Figure 1)'. Figure legends: Figure 1: 'Title...'. All illustrations/figures/graphs must be of **high resolution/quality**: 300 dpi or more is preferable, but images must not be resized to increase resolution. Unformatted and uncompressed images must be attached as '**supplementary files**' upon submission (**not** embedded in the accompanying manuscript). TIFF and PNG formats are

preferable; JPEG and PDF formats are accepted, but authors must be wary of image compression. Illustrations and graphs prepared in Microsoft PowerPoint or Excel must be accompanied by the original workbook.

Graphs may be embedded in the manuscript but the original (open) file must be provided as a supplementary file.

REFERENCES

Authors must verify references from the original sources. *Only complete, correctly formatted reference lists will be accepted.* Reference lists may be generated with the use of reference manager software, but the final document must be delinked from the reference database or otherwise generated manually. Citations should be inserted in the text as superscript, e.g. These regulations are endorsed by the World Health Organization,[2] and others.[3,4-6] The superscript reference number should come after the punctuation mark and should not be in brackets.

All references should be listed at the end of the article in numerical order of appearance in the **Vancouver style** (not alphabetical order). Approved abbreviations of journal titles must be used; see the List of Journals in Index Medicus. Names and initials of all authors should be given; if there are more than six authors, the first four names should be given followed by et al. First and last page, volume and issue numbers should be given. **Wherever possible, references must be accompanied by a digital object identifier (DOI) link and PubMed ID (PMID)/PubMed Central ID (PMCID).** Authors are encouraged to use the DOI lookup service offered by CrossRef. Crossref DOIs should always be displayed as a full URL link in the form https://doi.org/10.xxxx/xxxxx

Journal references:

1. Jun BC, Song SW, Park CS, Lee DH. The analysis of maxillary sinus aeration according to aging process: volume assessment by 3-dimensional reconstruction by high-resolutional CT scanning. Otolaryngol Head Neck Surg. 2005 Mar;132(3):429-34.
2. Polgreen PM, Diekema DJ, Vandeberg J, Wiblin RT, et al. Risk factors for groin wound infection after femoral artery catheterization: a case-control study. Infect Control Hosp Epidemiol [Internet]. 2006 Jan [cited 2007 Jan 5];27(1):34-7. Available from: http://www.journals.uchicago.edu/ICHE/journal/issues/v27n1/2004069/2004069.web.pdf

Book references: Jeffcoate N. Principles of Gynaecology. 4th ed. London: Butterworth, 1975:96-101. *Chapter/section in a book:* Weinstein L, Swartz MN. Pathogenic Properties of Invading Microorganisms. In: Sodeman WA jun, Sodeman WA, eds. Pathologic Physiology: Mechanisms of Disease. Philadelphia: WB Saunders, 1974:457-472.

Internet references: World Health Organization. The World Health Report 2002 - Reducing Risks, Promoting Healthy Life. Geneva: World Health Organization, 2002. http://www.who.int/whr/2002 (accessed 16 January 2010).

Other references (e.g. reports) should follow the same format: Author(s). Title. Publisher place: publisher name, year; pages. Cited manuscripts that have been accepted but not yet published can be included as references followed by '(in press)'. Unpublished observations and personal communications in the text must not appear in the reference list. The full name of the source person must be provided for personal communications e.g. '... (Prof. Michael Jones, personal communication)'.

STATISTICAL ANALYSIS

Authors are advised to involve medical statisticians at the protocol stage of their research project to plan sample size, and the selection of appropriate statistical tests for analysis and presentation.

PROTECTION OF PATIENT'S RIGHTS TO PRIVACY

Identifying information should not be published in written descriptions, photographs, and pedigrees unless the information is essential for scientific purposes and the patient (or parent or guardian) gives informed written consent for publication. The patient should be shown the manuscript to be published. Refer to www.icmje.org.

ETHNIC CLASSIFICATION

The rationale for analysis based on racio-ethnic-cultural categorisation should be indicated.

COVERING LETTER

A covering letter to the editor is mandatory and must include statements that the manuscript has not been published previously and is not under review elsewhere. It should state details of any prior publication of the research in abstract form or in Congress proceedings. The letter must declare if any of the authors have a conflict of interest and that the requirements for submission, including ethics approval and patient permission for case reports have been fulfilled. All authors must sign the covering letter.

REVIEW PROCESS

Manuscripts, after vetting by the editorial team, are assigned for peer-review to 2 reviewers, conversant with the particular field of research. The reviewers and the authors are blinded to each other's identity. The turn-around time for review and initial editorial decision notification aims to be within 6 weeks of submission.

PROOFS

A PDF proof of an article may be sent to the corresponding author before publication to resolve remaining queries. At that stage, **only** typographical changes are permitted; the corresponding author is required, having conferred with his/her co-authors, to reply within 2 working days in order for the article to be published in the issue for which it has been scheduled.

CHANGES OF ADDRESS

Please notify the editorial department of any contact detail changes, including email, to facilitate communication.

CHARGES

There is no charge for the publication of manuscripts.

PRIVACY STATEMENT

SAJAA is committed to protecting the privacy of the users of this journal website. The names, personal particulars and email addresses entered in this website will be used only for the stated purposes of this journal and will not be made available to third parties without the user's permission or due process. Users consent to receive communication from *SAJAA* for the stated purposes of the journal. Queries with regard to privacy may be directed to robyn@jesser-point.co.za.

Letters to the Editor

(400–800 words) (1 page)

Original Research

(2800–3200 words) (4–5 pages)

Scientific Letters

(2400 words) (3–4 pages)

Case Studies

(1 800 words) (3 pages)

Clinical reviews

(2 400 words) (3–4 pages)

Copyright Notice

By submitting manuscripts to SAJAA, authors of original articles are assigning copyright to the SA Society of Anaesthesiologists. Authors may use their own work after publication without written permission, provided they acknowledge the original source. Individuals and academic institutions may freely copy and distribute articles published in SAJAA for educational and research purposes without obtaining permission.

The work is licensed under a Creative Commons Attribution-Non-Commercial Works 4.0 South Africa License. The SAJAA does not hold itself responsible for statements made by the authors.

Privacy Statement

The names and email addresses entered in this journal site will be used exclusively for the stated purposes of this journal and will not be made available for any other purpose or to any other party.