



Isle of Wight

Syringe Driver Compatibility Guidelines

Produced by

The Earl Mountbatten Hospice, Isle of Wight

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This guideline is available as a paper pocketbook and a hyperlinked PDF:

- Paper pocketbook (available to all IoW clinical staff) – ask your palliative care CNS
- Hyperlinked PDF - download from the intranet or from www.iwhospice.org/clinicians.aspx

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Who is this booklet for?

This is intended to guide primary and secondary care clinicians throughout the Isle of Wight in deciding which medicines can be combined for use with subcutaneous syringe drivers.

Roles and responsibilities

Adherence to St Mary's Medicines Policy, and to GMC, NMC and GPhC professional standards, are assumed: users of this booklet need to use their clinical judgement, and if in doubt, seek advice from other sources.

Layout

The 3rd column indicates the diluent

- W = water for injections
- S = sodium chloride 0.9%

The 4th column indicates the reference source (generally gives more information about the doses combined)

- P. Palliatedrugs.com syringe driver compatibilities database
- D. Dickman A. and Schneider J. The Syringe Driver (3rd edition) – copy in the pharmacy team office
- M. Palliative Care Matters database
- T. Trissel

Other abbreviations used: CSCI = continuous subcutaneous infusion (synonym: syringe driver)

When should medicines be combined?

Combining medicines in a syringe before administration creates an unlicensed product. However, such practice is consistent with professional standards because relevant licensed combinations do not exist and administering each medicine in a separate pump is unsatisfactory (requiring a patient to have multiple SC needles and, if ambulant, carry multiple pumps).

Indications of incompatibility

Cloudiness or visible crystals/'grit' reliably indicate incompatibility (see action needed below).

However, a clear solution doesn't exclude incompatibility. Other features of incompatibility include:

- *Site reactions*: usually indicates a reaction to a single constituent drug, but can be a feature of incompatibility.
- *Unexpected worsening of symptoms*: for example, where a drug is added for a 2nd symptom and the 1st (previously well controlled) symptom unexpectedly recurs.

If in doubt, seek advice from a palliative care pharmacist or consultant.

Combinations requiring additional caution [indicated by square brackets]

Some combinations require additional care because:

- Similar combinations are known to be problematic, *or*
- They are based on extrapolation (i.e. combination was previously reported with an additional drug present).

When using a combination in squared brackets, look frequently for cloudiness and be alert to symptoms worsening.

Action if incompatibility occurs

- Stop the infusion.
- Either switch drugs or split the combination into 2 separate pumps (for example, taking the most recently added drug out and into a separate pump if the previous mix was known to be effective)
- Please report the problematic combination to paul.howard@iow.nhs.uk so that it can be uploaded to the syringe driver compatibility database. Please state the drugs used, the diluent, the total syringe volume and the reason a problem was suspected (e.g. "went cloudy")

Morphine combinations

	Cyclizine	W	P
	Cyclizine <i>and</i> midazolam	W	P
	Haloperidol	W/S	P
	Haloperidol <i>and</i> cyclizine	W	P
	Haloperidol <i>and</i> cyclizine <i>and</i> octreotide	W	D
	Haloperidol <i>and</i> cyclizine <i>and</i> ranitidine	W	P
	Haloperidol <i>and</i> hyoscine butylbromide	W/S	P
	Haloperidol <i>and</i> hyoscine butylbromide <i>and</i> rantidine	W	P
	Haloperidol <i>and</i> hyoscine <i>HYDRO</i> bromide	S	D
	Haloperidol <i>and</i> ketamine	S	P
	Haloperidol <i>and</i> midazolam	W/S	P
	Haloperidol <i>and</i> midazolam <i>and</i> cyclizine	W	D
	Haloperidol <i>and</i> midazolam <i>and</i> hyoscine butylbromide	W	P
	Haloperidol <i>and</i> octreotide	W/S	P
	Hyoscine butylbromide	W	P
	Hyoscine butylbromide <i>and</i> octreotide	S	D
	Hyoscine butylbromide <i>and</i> ondansetron	S	D
	Hyoscine <i>HYDRO</i> bromide	W	P
	[Ketamine] ^a	S	P
	Levomepromazine	W/S	P
	Levomepromazine <i>and</i> hyoscine butylbromide	W/S	P
	Levomepromazine <i>and</i> hyoscine butylbromide <i>and</i> octreotide	S	D
	[Levomepromazine <i>and</i> hyoscine butylbromide <i>and</i> ranitidine] ^b	W	P
	Levomepromazine <i>and</i> hyoscine <i>HYDRO</i> bromide	S	P
Morphine sulphate plus:	Levomepromazine <i>and</i> metoclopramide	W/S	P/D
	Levomepromazine <i>and</i> midazolam	W/S	P
	Levomepromazine <i>and</i> midazolam <i>and</i> hyoscine butylbromide	W	P
	Levomepromazine <i>and</i> midazolam <i>and</i> hyoscine <i>HYDRO</i> bromide	S	D
	Levomepromazine <i>and</i> midazolam <i>and</i> metoclopramide	W/S	P/D
	Levomepromazine <i>and</i> midazolam <i>and</i> ondansetron	W	P
	Levomepromazine <i>and</i> octreotide	W/S	P
	Levomepromazine <i>and</i> ranitidine	W	P
	Metoclopramide	W/S	P
	Metoclopramide <i>and</i> midazolam <i>and</i> ketamine	S	D
	Metoclopramide <i>and</i> ondansetron	S	D
	Metoclopramide <i>and</i> ranitidine	S	P
	Midazolam	W/S	P
	Midazolam <i>and</i> cyclizine	W	P
	Midazolam <i>and</i> hyoscine butylbromide	W/S	P
	Midazolam <i>and</i> hyoscine butylbromide <i>and</i> octreotide	S	D
	Midazolam <i>and</i> hyoscine <i>HYDRO</i> bromide	W/S	P/D
	Midazolam <i>and</i> ketamine	W/S	P
	Midazolam <i>and</i> metoclopramide	W/S	P
	Midazolam <i>and</i> metoclopramide <i>and</i> octreotide	W/S	P/D
	Midazolam <i>and</i> octreotide	W/S	P
	Midazolam <i>and</i> ondansetron	S	P
	Octreotide	S	P
	Ondansetron	W/S	D
	Ondansetron <i>and</i> metoclopramide <i>and</i> octreotide	S	D
	Ranitidine	W	T

- a. This combination is compatible with several other 3 and 4 drug combinations, but caution is advised because *separate* use of these 2 drugs has *not* been reported
- b. Use caution – based on reported experience with a 5th drug

Oxycodone combinations

	[Cyclizine (avoid if oxycodone dose >100mg – may precipitate)]	W	P
	Haloperidol	W/S	P
	[Haloperidol <i>and</i> cyclizine (avoid if oxycodone dose > 100mg – may precipitate)]	W	P
	Haloperidol <i>and</i> hyoscine butylbromide	W/S	P
	Haloperidol <i>and</i> hyoscine <i>HYDRO</i> bromide	W/S	D
	Haloperidol <i>and</i> ketamine	S	P
	Haloperidol <i>and</i> midazolam	W/S	P
	[Haloperidol <i>and</i> midazolam <i>and</i> cyclizine (avoid if oxycodone dose > 100mg – may precipitate)]	W	P
	Haloperidol <i>and</i> midazolam <i>and</i> hyoscine butylbromide	W/S	P
	Haloperidol <i>and</i> midazolam <i>and</i> ketamine	S	P
	Haloperidol <i>and</i> octreotide	W/S	P
	Hyoscine butylbromide	W/S	P
	Ketamine	W/S	P
	Ketorolac	S	D
	Ketorolac <i>and</i> ranitidine	W/S	D
	Levomepromazine	W/S	P
	Levomepromazine <i>and</i> hyoscine butylbromide	W/S	P
	Levomepromazine <i>and</i> hyoscine butylbromide <i>and</i> octreotide	W/S	P
	Levomepromazine <i>and</i> hyoscine <i>HYDRO</i> bromide	W/S	D
	Levomepromazine <i>and</i> ketamine	S	P
Oxycodone plus:	Levomepromazine <i>and</i> metoclopramide	W/S	P
	Levomepromazine <i>and</i> midazolam	W/S	P
	Levomepromazine <i>and</i> midazolam <i>and</i> hyoscine butylbromide	W/S	P
	Levomepromazine <i>and</i> midazolam <i>and</i> hyoscine <i>HYDRO</i> bromide	W/S	P
	Levomepromazine <i>and</i> midazolam <i>and</i> octreotide	W/S	P
	Levomepromazine <i>and</i> midazolam <i>and</i> ondansetron	S	D
	Levomepromazine <i>and</i> octreotide	W/S	P
	Levomepromazine <i>and</i> octreotide <i>and</i> hyoscine <i>HYDRO</i> bromide	W/S	D
	Levomepromazine <i>and</i> octreotide <i>and</i> ondansetron	W/S	D
	Levomepromazine <i>and</i> ondansetron	S	P
	Metoclopramide	W/S	P
	Metoclopramide <i>and</i> ondansetron	W/S	P/D
	Midazolam	W/S	P
	[Midazolam <i>and</i> cyclizine (avoid if oxycodone dose >100mg – may precipitate)]	W	P
	Midazolam <i>and</i> hyoscine butylbromide	W/S	P
	Midazolam <i>and</i> ketamine	W/S	P
	Midazolam <i>and</i> metoclopramide	W/S	P
	Midazolam <i>and</i> octreotide	W/S	P/D
	Midazolam <i>and</i> ondansetron	W/S	P/D
	Octreotide	W/S	P
	Octreotide <i>and</i> ondansetron	W/S	P/D
	Ondansetron	W/S	P
	Ranitidine	W/S	D

Fentanyl combinations

Fentanyl plus:	Haloperidol	W	P
	Haloperidol <i>and</i> midazolam	W	P
	Haloperidol <i>and</i> midazolam <i>and</i> hyoscine butylbromide	W	P
	Hyoscine butylbromide	W	P
	Levomepromazine	W	P
	Levomepromazine <i>and</i> metoclopramide	W	P
	Levomepromazine <i>and</i> midazolam	W	P
	Levomepromazine <i>and</i> midazolam <i>and</i> metoclopramide	W	P
	Levomepromazine <i>and</i> ranitidine	S	M
	Metoclopramide	W	P
	Midazolam	W	P
	Midazolam <i>and</i> cyclizine	W	D
	Midazolam <i>and</i> hyoscine butylbromide	S	D
	Midazolam <i>and</i> metoclopramide	S	D
	Ondansetron	S	D
Ranitidine	S	T	

Alfentanil combinations

Fentanyl is the preferred opioid for renal impairment; alfentanil CSCI is used if higher opioid doses cause volume problems with fentanyl, oxycodone or morphine sulphate

Alfentanil plus:	Haloperidol	W/S	P
	[Haloperidol <i>and</i> cyclizine] ^c	W	P
	Haloperidol <i>and</i> cyclizine <i>and</i> octreotide	W	D
	Haloperidol <i>and</i> hyoscine butylbromide	W	P
	Haloperidol <i>and</i> midazolam	W/S	P
	[Haloperidol <i>and</i> midazolam <i>and</i> cyclizine]	W	D
	Haloperidol <i>and</i> midazolam <i>and</i> hyoscine butylbromide	W/S	D
	Haloperidol <i>and</i> ondansetron	S	D
	Hyoscine butylbromide	S	D
	Levomepromazine	W/S	P/D
	Levomepromazine <i>and</i> hyoscine butylbromide	S	P
	Levomepromazine <i>and</i> hyoscine butylbromide <i>and</i> octreotide	S	D
	Levomepromazine <i>and</i> hyoscine butylbromide <i>and</i> ondansetron	S	D
	Levomepromazine <i>and</i> metoclopramide	W/S	P/D
	Levomepromazine <i>and</i> midazolam	W/S	P
	Levomepromazine <i>and</i> midazolam <i>and</i> hyoscine butylbromide	W/S	D
	Levomepromazine <i>and</i> midazolam <i>and</i> metoclopramide	S	D
	Levomepromazine <i>and</i> octreotide	W/S	P
	Levomepromazine <i>and</i> octreotide <i>and</i> ondansetron	S	D
	Levomepromazine <i>and</i> ondansetron	S	D
	Metoclopramide	W/S	P
	Midazolam	W/S	P
	[Midazolam <i>and</i> cyclizine] ^c	W	D
	Midazolam <i>and</i> hyoscine butylbromide	W/S	P
	Midazolam <i>and</i> metoclopramide	W/S	D
	Midazolam <i>and</i> octreotide	S	D
	Midazolam <i>and</i> ondansetron	W/S	D
	Octreotide	W/S	P/D
Ondansetron	W/S	P/D	

- c. Although numerous reports of this 3 drug combination, use caution because alfentanil/cyclizine alone is reported to be *incompatible*

Methadone combinations			
Methadone plus:	Cyclizine		W P
	Haloperidol		W P
	Haloperidol <i>and</i> midazolam		W P
	Haloperidol <i>and</i> ranitidine <i>and</i> hyoscine butylbromide		S P
	Hyoscine butylbromide <i>and</i> ranitidine		S P
	Ketamine		W/S P
	Ketamine <i>and</i> midazolam		W P
	Levomepromazine		W P
	Levomepromazine <i>and</i> hyoscine butylbromide		W P
	Levomepromazine <i>and</i> midazolam <i>and</i> hyoscine butylbromide		S D
	Midazolam		W P
	Octreotide <i>and</i> ranitidine		S P

Opioid-free combinations			
	Haloperidol <i>and</i> cyclizine		W P
	Haloperidol <i>and</i> hyoscine butylbromide		W D
	Haloperidol <i>and</i> hyoscine butylbromide <i>and</i> ranitidine		W/S P
	Haloperidol <i>and</i> hyoscine butylbromide <i>and</i> octreotide <i>and</i> ranitidine		S P
	Haloperidol <i>and</i> ketamine		S P
	Haloperidol <i>and</i> midazolam		W P
	Haloperidol <i>and</i> midazolam <i>and</i> cyclizine		W P
	Haloperidol <i>and</i> midazolam <i>and</i> hyoscine butylbromide		S P
	Haloperidol <i>and</i> midazolam <i>and</i> ketamine		W P
	Haloperidol <i>and</i> midazolam <i>and</i> metoclopramide ^d		W/S P/D
	Haloperidol <i>and</i> midazolam <i>and</i> octreotide		S P
	Haloperidol <i>and</i> ondansetron		S P
	Hyoscine butylbromide <i>and</i> ondansetron		S D
	Ketorolac <i>and</i> ranitidine		S D
	Levomepromazine <i>and</i> hyoscine butylbromide <i>and</i> octreotide		W/S P
	Levomepromazine <i>and</i> ketamine		S D
	Levomepromazine <i>and</i> midazolam		W/S P
	Levomepromazine <i>and</i> midazolam <i>and</i> octreotide		S D
	Levomepromazine <i>and</i> octreotide		W/S P
	Levomepromazine <i>and</i> octreotide <i>and</i> ondansetron		S D
	Levomepromazine <i>and</i> ondansetron		W/S P
	Metoclopramide <i>and</i> ondansetron		S P
	Metoclopramide <i>and</i> midazolam <i>and</i> ranitidine		S P
	Metoclopramide <i>and</i> ranitidine		S P
	[Midazolam <i>and</i> cyclizine] ^e		W P
	Midazolam <i>and</i> hyoscine butylbromide		S D
	Midazolam <i>and</i> ketamine		S P
	Midazolam <i>and</i> metoclopramide		W/S D
	Midazolam <i>and</i> ondansetron		S D
	Octreotide <i>and</i> ondansetron		W/S D

- d. If using for nausea, consider switching rather than combining haloperidol and metoclopramide: although chemically compatible, their actions overlap (and increase the risk of extrapyramidal effects).
- e. Use caution: occasional incompatibility reported, but mostly reported to be compatible

Single drug CSCIs (cannot be combined in the same syringe with other drugs)			
Diclofenac	By CSCI only. Do not give stat SC injections (tissue necrosis reported)		S
Furosemide	Either CSCI or stat SC injection (but overnight diuresis from CSCI problematic unless catheterized)		S
Levetiracetam	By CSCI only. Dilute IV preparation with water		W
Lidocaine	Palliative Care Consultant initiated for refractory neuropathic pain		S
Phenobarbital	By CSCI only. Bolus doses given undiluted IM . Do not give stat SC injections (tissue necrosis occurs)		W
Valproate	By CSCI only. Dilute IV preparation with 30ml water. Do not give stat SC injections.		W

Dexamethasone combinations for SC site reactions

Dexamethasone is not usually added to syringe drivers – it is given as a once daily stat dose in the morning to avoid sleep disturbance.

Dexamethasone is used for site reactions that persist despite:

- Maximising the dilution by using the largest syringe size possible
- If possible, switching diluent from water to sodium chloride 0.9%

Dexamethasone 0.66mg (= 0.2ml of a 3.3mg/1ml ampoule) is added to the syringe last, after the other drug(s) and diluent have been mixed.

Dexamethasone plus:	Morphine sulphate and	Haloperidol	S	P
		Haloperidol and hyoscine butylbromide	W	P
		Haloperidol and ondansetron	S	P
		[Levomepromazine and hyoscine butylbromide] ^f	W	P
		[Levomepromazine and metoclopramide] ^f	W	P
		[Levomepromazine and midazolam] ^f	W	P
		[Levomepromazine and octreotide] ^f	W	P
		Metoclopramide	W/S	P
	Metoclopramide and midazolam	W/S	P	
	Oxycodone and	Haloperidol	W/S	P
		Haloperidol and hyoscine butylbromide	S	P
		Haloperidol and midazolam	W	P
		Ketamine	W	P
		[Levomepromazine] ^f	W	P
		[Levomepromazine and hyoscine butylbromide] ^f	S	P
		[Levomepromazine and ketamine] ^f	W	P
		[Levomepromazine and octreotide] ^f	W	P
		Metoclopramide	W	P
		Midazolam	S	P
		[Midazolam and cyclizine] ^g	W	P
	Midazolam and ketamine	S	P	
	Fentanyl and	[Levomepromazine and midazolam] ^f	W	P
	Alfentanil and	Haloperidol and midazolam	W	P
	(opioid-free)	Ketamine	S	P
		Haloperidol and ketamine	S	P
		Haloperidol and hyoscine butylbromide and octreotide	W	P
		Hyoscine butylbromide	W	P
		Hyoscine butylbromide and octreotide	S	P
		Hyoscine butylbromide and ondansetron	S	P
		[Levomepromazine] ^f	W	P
		Levomepromazine and hyoscine butylbromide and octreotide	W/S	P
		[Levomepromazine and metoclopramide] ^f	S	P
		[Levomepromazine and metoclopramide and midazolam] ^f	W	P
		[Levomepromazine and ondansetron] ^f	S	P
		[Levomepromazine and ondansetron and midazolam] ^f	W	P
		Metoclopramide	W/S	P
		Midazolam and ketamine	S	P
		Ondansetron	S	P

f. Although this combination has been used successfully, use caution because incompatibility is reported between dexamethasone and levomepromazine

g. Although this combination has been used successfully, use caution because incompatibility is reported between dexamethasone and cyclizine

Preferred ampoule sizes held by community pharmacies

Cyclizine	50mg/1ml
Dexamethasone	3.3mg/1ml
Fentanyl	100micrograms/2ml
Haloperidol	5mg/1ml
Hyoscine butylbromide	20mg/1ml
Levomepromazine	25mg/1ml

Metoclopramide	10mg/2ml
Midazolam	10mg/2ml
Morphine sulphate (usual choice)	10mg/1ml
Morphine sulphate (for higher doses)	30mg/1ml
Oxycodone	10mg/1ml
Water for injections	20ml

Infrequently used medicines kept centrally (Sainsbury's community pharmacy; St Mary's hospital dispensary)

Methadone	10mg/1ml
Ondansetron	4mg/2ml

Phenobarbital	200mg/1ml
Ranitidine	50mg/2ml

Community pharmacy contact details

Cowes	Boots Pharmacy (Cowes) 200 Newport Rd, PO31 7ER 01983 294467
Ryde and North East	Regent Pharmacy (East Cowes) Well Rd, PO32 6SP 01983 717002
	Lloyds Pharmacy (East Cowes) Church Path, PO32 6RP 01983 293133
	Boots Pharmacy (Ryde) 170-172 High St, PO33 2HW 01983 562280
	Gibbs and Gurnell (Ryde) 34 Union St, PO33 2LE 01983 562570
	Boots Pharmacy (Ryde) Tower House, Rink Rd, PO33 1LP 01983 562156
	Seaview Pharmacy (Seaview) Pier Rd, PO34 5BL 01983 613116

Centre of island	Day Lewis (formerly Sidy's) (Newport) 86-88 High St, PO30 1BH 01983 522346
	Sainsbury's (Newport) Foxes Rd, PO30 5ZB 01983 539985
	Lloyds Pharmacy (Newport) 41-42 Pyle Street, PO30 1XB 01983 522638
South Wight	Regent Pharmacy (Shanklin) 59 Regent St, PO37 7AE 01983 863677
	Boots Pharmacy (Sandown) Sandown, 107 High St, PO36 8AF 01983 403238
West Wight	Yarmouth Pharmacy (Yarmouth) Quay St, PO41 0PB 01983 760260
	Kemkay Pharmacy (Freshwater) Avenue Rd, PO40 9UT 01983 752908

St Mary's Hospital pharmacy contact details

Tel	01983 822099 Ext. 4617 (for <i>emergencies</i> out of hours, an on-call pharmacist is available via bed management)
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Fax	01983 534621 (dispensary)
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