# In-Time-Naloxone: Drones for Prehospital Care of Opioid Poisoning:

Small Business Research Initiative, funded by Office of Life Sciences and the Scottish Health Industry Partnership

# In Time Naloxone Partners

NHS inclusion
Part of Midlands Partnership NHS Foundation Trust

University of Southampton

DroneMatLab
Drone Medical Logistics
Drone Materials Laboratory

Wessex Academic Health Science Network NHS

HEROTECH8 OPEN AIR

KING'S College LONDON

# Problem that In Time Naloxone seeks to address

- There is a gap in the availability of naloxone, which research shows has led to high levels of overdose and deaths (ONS 2022, Santo et al. 2021)
- For example, in 2021 there were 2,219 opioid deaths registered by the office of National statistics in the UK, this figure is rising every year. One of the many contributing factors is the time it takes for Naloxone to be available at the scene of the overdose and / or ambulance or equivalent healthcare service provider to arrive at the point-of-care and deliver the overdose antidote.
- **Arrival of service within 7 minutes?**

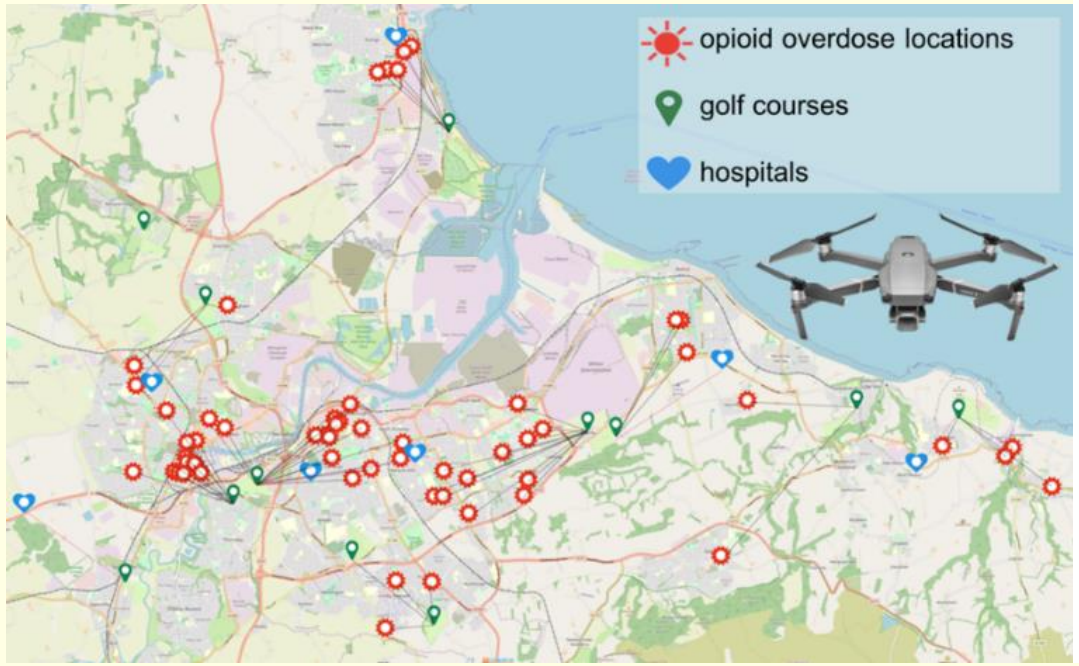
# In Time Naloxone

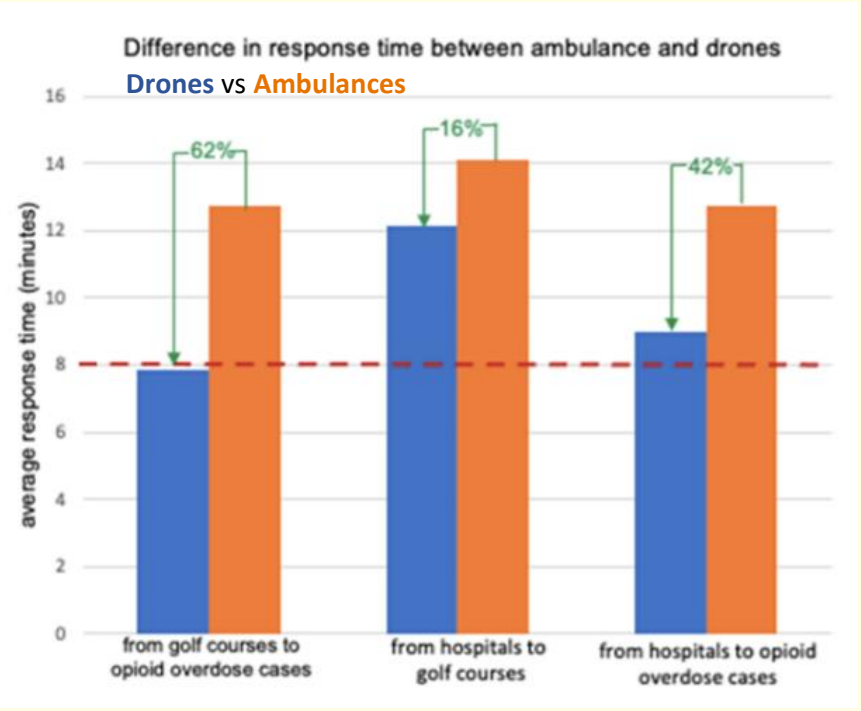
Aims to develop an effective emergency response for the distribution of naloxone, by drone, to prevent opioid poisoning becoming fatal.

Without access to the timely provision of naloxone greatly increases the chances of premature death.

## Coroners Data from The National Programme on Substance Use Mortality (NPSUD)
## Dr Caroline Copeland

***Preliminary real-world Teesside data showing potential impact of drones on overdoses, accounting for weather & wind conditions, & commercial opportunities of locating drone hubs in golf courses.***



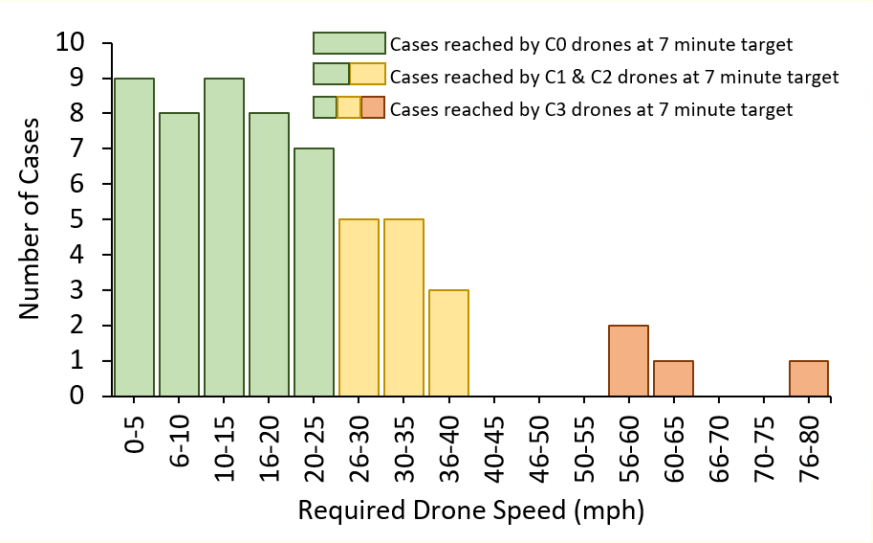

**Published the work!**

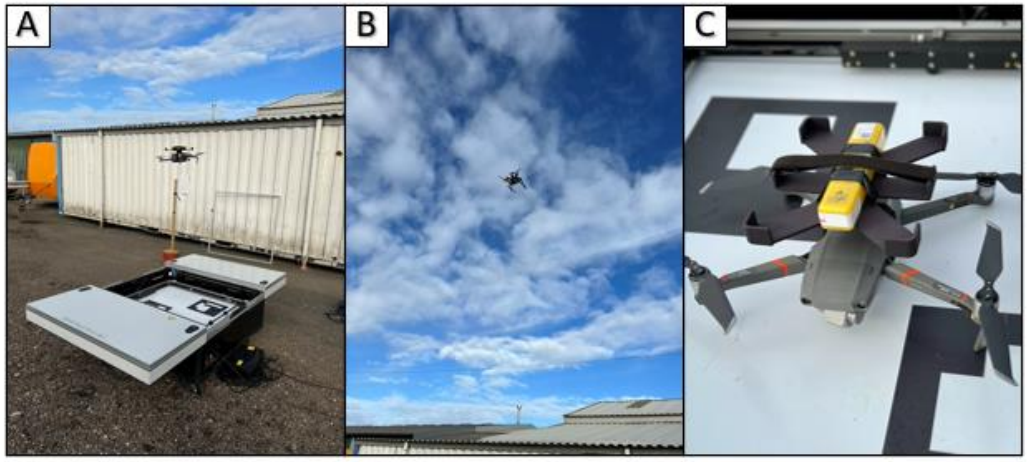
Royall, PG, Courtney, P, Goodair, C, Copeland, CS.

**An evaluation of naloxone transit for opioid overdose using drones: A case study using real-world coroner data.**

**Addiction 2023**.

https://doi.org/10.1111/add.16361



Pro's

COTS‡ meet speed targets when flown under normal mode in prevailing wind.

Con's

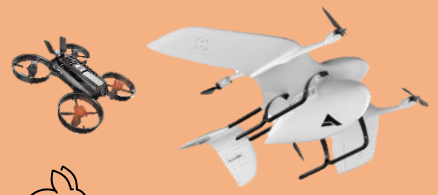
Drones < 250g may fly safely over people > 250g able to fly but within CAA approved operations$^{\psi}$.

Pro's

COTS ‡ meet speed targets when flown under sport mode in prevailing wind, larger platforms optimal.

Con's

Larger drones > 2 Kg have higher levels of CAA operational classification$^{\psi}$.

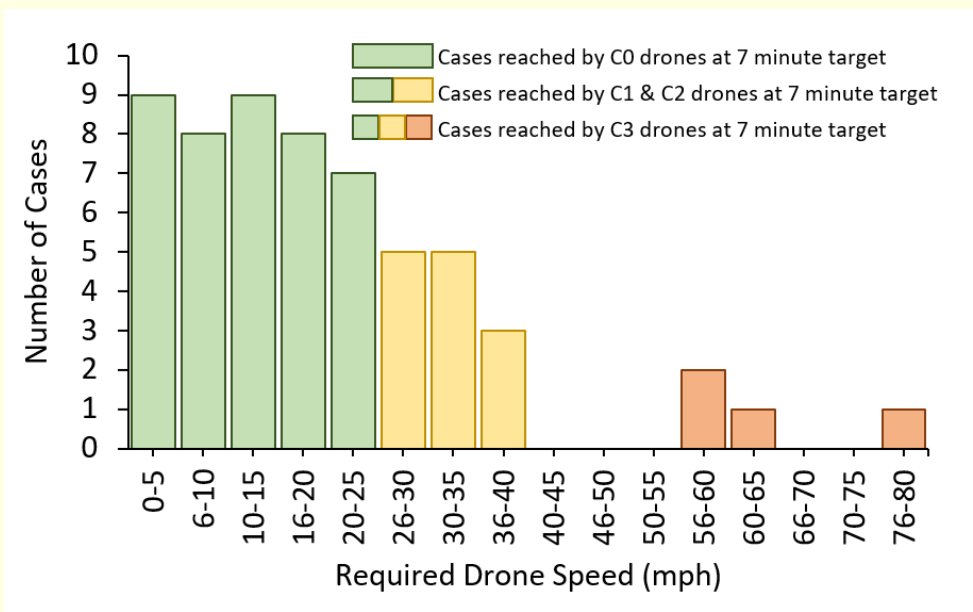


Pro's

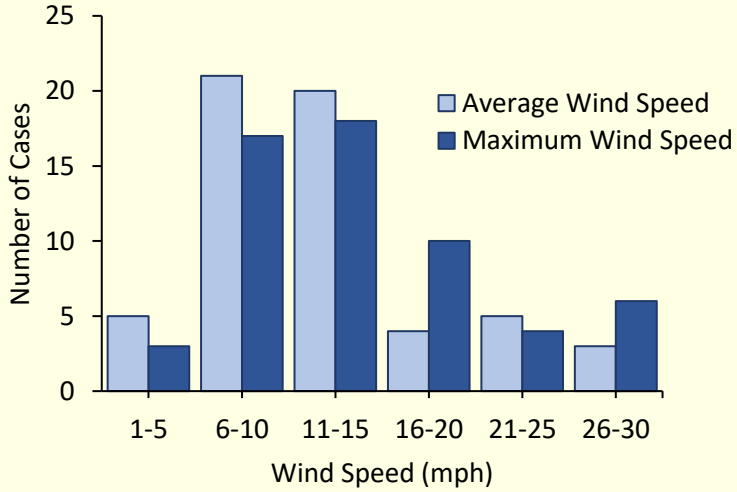
Commercial cargo VTOL† & racing drones meet speed targets under moderate to high winds (25mph).

Con's

Approval for emergency operations$^{\psi}$ possible, pre planned landing sites vital.




| Drone Maximum Take-off Mass* | Class | Selected COTS examples | Regulatory Notes~ |
|---|---|---|---|
| **≤250g** | C0 | DJI Mini; ZLRC SG2108; Hubsan Zino Mini Pro; Diatone Crusader GT2 200. | Can be flown in all CAA operational subcategories, for example A2 "flying close to people" descents are permitted to within 5m of people when controlled in a low-speed mode. Maximum permitted speed: 42.5mph (but typical performance of this class of drone is ≤25mph). |
| **Under 900g** | C1† | DJI Mavic Pro 2 and 3; Parrot ANAFI AI; Skydio 2+ | Design specification must aim to minimise injury to people by limiting energy transmitted to less than 80 joules, then covered by A2 permitting flight to within 5m of people. Maximum permitted speed: 42.5mph. |
| **Under 4kg** | C2‡ | DJI Matrice Series; WingtraOne GEN II; Nordic Unmanned AR100-H. | Descent permitted to within 5m of people when controlled by a low-speed mode, at 30m distance from people can fly at speeds up to 42.5mph. |
| **Under 25kg** | C3 | DroneMatrix Yacob; Nordic Unmanned Staaker®; Wingcopter 198 Delivery Variant. | Requirement for flight far from people, thus requires emergency services exemption. Requires remote identification and geo-awareness systems. May fly at speeds exceeding 42.5mph. |



# In Time Naloxone is needed

An evaluation of naloxone transit for opioid overdose using drones: A case study using real-world coroner data. **Addiction 2023** Royall, Courtney, Goodair & Copeland,

In the Tyne Tees area, it was discovered that 25% of overdoses had a bystander likely to be present, and **78% of these could be reached by drone within 7 minutes**. When applying these numbers to the ONS 2021 drug poisoning data, they suggest that in 555 of the 2,219 opiate deaths registered due to opioid use a bystander would have likely been present (25% of deaths), and in 421 of these deaths (76%) naloxone could have been delivered more quickly by drone and potentially saved their life -- more than one life for every day of the year.

Slides 8 - 18 of this presentation
were not made available for downloading


Take off
Drone Station


Landing
Naloxone on Board


Bystander
Ambulance Following
Documentary for Sky News

# In-Time-Naloxone Conclusions

- ✓ Real-world coroner records can locate where rapid drone-delivered naloxone can save lives most effectively.
- ✓ Commercially available certified drones can feasibly deliver naloxone within CAA/MHRA compliance.
- ✓ ITN's delivery model demonstrated that in the Gosport testbed >60% of overdose fatalities with a bystander present could have received naloxone within the recommended 7-minutes.
- ✓ PPIE showed 87% of service users would use ITN's novel bystander guide if a drone delivered naloxone to them whilst witnessing an overdose.
- ✓ ITN testbed demonstrated commercial feasibility, with a quality-adjusted-life-year estimate of £1754 (less than a tenth of the accepted ceiling).
- ✓ Pharmacists are key for maintaining clinical governance & safety for drone-delivered-naloxone.

**Co-design with stakeholders vital for success & acceptability**