



THE OPIOID CRISIS

HSHQDC-17-P-00112

CYNTHIA M. OTTO DVM, PHD, DACVECC, DACVSMR

PENN VET WORKING DOG CENTER

WHY IT IS IMPORTANT?

- THE OPIOID CRISIS!
 - POTENT OPIOIDS LIKE FENTANYL AND CARFENTANYL ADDED TO HEROIN
 - HEROIN IS 2-4 TIMES MORE POTENT THAN MORPHINE
 - FENTANYL IS 100 TIMES MORE POTENT THAN MORPHINE
 - CARFENTANYL IS 100 TIMES MORE POTENT THAN FENTANYL
 - BOTH CAN BE ABSORBED ACROSS MUCOUS MEMBRANES



WHAT WOULD YOU DO?



HOW WOULD YOU RESPOND?



WHY IT IS IMPORTANT?

- OPIOID EXPOSURE
 - BY INHALATION OR INGESTION
 - DOGS REQUIRE UP TO 20 TIMES AS MUCH AS PEOPLE TO CAUSE SIGNS
- SIGNS OF EXPOSURE
 - SEDATION OR *EXCITABILITY*
 - DROOLING, ATAXIA
 - HYPOPNEA, BRADYCARDIA
 - COMA ----> DEATH



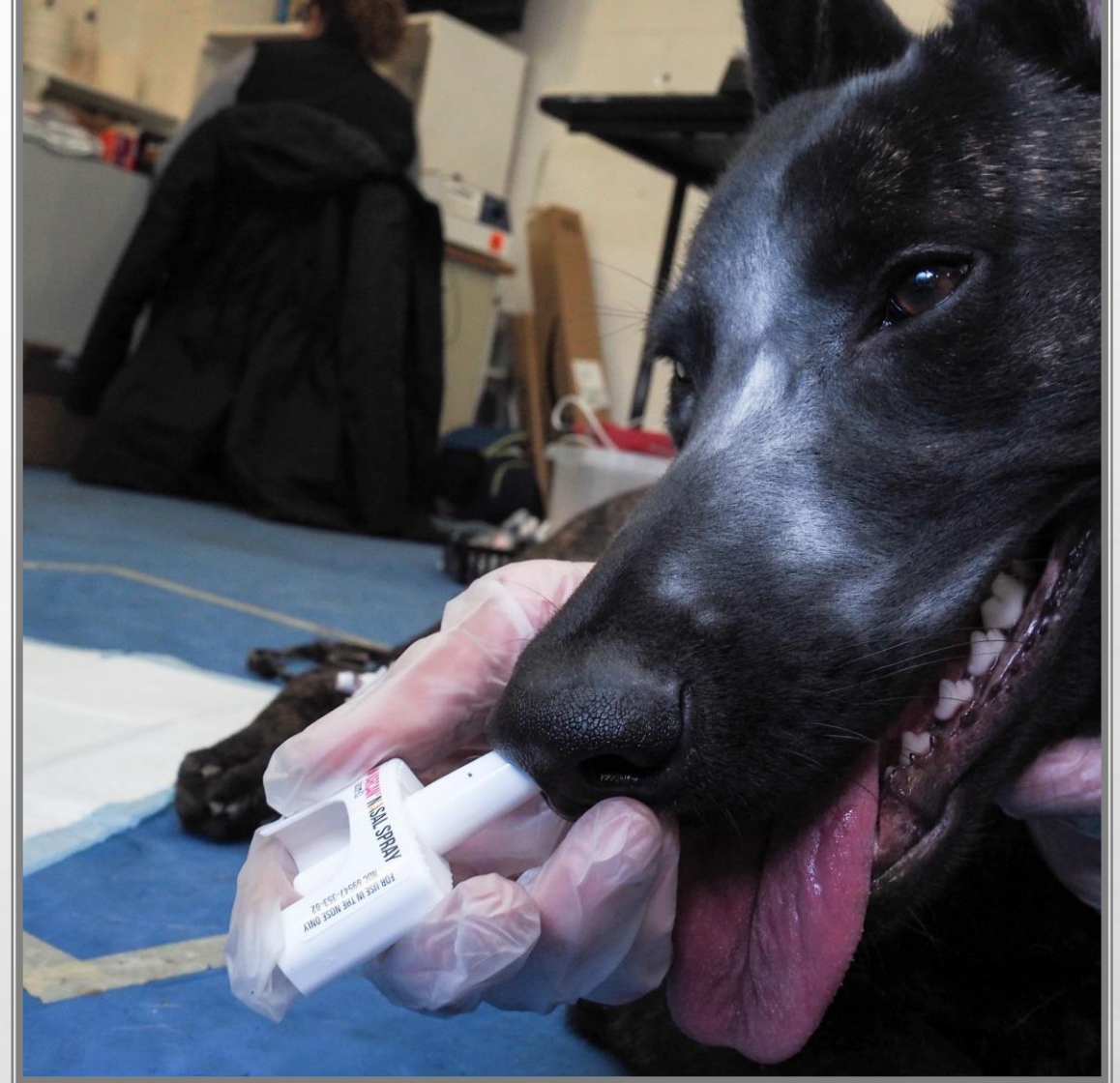
WHAT ARE THE RISKS?

- TO THE CANINE:
 - SEDATION
 - DEATH
- TO THE HANDLER, FIRST RESPONDER, OR VETERINARIAN
 - EXPOSURE TO POWDER ON THE CANINE
 - INJURY FROM A CANINE UNDER THE INFLUENCE



NALOXONE STUDY

- 10 WORKING DOGS
 - GERMAN SHEPHERDS 5
 - DUTCH SHEPHERDS 2
 - BELGIAN MALINOIS 1
 - LABRADORS 2
- IV FENTANYL SEDATION (0.3 MG)
- NALOXONE REVERSAL (4 MG)
 - INTRANASAL
 - INTRAMUSCULAR (EPAXIAL)



STUDY DESIGN

- RANDOMIZED
- CROSS OVER DESIGN (*EACH DOG TESTED WITH EACH ROUTE*)
 - 10 DOGS WITH IN, 10 DOGS WITH IM
 - ALL PEOPLE SCORING WERE BLINDED TO TREATMENT GROUP



TESTING PARAMETERS

- PHARMACOKINETICS
- PHARMACODYNAMICS
- EFFECT ON OLFACTION
- EFFECT ON HANDLER EXPOSURE



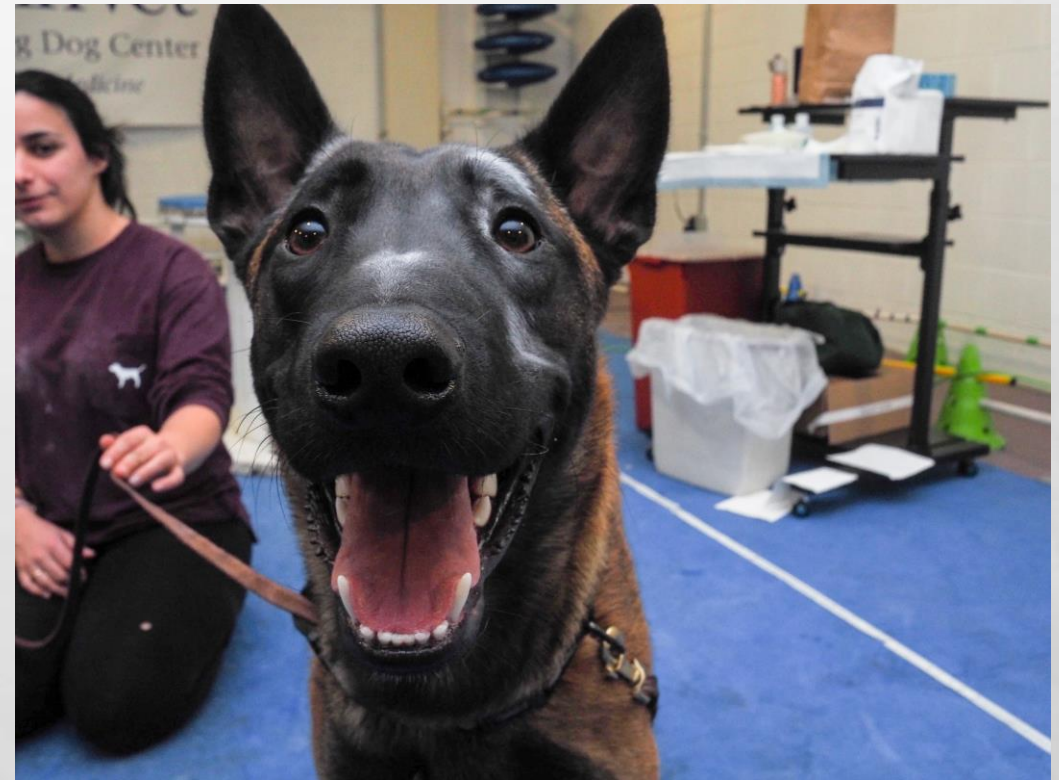
Article

A Randomized Cross-Over Trial Comparing the Effect of Intramuscular Versus Intranasal Naloxone Reversal of Intravenous Fentanyl on Odor Detection in Working Dogs

Jennifer L. Essler ^{1,*}, Paige G. Smith ¹, Danielle Berger ¹, Elizabeth Gregorio ¹,
M. Ross Pennington ², Amanda McGuire ², Kenneth G. Furton ³ and Cynthia M. Otto ^{1,4}

TAKE HOME – WHAT WE KNOW FOR SURE

- DOGS - MORE RESISTANT TO OPIOID EFFECTS THAN HUMANS
- K9 RESPONSE TO OPIOIDS IS HIGHLY VARIABLE
- DOG SHOWING SIGNS . . .HIGH RISK OF HUMAN EXPOSURE
- NALOXONE (4 MG) IN OR IM
 - SAFE (FOR THE DOG) ,
 - NO EFFECT ON OLFACTION
 - RAPIDLY EFFECTIVE
- **RECOGNIZE SIGNS OF OPIOID EXPOSURE!**



OPIOID EXPOSURE

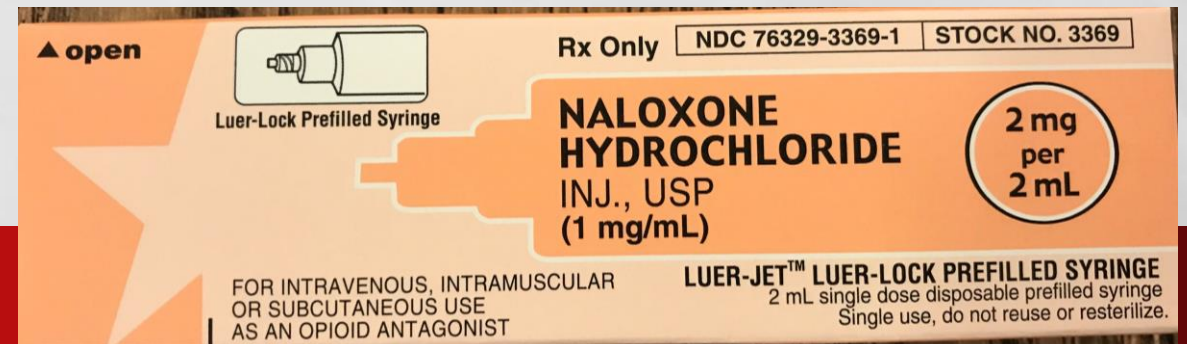
- SIGNS

- PANTING
- VOCALIZING
- SALIVATING
- DEFECATING
- HYPOPNEA
- BRADYCARDIA
- SENSITIVE TO NOISE
- COLLAPSE



IF IN DOUBT ...

- **ADMINISTER NALOXONE!**
- **TAKE PRECAUTIONS FOR EXPOSURE!**



STUDY TEAM





- CYNTHIA OTTO, DVM, PHD, DACVECC, DACVSMR
 - PI, EXECUTIVE DIRECTOR PENN VET WORKING DOG CENTER
 - CMOTTO@VET.UPENN.EDU
- GIACOMO GIANOTTI, DVM, DAVCA, PENN VET ANESTHESIOLOGIST
- CIARA BARR, DVM, DAVCA, PENN VET ANESTHESIOLOGIST
- MAJ. AMANDA MCGUIRE, DVM, DACVPM
- THE PENNVET WORKING DOG CENTER TEAM (TRAINERS & TECHNICIANS & DOGS)

STUDY TEAM

SUPPORTED BY

- **DEPARTMENT OF HOMELAND SECURITY**
 - **HS HQDC-17-P-00112**
- **U.S. ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE**
 - **CRADA**