Best practice recommendations for the use of fully implanted biologging devices in pinnipeds

What is ‘best practice’?

Professional procedures that are accepted in the field as superior to alternatives by producing best results, most positive outcomes, least negative consequences; and are based on evidence synthesized from prior efforts.

Abdominal implantation surgery at sea.

An adult female Pacific harbor seal under general anesthesia is receiving two LHX telemetry implants, using standard, aseptic surgical procedures in a mobile surgical unit placed on a support vessel, in the Aleutian Islands, 2016. NMFS Permit 19309, AUP A/WW/2056-1.

Best practice recommendations:

1. Properly justify the use of Fully Implanted Tags (FITs) in view of alternatives.
2. Select appropriate implant mode and location (i.e. subcutaneous or intraperitoneal, free-floating or fixed).
3. There is no single rule for a safe size, shape and style. Instead, users need to evaluate and validate safe designs for each type of animal, sex and life history stage.
4. Users need to ensure biocompatibility through choice of materials (USP Class 6 or ISO-10993 approved) or appropriate testing.
5. We propose a 3x pressure safety factor. A device should be designed for a pressure rating 3x the mean maximum depth previously recorded for the age class and sex of a species.
6. Tags using lithium batteries need to apply approved designs.
7. Tags need to be and remain fully sterilized (not just disinfected) until and during insertion.
8. Surgeries need to follow accepted, standard aseptic technique.
10. All procedures and monitoring should be conducted or directly supervised by trained personnel.
11. Antibiotic treatment and antibacterial sutures should be considered.
12. Conducting effect assessments is essential, and should include short-, medium- and long-term assessments.
13. A study inclusion criterion should be used to determine data applicability.
14. Manipulations and captivity should be minimized as needed.
15. All findings have to be reported in peer reviewed literature, no matter what the outcome.

A narrated listing with additional details is featured in Horning et al. 2017

Why do we need best practices?

Telemetry yields essential data, but external and internal tags - and procedures - differently affect:

- health & wellbeing
- cost of locomotion & thermoregulation
- behavior
- detectability & predation risk
- entanglement risk
- data & data quality

How did we derive these recommendations?

- Deployments of 124 implanted vital rate transmitters (LHX tags, SEE POSTER) in 69 animals in four species [2-10]
- Control studies on captive and wild animals [2-10]
- Framework of the Three R’s [12]
- Details given in [11]

References


Best Practice publication [11]:

This poster: