CLINICAL GUIDELINE TITLE	**Patient-Controlled Analgesia (PCA) for pain after surgery or trauma: Clinical nursing guidelines for adult patients**

1) SUMMARY

This guideline has been created to support all nursing and medical staff caring for adult patients receiving a PCA for acute pain after surgery or trauma.
Please note there are separate guidelines for PCA in the management of pain during sickle cell crisis and the management of pain in children.

KEY POINTS

- Patient-controlled analgesia can be effective in the management of acute pain after surgery and trauma.
- Registered practitioners should be aware of:
  - Indications and contraindications for patient-controlled analgesia
  - Drug-related side-effects and their management
  - Frequency of observations
  - Criteria for stopping patient-controlled analgesia
  - Who to contact in an emergency
  - Training required and competency assessment process

Quick link accesses (Ctrl + Click to follow links)

Observations	Uncontrolled Pain	Background infusions
Sedation and respiratory depression	Pump trouble shooting guide	Stopping PCA
Contacts	Training	Opioid tolerant patients

2) INTRODUCTION

PCA is most commonly in the form of an intravenous (IV) or subcutaneous (SC) opioid. PCA is a maintenance therapy that requires the patient's pain to be controlled before it is commenced, which is usually achieved by titrating small doses of IV opioid. Once established, PCA will then allow the patient to administer frequent bolus doses of opioid as needed. This approach is more likely to maintain relatively constant blood concentration levels of the drug, thereby keeping the patient comfortable. PCA also allows for individualised dosing which acknowledges individual variability (Macintyre and Schug 2014).

3) DEFINITIONS

Patient Controlled Analgesia (PCA) is a technique that relies on the patient being able to demand doses of an analgesic agent within pre-set limits.

Opioids work by attaching to opioid receptors in the dorsal horn of the spinal cord and prevent the transmission of signals to the brain, where pain becomes a conscious experience.

4) SCOPE

All registered healthcare professionals caring for patients receiving PCA should demonstrate an awareness of this guideline. Managers have a responsibility for ensuring that a minimum 75% of registered nurses in relevant areas have attended PCA training. This should be calculated against required establishment within individual clinical areas not actual nurses in post. Places can be booked via LEARN.

Clinicians should liaise with the ward manager or senior nurse to ensure that at least one trained nurse who is competent in the management of patients receiving PCA is on duty for each shift.

4.1 Pre- requisites for registered practitioners (level 1 access codes)

Registered practitioners who meet the following criteria can access the menu options, change the infusion bag, and discontinue the infusion and clear air in the line. All registered practitioners can charge the pump battery. Registered practitioners should have:

- A certificate in IV drug administration.
- Attended the Trust Pain Management training. The morning session relates to general pain management. The PCA theory session is delivered in the afternoon. Registered practitioners need to update the morning sessions every 4 years.
- Complete a period of supervised practice and the PCA component in the inpatient pain competency booklet. This can be accessed on the Pain Service webpage via the intranet. We recommend completing within 3 months of PCA theory training.
- Completed bodyguard 575^{TM} pump training. Registered practitioners need to update pump training every 3 years. This can be booked via LEARN.

4.2 Additional pre-requisites for registered practitioners who can set up PCA devices and change protocols (level 2 access codes)

- Successfully completed advanced training to programme PCA pumps.
- Successfully passed a programming test in accordance with National Health Service Litigation Authority (NHSLA) guidelines.

Advanced training can be arranged with a member of the Pain Service.

Student nurses should be encouraged to observe and learn about PCA but must not participate in procedures.

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5) FULL GUIDELINE

5.1 Preparing and commencing a PCA

Refer to *Appendix 1* for a list of clinical areas where nurses are currently trained to care for patients receiving PCA.

The following staff can prepare and commence a PCA
Anaesthetists
*Clinical Nurse Specialists in the Pain Service
*Site nurse practitioners
*Registered nurses in the Recovery Unit at CXH, HH and SMH
*Registered nurses in GICU at HH and SMH (band 7 and above)
*Registered nurses in 11 West & 11 North at CXH (band 7 and above)
*Registered nurses in cardiothoracic recovery and high dependency unit at HH (band 7 and above)
*Clinical Practice Educators in Critical Care (band 6 and above)
*Imaging/Radiology nurses in CXH, SMH & HH (band 6 & above)

*Providing meet the additional practitioner pre-requisites set out in section 4

5.1.1 Contacts

If there are any concerns about patients with PCA, please contact the Pain Service or out of hours contact the site nurse practitioner (first line) or the on-call anaesthetist (second line).

Site	Days	Time	Bleeps
CXH	Mon-Fri	08.30-16.30 Out of hours Out of hours	4001 (clinical nurse specialist) 6183 (site nurse practitioner) 8111 (on-call anaesthetist)
HH	Mon-Fri	08.30-16.30 Out of hours Out of hours	5461 (clinical nurse specialist) 8113 (site nurse practitioner) 9313 (on-call anaesthetist)
SMH	Mon-Fri	08.30-16.30 Out of hours Out of hours	1043 (clinical nurse specialist) 1065 (site nurse practitioner) 1213 (on-call anaesthetist)

5.1.2 PCA pumps and medicines used

The blue Bodyguard 575™ pumps are used for PCA. Refer to *Appendix 2* for a quick user guide. Empty infusion bags must be changed promptly when the end infusion alarm is displayed.

Pre-mixed PCA infusion bags of morphine or fentanyl are used to reduce the risk of drug error. Standard IV and SC PCA regimens are given below:

IV PCA regimen

	Morphine	Fentanyl
Premixed bag	200mg in 100mL sodium chloride 0.9%	3,000micrograms in 300 mLs sodium chloride 0.9%
Concentration	2mg per mL	10micrograms per mL
Bolus Dose	1mg	10micrograms
Lock-out	5 minutes	3 minutes

SC PCA regimen

	Morphine	Fentanyl
Premixed bag	200mg in 100mL sodium chloride 0.9%	3,000micrograms in 300 mLs sodium chloride 0.9%
Concentration	2mg per mL	10micrograms per mL
Bolus Dose	2mg	20micrograms
Lock-out	10 minutes	10 minutes

Opioids administered via PCA must be prescribed on Cerner or ICCA. Patients must be informed about how to administer their pain relief. For surgical patients, information should be given before surgery by the anaesthetist or nursing staff. For guidance about what information patients want to know about PCA, please refer to *Appendix 3* (Chumbley, Hall and Salmon 2002).

5.1.3 Continuous (Background) infusions in addition to PCA

The PCA device can be programmed to include a continuous infusion of opioid in conjunction with a bolus dose of opioid. This would be suitable for patients who have a tolerance to opioids, such as patients with an established methadone use and patients on opioids, such as morphine (e.g. Oramorph or MST), oxycodone (e.g. Oxynorm or Oxycontin) or fentanyl patches.

PCA settings should include a continuous infusion, which is calculated to replace the patient's usual opioid dose (ANZCA 2015, Simpson and Jackson 2017).

Please refer to *Appendix 4* for guidance on starting PCA on patients who are already taking opioids. Opioid requirements are usually significantly higher in these patients and their management should focus on preventing opioid withdrawal in addition to administering effective analgesia (Simpson and Jackson 2017). These patients should be discussed with the Pain Service prior to commencing PCA so that an appropriate regimen can be prescribed. Depending on the patient's surgery and reason for opioid consumption preoperatively, the patient may go back to their normal regimen once the pain is controlled and the required route is established.

5.1.4 Procedure for commencing PCA

- Complete a blue PCA referral form (*see Appendix 5*).
- Infusion bag and prescription should be checked by two registered nurses, one of whom should be competent in the care of patients requiring PCA and trained in IV drug administration.
- Connect the prescribed solution to a dedicated blue PCA administration set and prime the line via the pump, ensuring all air is removed (refer to *Appendix 2* for priming instructions).
- Programme the pump in accordance with the prescription. The programme must be checked by two registered nurses, one of whom is deemed competent in the management of patients receiving PCA and has completed programme training for the bodyguard 575™ pump.
- Identify the patient, checking that the hospital number on the identity band and the prescription match.
- PCA must be given through a dedicated peripheral cannula. The administration set must be changed every 4 days and clearly labelled with the date.
- If no peripheral access is available then PCA can be administered through a dedicated lumen of a central venous line. PCA administration sets must be changed every 3 days when attached to a central line. Three way taps must not be used.

5.2 Care and monitoring of the patient

5.2.1 PCA observations

Pain scores, conscious levels and nausea scores

The following scores rank intensity or magnitude and are used to assess pain, conscious level and nausea. A verbal rating score is used to assess pain intensity. The patient must be asked the following question: 'On moving would you say your pain is none, mild, moderate or severe'?

Pain	Conscious Level	Nausea
None	A - Alert	None
Mild	C – New confusion	Nauseous
Moderate	V – Responds to voice	Vomiting
Severe	P – Responds to pain	
	U - Unresponsive	

The amount of PCA morphine (mg) or fentanyl (micrograms) and how long the patient has been using PCA should also be recorded on Cerner.

To ensure patient safety, patients with PCA **should not** leave the clinical area unless accompanied by a trained member of nursing staff.

Frequency of observations:

Observation	Frequency on starting a PCA	If the patient receives a loading dose	If the bolus dose is increased or the lockout time is decreased
Respiratory rate Sedation score Blood pressure Pain score Location of pain	15min for 1hr 30min for 4hr Hourly for 4hr, then 4hourly if stable	Every 5min for 15min, then 15min for 45 min, then revert to previous frequency.	After 15min and 45min, then revert to the previous frequency.

5.2.2 The management of side effects and complications related to PCA

Symptoms	Causes and presentation	Action
Nausea and vomiting **Pruritis (itching)** **Constipation** **Hallucinations & nightmares**	**Opioid side effect?**	**● Administer relevant drugs, such as anti-emetics for nausea and vomiting and low dose naloxone or ondansetron for opioid-induced itching.** **● If the itching or hallucinations & nightmares areF related to the opioid, consider switching to an alternative opioid.** **● For constipation consider regular laxatives if allowed.** **● If problem persists, contact patient's medical team and the Pain Service.**
Uncontrolled Pain	**Moderate to severe pain from surgery or trauma. This may limit the patient's ability to deep breathe, cough and mobilise.**	**● Check that the PCA pump is working, the handset is correctly attached and within easy reach of the patient.** **● Check amount of mg/micrograms that has been infused as the patient may not understand how to use the PCA effectively. If necessary, educate the patient on the use of PCA and encourage them to use more often.** **● Give adjuvants, such as paracetamol or non-steroidal anti-inflammatory drugs (NSAIDS) if prescribed, to improve pain control.** **● If the patient is still in pain, contact the Pain Service or the on-call anaesthetist (out-of-hours) for a review.**
Respiratory depression (RR<8/min) or increased sedation	**Opioid effect?**	**● Stop the PCA.** **● Stimulate the patient.=** **● Administer oxygen @ 15l/ min. Summon emergency assistance.** **● Commence pulse oximetry.** **● Naloxone 400micrograms must be available. Care must be taken not to use too large a dose as patients may experience intense pain and distress. It is recommended that doses of 100 - 200 micrograms of Naloxone by intravenous injection are given at 2 minute intervals for the reversal of post-operative respiratory depression (Joint Formulary Committee 2020).** **● A bag and mask must be available to ventilate the patient, if required.**

5.3 Stopping PCA

Registered nurses can stop the PCA, provided the patient has met the following criteria:

- The patient has a pain score of none or mild pain on movement.
- The patient is able to tolerate oral medication.
- The patient has used less than 30mg morphine or 300micrograms fentanyl in the previous 24 hours.

5.3.1 Step-down analgesia

Please start either regimen 1 or regimen 2, as detailed below.
Please note tramadol should not be given to patients who are epileptic and attention should be paid with drug interactions to avoid the onset of serotonin syndrome. In addition, dihydrocodeine should be used with extreme caution in patients undergoing gastro-intestinal and genital reconstructive surgery.

Regimen 1	Regimen 2
Paracetamol 1gram, 6 hourly regularly Tramadol 50mg, 6 hourly regularly Tramadol 50mg, 6 hourly PRN Morphine sulfate oral solution 10mg, 4 hourly PRN	Paracetamol 1gram, 6 hourly regularly Dihydrocodeine 30mg, 6 hourly regularly Dihydrocodeine 30mg, 6 hourly PRN Morphine sulfate oral solution 10mg, 4 hourly PRN

All patients should continue to have pain scores recorded with routine observations. Patients should be reviewed after 24 hours by the medical team. If pain is not controlled then the regular dose of tramadol or dihydrocodeine may need to be increased as per the guidlance in the Getting on Top of Pain In Adults, Pain Mountain.
Please see 'Pain management for adult inpatients with acute or chronic pain' guideline on the Trust's intranet. If the patient continues to experience inadequate pain control, please contact the Pain Service for advice.

5.3.2 Procedure for stopping PCA

- Press **'stop'.**
- Press the grey 'on/off' button on the top left hand corner of the front display to turn the pump off.
- Remove the PCA administration set from the pump and dispose of any wasted opioid as per the Trust's policy on controlled drug wastage.
- Clean the pump as per the infection control policy. PCA carry bags are single use only and can be disposed of with domestic waste. Please clean and return the pump to theatre recovery as soon as possible.

6) IMPLEMENTATION

Training required for staff	Yes
If yes, who will provide training:	Pain Service
When will training be provided?	● Pain Study Day ● PCA pump basic user training session – level 1 access code ● PCA pump programmer training – level 2 access code
Date for implementation of guideline:	

7) MONITORING / AUDIT

When will this guideline be audited?	Continual monitoring by the Pain Service
Who will be responsible for auditing this guideline?	Members of the Pain Service and registered practitioners within clinical areas that manage PCA
Are there any other specific recommendations for audit?	No

8) REVIEW

Frequency of review	**Please indicate frequency of review** Every 3 years **Person and post responsible for the review:** Lead Nurse(s), Pain Service

9) REFERENCES

1. Australian & New Zealand College of Anaesthetists & Faculty of Pain Medicine ANZCA (2015). *Acute Pain Management: Scientific Evidence.* 4th Edition. Melbourne. Australian & New Zealand College of Anaesthetists.

2. Chumbley, GM., Hall, GM. & Salmon, P. (2002) Patient-controlled analgesia: what Information does the patient want? Journal of Advanced Nursing.39, pp.459-471.

3. Joint Formulary Committee (2020) *British National Formulary*. Available at: http://www.medicinescomplete.comhttps://bnf.nice.org.uk/drug/naloxone-hydrochloride.htmL#indicationsAndDoses (Accessed 20th January 2020).

4. Macintyre, PE & Schug, SA. (2014) *Acute Pain Management: A Practical Guide.* 4th edition. London, Saunders Elsevier.

5. National Patient Safety Agency (2014) Patient Safety Alert. Stage One: Warning. Risk of distress and death from inappropriate doses of naloxone in patients on long-term opioid/opiate treatment. 20 November 2014. NHS/PSA/W/2014/016

6. Simpson, GK & Jackson, M (2017) Perioperative management of opioid-tolerant patients, *BJA Education*, 17, (4) pp.124–128

10) GUIDELINE DETAIL

Start Date:	**17th April 2020**
Approval Dates	Drugs and Therapeutics Committee 24th March 2020 (chair's action 16th April 2020) Theatres, Anaesthetic and Pain 4th February 2020 Surgery, Cancer and Cardiovascular DATE
Has all relevant legislation, national guidance, recommendations, alerts and Trust action plans been considered, and included as appropriate in the development of this guideline?	**Please list ALL guidance considered:** National Patient Safety Agency (2014) Patient Safety Alert. Stage One: Warning. Risk of distress and death from inappropriate doses of naloxone in patients on long-term opioid/opiate treatment. 20th November 2014. NHS/PSA/W/2014/016
Have all relevant stakeholders been included in the development of this guideline?	**Please list all (name and role):** Dr Nicola Stranix, Inpatient pain consultant, CXH Dr Ashwin Kalbag Inpatient pain consultant, CXH Dr Claire Boynton Inpatient pain consultant, HH Dr Alison Knaggs Consultant Anaesthetist, SMH Dr Jenny Illingworth Consultant Anaesthetist, SMH Dr Gillian Chumbley Consultant nurse for the Pain Service Dhanesh Solanki, Senior Lead Pharmacist
Who will you be notifying of the existence of this guidance?	**Please give names/depts:** All clinical areas that manage patients with PCA, anaesthetics, theatres and recovery, critical care & high dependency units, critical care outreach team, clinical practice educators, Head nurses for all CPG's.
Related documents	Injectable Medicines guide Controlled Drugs policy Medical Devices Management policy Decontamination policy Pain management for adult inpatients with acute or chronic pain.
Author/further information	Eamon McMonagle Senior Clinical Nurse Specialist, Pain Service Telephone/Bleep:17568/4001 Trust email address: eamon.mcmonagle@nhs.net
Document review history	**Next review due: 16th April 2023** V6.1 – reviewed guideline V6.2 – format changes V6.3 – changes in response to comments from DTC V6.4 – further changes **V7.0 – finalised version**
THIS GUIDELINE REPLACES:	**Patient-Controlled Analgesia (PCA) for post-operative and acute pain: Clinical nursing guidelines for adult patients** Version 6 - EBS&E recommendations, December 2015

11) INTRANET HOUSEKEEPING

Key words	Patient-controlled analgesia (PCA), acute pain
Which Division/Directorate category does this belong to?	Surgery, Cancer & Cardiovascular
Which specialty should this belong to when appearing on the Source?	Pain

12) EQUALITY IMPACT OF GUIDELINE

Is this guideline anticipated to have any significant equality-related impact on patients, carers or staff? No

Appendix 1 - Commencing a PCA

Patients receiving a PCA are normally nursed in the following areas (does not include areas within Maternity Care or Paediatrics, see separate guidelines):

SMH	CXH	HH
QEQM Main Theatre, SIC and Day Case Surgical Recovery Units	Main Theatre Recovery Unit	Main Theatre Recovery Unit
Adult Intensive Care and High-dependency Unit	11 North & West (Critical Care Unit)	General Intensive Care Unit
Zachary Cope ward (Vascular)	11 South ward (Neurosurgical)	Cardiothoracic Recovery & High Dependency Unit
Major Trauma Unit	10 South ward (ENT and Plastics)	A9 ward (Cardiothoracic surgery)
Charles Pannett ward (General Surgery)	7 North ward (Colorectal & Urology)	A8 ward (Hepatobiliary Surgery)
Valentine Ellis ward (Orthopaedics)	7 South ward (Orthopaedics)	Dewardener ward (Renal high-dependency unit)
Patterson ward (General Surgery)	Riverside ward (General Surgery)	Handfield Jones ward (Renal Surgery)
Imaging department	Imaging department	Imaging department
Lindo Wing Levels 2 & 3 (private patients)	15 North and South wards (private patients)	Sainsbury levels 3 and 4 (private patients)
Accident & Emergency department		A7 Coronary Care Unit **(under exceptional circumstances)**
Lillian Holland ward (Gynaecological surgery)		Victor Bonney ward (Gynaecological surgery)

Appendix 2 - PCA pump user guide

COLOURVISION BODYGUARD

Pain Management Pump

Quick user guide

ColourVision BODY GUARD 545 Epidural Infusion Pump

ColourVision BODY GUARD 575 PCA Infusion Pump

CME Medical Device Training Is RCN-Accredited

Keypad Lock

With the keypad lock activated, the user can STOP and START an infusion, and with the infusion running use the INFO key to review infusion status.
Users cannot (for example) power off, rate change, change bolus or lockout time, deliver a clinician activated bolus or go to the main menu with the keypad lock activated.

Accessing infusion summary

During an infusion, repeatedly press the INFO to access current infusion information:
volume infused/to be infused (VI/VTBI), battery level, Pt bolus attempts/given, Clinican Bolus, protocol review screen and date & time

Note

- Refer to Operating Manual for full operating instructions
- Users must have undertaken training before operating this device
- Screen information/sequences may vary with different software versions and local pump configuration

Always follow screen prompts and before pressing keys to proceed, ensure selections made correspond with what is required

cme medical
Listen > Develop > Deliver

CME Medical UK Ltd
Kincraig Business Park,
Kincraig Road,
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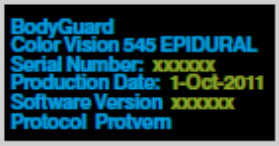
info@cmemedical.co.uk
www.cmemedical.co.uk

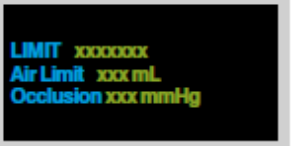
Start a new infusion

Prepare bag and set as per local policy

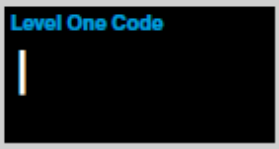
To power on, press and hold down the **ON/OFF** key until a beep is heard and screen displays



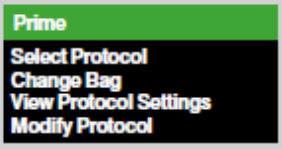
Screen displays pump identification



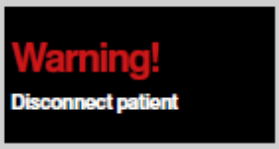
Next screen displays pump settings



Enter code, press START/OK

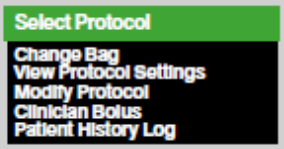


To prime, press START/OK

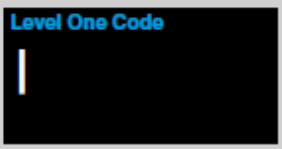


Ensure the set is disconnected from the patient. Press START/OK

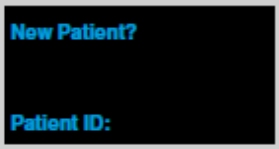
On completion, the screen returns to the main menu



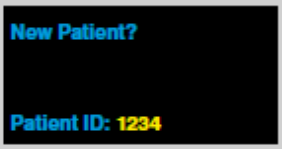
To select protocol, press START/OK



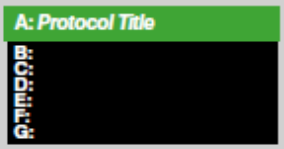
Enter code, press START/OK



Enter the ID number for a new pt (optional)



Press START/OK

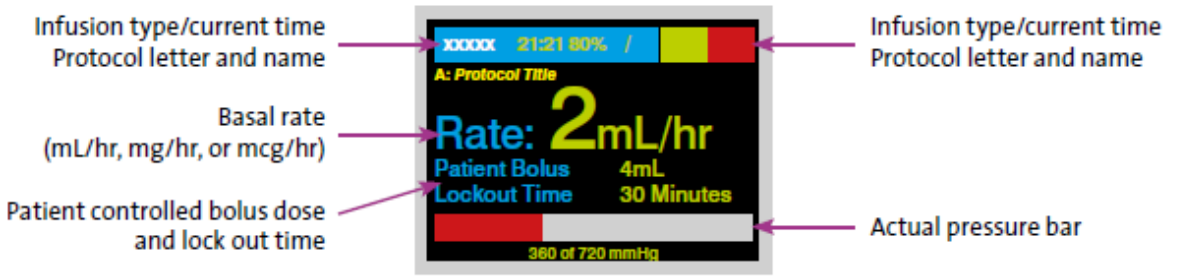


Select the Protocol required (use ↑↓ key if necessary), press START/OK

Check protocol, if correct, press START/OK

Connect set to the **correct** patient access port and unclamp if necessary
When ready to do, press START/OK to start protocol/infusion

Infusion screen running



Rate Change During Delivery (Rate Titration)

Remember to de-activate and activate keypad lock if necessary

1. With the infusion in progress, enter the new rate using the numerical keypad, press **START/OK**
2. Enter relevant code, press **START/OK**
3. Check the rate change is complete on the infusion running screen

Bag Change

Ensure set is clamped/disconnected from patient`s access device.

If end infusion alarm activates:

- Keypad Lock is automatically removed
- Press **STOP/NO** to confirm end of infusion and mute alarm
- Follow screen prompts to return to main menu, complete bag change, re-commence protocol and activate keypad lock

If changing bag prior to end infusion alarm:

- Press **INFO** to record VTBI and VI
- De-activate keypad lock
- Press **STOP/NO** to stop the infusion
- Follow screen prompts to return to main menu, complete bag change, re-connect/unclamp set, resume protocol, and activate keypad lock

Note: When a protocol is resumed and the protocol summary displays, the new VTBI and the total of all volume infused to date out of previous bag(s) will display.

Alerts, alarms and troubleshooting

When an **ALERT** is activated:

The infusion continues, LED indicator light remains green, intermittent beeps are heard approx. every 3/4 mins and a screen message alternates with the infusion running screen.

When an **ALARM** is activated:

The infusion stops, the LED indicator light turns red, a continuous audible alarm activates and a screen message displays indicating the cause.

Press STOP/NO to mute alarms and follow screen prompts.

Screen	Description
Low Battery	Alert: Approximately 30 minutes of battery life remaining. Connect to mains power.
Near End	Alert: Bag nearly empty, approximately 5mL volume remaining. Prepare new bag, if applicable.
Pump Stopped	Pump has been left in the STOP state for more than 2 minutes with no key presses. Press START/OK to resume, press STOP/NO to continue pause or press and hold down STOP/NO for menu.
End Battery **Press Stop**	Battery power is depleted. Connect to mains power immediately. Place pump in charger or use the battery cable to connect to the DC socket.
End of Infusion **Press STOP/NO for Menu**	Current infusion programme has completed. Either discontinue use or change bag to start a new protocol.
Air/Up Occlusion **Check for air/ occlusion**	Air in set or the set is occluded between the infusion bag and pump. If air is visible, disconnect set from patient and prime the set and resume protocol. Check for occlusion source (kinked or trapped set).
Down Occlusion **Check set/access**	The set or access device is occluded (below pump). Straighten the set and/or remove or open any clamp or clip. Change/flush the access device.
Missing Set Key **Load Set Key & Close Door**	The set is loaded incorrectly or user has loaded a non-proprietary set .Load administration set with key in keyway. Check set is the correct dedicated BodyGuard set.
Door Open **Close Door**	The pump door has opened during infusion. Check set is loaded correctly, close door and re-start infusion.
System Error **Press Info**	A technical/Internal malfunction has occurred Follow on screen prompts. User may be prompted to power off and on to rectify the problem.
Error (number) **Send for Service**	If the problem cannot be rectified, power off and remove from patient use. Follow local policy and contact service dept.

CV545 & 575 Pain Mgt/QUGv2/May2014

Appendix 3 - What patients want to know about PCA

Dangers of morphine
Patients want to be informed that the drug used in PCA is morphine, but they associate morphine with dying or drug abuse. They want to be reassured that morphine is a safe drug, routinely used in hospital and only for a limited period. It must be stressed for safety reasons that only the patient can press the PCA button.

Side-effects of morphine
Patients want to be told the common side effects of morphine, so they can recognise them and ask for help to alleviate them. They would like to be told about the following side effects:

- Feeling sleepy
- Feeling dizzy
- Hallucinations
- Nightmares
- Nausea
- Vomiting
- Feeling itchy
- Constipation

Side-effects are more common with larger doses. Therefore, drugs such as paracetamol or NSAIDS, can be given in conjunction with PCA to reduce the patient's morphine requirements. This may lessen unwanted side effects. Anti-emetics can be given for nausea and ondansetron or low dose naloxone for itching.

Alternative pain relief to PCA
Patients want to know that there are alternatives to PCA, should they decide that the PCA does not suit them. If they decide to stop PCA, the Pain Service will be available to advise on alternative pain management.

Pre-operative information
Studies have revealed that patients want pre-operative information. They do not want to learn about PCA as they are waking up from surgery. They would like information prior to surgery about how PCA works and when to press the button. They want to be given the opportunity to ask questions.

Support from staff
Patients want support from staff when they are using PCA. They may require further explanations or discussion about side-effects. They prefer staff to ask 'how is their pain? ‘rather than 'have you used your machine?' They don't appreciate contradictory information.

Adapted from Chumbley GM, Hall GM, Salmon P. Patient-controlled analgesia: what information does the patient want? Journal of Advanced Nursing 2002; 39, 459-471.

Appendix 4 - Guidelines for starting PCA on patients taking opioids

Patients who are established on methadone or taking regular opioid medication for pain prior to requiring a PCA can be very complex and challenging to treat. Prompt referral to the Pain Service for advice is important so that an individualised regimen that is both safe and effective can be agreed. It is generally recommended that the patient's baseline opioid is continued in the postoperative period and that acute post-surgical pain is managed with the addition of an appropriate dose of immediate release opioids. Some patients may however require an intravenous replacement of their usual opioids in the form of a PCA.

If patients need to be **nil by mouth** or there is **any concern about gastrointestinal absorption** the intravenous regimen described below can be used to prevent withdrawal and provide analgesia. Drug delivery from transdermal opioid patches can be affected post-operatively by poor perfusion and reduced temperature and it may also be appropriate to replace a patch with a PCA.

- Contact the Pain Service to alert them to your patient.
- Stop the regular opioids post-operatively
  - Give half of their daily opioid dose as a background infusion via the PCA. The oral dose has to be converted into intravenous equivalents and half of this dose prescribed at an hourly rate. Please contact the Pain Service for further advice on opioid equivalence.
- The patient may need a larger bolus dose.

Appendix 5 – PCA Blue audit form

Imperial College Healthcare NHS

PCA Audit Form

Name:	**Start date & time:**
Hosp. No:	
DOB:	**Surgeon:**
Gender: M F	**Anaesthetist:**
Operation:	
Ward:	**Bed No:** **Pump No:**

Starting Regimen

Drug	Strength	Bolus	Lockout	Please tick box
Morphine	2mg/ml			☐
Fentanyl	10mcg/ml			☐
Other (specify) :				☐
Continuous Infusion Y/N Rate:			IV Subcutaneous	☐ ☐

Relevant PMH:

Contraindications to NSAID: Yes ☐ No ☐

Shaded area to be completed by the pain team

Type of PCA

Post -op	☐	Post-epi	☐	Non-surgical pain	☐

Regimen Changes

Morphine to fentanyl Y/N	Bolus dose altered Y / N	Ward bolus given Y / N

Significant events, other than those below:

Adverse Effects & management:

Resp. rate < 8	Y/N	Nausea	Y/N
Feeling sleepy	Y/N	Vomiting	Y/N
Naloxone required?	Y/N	Hallucinations	Y/N
Pruritus	Y/N	Vivid dreams	Y/N

Management after PCA Oral ☐ IM/SC ☐ Other ☐

		Step down analgesia	
PCA Finish	**Total days**	Step 3	☐
Date:		Step 2	☐
Time:		Step 1	☐
Early discharge: 1 ☐ 2 ☐			
Total No. Visits		**Total Time:**	

Day post op:	Pain score		Bolus	Lockout	Rate (Cont.inf)	Pump total	24hrTot.	PONV	Other analgesia
	Rest	Moving							Paracetamol
Date:									NSAID
Time:									Time spent:
Comments:									< 20 mins. ☐
									< 40 mins. ☐
									< 60 mins. ☐
									Other:
Day post op:	Pain score		Bolus	Lockout	Rate (Cont.inf)	Pump total	24hrTot.	PONV	Other analgesia
	Rest	Moving							Paracetamol
Date:									NSAID
Time:									Time spent:
Comments:									< 20 mins. ☐
									< 40 mins. ☐
									< 60 mins. ☐
									Other:
Day post op:	Pain score		Bolus	Lockout	Rate (Cont.inf)	Pump total	24hrTot.	PONV	Other analgesia
	Rest	Moving							Paracetamol
Date:									NSAID
Time:									Time spent:
Comments:									< 20 mins. ☐
									< 40 mins. ☐
									< 60 mins. ☐
									Other:
Day post op:	Pain score		Bolus	Lockout	Rate (Cont.inf)	Pump total	24hrTot.	PONV	Other analgesia
	Rest	Moving							Paracetamol
Date:									NSAID
Time:									Time spent:
Comments:									< 20 mins. ☐
									< 40 mins. ☐
									< 60 mins. ☐
									Other:
Day post op:	Pain score		Bolus	Lockout	Rate (Cont.inf)	Pump total	24hrTot.	PONV	Other analgesia
	Rest	Moving							Paracetamol
Date:									NSAID
Time:									Time spent:
Comments:									< 20 mins. ☐
									< 40 mins. ☐
									< 60 mins. ☐
									Other:
Day post op:	Pain score		Bolus	Lockout	Rate (Cont.inf)	Pump total	24hrTot.	PONV	Other analgesia
	Rest	Moving							Paracetamol
Date:									NSAID
Time:									Time spent:
Comments:									< 20 mins. ☐
									< 40 mins. ☐
									< 60 mins. ☐
									Other:
Day post op:	Pain score		Bolus	Lockout	Rate (Cont.inf)	Pump total	24hrTot.	PONV	Other analgesia
	Rest	Moving							Paracetamol
Date:									NSAID
Time:									Time spent:
Comments:									< 20 mins. ☐
									< 40 mins. ☐
									< 60 mins. ☐
									Other:

Pain Score	Sedation Score	PONV Score
A None	A Awake	A None
B Mild	B Dozing	B Nausea
C Moderate	C Asleep	C Vomit
D Severe	D Unrousable	