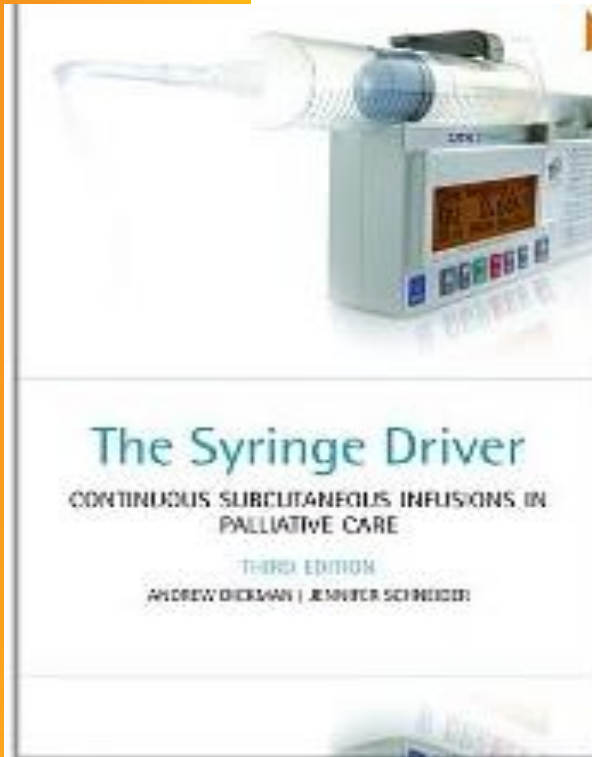


# Mixing Drugs in Syringe Drivers

Dr Satbir Jassal



# Mixing Drugs



- To date there has been NO major issue reported related to this practice
- *‘allowing the administration of medicines necessary for maintaining life or managing symptoms when parental access is limited and / or alternative routes present significant risk or patient discomfort’*



# The Law

- 2009 illegal to mix two or more drugs.

Medicine Act 1968 ; manufacture of an unlicensed medicine.

MHRA – confirmed licence required.

Commission on Human Medicine advised  
MHRA

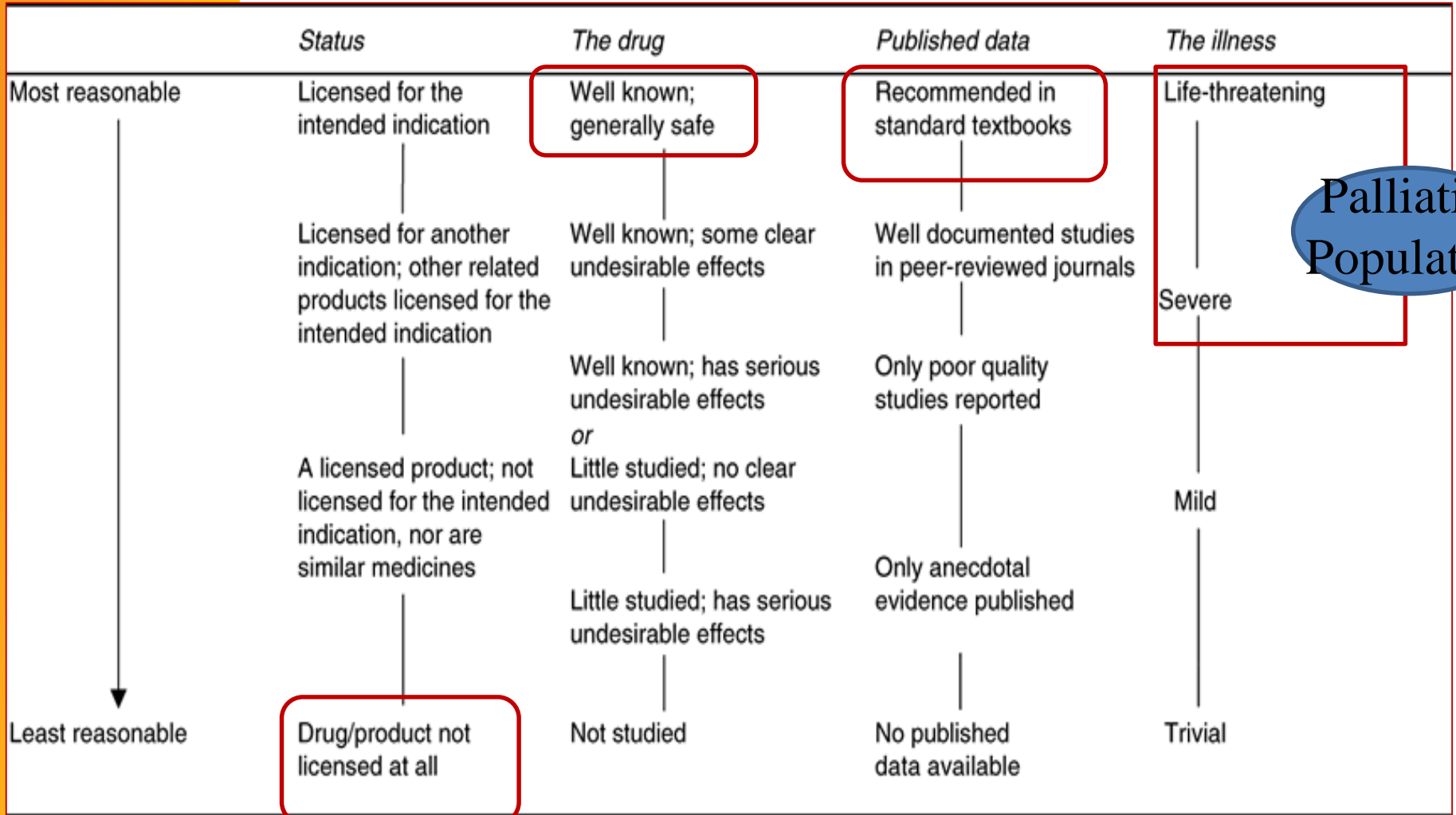
*Mixing must only be undertaken when clinically appropriate and essential for patient.*

**Medicine act has been amended.**



# Mixing drugs in a driver...?

Palliative  
Population



# pH

- Too acidic <2, too alkaline >11
- Most drugs are acidic
- Dexamethasone, diclofenac, furosemide, ketorolac and phenobarbital are alkaline. Combinations tend to be incompatible.
- pH effects solubility e.g. dexamethasone and midazolam. Loss of midazolam 20-40% at 48hrs and cloudiness / precipitation.



# Which diluent

- Water for injection can be used for all mixtures. However it is hypotonic and so can cause site reaction
- NaCl for injection causes less site problems. Can be used for most mixtures except Cyclizine (precipitates) or diamorphine conc  $>40\text{mg/mL}$  (becomes hypertonic)



# Concentration

- High conc of diamorphine >40mg/ml with NaCl.
- Dexamethasone with midazolam. High concentrations leads to precipitation.
- Use more dilute solutions.



# Solubility

- Most drugs based on weak salts or bases.
- Morphine tartrate more soluble than morphine sulphate
- Cyclizine lactate more soluble than Cyclizine hydrochloride.





# Temperature

- Effects stability of mixtures
- Keep syringe driver on top of covers.



# Sunlight

- Levomepromazine



# Number of drugs to mix

- Maximum 4 in one driver.
- Four groups
  - Analgesic
  - Sedative
  - Anticholinergic
  - Antiemetics



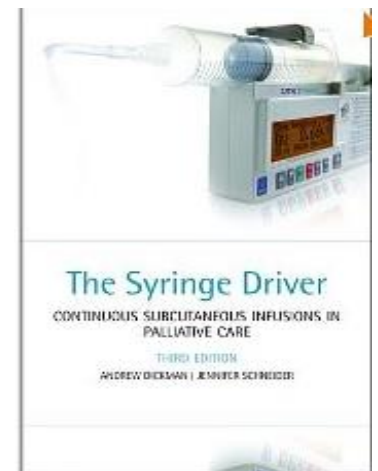
# Minimize compatibility issues

- Dilute maximum volume
- Over maximum time 24hrs
- Protect from sunlight – Levomepromazine
- Temperature
- Certain incompatibility dependant upon concentration – cyclizine and diamorphine



# Syringe Drivers other considerations

- Thickness / viscosity of Phenobarbital
- Midazolam volume
- Keep it simple



Thank you for coming  
and listening

