# Prescribing for Syringe Pumps: top tips for getting it right.

Dr Sarah Human, Consultant in Palliative Medicine, Rowcroft Hospice.

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McKinley T34 Syringe Pump
CME McKinley
1. Press and Hold key until START UP screens appear
2. Wait until Pre-Loading has finished (actuator stops moving)
3. Load Syringe-position correctly so all sensors stop flashing
4. Confirm syringe size & brand
5. Press for New Syringe or to Resume current program
NOTE:-Steps 6-8 are skipped if a pre-set duration is locked in.
Whilst delivering shows infusion data & battery life.
6. Confirm volume to be infused or Change
7. Confirm infusion duration or Change
8. Confirm calculated rate or Change
9. ALWAYS check data on the summary screen matches prescription before pressing key to confirm acceptance
10. Press key to start infusion
INFO
YES START
NO STOP
FF
BACK
ON/OFF

# Prescribing for Syringe Pumps

- **When** to prescribe
- **What** to prescribe
- **How** to prescribe
- A case study
- Useful resources
- Questions

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A syringe pump is for……
not just for dying

# Indications for Syringe Pumps

1. Altered level of consciousness in a dying patient
2. Persistent nausea and vomiting e.g., in bowel obstruction
3. Impaired swallow
4. Poor compliance with oral medication
5. Poor absorption of oral drugs (rare)
6. Patient preference

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# Indications for Syringe Pumps

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6. Patient preference

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The syringe pump is simply another method of administration of medication for patients who are symptomatic

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# The weighing up……

| Advantages | Disadvantages |
| --- | --- |
| Round the clock delivery of medication | Initial cost and training |
| Reduces need for repeated injections | Inflammation/pain at infusion site |
| Once daily change of pump | Compatibility of drugs problems |
| Control of multiple symptoms | Once daily change of pump |
| More independence – can be worn in a holster | Patients/families can find daily visit intrusive |
| Patients/families can find daily visit reassuring | |

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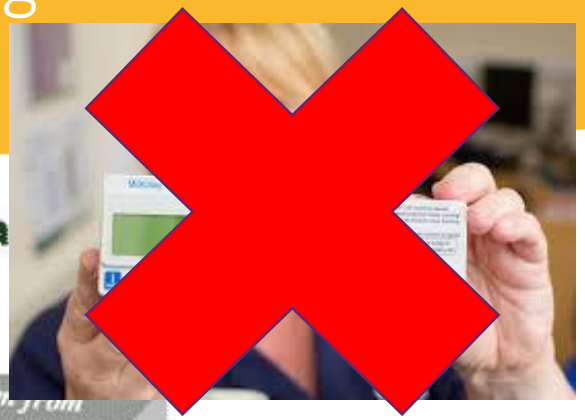
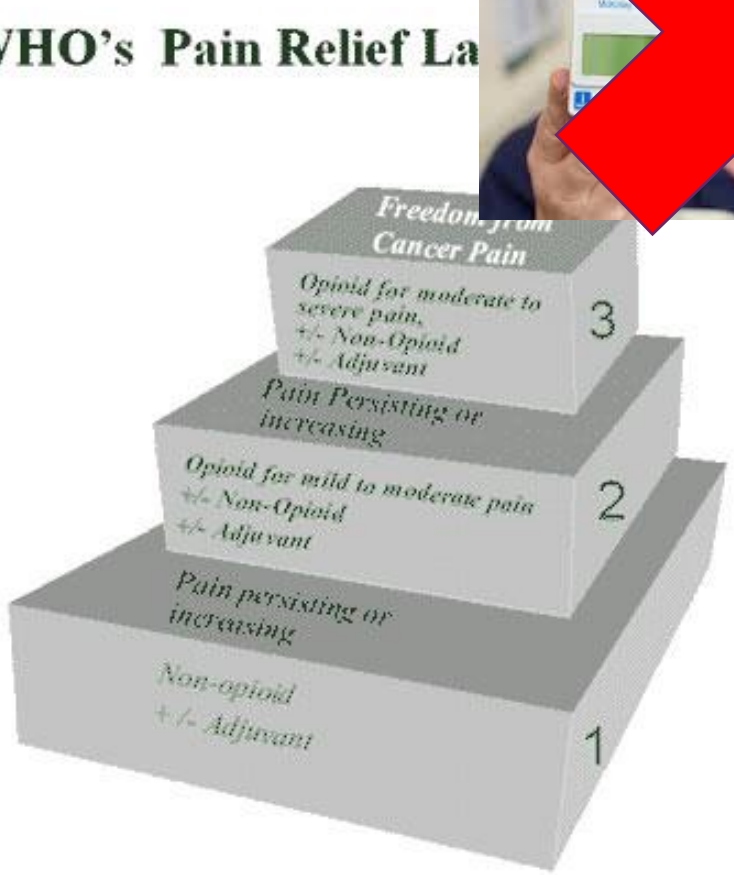
# Analgesic Prescribing



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STANLEY
SUPER GLUE
wilko
5m/16'

# Syringe pump medications

For the continuous subcutaneous infusion (pump) **only** prescribe drugs that are clinically indicated at the time

**Analgesic**

**Antiemetic(s)**

**Antispasmodic**

**Antisecretory**

**Anxiolytic (sedative)**

**Plus diluent**

**All** of these should be prescribed on the **PRN section** of the prescription chart in anticipation of use

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NHS
Torbay and South Devon
NHS Foundation Trust

# PRESCRIBER MUST COMPLETE PARTS 1 & 2 OF THIS FORM

DURING COVID PANDEMIC 2020 TRANSFER OF THIS PMAR IS TO TAKE PLACE ELECTRONICALLY FROM GENERAL PRACTICE TO THE LOCALITY COMMUNITY NURSING TEAM

| Patient Name | | Date of Birth | | GP | |
|---|---|---|---|---|---|
| NHS /Unique Identification number | | Allergies | | | |

## Part 1: COMMUNITY PRESCRIPTION FOR CONTINUOUS SUBCUTANEOUS SYRINGE PUMP INFUSIONS

For prescribing guidance see overleaf

| DATE/TIME | Generic NAME of DRUG and DILUENT<br>Blank rows are provided for prescribing of drugs not listed | 24 HOUR DOSE mg/24hrs<br>Consider prescribing dose ranges | PRESCRIBER NAME & SIGNATURE (IN FULL) |
|---|---|---|---|
| | MORPHINE sulfate- max of 30mg/ml due to solubility | | |
| | Metoclopramide Hydrochloride | | |
| | Levomepromazine | | |
| | Midazolam | | |
| | Hyoscine BUTYLbromide | | |
| | Hyoscine HYDRObromide | | |
| | Haloperidol | | |
| | Water for injection | | |
| | | | |
| | | | |

## Part 2: PRESCRIPTION FOR AS REQUIRED (PRN) DOSES

| DATE/TIME | GENERIC NAME OF MEDICATION & ANY DILUENT | DOSE<br>Consider prescribing dose ranges | FREQUENCY | ROUTE | PRESCRIBER NAME & SIGNATURE IN FULL |
|---|---|---|---|---|---|
| | MORPHINE sulfate | | | | |
| | Metoclopramide Hydrochloride | | | | |
| | Levomepromazine | | | | |
| | Midazolam | | | | |
| | Hyoscine BUTYLbromide | | | | |
| | Hyoscine HYDRObromide | | | | |
| | Haloperidol | | | | |
| | | | | | |
| | | | | | |

For prescribing guidance see overleaf

# Anticipatory syringe pumps? To do or not to do…

| RISKS | BENEFITS |
| --- | --- |
| A lack of individualisation | Patient circumstances are foreseeable and unambiguous even for those without specialist experience |
| No anticipation of dose/drug changes between prescribing and initiation | Medication choices and doses are unlikely to change |
| Administration errors | Initiation of the syringe pump is overseen and followed by a timely review by a skilled clinician |

Ben Bowers et al

*BMJ Supportive and Palliative Care* 2021; **0** ; 1-2

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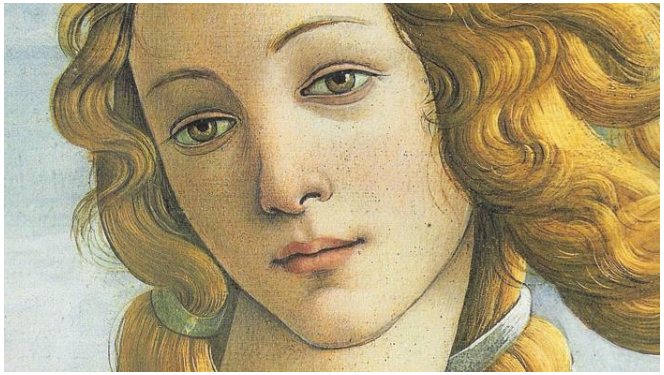

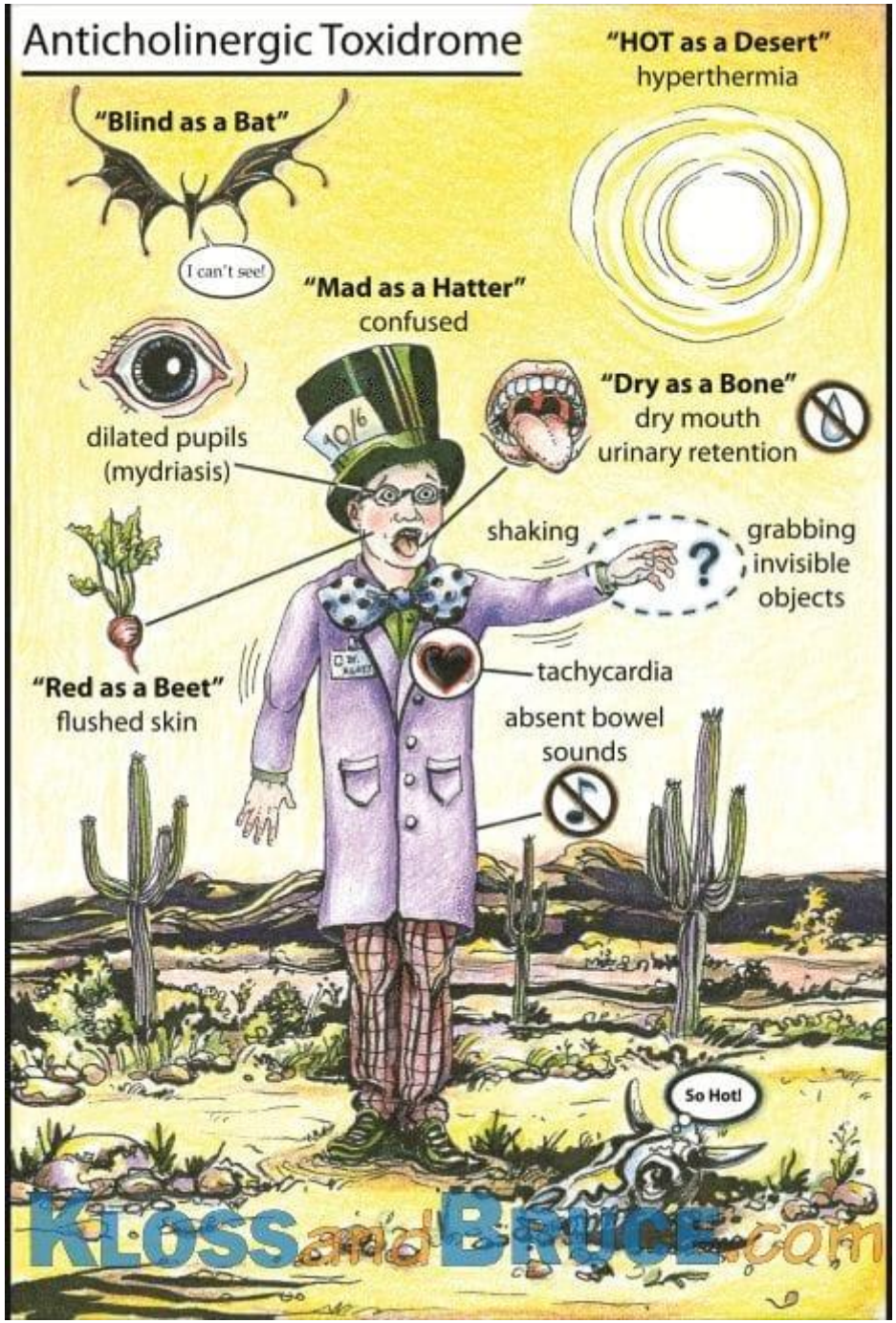
Anticholinergic Toxidrome
"HOT as a Desert"
hyperthermia
"Blind as a Bat"
I can't see!
"Mad as a Hatter"
confused
dilated pupils
(mydriasis)
"Dry as a Bone"
dry mouth
urinary retention
shaking
grabbing
invisible
objects
"Red as a Beet"
flushed skin
tachycardia
absent bowel
sounds
So Hot!
KLOSS and BRUCE.com


1000 ml
PYREX
125 ml
PYREX
Made in Germany
No. 4980
STOPPER No. 5
250 mL
PYREX
500 mL
PYREX
50 mL
PYREX

# Antisecretory Medications

Pooling of fluid in hypopharynx

Affects about 50% patients

Non-drug measures important

- Reassure family
- Positioning of patient

Occasionally suction

**Anticholinergic drugs**

- Successful in approx 50%
- Give early
- Hyoscine hydrobromide (sedating)
- Hyoscine butylbromide (buscopan)

or glycopyronium (both non-sedating)

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# Antispasmodic Medications

Anticholinergic drugs

- Hyoscine butylbromide (buscopan), hyoscine hydrobromide, glycopyrronium
- Smooth muscle spasm
  - Intestinal colic
  - Bladder spasm
- Sedating vs non-sedating
- Dosing
  - Buscopan 20mg stat, 60-120mg/24hrs in pump
  - Hyoscine hydrobromide 0.4mg stat, 1.2 - 2.4mg/24hrs max in pump

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# What about opioid transdermal patches?


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# What about prescribing in renal failure?

https://rowcrofthospice.org.uk/wp-content/uploads/Prescribing-at-the-End-of-Life-for-Patients-with-Renal-Impairment-G1612-04.09.2020.pdf

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# And some other scenarios…….

- Managing people with Diabetes

https://rowcrofthospice.org.uk/wp-content/uploads/RH-diabetic-guidelines-jul2013_2-1.pdf

- Managing people with Parkinson's

https://rowcrofthospice.org.uk/wp-content/uploads/End-of-Life-Care-in-Parkinsons-Disease.pdf

- Managing seizures

https://rowcrofthospice.org.uk/wp-content/uploads/Guidance-for-administration-of-Levetiracetam-via-continuous-subcutaneous-infusion-in-the-community-setting.pdf

- What about steroids?

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# For interest

Other drugs that can be used in syringe pumps

- Diclofenac
- Octreotide
- Esomeprazole
- Furosemide
- Levetiracetam
- Ketamine

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# Troubleshooting

- Infusion site problems – may need to add a small dose of dexamethasone (0.1mls of 3.8mg/ml or 3.3mg/ml) to the continuous subcutaneous infusion
- Drug compatibility – mixing drugs
- Dose conversions when changing route of medication

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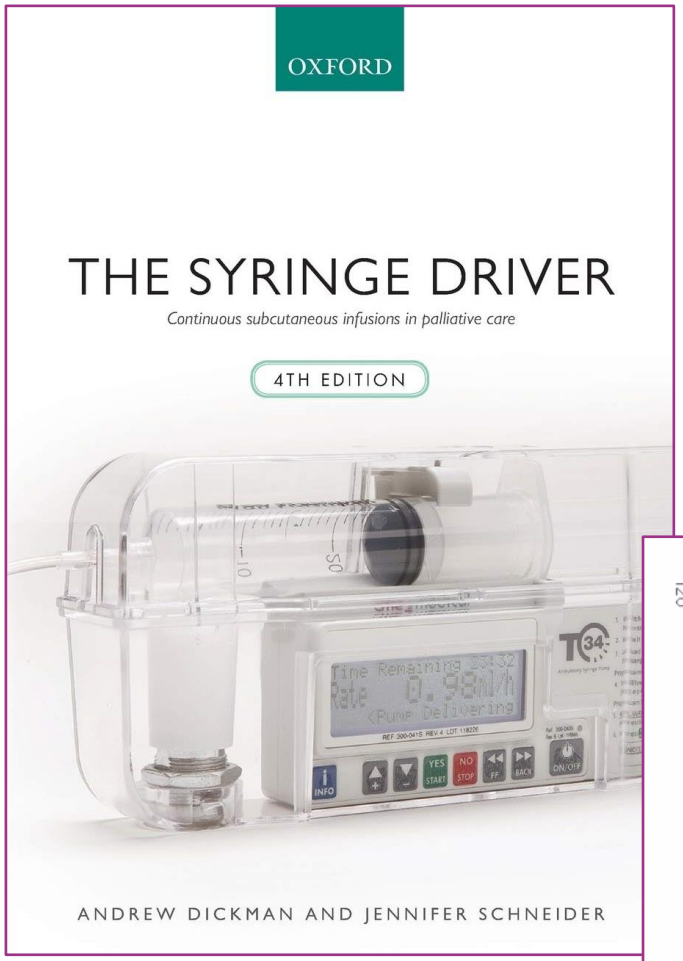




**Table X:** Compatibility Chart for Two Drugs in Water for Injections

- **Incompatible - DO NOT USE**
- **Caution** - some reports of incompatibility
- **Caution** - Some reports of incompatibility at doses outside those commonly use in palliative care
- **Compatible**
- **Combination not advised clinically**
- ? **No published data available**

| | Cyclizine | Glycopyrronium | Haloperidol | Hyoscine HBr | Hyoscine BBr | Levomepromazine | Metoclopromide | Midazolam |
|---|---|---|---|---|---|---|---|---|
| Glycopyrronium | ? | | | | | | | |
| Haloperidol | | | | | | | | |
| Hyoscine hydrobromide | | | | | | | | |
| Hyoscine butylbromide | | | | | | | | |
| Levomepromazine | | | | | | | | |
| Metoclopromide | | | | | | | | |
| Midazolam | | | | | | | | |
| Morphine/Diamorphine | | | | | | | | |
| Oxycodone | | | | | | | | |



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# How to prescribe Syringe Pumps

- Use available guidance for prescribing – or phone a friend!
- Send prescription to pharmacy and arrange collection
- Ensure PMAR sent (some areas can be electronic to DN team)
- Liaise DN team and co-ordination of set-up
- Ensure  patient and family aware of prescribing and rational, talk about what to expect
- Check TEP/Palliative Care Register up to date
- Ensure clinical follow up planned

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# Communication

- Patient (if possible)
- Family/carers
- Healthcare professionals – robust

communication between daytime

and out of hours services

- Ensure plans in place for regular reviews

clarity of roles and responsibilities

- Clarify who the patient/family should call if there are any problems
- Ensure these plans are clearly documented and that you have given this information

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# PRESCRIBING IN PALLIATIVE CARE: A GUIDE TO EQUIVALENT DOSES FOR OPIOID DRUGS

This is to be used as **a guide** rather than a set of definitive equivalences. It is crucial to appreciate that conversion ratios are never more than an approximate guide (comprehensive data are lacking, inter-individual variation). The advice is always to calculate doses using morphine as standard and to adjust them to suit the patient and the situation. Some of these doses have by necessity been rounded up or down to fit in with the preparations available, including adjustment of doses for liquid and injectable medications in order to optimise ability to dispense accurately.

**PLEASE SEEK SPECIALIST ADVICE IF YOU ARE UNCERTAIN ABOUT WHAT TO PRESCRIBE AND/OR PATIENT NEEDING ESCALATNG OPIOID DOSES**

| Oral Morphine | | | Subcutaneous Morphine | | Subcutaneous Diamorphine | | Oral Oxycodone | | | Subcutaneous Oxycodone | | Approximate TD Fentanyl patch micrograms/hr | Subcutaneous Alfentanil | | Subcutaneous Fentanyl | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 hr dose (mg) | 12hr SR dose (mg) | 24hr Total dose (mg) | 4 hr dose (mg) | 24 hr total dose (mg) | 4 hr dose (mg) | 24 hr total dose (mg) | 4hr dose (mg) | 12hr SR dose (mg) | 24hr total dose (mg) | 4 hr dose (mg) | 24 hr total dose (mg) | Please see additional chart below for dose conversion ranges | 4 hr dose (mg) | 24hr total dose (mg) | 4 hr dose (mcg) | 24hr total dose (mcg) |
| 5 | 15 | 30 | 2.5 | 15 | 1 | 10 | 2.5 | 7.5 | 15 | 1 | 7.5 | 12mcg | 0.1 | 1 | 25 | 200-250 |
| 10 | 30 | 60 | 5 | 30 | 2.5-5 | 20 | 5 | 15 | 30 | 2.5 | 15 | 25mcg | 0.2 | 2 | 50 | 400-500 |
| 15 | 45 | 90 | 7.5 | 45 | 5 | 30 | 7.5 | 25 | 50 | 4 | 25 | 25-37mcg | 0.5 | 3 | 100 | 600-750 |
| 20 | 60 | 120 | 10 | 60 | 7.5 | 40 | 10 | 30 | 60 | 5 | 30 | 37-50mcg | 0.7 | 4 | Syringe pump volume issues likely above 500mcg/24hours because fentanyl injection available as 50micrograms/ml | |
| 30 | 90 | 180 | 15 | 90 | 10 | 60 | 15 | 45 | 90 | 7.5 | 45 | 50-75mcg | 1 | 6 | | |
| 40 | 120 | 240 | 20 | 120 | 12.5 | 80 | 20 | 60 | 120 | 10 | 60 | 75-100mcg | 1 | 8 | | |
| 50 | 150 | 300 | 25 | 150 | 15 | 100 | 25 | 75 | 150 | 12.5 | 75 | 100-150mcg | 1.5 | 10 | | |
| 60 | 180 | 360 | 30 | 180 | 20 | 120 | 30 | 90 | 180 | 15 | 90 | 100-150mcg | 2 | 12 | | |
| 70 | 210 | 420 | 35 | 210 | 25 | 140 | 35 | 105 | 210 | 17.5 | 100 | 125-175mcg | 2.5 | 14 | | |
| 80 | 240 | 480 | 40 | 240 | 27.5 | 160 | 40 | 120 | 240 | 20 | 120 | 125-200mcg | 2.5 | 16 | | |

- Two thirds of palliative care patients need <180mg/24hrs of oral morphine
- The dose conversion ratio of morphine to oxycodone is approximately 1.5-2:1.For the purposes of this guidance we have adopted a 2:1 ratio
- The dose conversion ratio of SC diamorphine: SC alfentanil is from 6-10:1. It is prudent to use the more conservative ratio when switching from one to the other e.g. if switching from diamorphine to alfentanil, use dose conversion ratio 10:1 so that 10mg diamorphine = 1mg alfentanil. If switching from alfentanil to diamorphine use dose conversion ratio 6:1 so that 1mg alfentanil = 6mg diamorphine.
- The dose conversion ratio of SC Alfentanil: SC fentanyl is approximately 4-5:1

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# TRANSDERMAL (TD) OPIOID PATCHES

| Fentanyl TD patch micrograms/hr | Approximate oral Morphine mg/24hours |
|---|---|
| 12 | 30-45 |
| 25 | 60-90 |
| 37 | 90-135 |
| 50 | 120-180 |
| 62 | 150-225 |
| 75 | 180-270 |
| 100 | 240-360 |
| 125 | 300-450 |
| 150 | 360-540 |
| 175 | 420-630 |
| 200 | 480-720 |

| Buprenorphine TD micrograms/hr | Approximate oral Morphine mg/24hrs |
|---|---|
| 5 | 10-20 |
| 10 | 20-30 |
| 15 | 30-40 |
| 20 | 40-50 |
| 35.5 | 80-90 |
| 52.5 | 120-130 |
| 70 | 160-180 |
| Maximum authorised dose is two 70micrograms/hr patches | |

- A PO morphine:transdermal fentanyl dose conversion ratio of 100-150:1 is used (PCF6 & BNF 100:1, Public Health Education Opioids Aware Resource 150:1) resulting in a dose range of oral morphine per patch strength e.g. Fentanyl TD 25mcg/hr patch approximately= 60-90mg oral morphine/24hrs
- It is suggested that for conversions from oral morphine to fentanyl patches, the lower doses of fentanyl should be used for patients who have been on oral opioids for just weeks and the higher doses for people who have been on a stable and well tolerated oral opioid regimen for a longer period.
- Transdermal fentanyl patches are changed every 3 days (72 hours)
- A PO morphine: transdermal buprenorphine dose conversion of 100:1 is used (PCF6)
- A variety of transdermal buprenorphine patches are available, changed either every 3, 4 days or 7 days. Check carefully before prescribing & instructing the patient.

**Resources:** Palliative Care Formulary 6th Edition (PCF6)
BNF
UK Medicines Information: How should conversion from oral morphine to fentanyl patches be carried out?
https://www.sps.nhs.uk/wp-content/uploads/2017/12/UKMI_QA_Conversion-from-oral-morphine-to-fentanyl-patches_November-2017_Final.docx.
Updated November 2018 / Review November 2021
Dr Sarah Human, Dr Jo Sykes and Dr George Walker, Consultants in Palliative Medicine, Rowcroft Hospice, South Devon in collaboration with Hospiscare, Exeter, St Luke's Hospice, Plymouth and North Devon Hospice, Barnstaple.

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**TORBAY & SOUTH DEVON SPECIALIST PALLIATIVE CARE SERVICE**
**INSTRUCTIONS FOR USE OF SUBCUTANEOUS SYRINGE PUMPS**

Indications for using a subcutaneous syringe pump [SCSP]:
1. Altered level of consciousness in a dying patient
2. Persistent nausea and vomiting e.g. in bowel obstruction
3. Inability to swallow
4. Poor compliance with oral medication

The syringe pump is simply another method of administration of medication for patients who are symptomatic.

### *ANALGESICS*

**Morphine – dose per 24 hours:** no ceiling dose but:
1. Start at 10-15mg/24 hours in opioid naïve patients (less in very elderly/frail)
2. See conversion table for calculating doses, changing from oral to SCSP use and using other opioids. See conversion table for calculating doses, changing from oral to SCSP use and using other opioids e.g. converting the total daily dose of oral morphine to the total daily dose of subcutaneous morphine by dividing by 2, e.g. MST 60mg bd=120mg/day =morphine 60mg/24 hours by SCSP.
3. **Caution:** in patients with **significant renal impairment (suspected eGFR <30)** aim to avoid morphine because of significant risk of opioid accumulation/toxicity. Alternative opioids such as oxycodone/fentanyl/alfentanil may be more appropriate. Please seek advice from Specialist Palliative Care team (see guidance on prescribing at end of life in renal failure)
4. **Patches** - Transdermal opioid patches should not be started in the terminal stage since it takes too long to titrate against a patient's pain. If the patient is already established on a patch it may be appropriate to continue with it and add in additional medications via the SCSP.

### *ANTIEMETICS*

1. **Metoclopramide** useful for gastric stasis and upper gastrointestinal obstruction. Avoid in patients with colic. Non-sedating.
**Dose per 24 hours:** 30-60mg *(BNF dose range is 30-100mg/24h)*
**Dose per prn injection:** 10mg 6-8 hourly
2. **Haloperidol** useful in chemically induced vomiting (e.g. hypercalcaemia, renal failure), and/or in patients with psychotic features. Sedating at higher doses. Use lower dose in the elderly.
**Dose per 24 hours:** 2.5-5mg (up to 10mg if being used for sedation as well)
**Dose per prn injection:** 1-3mg od-bd
3. **Levomepromazine** good antiemetic especially with co-existing anxiety, very sedating at higher doses.
**Dose per 24 hours:** 6.25-25mg *(BNF dose range 5-25mg/24h)*
**Dose per prn injection:** 6.25mg 6-8 hourly
4. **Cyclizine** relatively non-sedating, useful in mechanical bowel obstruction or raised intracranial pressure, but precipitates out when mixed with Hyoscine Butylbromide.
**Dose per 24 hours:** 50-150mg **Dose per prn injection:** 50mg 8 hourly (max. 150mg/24hours)

### *ANTISPASMODICS*

**Hyoscine butylbromide (Buscopan)**
**Dose per 24 hrs:** 60-120mg *(BNF dose range 60-300mg/24h)*
**Dose per PRN injection** 20mg 4 hourly

### *SEDATIVES*

1. **Midazolam** useful for anxiety, breathlessness, restlessness and muscle stiffness in terminal phase. Also used as an anticonvulsant.
**Dose per 24 hours:** 10-60mg. Higher doses occasionally required. *(BNF start 10-20mg/24h usual dose 20-60mg/24h)*
**Dose per prn injection:** 2.5-10mg 4 hourly
**Caution:** respiratory depression is more likely when midazolam is given parenterally with morphine.

2. **Levomepromazine** useful as sedative but can lower fitting threshold
**Dose per 24 hours:** 12.5-50mg (higher doses occasionally required)
**Dose per prn injection:** 12.5-25mg 4 hourly

### *TERMINAL SECRETIONS*

1. **Hyoscine butylbromide (Buscopan)** useful in respiratory secretions **when sedation not desired**
**Dose per 24 hours:** 60-120mg *(BNF dose range 20-120mg/24h)*
**Dose per prn injection:** 20mg 4 hourly
Suitable for use if suspected eGFR <30
2. **Hyoscine hydrobromide** useful in terminal stages **when sedation required** but can cause paradoxical agitation; usually given with a sedative, e.g. Levomepromazine or Midazolam. **Caution: avoid if suspected eGFR <30.**
**Dose per 24 hours:** 1.2-2.4mg *(BNF dose range 1.2-2mg/24h)*
**Dose per prn injection:** 0.4-0.6mg 4 hourly (max. 2.4mg/24 hours)

**AS REQUIRED (PRN) DOSES MUST BE PRESCRIBED**

- Always ensure that adequate prn doses are clearly written on the syringe pump prescription sheet so that any trained healthcare professional visiting the home who does not know the patient can give extra medication when indicated. These prn medications are not the same as Just In Case Bag (JICB) medication.
- JICB medication should be prescribed when a clinical deterioration is anticipated but the patient does not yet need a syringe pump for current symptom control.
- A syringe pump should be started when clinically indicated and should not be delayed because JICB medications are already available. There is no requirement to use JICB medication prior to setting up a syringe pump.
- Ideally there should be no more than a 4 hour delay between the request for starting a syringe pump and it being set up for the patient.

**24 hour advice line (Rowcroft Hospice)** tel no: **01803 210800.** Calls go through to the hospice. The senior nurse will be able to answer queries or ask the doctor on call to ring you back.
**Rowcroft Community Specialist Palliative Care Team** - Mon – Fri 9-5 tel no: 01803 210811 Sat – Sun, bank holidays 9-1 (tel advice) tel no: 01803 210812

Consultants in Palliative Medicine, Torbay and South Devon NHS Foundation Trust/Rowcroft Hospice
GP Facilitators in Palliative Care, South Devon and Torbay.
Updated November 2018 Review November 2021

# Case study

Fred is 72 and has lung cancer

He is thought to be in the last few days/week or two of life

He cannot manage his tablets orally

He has had pain and nausea but these symptoms have been well controlled by:

MST 60mg bd, oramorph 20mg used once in the last 24 hours

Metoclopramide 10mg tds

What could you prescribe for his syringe pump?

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# Case study

The next day Fred becomes unsettled, agitated and chesty.

You have ruled out urinary retention but feel he is in pain.

How might you amend his medication regime?

How might you amend his medication regimen if nausea and vomiting became an issue, rather than respiratory secretions?

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# Some Resources

1. S+W Devon Formulary – Chapter 16 Palliative Care

https://southwest.devonformularyguidance.nhs.uk/formulary/chapters/16.-palliative-care

2. N+E Devon Formulary – Chapter 16 Palliative Care

https://northeast.devonformularyguidance.nhs.uk/formulary/chapters/16-palliative-care

3. Rowcroft Hospice website – follow tabs How Can We Help, then Referrals, then Clinical Resources

https://www.rowcrofthospice.org.uk/how-we-can-help/referrals-access-services/clinical-resources/

4. St Luke's Hospice website – follow tabs Information Hub, then Healthcare Professionals

https://www.stlukes-hospice.org.uk/healthcare-professionals/

All above include links to the Devon Opioid Conversion Chart

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# Some Resources

5. NDDH Symptom Management in Palliative Care Guidelines:

https://www.northdevonhealth.nhs.uk/2019/11/symptom-management-in-palliative-care-guidelines/

6. Cornwall Hospice Care – you can visit the website then follow tabs Our Care, then Healthcare Professionals, then Professional Advice, then APG chart (takes you to this pdf document)

https://www.cornwallhospicecare.co.uk/wp-content/uploads/2019/04/APG-V7-FINAL-1.pdf

7. Palliative Care Adult Network Guidelines Plus; Dr Ian Back, Dr Max Watson, Dr Nigel Sykes, Dr Craig Gannon and Peter Armstrong

https://book.pallcare.info/

This online resource (and available as an App) includes an opioid dose converter and information about syringe pump medication compatibility

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DIAL
999
100
FIRE
POLICE
AMBULANCE
OPERATOR
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