

PCA Safety & Order Entry



Department of Pharmacy
John Dempsey Hospital at UConn Health

April 2016

PCA Order Audit



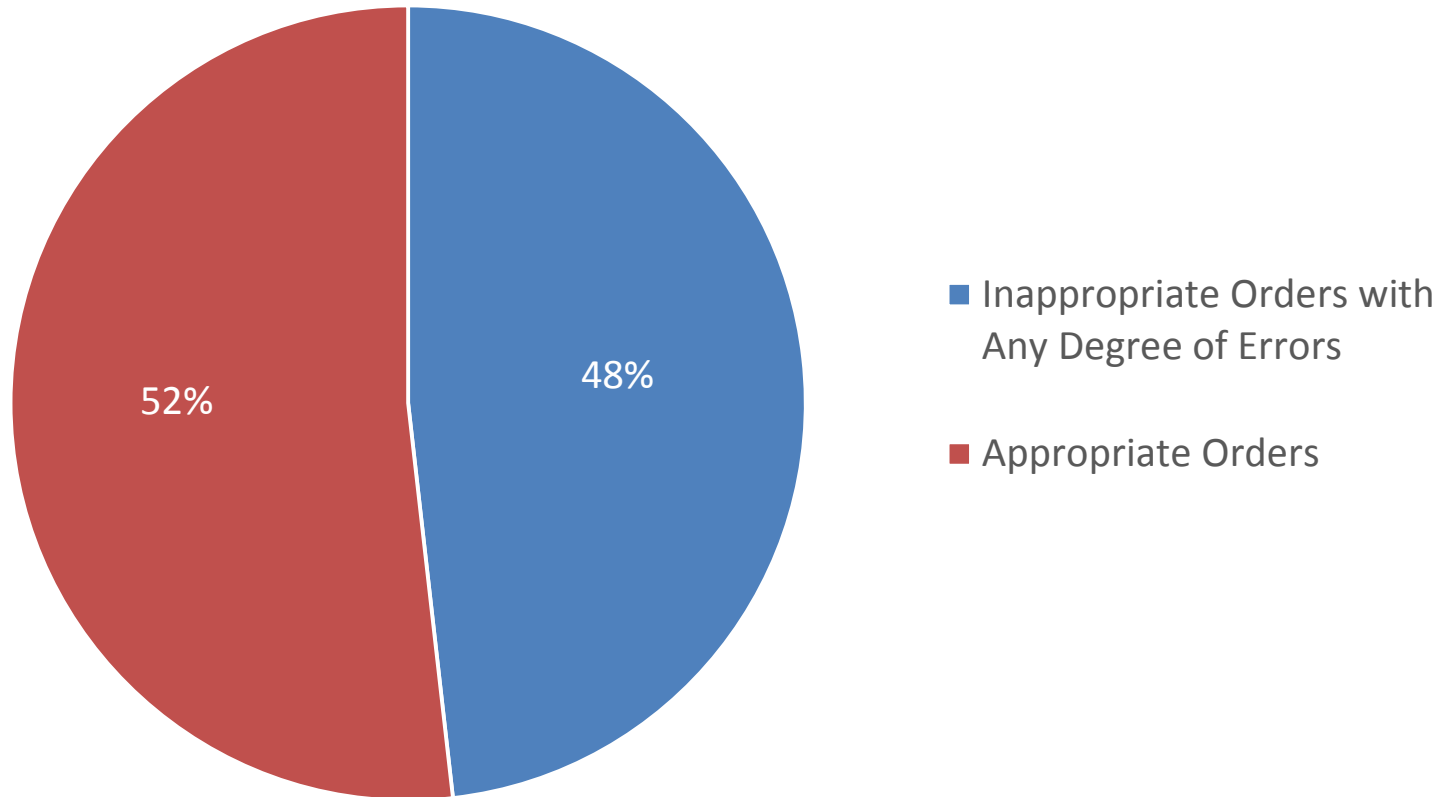
- A recent audit by the Department of Pharmacy from 12/15/15 through 1/15/16 was conducted
- 139 PCA orders reviewed in detail to assess the following:

- Unit location
 - SURG7, ONC6, MS5, MED4, CS2, ICU, OB
- Ordering Service
 - Medicine, Surgery, Heme/Onc, Gyn/Onc, etc.
- Drug
 - hydromorphone 0.2 mg/mL
 - hydromorphone 1 mg/mL
 - morphine 1 mg/mL
 - morphine 5 mg/mL
- Hours each order was active
- Appropriateness of dose and/or frequency
- Basal rate (if any)
- Do not titrate/titrate and appropriateness of such order
- Appropriateness of maximum limit in mg/hr
- Any other errors found within the order

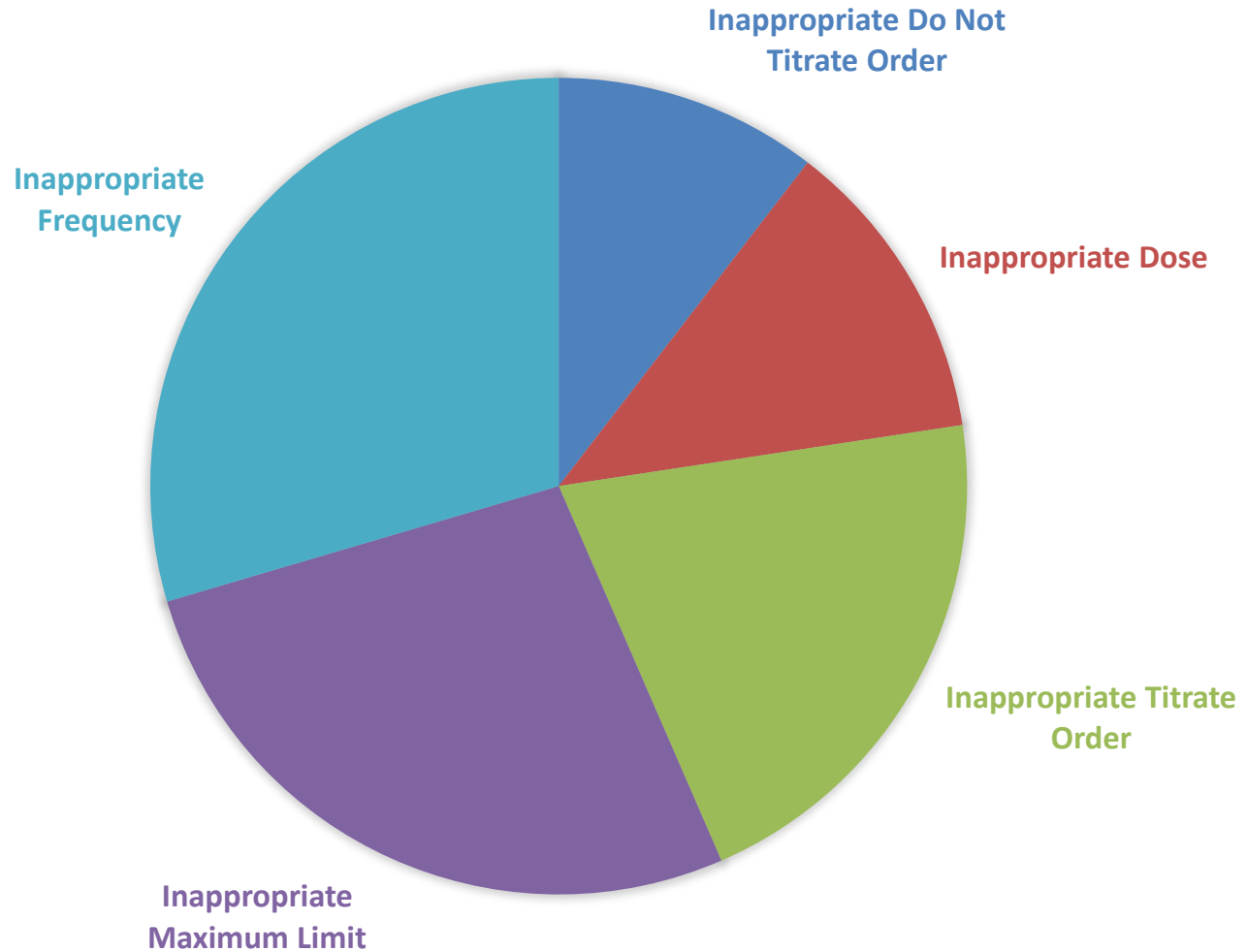
PCA Order Audit

- Joint Commission standards:
 - Standard MM.04.01.01 Medication orders are clear and accurate
 - Standard MM.05.01.01 A pharmacist reviews the appropriateness of all medication orders for medications to be dispensed in the hospital
- Many PCA orders have been found to be out of compliance with the Joint Commission standards mentioned above

All Orders by Overall Appropriateness



PCA ERROR BREAKDOWN



Erroneous PCA Orders

- Most common errors found:
 - Basal rate + patient demand dose + titration dose exceeded the maximum limit of the order
 - Titrate orders missing a pain scale
 - Do not titrate orders which had titrate dose and frequency
 - Orders that instructed to increase for a pain score \geq “X” but no titrate dose or frequency on order
 - Patient demand doses only available q30 minutes or once per hour

Components of an Appropriate PCA Order

Do Not Titrate Orders

- Include the words “Do not titrate”
- Should **NOT** include a titrate dose or frequency
- Should **NOT** include a pain scale

Titratable Orders

- Include a titrate dose and frequency that *make sense*
- **MUST** include a pain scale
- Should **NOT** include comments such as “do not titrate” or “do not titrate yet”

All Orders

- Patient demand dose and frequency that *make sense*
 - Reasonable lockout period between 6-15 minutes
- Maximum limit in mg/hr that appropriately accounts for basal rate, titration dose and frequency, and patient demand doses per hour

How to Appropriately Order a PCA

These PCA orders are not intended for Sickle Cell Patients/Opioid Tolerant

Current Order Sets Pt. Care DX / TX **Med / IV**

Common

- Medications
- IV Fluids

Special

- Build IV
- Irrigation
- Non-Formulary
- Sliding Scale Insulin
- Opioid Analgesics IV & PO
- PCA / Epidural Orders**

Consider using ORDER SETS when entering orders

Search Med / IV

Search! Enter at least 3 characters.

Step 1

Step 2
Choose:
PCA without basal
or PCA with basal
(This is usually not
for patients opioid
tolerant or sickle
cell).

Patient Controlled Analgesia
Pt Controlled Analgesia wBasal
Epidural/Spinal Orders
Regional Block Infusions
EPIDURAL/PCA D/C'd
Epidural Bolus Given
Epidural Supplemental Meds
OBG-L&D Epidural Orders
Sickle Cell Crisis

Common list

How to Appropriately Order a PCA Without Basal

Med / IV

- Patient Controlled Analgesia**
- Pt Controlled Analgesia w/Bas
- Epidural/Spinal Orders
- Regional Block Infusions
- EPIDURAL/PCA D/C'd
- Epidural Bolus Given
- Epidural Supplemental Meds
- OBG-L&D Epidural Orders

Med / IV

Patient Controlled Analgesia

- Pt Controlled Analgesia w/Bas
- Epidural/Spinal Orders
- Regional Block Infusions
- EPIDURAL/PCA D/C'd
- Epidural Bolus Given
- Epidural Supplemental Meds
- OBG-L&D Epidural Orders



Patient Controlled Analgesia

HYDROMorphine is 7 to 10 more potent than Morphine

Infusion Type:

Opioid Naive/Frail Patients

- Morphine PCA 1mg q12min, max 5mg/hr
- Hydromorphone PCA 0.2mg q12min, max 1mg/hr

Opioid Average Patients

- Morphine PCA 1mg q6min, max 10mg/hr
- Hydromorphone PCA 0.2mg q6min, max 2mg/hr

Opioid Tolerant Patients

- Morphine PCA 2mg q6min, max 20mg/hr
- Hydromorphone PCA 0.4mg q6min, max 4mg/hr

fentaNYL low dose PCA can only be infused per policy on ED, ICU and ONC6

- fentaNYL PCA 10mcg Q10min, Max 60mcg/hr

Please order the appropriate medication in the event that there is a delay in initiating the PCA Infusion

- MORPHINE 2 MG IV Unsched PRN Pain Only until PCA establishe*
- HYDROMorphine 0.5 MG IV Unsched PRN Pain Only until PCA estab*
- HYDROMorphine 1 MG IV Unsched PRN Pain Only until PCA estab*
- HYDROMorphine 2 MG IV Unsched PRN Pain Only until PCA estab*
- fentaNYL 25 MCG IV Unsched PRN Pain Only until PCA establis*

- NALOXONE 0.04 MG IV q2min PRN Partial Reversal Difficult to*
- NALOXONE 0.4 MG IV Unsched PRN Full Reversal Unresponsive, *

Choose either morphine or hydromorphone as appropriate based on the patient's past opioid use

How to Appropriately Order a PCA Without Basal

Pain Management Method: **Patient Controlled Analgesia (PCA)**

HYDROMORPHONE 0.2MG/ML NS PCA 4672

Parameters

Patient PCA Dose:	<input type="text" value="0.2"/> mg	Lockout Interval:	<input type="text" value="12"/> min	1 Hr Max Limit:	<input type="text" value="1"/> mg/hr
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Duration: For

Start: at current time
 in AM
 on: at

Additional Directions (Max 90 characters):

OK Cancel Help

How to Appropriately Order a PCA With Basal

Med / IV
Patient Controlled Analgesia
Pt Controlled Analgesia w/Basal
Epidural/Spinal Orders
Regional Block Infusions
EPIDURAL/PCA D/C'd
Epidural Bolus Given
Epidural Supplemental Meds
OBG-L&D Epidural Orders



Pt Controlled Analgesia w/Basa
HYDROmorphine is 7 to 10 times more potent than Morphine

Opioid Naive/Frail Patients
Morphine PCA-Basal 0.5mg-1mg q12min, max 5.5mg/hr
 Hydromorphone PCA-Basal 0.1mg-0.2mg q12min,max 1.1 mg/hr

Opioid Average Patients
Morphine PCA-Basal 1mg-1mg q6min, max 11 mg/hr
 Hydromorphone PCA-Basal-0.2mg-0.2mg q6min,max 2.2mg/hr

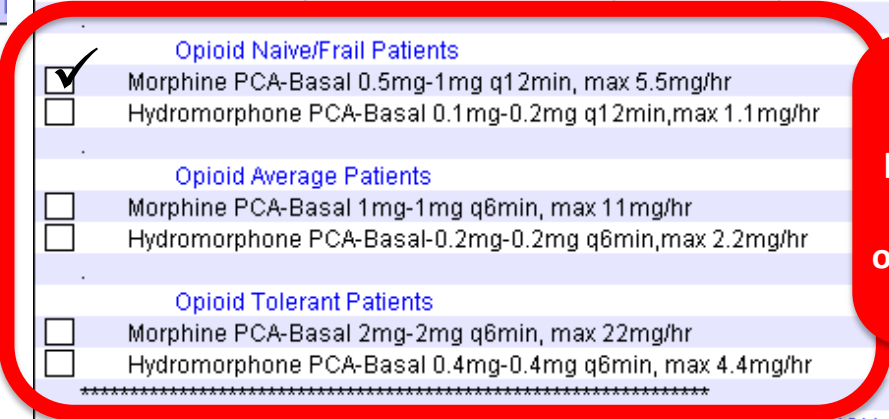
Opioid Tolerant Patients
Morphine PCA-Basal 2mg-2mg q6min, max 22mg/hr
 Hydromorphone PCA-Basal 0.4mg-0.4mg q6min, max 4.4mg/hr

fentaNYL low dose PCA can only be infused per policy on ED, ICU and ONC6
fentaNYL PCA-Basal 10mcg-10mcg Q10m,max 70mcg/hr

Please order the appropriate medication in the event that there is a delay in initiating the PCA Infusion

MORPHINE 2 MG IV Unsched PRN Pain Only until PCA establishe*
 HYDROmorphine 0.5 MG IV Unsched PRN Pain Only until PCA est*
 HYDROmorphine 1 MG IV Unsched PRN Pain Only until PCA estab*
 HYDROmorphine 2 MG IV Unsched PRN Pain Only until PCA estab*
 fentaNYL 25 MCG IV Unsched PRN Pain Only until PCA establis*

NALOXONE 0.04 MG IV q2min PRN Partial Reversal Difficult to*
 NALOXONE 0.4 MG IV Unsched PRN Full Reversal Unresponsive, *



Choose either morphine or hydromorphone as appropriate based on the patient's past opioid use

How to Appropriately Order a PCA With Basal

Pain Management Method: Patient Controlled Analgesia (PCA)

MORPHINE *1MG/1ML* NS PCA 1269

Parameters

Continuous / Basal Rate: 0.5 mg/hr	Patient PCA Dose: 1 mg	Lockout Interval: 12 min	1 Hr Max Limit: 5.5 mg/hr
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Duration: For 7 DAYS

Start: at current time
 in AM
 on: 1/18/2016 at 0922

Additional Directions (Max 90 characters):
DO NOT TITRATE

OK Cancel Help

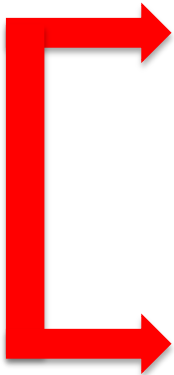
How to Appropriately Order a Do Not Titrate Sickle Cell PCA

The screenshot displays a medical order entry interface with the following components:

- Navigation Tabs:** Current, Order Sets, Pt. Care, DX / TX, Med / IV.
- Common Section:**
 - Medications
 - IV Fluids
- Special Section:**
 - Build IV
 - Irrigation
 - Non-Formulary
 - Sliding Scale Insulin
 - Opioid Analgesics IV & PO
 - PCA / Epidural Orders** (Step 1)
- Search Section:**
 - Search Med / IV
 - Search! button
 - Enter at least 3 characters.
- Search Results List:**
 - Patient Controlled Analgesia
 - Pt Controlled Analgesia w/Basal
 - Epidural/Spinal Orders
 - Regional Block Infusions
 - EPIDURAL/PCA D/C'd
 - Epidural Bolus Given
 - Epidural Supplemental Meds
 - Sickle Cell Crisis** (Step 2)

How to Appropriately Order a Do Not Titrate Sickle Cell PCA

Choose 1



Sickle Cell Crisis

HIGH CONCENTRATION PCA'S W/CONTINUOUS BASAL RATE ALONG WITH CONTINUOUS INFUSIONS

HYDROMORPHONE is 7 to 10 times more potent than Morphine

HYDROMORPHONE
*****HIGH CONCENTRATION PCA 1mg/ml*****
 Hydromorphone 1mg/1ml PCA with Continuous Rate
HIGH CONCENTRATION CONTINUOUS INFUSION...
Note: Order a SEPARATE CONTINUOUS INFUSION of Hydromorphone for the basal infusion IF the FOLLOWING IS EXCEEDED with a PCA syringe:
Basal >20mg/hr OR 1 hr total dose (CI + PCA) >30mg/hr
 Hydromorphone 250MG/250ML D5W X 7 Day

MORPHINE
*****HIGH CONCENTRATION PCA 5mg/ml*****
 Morphine 5mg/1ml PCA with Continuous Rate
HIGH CONCENTRATION CONTINUOUS INFUSION...
Note: Order a SEPARATE CONTINUOUS INFUSION of Morphine for the basal infusion IF the FOLLOWING IS EXCEEDED with a PCA syringe:
Basal >60mg/hr OR 1 hr total dose (CI + PCA) >80mg/hr
 MORPHINE 500 MG/100 ML X 7 Day

fentaNYL
*****HIGH CONCENTRATION PCA 50mcg/ml*****

How to Appropriately Order a Do Not Titrate Sickle Cell PCA

Hydromorphone 1mg/1ml PCA with Continuous Rate

HYDROMORPHONE 1MG/1ML NS PCA

50 ML

Starting Cont Dose: 1 MG/HR

Cont Dose Adjustment Increments: 0 MG every

Patient PCA Dose: 1 MG Lockout Interval: 10MIN

Max Limit: 7 MG/HR


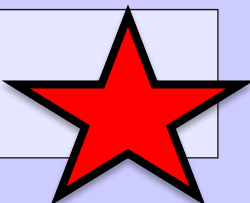
Priority: TITRATE Order Reason: SICKLE CELL CRISIS

Select a Frequency? How often? Once (One Time Order) or q CONT PRN every DAILY

Additional Directions (Max 30 Characters): Do Not Titrate

Do Not Titrate
Increase for Pain Score>3
Increase for Pain Score>4
Increase for Pain Score>5
Increase for Pain Score>6
Increase for Pain Score>7
Increase for Pain Score>8
Increase for Pain Score>9
Decrease for Pain Score<10

Delete



Do **Not** change this field if not want to titrate

How to Appropriately Order a Titratable PCA/Sickle Cell PCA

The screenshot shows a medical order entry interface with the following components:

- Navigation Tabs:** Current, Order Sets, Pt. Care, DX / TX, Med / IV.
- Left Panel (Common):**
 - Medications
 - IV Fluids
 - Special
 - Build IV
 - Irrigation
 - Non-Formulary
 - Sliding Scale Insulin
 - Opioid Analgesics IV & PO
 - PCA / Epidural Orders** (Step 1)
- Search Section:** Search Med / IV, Search! button, Enter at least 3 characters.
- Right Panel (Search Results):**
 - Patient Controlled Analgesia
 - Pt Controlled Analgesia w/Basal
 - Epidural/Spinal Orders
 - Regional Block Infusions
 - EPIDURAL/PCA D/C'd
 - Epidural Bolus Given
 - Epidural Supplemental Meds
 - SBC Lab Epidural Orders
 - Sickle Cell Crisis** (Step 2)

How to Appropriately Order a Titratable PCA

Choose 1

Sickle Cell Crisis

HIGH CONCENTRATION PCA'S W/CONTINUOUS BASAL RATE ALONG WITH CONTINUOUS INFUSIONS

HYDROMORPHONE is 7 to 10 times more potent than Morphine

HYDROMORPHONE

HIGH CONCENTRATION PCA 1mg/ml

Hydromorphone 1mg/1ml PCA with Continuous Rate

HIGH CONCENTRATION CONTINUOUS INFUSION...
Note: Order a SEPARATE CONTINUOUS INFUSION of Hydromorphone for the basal infusion IF the FOLLOWING IS EXCEEDED with a PCA syringe:
Basal >20mg/hr OR 1 hr total dose (CI + PCA) >30mg/hr

Hydromorphone 250MG/250ML D5W X 7 Day

MORPHINE

HIGH CONCENTRATION PCA 5mg/ml

Morphine 5mg/1ml PCA with Continuous Rate

HIGH CONCENTRATION CONTINUOUS INFUSION...
Note: Order a SEPARATE CONTINUOUS INFUSION of Morphine for the basal infusion IF the FOLLOWING IS EXCEEDED with a PCA syringe:
Basal >60mg/hr OR 1 hr total dose (CI + PCA) >80mg/hr

MORPHINE 500 MG/100 ML X 7 Day

fentaNYL

*****HIGH CONCENTRATION PCA 50mcg/ml*****

How to Appropriately Order a Titratable PCA

Hydromorphone 1mg/1ml PCA with Continuous Rate

HYDROMORPHONE 1MG/1ML NS PCA

50 ML

Starting Cont Dose: 1 MG/HR

Cont Dose Adjustment Increments: 1 MG every 1HR

Patient PCA Dose: 1 MG Lockout Interval: 10MIN

Max Limit: 8 MG/HR

Priority: TITRATE

Order Reason: SICKLE CELL CRISIS

Select a Frequency?

How often?

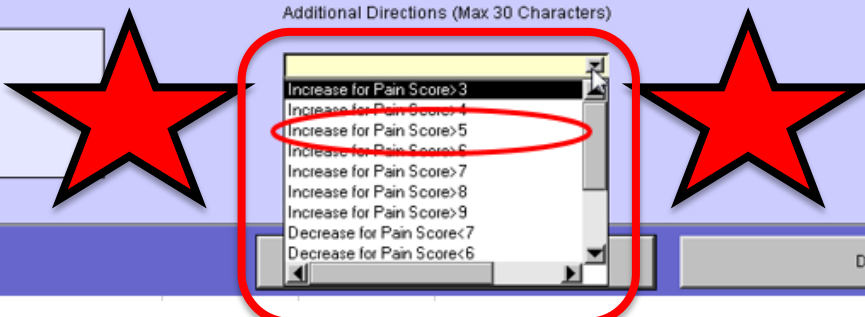
Once (One Time Order)

or q CONT PRN

every DAILY

Additional Directions (Max 30 Characters)

- Increase for Pain Score > 3
- Increase for Pain Score > 4
- Increase for Pain Score > 5
- Increase for Pain Score > 6
- Increase for Pain Score > 7
- Increase for Pain Score > 8
- Increase for Pain Score > 9
- Decrease for Pain Score < 7
- Decrease for Pain Score < 6



How to Appropriately Order a Titratable PCA

- A pain scale MUST be chosen for all PCA orders that have a titrate dose and frequency
 - May choose to titrate up (increasing the dose) or titrate down (decreasing the dose) but cannot do both within the same order
- This is required in order to be compliant with Joint Commission standards that nursing must have explicit directions on when to titrate the medication
- Without a pain scale, a titratable PCA order should be considered incomplete

Example of an Appropriate Titratable PCA Order

Clinician Directions :

START CONT AT 4MG/HR
ADJUST CONT BY 1MG Q2HR
PT DOSE 1.5MG LOCKOUT 15MIN
MAX LIMIT 12MG/HR
INCREASE FOR PAIN SCORE>9
RPH TO HAND DELIVER TO RN

- ✓ Basal rate
- ✓ Titration dose and frequency are appropriate
- ✓ Patient demand dose and frequency are appropriate
- ✓ Order has clear directions to titrate dependent on pain scale
- ✓ Maximum limit makes sense when accounting for basal + patient demand doses + titrations

Remember...

48% of PCA orders had errors

Let's look at some examples of inappropriate PCA orders



<http://content.mycutegraphics.com/graphics/detective/boy-detective-with-magnifying-glass.png>

Clinician Directions :

START CONT AT 4MG/HR

ADJUST CONT BY 1MG Q15MIN

PT DOSE 1MG LOCKOUT 1HR

MAX LIMIT 8MG/HR

NONE

Can you spot the error(s)?

Clinician Directions :

START CONT AT 4MG/HR

ADJUST CONT BY 1MG Q15MIN

PT DOSE 1MG LOCKOUT 1HR

MAX LIMIT 8MG/HR

NONE

- **Titrating every 15 minutes?**
 - **PCA would go from 4 mg/hr → 8 mg/hr in ONE hour ... doubling the dose!**
- **What pain scale is being used to titrate?**
- **Patient can only demand a dose once per hour? Is this truly a PCA?**
- **Basal dose + patient demand dose + titrating dose exceeds 8 mg/hr max limit on order**
- **What does none mean?**

START CONT AT 0MG/HR

PT DOSE 0.5MG LOCKOUT 0.6 MTS
MAX LIMIT 5MG/HR
INCREASE FOR PAIN SCORE>4
RPH TO HAND DELIVER TO RN

- What frequency is MTS? Patient can demand dose every 0.6 minutes?
- Max dose cannot be calculated
- Increase for PS>4 but no titrating dose or frequency in order

START CONT AT 1MG/HR

ADJUST CONT BY 0.5MG Q2HR
PT DOSE 0.5MG LOCKOUT 30MIN
MAX LIMIT 2MG/HR

DONT TITRATE YET

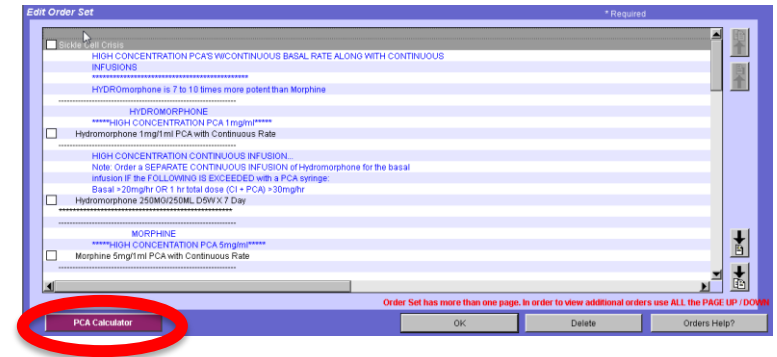
- Titration dose and frequency listed but no pain scale on order
- Patient demand dose every 30 minutes may be too long without breakthrough availability, could have done smaller dose (0.25mg) more frequently (q15min)
- Basal dose + patient demand dose + titrating dose exceeds maximum limit on order
- "Don't titrate yet" but the order clearly has a titrating dose and frequency

START CONT AT 0MG/HR

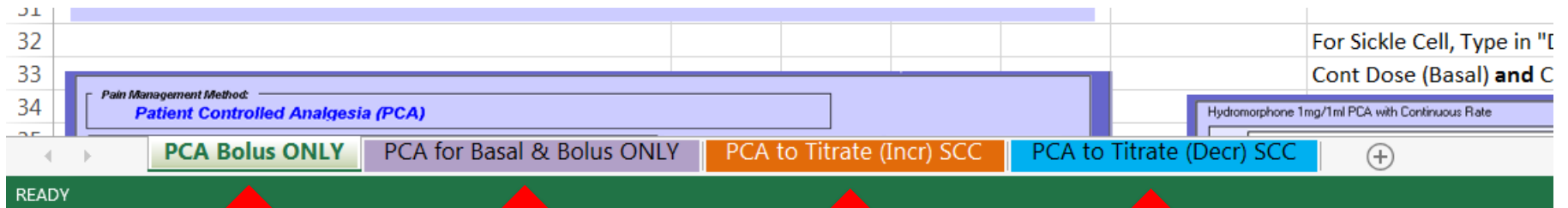
PT DOSE 3.5MG LOCKOUT 15MIN
MAX LIMIT 14MG/HR
INCREASE FOR PAIN SCORE>3
IGNORE ABOVE DIRECTIONS



PCA Calculator



Step 1: At the bottom of the calculator (excel file), choose the tab that represents the PCA order type



Do not titrate orders

Titrate Orders

PCA Calculator

Step 2: Input desired values into the appropriate yellow fields

THIS CALCULATOR IS ONLY FOR A PCA (HIGH DOSE) WITH BASAL & BOLUS & TITRATE ORDERS ONLY

PLEASE click on the appropriate tab at the bottom if you require a different PCA order

This calculator is to assist with determining the absolute maximum limit in a 24 hour time period. The maximum limit can be adjusted based on provider discretion and patient response.

INCREASE TITRATE ORDERS

PCA Calculator for Basal & Titrate (INCREASE) & Bolus

Rate (Basal Dose)		mg/hr
Cont Dose Adjustment Increments* <<Titrate>>		mg
Cont Dose Adjustment Increment Interval* <<Titrate>>		minutes
PCA Dose (Bolus Dose)		mg
PCA Lockout Interval		minutes

{make sure this is in minutes}

Fill in the yellow areas to calculate

Below are dose titrations up

Min Limit **This is the dose needed if titrate at least once**	#DIV/0!	mg/hr
Max Increase Limit **Anticipate 2 titrations up/24hrs**	#DIV/0!	mg/hr
Max Increase Limit **Anticipate 3 titrations up/24hrs**	#DIV/0!	mg/hr
Max Increase Limit **Anticipate 4 titrations up/24hrs**	#DIV/0!	mg/hr
Max Increase Limit **Anticipate 5 titrations up/24hrs**	#DIV/0!	mg/hr
Max Increase Limit **Anticipate 6 titrations up/24hrs**	#DIV/0!	mg/hr
Max Increase Limit **Anticipate 7 titrations up/24hrs**	#DIV/0!	mg/hr
Max Increase Limit **Anticipate 8 titrations up/24hrs**	#DIV/0!	mg/hr

Pick the Appropriate Max Limit dependent upon how many anticipated PCA increases in a 24 hour period. The order in CPOE should reflect at least the value in green to ensure the patient is able to obtain the Basal AND PCA Doses for a 60 minute time period AND

*Order **MUST** have a pain scale for increase per policy. If no dose adjustment, consult the tab for PCA for Basal & Bolus ONLY below.

PCA Calculator

Step 2 Example: Input desired values into the appropriate yellow fields

Clinician Directions :

START CONT AT 4MG/HR
 ADJUST CONT BY 1MG Q2HR
 PT DOSE 1.5MG LOCKOUT 15MIN
 MAX LIMIT 12MG/HR
 INCREASE FOR PAIN SCORE>9
 RPH TO HAND DELIVER TO RN

PCA Calculator for E		
Rate (Basal Dose)		4 mg/hr
Cont Dose Adjustment Increments*	<<Titrate>>	1 mg
Cont Dose Adjustment Increment Interval* <<Titrate>>		120 minutes
PCA Dose (Bolus Dose)		1.5 mg
PCA Lockout Interval		15 minutes
Below are dose titrations up		
Min Limit **This is the dose needed if titrated at least once**		11 mg/hr
Max Increase Limit **Anticipate 2 titrations up/24hrs**		12 mg/hr
Max Increase Limit **Anticipate 3 titrations up/24hrs**		13 mg/hr
Max Increase Limit **Anticipate 4 titrations up/24hrs**		14 mg/hr
Max Increase Limit **Anticipate 5 titrations up/24hrs**		15 mg/hr
Max Increase Limit **Anticipate 6 titrations up/24hrs**		16 mg/hr
Max Increase Limit **Anticipate 7 titrations up/24hrs**		17 mg/hr
Max Increase Limit **Anticipate 8 titrations up/24hrs**		18 mg/hr

PCA Calculator

Step 3: Ensure that the maximum limit on the order is **AT LEAST** the value found in the field highlighted in green. This limit may be greater depending on the provider's anticipated titrations.

PCA Calculator for Basal & Titrate (INCREASE) & Bolus		
Rate (Basal Dose)	4 mg/hr	
Cont Dose Adjustment Increments* <<Titrate>>	1 mg	
Cont Dose Adjustment Increment Interval* <<Titrate>>	120 minutes	{make sure this is in minutes}
PCA Dose (Bolus Dose)	1.5 mg	
PCA Lockout Interval	15 minutes	

Below are dose titrations up		
Min Limit **This is the dose needed if titrate at least once**	11 mg/hr	
Max Increase Limit **Anticipate 2 titrations up/24hrs**	12 mg/hr	
Max Increase Limit **Anticipate 3 titrations up/24hrs**	13 mg/hr	
Max Increase Limit **Anticipate 4 titrations up/24hrs**	14 mg/hr	
Max Increase Limit **Anticipate 5 titrations up/24hrs**	15 mg/hr	
Max Increase Limit **Anticipate 6 titrations up/24hrs**	16 mg/hr	
Max Increase Limit **Anticipate 7 titrations up/24hrs**	17 mg/hr	
Max Increase Limit **Anticipate 8 titrations up/24hrs**	18 mg/hr	

Fill in the yellow areas to calculate

Pick the Appropriate Max Limit dependent upon how many anticipated PCA increases in a 24 hour period. The order in CPOE should reflect at least the value in green to ensure the patient is able to obtain the Basal AND PCA Doses for a 60 minute time period AND

For any further questions on the material presented in these slides or on the general ordering and validation of a PCA order, please contact:

Ruth LaCasse Kalish, RPh, BCPP
Investigational Drug Study and
Medication Safety Pharmacist

or

Refer to PCA protocols & procedures found on the UConn Health Department of Nursing Website

thank you!

http://1.bp.blogspot.com/-Ik3Lp_pbvwk/VKQySKTnvcI/AAAAAAAAAAOw/TqxUpq287FM/s1600/thankyou.png