



# LIFE ARCPROM



ΑΝΘΡΩΠΟΣ  
ΥΣΟΜΟ  
HUMAN

1/4

ΑΡΚΟΥΔΑ  
ORSO  
BEAR

## LIFE18 NAT/GR/000768

Improving human-bear coexistence in 4 National Parks of South Europe

### ACTION D2

One (1) medium length report of the immediate results of the training actions (D2.2)



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## *SUMMARY*

The present deliverable presents the full question sets and outcome analyses for three successive training cohorts under LIFE ARCPROM: the First Training Course (Webinar, 10 Nov 2020; n=76), a Field Workshop (2021; n=49), and the Three-Day Seminar & Workshops, Action C2.2 (2022; n=84). The 2020 questionnaire (40 MCQs) was administered electronically via Google Forms within a defined window, whereas the 2021 (20 MCQs, exclusively practical) and 2022 (40 MCQs, advanced and practice-oriented) questionnaires were paper-based and distributed by hand on site immediately after the sessions. In all cases, completion was mandatory for the issuance of attendance certificates.

The report includes the complete questionnaires (with keyed correct options), per-item success rates and brief field-use rationales, as well as category-level summaries and bar-chart visualizations to support targeted curriculum refinement. Results indicate a sustained upward trajectory and a convergence of competence across domains: cohort means increase from 61.6% (2020) to 73.4% (2021) and 78.2% (2022), while between-category variability narrows.

## ΠΕΡΙΛΗΨΗ

Το παρόν παραδοτέο παρουσιάζει τις ερωτήσεις αξιολόγησης αποτελεσματικότητας της εκπαιδευτικής διαδικασίας, καθώς και την ανάλυση των αποτελεσμάτων των τριών εκπαιδευτικών δραστηριοτήτων που έλαβαν χώρα στο πλαίσιο του LIFE ARCPROM. Ειδικότερα, το παραδοτέο αναφέρεται στο διαδικτυακό σεμινάριο που υλοποιήθηκε την 10η Νοεμβρίου 2020, στα τρία σεμινάρια δεξιοτήτων που υλοποιήθηκαν στις έδρες των 3 Εθνικών Πάρκων (Οροσειράς Ροδόπης, 4–5 Οκτωβρίου 2021, Β. Πίνδου, 9–10 Νοεμβρίου 2021 και Πρεσπών 16–17 Μαΐου 2022) και τα δύο σεμινάρια που υλοποιήθηκαν στην έδρα του Πανεπιστημίου Θεσσαλίας ( 29 Ιουνίου έως 1 Ιουλίου 2022 και 16 έως 18 Νοεμβρίου 2022).

Το ερωτηματολόγιο του 2020 (40 ερωτήσεις πολλαπλής επιλογής) διανεμήθηκε ηλεκτρονικά μέσω Google Forms σε καθορισμένο χρονικό παράθυρο μετά το πέρας της εκπαίδευσης. Τα ερωτηματολόγια του 2021 (20 ερωτήσεις πολλαπλής επιλογής) και του 2022 (40 ερωτήσεις πολλαπλής επιλογής) διανεμήθηκαν επί τόπου αμέσως μετά τη λήξη των συνεδριών. Σε όλες τις περιπτώσεις, η συμπλήρωση ήταν υποχρεωτική για την έκδοση βεβαιώσεων παρακολούθησης.

Τα αποτελέσματα υποδεικνύουν σταθερή ανοδική πορεία και σύγκλιση ικανοτήτων μεταξύ θεματικών: οι μέσοι όροι αυξάνονται από 71,3% (2020) σε 74,9% (2021) και 77,6% (2022), ενώ μειώνεται η μεταβλητότητα μεταξύ κατηγοριών. Κρίσιμες επιχειρησιακές πρακτικές και δεξιότητες φαίνεται να έχουν εμπедωθεί σε μεγάλο βαθμό, σηματοδοτώντας τη μετάβαση από τη θεωρητική εξοικείωση σε επιδόσεις έτοιμες για το πεδίο.

## RIASSUNTO

Il presente deliverable presenta le domande di valutazione dell'efficacia del percorso formativo e l'analisi dei risultati delle tre attività didattiche svolte nell'ambito di LIFE ARCPROM. In particolare, il documento si riferisce al seminario online realizzato il 10 novembre 2020, ai tre seminari pratici svolti presso le sedi dei tre Parchi Nazionali (Parco Nazionale della Catena dei Rodopi, 4–5 ottobre 2021; Parco Nazionale del Pindo Settentrionale, 9–10 novembre 2021; e Parco Nazionale di Prespa, 16–17 maggio 2022) e ai due seminari svolti presso la sede dell'Università della Tessaglia (29 giugno–1 luglio 2022 e 16–18 novembre 2022).

Il questionario del 2020 (40 domande a scelta multipla) è stato distribuito elettronicamente tramite Google Forms in una finestra temporale definita dopo la conclusione della formazione. I questionari del 2021 (20 domande, esclusivamente pratiche) e del 2022 (40 domande, avanzate e orientate alla pratica) sono stati cartacei e distribuiti a mano in loco immediatamente al termine delle sessioni. In tutti i casi, la compilazione era obbligatoria per il rilascio degli attestati di frequenza.

I risultati indicano una tendenza di miglioramento costante e una convergenza delle competenze tra le aree tematiche: le medie passano dal 71,3% (2020) al 74,9% (2021) e al 77,6% (2022), mentre si riduce la variabilità tra categorie. Pratiche e competenze operative critiche risultano ampiamente consolidate, segnando il passaggio dalla familiarità teorica a prestazioni pronte per il campo.

## Introduction

The first training course under the C.2.1 action was implemented by UTH as an online webinar on 10 November 2020, in close collaboration with CALLISTO. Although this course format was not originally foreseen in the LIFE ARCPROM project proposal, the outbreak of the COVID-19 pandemic—and the resulting restrictions on mobility, gatherings, and in-person educational activities—rendered field-based practical seminars temporarily unfeasible. Therefore, the consortium adopted a remote training solution as a necessary contingency to ensure continuity of capacity building and to provide stakeholders with a solid knowledge base ahead of the subsequent hands-on workshops planned under the action.

The webinar, entitled *“Managing human–bear conflicts,”* was attended by 76 participants, mainly working on Forest Services, National Park Management Organizations, as well as Federal Game Guard Association, regional administrations, and other public bodies involved in wildlife management and the governance of national protected areas. The training programme was drafted and presented by a multidisciplinary team of UTH staff and experts in the field, such as specialized veterinarians, a professional dog trainer, and field practitioners. The programme consisted of eleven thematic modules that collectively addressed the project’s core main objectives. Content covered monitoring techniques for brown bear populations in Greece and the early identification of conflict situations; prevention and deterrence methods to reduce human–bear encounters; the ethology, training, and veterinary health management of Livestock Guarding Dogs; basic veterinary first aid for working dogs; recognition and emergency response to poisoning incidents; major wildlife diseases of relevance to Greece and Europe, biosecurity standards and protocols for the safe collection, packaging, and transport of biological samples; field necropsy approaches for estimating cause and time of death in wild animals; and the institutional procedures of the Hellenic Agricultural Insurance Organization (ELGA) for reporting and assessing wildlife-related livestock damages.

In order to facilitate orderly participation in the digital environment and to document attendance, all participants were required to complete an online registration questionnaire before joining the seminar, which also captured baseline information on their professional background and expectations. Upon completing the webinar, attendees were additionally required to submit an electronic evaluation via Google Forms within a specified time frame. Completion of this evaluation was mandatory for the issuance of an official certificate of attendance.

Later, when small-scale gatherings were again permitted, UTH transitioned from remote delivery to in-person training and organized three two-day hands-on seminars under Action C2.1. These were hosted at the headquarters of the Rodopi Mountain National Park (RMNP) on 4–5 October 2021, at the headquarters of the Northern Pindos National Park (PINDNP) on 9–10 November 2021, and in a subsequent session held on 16–17 May 2022. Beyond the National Parks’ personnel, invitations were extended to state authorities and local professionals engaged in wildlife conservation, broadening the reach and operational relevance of

the capacity building. Each workshop comprised at least eleven modules delivered by six trainers—five members of the UTH team and one bear specialist from CALLISTO. For every topic, the trainer opened with a concise briefing and live demonstration and then guided participants through structured, supervised practice to consolidate skills in real-world conditions. The first day of each seminar focused on the safe handling of injured, trapped, or dead animals in the field and on the workflow of forensic investigation, including scene documentation. Trainers also presented the required biosafety measures and sampling principles for collecting, packaging, and transporting biological material for bacteriological, toxicological, and genetic analyses. The second day was devoted to the deployment and correct use of available deterrents for addressing bear presence within or near settlements, to the optimal, scenario-based application of the First-Aid Anti-Poison Kit developed within LIFE ARCPROM, and to behaviour-adjustment rationales for Livestock Guarding Dogs (LGDs) as explained by a professional working-dog trainer. In total, forty-nine participants attended the three 2021 seminars.

Under Task C2.2, UTH subsequently organized an intensive three-day seminar at the UTH in campus Larissa from 29 June to 1 July 2022, combining theoretical lectures with practical sessions and centring on tools and protocols that improve human–bear coexistence. Members of the UTH team, together with experts from CALLISTO and the Hellenic Natural Environment and Climate Change Agency (NECCA), delivered twenty modules. At the same time, a biologist from the Hellenic Ornithological Society (and former Anti-poison Dog Unit handler) presented current data on the use of canine ADUs against poison baits.

A second, complementary three-day seminar followed on 16–18 November 2022 at the UTH Faculty of Veterinary Medicine in Karditsa as a joint educational event of LIFE ARCPROM and LIFE Egyptian Vulture – New LIFE (LIFE16 NAT/BG/000874). Trainers again included specialists from UTH, CALLISTO, NECCA and the Hellenic Ornithological Society, and the event drew sixty-four participants who actively engaged in the practical components.

## Methodology

As noted above, across all training events—and immediately upon their completion—participants were required to complete a structured, knowledge-focused questionnaire designed to measure both comprehension and the ability to operationalize the topics delivered. The questionnaire was administered electronically via Google Forms and required timely submission within a defined time window; timely submission was a prerequisite for issuing each participant’s certificate of attendance. This procedure enabled an objective, comparable assessment of short-term learning outcomes by thematic area, documented active engagement, and generated actionable feedback to inform the design and refinement of subsequent capacity-building activities.

The questionnaires comprised a mix of easier and more demanding items and were explicitly designed



3. Which measure is most likely to fail if applied on its own when a Bear is foraging in garbage?

- a) Use of firecrackers
- b) Reinforcing waste bins with locking lids
- c) Active hazing with dogs
- d) Translocating the bear to another site  (31.6%, 24/76)

**Hint:** Translocation alone has high recidivism as they attractants remain. Bear Intervention Units should prioritize removing food rewards and reinforcing deterrents on-site.

4. In a LGD evaluation, which behaviour suggests a potential future difficulty?

- a) Avoidance of humans during social attraction  38.2% (29/76)
- b) Following a person
- c) Chasing a thrown object without returning it
- d) Indifference in general

**Hint:** Poor social attraction predicts handler aversion and weak responsiveness.

5. What was identified as the major practical constraint in developing the LGD network?

- a) Lack of suitable males
- b) Excessive microchip costs
- c) Inability to isolate females in heat  (61.8%, 47/76)
- d) Low resilience to leptospirosis

**Hint:** Managing estrus is critical for selective breeding and deployment schedules.

6. At 8–11 months of age, which characteristic is critical to strengthen in LGDs?

- a) Reinforcement of obedience commands
- b) Management of the fear period  59.2% (45/76)
- c) Ability to chase quarry
- d) Adaptation to kennels and transport

**Hint:** Mismanaged fear periods lead to persistent anxiety or aggression. Timely, controlled exposure ensures stable, reliable guardians.

7. Failure to vaccinate an LGD against rabies is considered:

- a) Illegal under Greek legislation  (90.8%, 69/76)
- b) A negligible omission
- c) Acceptable if the dog does not interact with people
- d) Permissible only in areas without rabies cases

**Hint:** Legal compliance protects public health and working teams. Up-to-date vaccination also streamlines post-exposure protocols.

8. For a dog with an external bleed, what is the correct sequence of actions?

- a) Apply antiseptic – bandage – pressure                      b) Remove the blood clot – irrigate – pressure  
c) Direct pressure – bandage – avoid removing the clot  (53.9% 41/76)                      d) Bandage & transport

**Hint:** Dislodging clots restarts bleeding. Field stabilization with pressure and dressings preserves perfusion until veterinary care.

9. In suspected anticoagulant rodenticide poisoning, which action is prohibited?

- a) Administering vitamin K1                      b) Inducing emesis if more than 2 hours have elapsed  (75.0%, 57/76)  
c) Administering activated charcoal                      d) Immediate transport to a veterinary clinic

**Hint:** Late emesis risks aspiration with little benefit. Prioritize vitamin K1 and rapid referral.

10. In which disease is behaviour change and loss of fear of humans' classic early signs?

- a) Rabies  (86.8%, 66/76)                      b) African swine fever  
c) European brown hare syndrome                      d) Leptospirosis

**Hint:** Early recognition limits exposure of personnel and the public. Always pair suspicion with strict bite-avoidance and reporting.

11. On opening a dead hare with European brown hare syndrome, which finding is most indicative?

- a) Extensive pulmonary hemorrhage                      b) Skeletal deformities of the limbs  
c) Hepatic enlargement with discoloration/degeneration  (64.5%, 49/76)                      d) Focal pancreatic lesions

**Hint:** Targeted necropsy observations guide sampling. Correct tissues increase diagnostic yield.

12. African swine fever is notably resilient because it:

- a) Transmitted by mosquitoes                      b) Survives for months in viscera  (82.9%, 63/76)  
c) Has an incubation period under 24 hours                      d) Mutates rapidly and escapes vaccination

**Hint:** Persistence in tissues demands strict carcass handling. Preventing carcass movement curbs spread.



18. What is the main reason direct personal outreach is used to invite stakeholders to such trainings?

- a) To increase turnout and participation  (78.9%,60/76)      b) Requirement imposed by the EU  
c) To reduce administrative costs      d) Filling communication gap

**Hint:** Wider attendance improves operational readiness.

19. Which of the following drugs is considered an antidote for most pesticide exposures used in poison baits?

- a) Atropine  (85.5%, 65/76)      b) Apomorphine      c) Syrup of ipecac      d) Vitamin K1

**Hint:** Cholinergic signs require prompt atropinization.

20. In which situation should you NOT attempt to induce emesis in a dog that has ingested a bait?

- a) When <2 hours have elapsed since ingestion  
b) When a corrosive/caustic substance was ingested  (92.1%, 70/76)  
c) When the animal is conscious  
d) When the poison was in powder form

**Hint:** Corrosives cause further injury on re-exposure.

21. Which sign is the earliest warning indicator of poisoning in dogs?

- a) Generalized seizures      b) Hypersalivation and muscle tremors  (65.8%,50/76)  
c) Collapse with loss of consciousness      d) Mucosal hemorrhage

**Hint:** Early cholinergic signs prompt faster intervention and better outcomes.

22. In Greece, which animal is the primary reservoir of the rabies virus?

- a) Bear      b) Fox  (89.5%, 68/76)      c) Wild boar      d) Dog

**Hint:** Reservoir identification shapes surveillance and vaccination priorities.

23. During an outbreak of European brown hare syndrome, which age is most commonly affected?

- a) <20 days                      b) 20–30 days                      c) >40–50 days  (56.6%, 43/76)                      d) Only adults

**Hint:** Age susceptibility patterns guide interpretation of die-offs.

24. At what temperature and for how long is the African swine fever virus inactivated?

- a) 40 °C for 10 minutes                      b) 50 °C for 20 minutes  
c) 60 °C for 30 minutes  (68.4%, 52/76)                      d) 70 °C for 5 minutes

**Hint:** Heat thresholds inform decontamination protocols. Correct parameters reduce residual risk.

25. Which of the following is NOT a classic clinical manifestation of African swine fever?

- a) Cutaneous hyperemia (ears, tail)                      b) Jaundice and splenomegaly  
c) Extensive fractures  (93.4%, 71/76)                      d) Cyanosis of the extremities

**Hint:** Recognizing typical vs. irrelevant signs avoids misdiagnosis.

26. What is the purpose of the triple-packaging rule for hazardous specimens?

- a) Simplify transport                      b) Reduce cost  
c) Prevent leakage and contamination  (80.3%, 61/76)                      d) Facilitate storage

**Hint:** Containment layers protect handlers, couriers, and labs. Compliance is legally and ethically required.

27. Which specimen is most suitable for rabies laboratory testing?

- a) Spleen                      b) Liver                      c) Brain  (94.7%, 72/76)                      d) Kidney

**Hint:** Rabies diagnosis relies on CNS tissues. Proper sampling prevents false negatives.

28. In genetic sampling, why is the hair root critical?

- a) It contains proteins of high diagnostic value                      b) It contains nuclear-cell DNA  (90.8%, 69/76)  
c) It carries fewer contaminants                      d) It preserves better at room temperature

**Hint:** Correct collection improves downstream analysis.

29. What is the correct practice for shipping tissues for pathology?

- a) Store at ambient temperature  
b) Ship immediately without cooling  
c) Keep at ~4 °C and transport promptly  (67.1%, 51/76)  
d) Freeze at -80 °C in all cases

**Hint:** Chilling slows autolysis while preserving histology and culture viability.

30. Which area typically develops rigor mortis first?

- a) Hind limbs  
b) Head and jaw  (60.5%, 46/76)  
c) Forelimbs  
d) Vertebral column

**Hint:** Early jaw stiffness is a practical field cue. Combined with temperature, it refines post-mortem timing.

31. Which finding most reliably indicates a recent death (<3 hours)?

- a) Body temperature drop of ~1 °C per hour  (55.3%, 42/76)  
b) Change in urine color  
c) Development of jaundice  
d) Tissue putrefaction

**Hint:** Temperature kinetics, interpreted with ambient conditions, provide a quantitative anchor.

32. Why does ambient temperature strongly affect time-of-death estimation?

- a) It alters blood flow  
b) It changes the rate of post-mortem cooling  (84.2%, 64/76)  
c) It affects gastric pH  
d) It causes differences in anaerobic glycolysis

**Hint:** Recording weather conditions is part of good field practice.

33. To document bear-related damage to a herd, which piece of evidence is most material?

- a) Track impression (paw print)  
b) Presence of bear hair  
c) Bite depth on the carcass  (40.8%, 31/76)  
d) A witness statement

**Hint:** Wound morphology and bite metrics most directly support predator attribution.



39. During training, what is the appropriate age to introduce an LGD puppy to the herd?

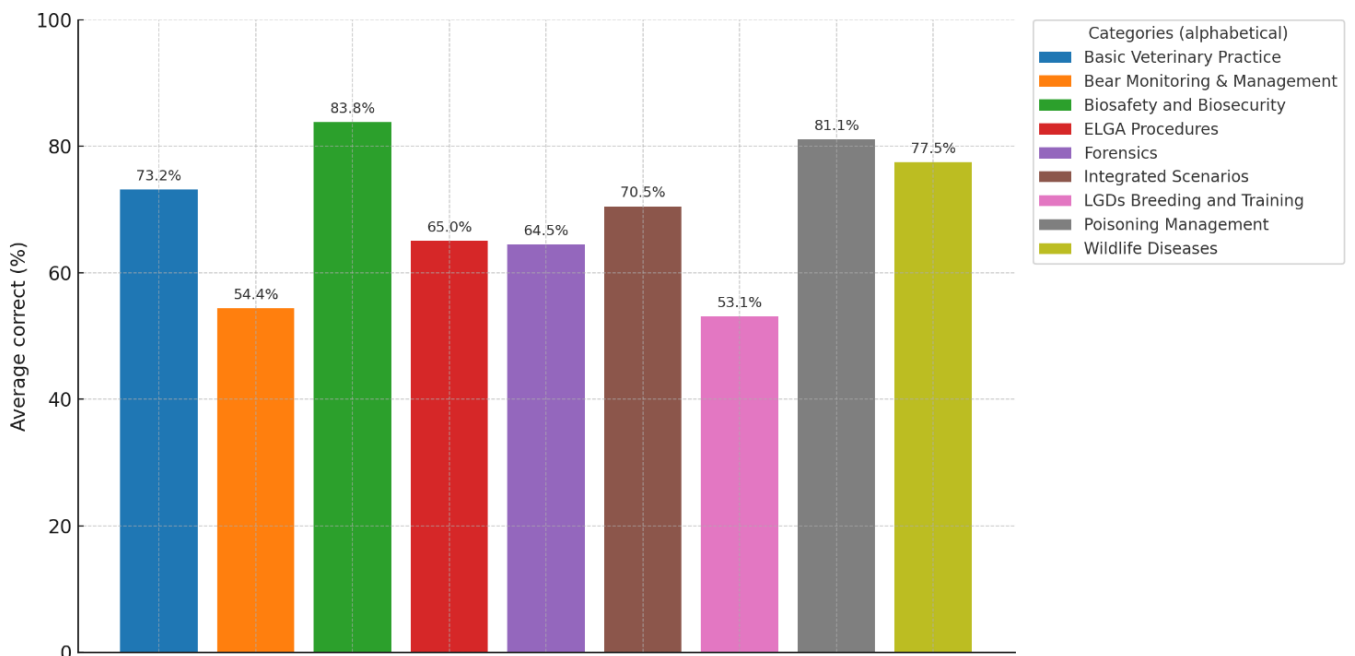
- a) 1 month      b) 3–4 months  (86.8%, 66/76)      c) 6–7 months      d) >12 months

**Hint:** Post-socialization, early herd bonding improves imprinting and task focus. Late introduction risks predation on stock or roaming.

40. What is the greatest challenge for effective response to bear–human incidents according to the training?

- a) Lack of equipment      b) Insufficient inter-agency cooperation  (63.2%, 48/76)  
c) Excessive cost of actions      d) Difficulty locating bears

**Hint:** Coordination bottlenecks delay and dilute response quality. Shared protocols and contact chains are as vital as gear.



**Figure 1.** Average Correct Response Rate by Category

## B. Two-Day Hands-On Field Workshops (Action C2.1)

1. Before approaching a wildlife carcass, what is the correct PPE donning sequence?

- a) Gloves → Mask → Suit → Goggles
- b) Suit → Mask/Respirator → Goggles/Face shield → Gloves  (78%, 38/49)
- c) Mask → Gloves → Goggles → Suit
- d) Goggles → Suit → Gloves → Mask

**Hint:** Correct donning order prevents contaminating clean PPE surfaces; gloves go on last so you keep the exterior of other items clean.

2. When securing the scene of a carcass find, what comes first?

- a) Sampling
- b) Moving the animal for better photos
- c) Perimeter marking/tape and control of third-party access  (84%, 41/49)
- d) Area disinfection

**Hint:** Early scene control preserves evidence and reduces biohazard exposure, allowing safe and defensible documentation.

3. For photographic documentation, which sequence is correct?

- a) Close-ups → Mid-range → Panoramic
- b) Any order, timestamps are enough
- b) Panoramic → Mid-range → Close-ups  (69%, 34/49)
- d) Mid-range → Panoramic → Close-ups

**Hint:** Wide–mid–close preserves context and orientation before details; scaled close-ups support measurements later.

4. In field estimation of cause/time of death, which action has priority?

- a) Measure rectal temperature and record ambient temperature  (85.7%, 42/49)
- b) Check urine color
- c) Test rigor only on hind limbs
- d) Immediate dissection to look for lesions

**Hint:** Temperature provides a quantitative baseline for Post-mortem interval (PMI); other signs are slower or nonspecific.

5. Which practice reduces cross-contamination during necropsy?

- a) Using the same scalpel for all organs
- b) Frequent tool/blade changes with disinfecting between steps  (65%, 32/49)
- c) Storing all organs in one jar
- d) Avoid changing gloves

**Hint:** Clean instrument changes and glove hygiene prevent carry-over of organisms across tissues and samples

6. For microbiological sampling, which choice is correct?

- a) Take from “clean” tissue after rinsing with water
- b) Sterile swab from active lesions before opening viscera  (61%, 30/49)
- c) Take only from muscle
- d) Place in formalin

**Hint:** Swabbing active lesions first preserves pathogen load and avoids contamination from gut contents after opening.

7. For toxicological analysis, which packaging is appropriate?

- a) Tissues in formalin at room temperature
- b) Tissues in clean, sterile container; cold chain at ~4 °C  (73%, 36/49)
- c) Swabs in dry gauze without a label
- d) Mix different tissues in one container

**Hint:** Many toxins are measurable only in unfixed tissue; cold chain prevents degradation.

8. For genetic analysis, which practice minimizes contamination?

- a) Snip hairs at the tip with scissors
- b) Pluck hairs with root using tweezers; separate envelopes per sample  (80%, 39/49)
- c) Store hairs in a trouser-pocket plastic bag
- d) Pluck without gloves

**Hint:** Hair roots carry nuclear DNA; individual envelopes and clean handling prevent mixed profiles.

9. In triple packaging of hazardous specimens, which layering is correct?

- a) Non-watertight primary – Paper secondary – Soft outer
- b) Watertight primary – Watertight secondary – Rigid outer  (85.7%, 42/49)
- c) Paper primary – Hard secondary – Small pouch outer
- d) Unprotected glass primary – Box secondary – Sack outer

**Hint:** The triple barrier prevents leaks during transport and meets legal biosafety requirements.

10. Which label information must never be missing from a sample?

- a) Collector’s name only
- b) Sample code, date/time, location, species/tissue  (85.7%, 42/49)
- c) GPS only
- d) Tissue only

**Hint:** Complete metadata enables traceability, correct lab routing, and defensible reporting.

11. What is the correct PPE doffing sequence to avoid self-contamination?

- a) Remove mask first, then gloves
- b) Gloves off → Goggles/face shield → Suit → Mask, with hand hygiene between steps  (55%, 27/49)
- c) Remove everything at once
- d) Suit → Gloves → Mask → Goggles

**Hint:** The highest-contamination items (gloves) come off first; hand hygiene between steps prevents face and clothing contamination.

12. During an LGD field health check, what precedes for safety?

- a) Measure heart rate
- b) Apply muzzle and gentle restraint  (59%, 29/49)
- c) Administer a sedative
- d) Take temperature

**Hint:** Safe restraint protects the team and the dog, allowing accurate vitals and examination.

13. First aid for external bleeding in a dog — correct sequence?

- a) Antiseptic → bandage → pressure
- b) Remove clot → irrigate → pressure
- c) Direct pressure → bandage/immobilize → avoid removing the clot  (85.7%, 42/49)
- d) Loose bandage → transport

**Hint:** Maintaining the clot and continuous pressure reduces blood loss until veterinary care.

14. Suspected pesticide poisoning with hypersalivation & tremors — immediate actions?

- a) Administer atropine per protocol and contact a veterinarian  (82%, 40/49)
- b) Empirical antibiotic
- c) Wait for seizures to appear
- d) Give large amounts of water

**Hint:** Muscarinic signs indicate cholinergic toxidrome; atropine is critical while arranging definitive treatment.

15. Bait ingestion <2 h ago; dog alert and airway protected. Appropriate kit use?

- a) Apomorphine to induce emesis under supervision, then activated charcoal  (71%, 35/49)
- b) Intramuscular adrenaline
- c) Formalin from the kit
- d) No intervention before transport

**Hint:** Early emesis plus charcoal reduces absorption; only when the airway is protected and timing is appropriate.

16. Using deterrents inside a settlement — which practice is correct?

- a) Drive the bear toward a dead end to prevent escape
- b) Maintain a safe escape corridor and apply noise/visual deterrents from distance  (65%, 32/49)
- c) Close in for a stronger stimulus
- d) Gather people to “push” the bear out

**Hint:** Bears must have a clear exit; controlled distance and coordinated signals reduce risk to people and the animal.

17. Farm visit after an incident — which cooperation protocol is correct?

- a) Move the carcass for better photos
- b) Explain the process, keep the scene intact, document, collect samples  (90%, 44/49)
- c) Ask for area clean-up before inspection
- d) Rely on verbal statements only

**Hint:** Preserving the scene improves species attribution and evidence quality for compensation and management actions.

18. Safe transport of contaminated disposables/PPE after the exercise:

- a) Discard in the nearest bin
- b) Place in a biohazard bag, seal, and send for sterilization  (92%, 45/49)
- c) Burn on site
- d) Keep unbagged in the vehicle

**Hint:** Regulated medical waste handling prevents exposure and complies with biosafety regulations.

19. Necropsy training under rabies restrictions — on what material was the demonstration performed and why?

- a) Random field mammals, for realism
- b) Wild birds with known cause of death, for compliance and safety  (53%, 26/49)
- c) Farm animals, for availability
- d) Frozen specimens without PPE, because there is no risk

**Hint:** Known-status avian material minimizes rabies risk while still enabling full procedural training.

20. In LGD field training, which practice is most effective for correcting unwanted behavior?

- a) Punishment after the event
- b) Targeted exercises, short repetitions, and handler consistency  (78%, 38/49)
- c) Long periods of isolation
- d) Long walks without guidance

**Hint:** Positive reinforcement with brief, consistent sessions builds reliable behaviors and avoids stress-induced setbacks.



3. Which is the best practice for orientation control in scene photography?

- a) Use GPS metadata only
- b) Include a north arrow and a photo slate with case ID in the first frame  (64.4%, 29/45)
- c) Rely on sun position
- d) Add direction later in notes

**Hint:** A visible arrow and slate anchor every subsequent image, preserving spatial context for reconstruction.

4. GPS documentation that maximizes reliability is to:

- a) Record coordinates once at the end
- b) Log coordinates and altitude at the start and end, and note device accuracy  (71.1%, 32/45)
- c) Screenshot a map only
- d) Trust phone location services

**Hint:** Redundant fixes plus accuracy estimates protect against drift and loss of precision in reports.

5. Before collecting surface swabs near suspected toxic bait, you should first:

- a) Start swabbing immediately
- b) Collect a field blank and label it as such  (66.6%, 30/45)
- c) Deodorize the area
- d) Wipe tools with alcohol after each swab only

**Hint:** Field blanks detect background contamination and validate negative findings.

6. Entomological evidence at a decomposed carcass is best preserved by:

- a) Freezing all larvae
- b) Preserving some larvae in ethanol and keeping a subset alive for rearing  (64.4%, 29/45)
- c) Sun-drying maggots first
- d) Rinsing larvae in bleach

**Hint:** Split-preservation enables both morphological ID and developmental-stage timing for PMI estimates.

7. When using chemical disinfectants on tools/surfaces in the Warm zone, you should:

- a) Wipe and move on immediately
- b) Keep surfaces visibly wet for the full contact time specified by the manufacturer  (48.8%, 22/45)
- c) Dilute more to be safer
- d) Rinse off right away

**Hint:** Disinfectants work by time-on-surface; rushing defeats decontamination.

8. Gloving strategy to reduce cross-contamination between specimens:

- a) Single pair throughout
- b) Double-glove and change the outer glove between samples  (66.6%, 30/45)
- c) Change gloves only if torn
- d) Use cloth gloves over nitrile

**Hint:** An outer “sacrificial” layer allows rapid turnover without breaking workflow.

9. During multi-specimen transport, how do you prevent vapor cross-effects on DNA integrity?

- a) Pack all together if sealed
- b) Physically segregate formalin-fixed from fresh/forensic specimens  (62.2%, 28/45)
- c) Add more ice to one cooler
- d) Vent the cooler frequently

**Hint:** Formalin fumes damage nucleic acids; separation protects genetic analyses.

10. Most defensible chain-of-custody practice for sample security:

- a) Initial the label only
- b) Seal containers with tamper-evident seals and record serial numbers  (82.2%, 37/45)
- c) Photograph the lid once
- d) Have a colleague witness verbally

**Hint:** Tamper-evident seals with logged numbers make custody breaks visible and auditable.

11. Deploying an Anti-poison Dog Unit (ADU) on suspected bait terrain, the search pattern should:

- a) Random-walk to cover more ground
- b) Run systematic transects perpendicular to wind to maximize scent encounters  (53.3%, 24/45)
- c) Follow vehicle tracks only
- d) Keep the dog downwind of the handler

**Hint:** Crosswind transects keep odor plumes intersecting the dog’s path predictably.

12. Post-emesis care after apomorphine (dog is stable): optimal immediate positioning is:

- a) Trendelenburg
- b) Sternal or lateral recumbency with head slightly down to protect airway  (44.4%, 20/45)
- c) Upright sitting
- d) Prone with head elevated

**Hint:** Airway protection reduces aspiration risk during residual vomiting.

13. In LGD behavior shaping, timing of reinforcement for a desired response should be:

- a) Whenever convenient
- b) Within 1–2 seconds of the behavior  (68.8%, 31/45)
- c) After the dog returns to the pen
- d) At the end of the day

**Hint:** Short latency links the reward to the exact behavior, strengthening correct associations.

14. At a livestock incident scene guarded by LGDs, first move is to:

- a) Pet the dog to gain trust
- b) Secure the LGD on a lead away from the carcass before examination  (93,3%, 42/45)
- c) Toss treats to distract
- d) Ignore the dog and work faster

**Hint:** Controlled restraint protects the team and preserves the scene from trampling or scent transfer.

15. Non-lethal bear hazing team roles should be assigned so that:

- a) Everyone does everything
- b) One leads safety/comms, one controls vehicle positioning, one deploys deterrents  (100%, 45/45)
- c) Only the loudest person leads
- d) Tools are passed around

**Hint:** Pre-assigned roles reduce confusion and keep the escape corridor clear during escalation.

16. Before relying on electric fencing at an apiary site, you should first:

- a) Turn it on and hope
- b) Clear vegetation from wires and verify grounding/continuity with a tester  (91.1%, 41/45)
- c) Add more posts
- d) Lower voltage to reduce shocks

**Hint:** Plant contact bleeds charge; grounding and continuity determine real deterrent power.

17. Vehicle decontamination on egress should prioritize:

- a) Car wash later
- b) Wheel wells/undercarriage with disinfectant, ensuring full contact time  (100%, 45/45)
- c) Quick rinse only
- d) Exterior windows first

**Hint:** Mud and organic debris under the vehicle spread pathogens between sites if not treated.

18. Which factor most commonly misleads PMI estimates if not recorded?

- a) Moon phase
- b) Wind and shade/sun exposure during the interval  (75.5%, 34/45)
- c) Color of the coat
- d) Presence of insects alone

**Hint:** Convection and solar loading drive heat loss/gain; without them, temperature-based PMI drifts.

19. Photolog discipline that best supports later reconstruction:

- a) Number images after the fact
- b) Begin with a slate (ID/date/time) and maintain continuous frame numbering  (100%, 45/45)
- c) Keep only the best shots
- d) Rely on memory for gaps

**Hint:** A strict photolog prevents missing links between frames and notes.

20. Time-critical sampling triage when minutes are limited:

- a) Random tissues
- b) Sterile swabs first, then high-yield targets (e.g., liver for tox, stomach content for bait)  (100%, 45/44)
- c) Bones only
- d) Fur only

**Hint:** Early sterile sampling preserves pathogen/toxin signals before contamination or degradation.

21. Initial area search to locate ancillary evidence (tracks, drag marks, scat) should use:

- a) Straight-line sprint
- b) An expanding spiral or grid from the carcass outward  (88.8%, 40/45)
- c) Perimeter-only Walk
- d) Random zigzag

**Hint:** Systematic patterns prevent blind spots and document secondary scenes.

22. Karelian Bear Dogs (KBDs) during urban-edge hazing must be:

- a) Off-leash for speed
- b) On long lines with strict handler control; no direct contact with the bear  (91.1%, 41/45)
- c) Muzzled to prevent barking
- d) Placed in vehicles

**Hint:** Leashed control avoids pursuit/entrapment and keeps focus on directional pressure, not chase.

23. Before deploying pyrotechnic deterrents in dry conditions, you should:

- a) Fire a test round immediately
- b) Confirm fire risk status, prepare extinguishing means and draw a safe firing direction  (91.1%, 41/45)
- c) Stand in tall grass for stability
- d) Aim directly at the animal

**Hint:** Pre-checks prevent starting wildfires and align deterrents with the escape corridor.

24. Sharps management during field necropsy:

- a) Recap blades carefully
- b) Use a blade remover or forceps; discard in a rigid sharps container on site  (73.3%, 33/45)
- c) Snap blades by hand into a bottle
- d) Wrap in tape and pocket them

**Hint:** Hands-off removal and proper containers eliminate needle-stick hazards and meet biosafety rules.

25. Needle-stick/cut with potentially infected material: first response is to:

- a) Apply a tourniquet
- b) Allow brief bleeding, wash with soap/water, disinfect and report  (95.5%, 43/45)
- c) Seal with glue
- d) Ignore if minor

**Hint:** Immediate irrigation reduces inoculum; documentation enables post-exposure care.

26. Insect evidence for toxicology (secondary exposure) is best handled by:

- a) Discarding all insects as irrelevant
- b) Collecting larvae from gut contents and preserving subsets appropriately  (93.3%, 42/45)
- c) Preserving only adults
- d) Freezing everything without labels

**Hint:** Insect tissues may reflect toxins; stratified collection supports lab assays.

27. Changing gloves in a multi-carcass operation should occur:

- a) Only when visibly soiled
- b) Between each carcass and whenever moving from dirty to sterile steps  (100%, 45/45)
- c) At lunch
- d) At the end only

**Hint:** Frequent glove changes break contamination chains and protect culture/PCR success.

28. Hair sample preservation for DNA in the field improves when you:

- a) Store wet in plastic tubes
- b) Use paper envelopes with desiccant; avoid humidity and heat  (100%, 45/84)
- c) Compress into a vial
- d) Add perfume to mask odors

**Hint:** Dry, breathable storage protects nuclear DNA in follicles from degradation.

29. Data integrity for samples is best ensured by:

- a) Labels only on the lid
- b) Duplicate identifiers (container + inner label) and a photo of label next to the sample  (100%, 45/45)
- c) Pencil on wet plastic
- d) Memory notes

**Hint:** Redundancy prevents mislabeling if condensation or abrasion smears outer labels.

30. Public communication during a settlement response should be handled by:

- a) Anyone on the team who is free
- b) A designated liaison who controls information and coordinates with authorities  (100%, 44/44)
- c) Posting live locations on social media
- d) Asking bystanders to spread the word

**Hint:** A single voice reduces rumors, keeps people clear of danger, and protects evidence.

31. Electric fence troubleshooting: the most common field fix is to:

- a) Lower the energizer setting
- b) Locate/clear vegetation bridges and check earth rods for corrosion/loose clamps  (100%, 45/45)
- c) Add more warning signs
- d) Move the battery indoors

**Hint:** Vegetation drains charge; bad grounding kills voltage—solve these first.

32. PPE removal quality improves when you:

- a) Rush to minimize exposure time
- b) Use a buddy check to call out contaminated surfaces during doffing  (100%, 45/45)
- c) Remove respirator first
- d) Sit down and peel everything off

**Hint:** A second set of eyes catches risky hand-to-face moves and sleeve “snap-backs.”

33. First-aid sequencing on a poisoned working dog should begin with:

- a) Antidotes immediately
- b) Primary survey (airway, breathing, circulation) before specific antidotes  (84.4%, 38/45)
- c) Blood draw on site
- d) Running to reduce stress

**Hint:** ABC priorities prevent hypoxia, which kills faster than toxins; antidotes follow stabilization.

34. Carcass transport when authorized must include:

- a) Wrapping in a tarpaulin only
- b) Double-bagging with absorbent, cold chain maintenance, and documented custody  (100%, 45/45)
- c) Tying to roof racks
- d) Leaving bags unsealed to vent

**Hint:** Proper packaging protects personnel, vehicles, and evidence quality.

35. Documenting bite evidence before necropsy requires:

- a) Immediate rinsing of wounds
- b) Scaled photos and precise canine spacing measurements prior to manipulation  (100%, 45/45)
- c) Suturing to preserve tissue
- d) Removing skin first

**Hint:** Pre-manipulation metrics support predator attribution and withstand scrutiny.

36. Track and sign orientation for movement analysis should:

- a) Ignore directionality
- b) Mark travel direction with arrows and map start/stop coordinates  (82.2%, 37/44)
- c) Photograph only one print
- d) Sketch later from memory

**Hint:** Direction marks and coordinates allow later reconstruction of routes/escape corridors.

37. Moistening a swab for low-moisture biological residues is best done with:

- a) Tap water
- b) Sterile saline or sterile water, applied sparingly  (97.7%, 44/45)
- c) Alcohol to dissolve proteins
- d) Bleach for sterility

**Hint:** Minimal sterile moisture improves collection without inhibiting downstream assays.

38. When time is short and you must choose one tissue for toxicology, prioritize:

- a) Skin
- b) Liver  (77.7%, 35/45)
- c) Spleen
- d) Pancreas

**Hint:** Liver concentrates many xenobiotics and gives the highest probability of detection.

39. Vehicle positioning during night hazing should:

- a) Box the bear in tightly
- b) Funnel the animal toward the designated escape corridor at a 45° angle  (53.3%, 24/45)
- c) Illuminate from all sides
- d) Park directly in the corridor

**Hint:** Angled positioning guides movement without trapping, reducing panic and property damage.

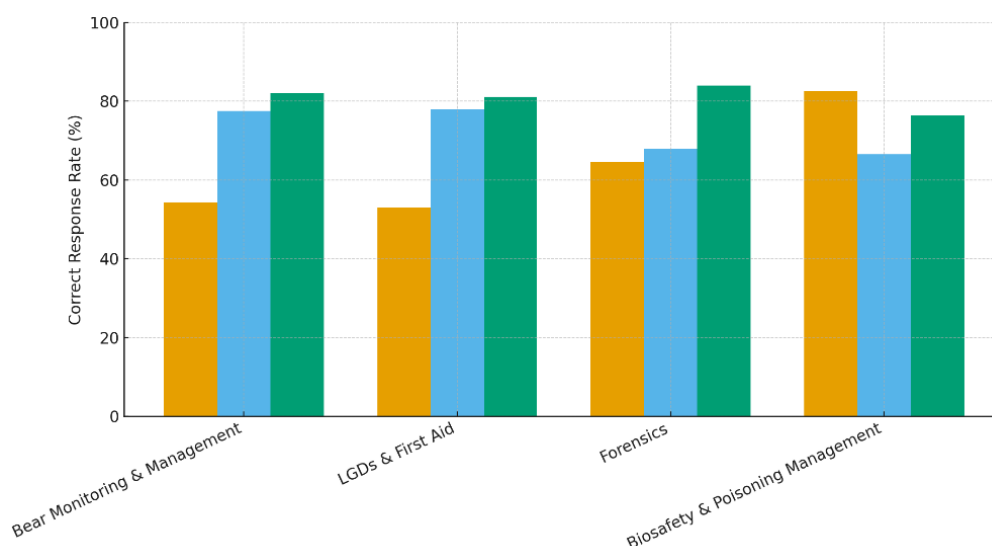
40. If you must correct a chain-of-custody entry mistake, you should:

- a) Erase and rewrite
- b) Strike-through with a single line, initial/date, and add the correct entry
- c) Start a new form without the error  (91.1%, 41/44)
- d) Use white-out and reprint

**Hint:** Transparent amendments preserve document integrity and audit trails.

## Conclusions

Overall, the evaluation of the three questionnaires indicated a steady and meaningful progression from basic knowledge to solid field competence. While the questionnaires were not strictly equivalent, they clearly revealed an increase in correct responses from 61.6% (Action C.2.1 Webinar) to 73.4% (Action C.2.1 Field Workshops) and 78.2% (Action C.2.2 Three-Day Seminars). In addition to the upward trend in the central tendency, the dispersion between the areas is decreasing over time. This indicates not only improved averages, but also a more even distribution of competences in the areas of security, evidence handling, compliance with laws, and deterrent measures.



**Figure 3.** Average correct response rate per thematic category across the three training phases of the educational program: *Action C.2.1 Webinar* (orange), *Action C.2.1 Field Workshops* (blue), and *Action C.2.2 Three-Day Seminars* (green). The chart illustrates participants' performance progression from the initial online training to field workshops and the final three-day seminars.

The 2020 webinar established the baseline profile. Performance was strong where procedures are codified and cognitively compact—Biosafety & Biosecurity (~83.8%) and Poisoning Management (~81.1%)—yet notably weaker in domains requiring integrated situational judgment, namely Bear Monitoring & Management (~54.4%), LGDs Breeding & Training (~53.1%), and Forensics (~64.5%). Administrative compliance (ELGA Procedures ~65.0%) was adequate but not yet audit-tight, indicating partial familiarity with documentation sufficiency and chain-of-custody standards.

The 2021 field workshop recorded an increase of +11.8 percentage points (to 73.4%) and shifted the focus of strength towards execution under duress. Categories such as sampling and chain of custody (78.1%), toxicology and first aid (77.9%), bear deterrence and incident response (77.5%) and crime scene management and documentation (76.5%) improved, which is consistent with the practical exercises that required boundary setting, panoramic, medium and close-up views with scale, sterile first extraction and prioritisation of tissue (e.g. liver for toxicology). Two weaknesses remained: (i) Biosafety & PPE (66.5%), particularly doff choreography and compliance with disinfectant contact times, and (ii) Forensics & Necropsy (67.9%), where control of cross-contamination between organs and instrument changes were inconsistent. The very good performance in the Waste & Decontamination category (92.0%) on one targeted item underlines that clear, highly proceduralised tasks are performed reliably.

The 2022 C.2.2 three-day seminars and workshops consolidated and extended these gains. The overall mean of 78.2% reflects improvement over both prior cohorts and, more importantly, convergence across domains: Bear Monitoring & Management 82.1%, LGDs & First Aid 81.1%, Forensics 84.0%, and Biosafety & Poisoning 76.3%. This tighter band of scores indicates a maturing training ecology in which the program no longer produces narrow specialists alongside weak links; instead, it lifts the cohort to a consistently competent operational floor. Item-level patterns reinforce this reading: standardized scene zoning (hot/warm/cold with single ingress/egress), tamper-evident sealing with recorded serials, double-gloving with outer-glove turnover, long-line control and cross-wind transects for ADUs, role-based non-lethal hazing (safety/comms, vehicle funnelling at ~45° to an escape corridor), and ABC-first clinical sequencing are now widely internalized.

In order to further consolidate knowledge and strengthen operational competencies—including throughout the After-LIFE period—UTH recommends a coherent package of evidence-informed measures: brief, high-frequency micro-drills on PMI and forensic entomology anchored in a one-page environmental pro forma together with a two-jar specimen-collection protocol (fixed and live material), assessed via standardized checklists; the institutionalization of laminated pocket SOPs targeting recurrent deviations and joint field exercises bringing together ADUs and rapid-response teams with local authorities to rehearse escape-corridor management, legally compliant deterrent toolsets, and structured public liaison under realistic operational constraints

