Workshop Objectives:

- Review the necessary preparation involved in darting an animal
- Familiarize the participants to:
  - Essential safety issues
  - Best darting strategies
  - Assessment of darting equipment and dart preparation
- Provide hands-on practical experience using various darting equipment

Stress is an ever-present phenomenon that may nullify any good done by well-intentioned therapy

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Introduction

- Each procedure will have some effect on the behavior, life and activity of the animal. Each of the following questions must be addressed:
  - Is the procedure justified?
  - What procedure will produce the greatest gain with the least hazard?
  - When will it be most desirable to proceed?
  - Who is the most qualified to accomplish the task with the least stress to the animal?

Evaluating the situation

Planning

- What is the procedure?
- Is this an emergency?
- Address all safety issues (animal and staff)
- Make sure the equipment is working (maintenance and testing prior to procedure)
- Training of staff (ongoing and review)
Planning
- Determine environmental conditions
  - Temperature
  - Humidity
  - Time of the day
  - Intensity of the wind
- Assess location
- Determine if method of confinement is safe
- Can the animal be observed post-procedure?

Considerations
- Which species is involved?
- Determine the psychological status of the individual
- What is the present condition of the animal?
- Review past history with darting

Considerations
- Location of procedure
  - Small area, no moats or pools, bedding, solid walls
  - Adjacent pen free
  - Isolation of animal if possible
  - One animal at a time
  - Keep area QUIET

Risks related to locations:
- Escape behavior
  - Running away from predator
  - Running animals are unable to see obstacles
  - For some species: safety = water

Risks related to behavior
- Social species
- Prey species
- Herd mentality
- Male aggression
- Aggression towards the injured or sick
- Mixed species exhibits: dominant males will chase weaker animals

Training to facilitate administration of drugs
Training to facilitate administration of drugs

Delivery Systems
- Oral administration
- Transmucosal absorption
- Hand injection
- Stationed animal
- Squeeze cage
- Net
- Pole syringe
- Darts and projectors

Pole syringe

Remote Delivery Systems: Effective Darting Range
- Blowpipe (1-10 m)
- Pistol
  - Air/gas propelled 1-15 m or 1-30 m
  - Explosive charge propelled 10-30 m
- Rifle
  - Air/gas propelled 2-40 m
  - Explosive charge 10-60 m
Remote drug delivery systems
- Powdered charged projectors
- Carbon dioxide powered projectors
- Compressed air powered projectors

Darts: discharge mechanisms
- Explosive
- Air or gas activated
- Spring activated
- Soda acid activated

Darts

Specialty Darts: Biopsy Needle

Remote Drug Delivery System Kit
Injection sites

Darting confined animals

- Isolate the animal if possible
- Remove obstacles, platforms
- Restrict access to water
- Make direct shot is available
- Make sure other animals and humans are not in the target line

Darting from a vehicle

- Approachability of animals depends on their past experiences with humans
- Animals used to tourist trucks will react differently to truck driving off roads and purposefully pursuing them
- Approach from ground (greater range) or from air

Darting strategies

- Approach from the ground (hide/vehicle)
- Approach from the air (helicopter)

Darting

- Get as close to the animal as possible (approach closer with vehicle than by foot)
- Drive on roads as much as possible, use tangential approach, stop often, avoid direct approach towards group/herd
- Adjust your approach according to the reaction of the animals

www.gamecapture.info
Darting from a vehicle

- Wait for the animal to be at the periphery of the group and has exposed hindquarters
- Make sure the trajectory is not obscured by as much as a twig (dart will deflect)
- Once the animal is darted never let it out of your sight
- The animal may run off for a while. If there is no further disturbance, the group will stop. If the animal runs fast, stay with it
- Wait for the clinical signs of sedation, ataxia

Darting from a hide

- Observation of the behavior of the animal to determine pattern and response to other species
- Place the bait outside the hide (same time of the day), wait for the animal to approach, equipment ready to fire

Darting from a hide

- Be aware of wind direction (avoid light colored clothes, strong perfumes, tobacco)
- Avoid excessive activity in hide
- Have effective tracking after the animal is darted

Darting from a helicopter

- Strong, reliable with stable darting platform
- Pilot with capture experience
- Prepare all the darts in advance and set gun at appropriate range (Telinject/DanInject darts may be too fragile)

Darting from a helicopter

- Notify ground crew of location of herd/animal
- Evaluate the terrain (tree, bush cover, river)
- Pilot will guide you
- Select the animal to be darted and if possible isolate it from the group

Darting from a helicopter

- Approach from the back, aim at rump, upper hind legs, either sides of tail
- Make sure dart is entering perpendicular to skin; fire only under best circumstances and when helicopter and animal are traveling at same speed – no need for shooting ahead
Darting from a helicopter

Once the animal is darted, it should be herded towards the ground crew and away from problem areas (< 1 minute to avoid excitement during induction)

If the animal is recumbent before the ground crew arrives, you will be dropped to assess it.

Complications of darting

- Wrong animal darted
- Animal too stressed
- Failure of drug delivery
- Intraosseous injection
- Improper dosage
- Trauma from projectile
  - Muscle
  - Fractured bone
  - Infection
Human safety:
- Carfentanil, Etorphine, Thiofentanil: 
  - Potent opioids: severe respiratory depression, death 
  - Transmucosal (ocular, nasal, oral) or percutaneous absorption 
- Other anesthetics: do not underestimate danger 
- Accidents if negligence during loading or cleaning of darts or careless handling of equipment

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Accidental human poisoning with a veterinary tranquilliser. F H Cummins

Human Safety: Prevention
- First aid kit: CPR equipment, drug labels and inserts, antidotes 
- Never work alone when preparing, using or cleaning darts 
- Train staff to recognize clinical signs post-exposure

In case of human exposure:
- Seek medical help immediately – communication cascade 
- Wash area immediately 
- If injected use pressure bandage to reduce absorption (?) 
- Monitor consciousness and breathing 
- Place an IV catheter 
- Decide if antidote is needed (naloxone, naltrexone) 
- CPR if warranted 
- Transport to medical unit - bring first aid kit with patient

Human Safety: Prevention
- Site of use (zoo, in field, abroad) 
- On site human exposure protocol (drills) 
- Notification and training of staff, local hospital and emergency room personnel (incl. paramedics)

Practical experience
- Physical restraint 
  - Proper physical restraint of various species 
  - Use of ropes 
  - Use of rabies pole 
  - Use of squeeze cage (for injection) 
  - Use of live traps 
  - Use of foot hold trap 
  - Use of pole syringe 
- Darting 
  - Description of equipment (pistols, blowpipe and darts) 
  - Practice darts using pistol 
  - Practice darts using blowpipe