Naloxone without the needle: non-injectable options

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Declarations

• RM has undertaken an unpaid student industry placement with Mundipharma Research Ltd., with focus on the analysis of naloxone nasal spray formulations.

• King’s College London has separately applied to register intellectual property on a novel buccal naloxone formulation with which JS and RM are involved.

• RM is a consultant for the United Nations (UNODC), supporting a naloxone study in Central Asia.
Overview

1. Background: Why is non-injectable naloxone needed
2. Method: Criteria for non-injectable routes
3. Non-injectable naloxone: products in development
Community management of opioid overdose

Community management of opioid overdose

Recommendation

People likely to witness an opioid overdose should have access to naloxone and be instructed in its administration to enable them to use it for the emergency management of suspected opioid overdose.
All work
None perfect
1 | Why is non-injectable naloxone needed?

- Training required
- Risk of needle-stick-injury
- Prescription-only medication status
  (Article 71, EU Medicinal Products Directive, 2001/83)
2.1 | Identification of non-injectable routes

2.2 | Identification of non-injectable routes

- Review of 112 FDA-recognized routes of drug administration (FDA, 1992)

- Inclusion if the route...
  1. Suitable for OD emergency situation
  2. No major risk of compromise from OD complication

- Exclusion if the route...
  1. Involves injection or invasive procedure
  2. Requires medical training
  3. Is not acceptable in public (e.g., rectal)
  4. Does not produce adequate drug absorption
  5. Does not produce sufficiently rapid drug absorption relative to parenteral administration (Hertz, 2012)

2.3 | Identification of non-injectable routes

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3.1 | Results: Research activity (PubMed)

- Sublingual:
  - 1 pharmacodynamic study: mixed results (Preston et al., 1990)

- Nasal:
  - 18 in vivo studies (across species)

- Buccal:
  - 2 preclinical pharmacokinetic studies: good bioavailability ($F \leq 71\%$) (Hussain et al., 1987, 1988)
3.1 | Identification of non-injectable routes

Naloxone nasal spray: what is required?

1. Easy to use
2. Small volume → concentrated solution
3. Good early absorption (similar to IM)
4. Dose adequate, but not excessive
Over to the nose...