INTERNATIONAL FEDERATION OF BEEKEEPERS' ASSOCIATIONS

POLICY BRIEF

RESEARCH GAPS IN VETERINARY MEDICINE:

MAPPING AREAS THAT NEED MORE DATA

1. Executive Summary

Issue:

Veterinary medicine in apiculture is constrained by major research gaps in disease epidemiology, diagnostics, treatment efficacy, pharmacovigilance, and emerging technologies.

Why it matters:

Insufficient evidence weakens disease prevention, treatment decisions, residue control, and long-term honey bee health management. This limits the effectiveness of veterinary support for beekeeping and slows policy development.

Key gap:

There is no coordinated international framework to identify, prioritize, and address the most urgent research gaps in honey bee veterinary medicine.

Main recommendations:

- Develop an international research gap map for veterinary medicine in apiculture.

- Prioritize research on disease surveillance, disease dynamics, diagnostics, treatment safety and efficacy, and pharmacovigilance.
- Improve coordination among researchers, veterinary authorities, beekeeping organizations, and beekeepers through holistic approaches.
- Strengthen participation in national beekeeping advisory and extension services on bee health and diseases.
- Translate research priorities into funding, regulation, and practice.

Target institution(s):
Apimondia, WHO, WOAH, FAO, IAEA, national veterinary authorities, research funding bodies, universities, and beekeeper organizations.

2. Background and Context

Status: Honey bee health is threatened by multiple interacting factors, including pesticides, diseases, parasites, and environmental stressors. Yet veterinary decision-making in apiculture is often based on incomplete, fragmented, or region-specific evidence.

Existing international/national framework: General animal health and food safety frameworks exist for other livestock sectors, but apiculture-specific veterinary research priorities remain poorly harmonized. In many countries, surveillance, diagnostics, treatment guidance, and residue monitoring are not sufficiently standardized or implemented in practice.

Relevance to animal health/sustainability/One Health: Honey bees are essential for pollination, biodiversity, food production, and ecosystem health. Research gaps in veterinary medicine therefore affect animal health, bee welfare, sustainability, agriculture, and One Health outcomes. Contemporary veterinary science in apiculture must protect and improve honey bee health as a foundation for sustainable beekeeping, food safety, and ecosystem stability.

3. Problem Statement

What is not functioning effectively?

Research in honey bee veterinary medicine is not sufficiently coordinated, comparable, or translated into practical veterinary guidance and policy.

What is missing?

- Long-term and globally comparable epidemiological data on honey bee diseases, pests, and colony losses.
- More complete and reliable reporting, as WOAH disease and pest country status data for Apinae remain a major information gap in many regions.
- Standardized diagnostic thresholds for clinical and subclinical infections and infestations.
- Strong field evidence on treatment efficacy, safety, and resistance risks.
- Better knowledge of disease transmission between apiaries and across regions within countries.
- Better evidence on nutrition, hive conditions, and colony management as determinants of colony health.
- Pharmacovigilance systems for adverse effects, treatment outcomes, and residues in hive products.
- Validation of digital and precision tools for veterinary use in apiculture.
- Accessible data systems and harmonized networks for information sharing among stakeholders.

What is the regulatory/institutional gap?

Globally, apiculture remains underrepresented in mainstream veterinary policy. Institutional coordination is limited for setting educational and research priorities, sharing data, and translating evidence into guidelines.

Who is affected?

Beekeepers, veterinarians, researchers, regulators, consumers, and ecosystems dependent on pollination services are all affected.

4. Evidence Base

Evidence point **1:** Honey bee colony losses are driven by multiple interacting stressors, but the relative contribution of pathogens, invasive species, environmental stressors, and management factors is still not sufficiently resolved across regions, and the available data are often not accessible to stakeholders.

Evidence point **2:** Important evidence gaps remain regarding veterinary medicinal products for bees, including optimal dosage, field efficacy, safety, resistance development, residue dynamics, and impacts on honey bee health.

Evidence point **3:** Emerging tools such as IoT-based hive monitoring, microbiome approaches, and novel therapeutics show promise, but their veterinary value, reliability, and regulatory relevance are not yet supported by enough standardized and open-access field data globally.

Optional data source/reference: National surveillance programs, COLOSS colony loss monitoring, peer-reviewed literature on AFB, EFB, Varroa, residues, and precision apiculture.

5. Policy Gap Analysis

Structural limitation: Apiculture research is often underfunded and treated as a niche field rather than an integral part of veterinary medicine.

Coordination gap: There is no shared international mechanism to regularly map and update evidence-based research gaps in honey bee veterinary medicine.

Institutional barrier: Veterinary authorities, laboratories, universities, and beekeeper organizations often work separately, with limited integration of research, surveillance, and policy.

Underutilized stakeholder(s): Field veterinarians, diagnostic laboratories, veterinary institutes, beekeeping associations, beekeepers, technology developers, research funders, apiculture industry, policy bodies.

6. Recommendations

- An international research gap map for veterinary medicine in apiculture should be established and regularly updated under Apimondia coordination.
- The faculties of veterinary medicine, agriculture, biology, and environmental sciences should be actively involved in basic and applied research, innovation in diagnostics and treatment, and postgraduate education and training in apiculture.
- Priority research areas should be formally defined, including disease epidemiology, invasive species, diagnostics, treatment efficacy, pharmacovigilance, residue dynamics, forensic veterinary medicine, and digital veterinary tools.

- National and international funding bodies support targeted, applied, and field-based veterinary research in apiculture to promote sustainable and evidence-based practices.
- Cross-sector platforms be created to connect veterinarians, researchers, laboratories, beekeepers, and regulators for shared evidence generation, knowledge exchange, and policy translation.
- The role of veterinary professionals in apiculture should be strengthened, including the development of specialized veterinary apiculturists and animal health experts who can link research, beekeepers, and regulatory authorities.

7. Implementation Pathway

Lead institution: Apimondia Working Group on Good Veterinary Practice in Apiculture (AWG - GVPA)

Supporting actors: WOAH, FAO, EU, national veterinary services, universities, research institutes, diagnostic laboratories, beekeepers, beekeeper associations, and funding agencies

Short-term action (0–12 months):

- Conduct experts consultation within the working group
- Compile existing evidence and identify major missing-data areas
- Produce a structured research gap map and priority list
- Align terminology and thematic categories across contributors

Medium-term action (1–3 years):

- Launch globally collaborative research initiatives
- Develop harmonized data collection and surveillance approaches
- Support pilot projects on diagnostics, pharmacovigilance, and digital monitoring
- Translate findings into veterinary guidance, training, and future policy briefs

Resource considerations: Support is needed for coordination, meetings, database development, laboratory capacity, multinational field studies, and knowledge-transfer activities.

8. Expected Impact

- ✓ **Improvement in honey bee health:** Better-targeted research will improve disease prevention, diagnostics, treatment decisions, and early detection of emerging threats.
- ✓ **Strengthened veterinary integration:** A stronger evidence base will support recognition of apiculture within veterinary medicine and One Health.
- ✓ **Governance improvement:** Institutions will be better able to prioritize funding, harmonize surveillance, and develop evidence-based guidelines and regulations.
- ✓ **Sustainability contribution:** Healthy honey bee populations will strengthen pollination services, biodiversity, agriculture, ecosystem health, and consumer confidence in hive products.

9. Summary Table and Illustrations

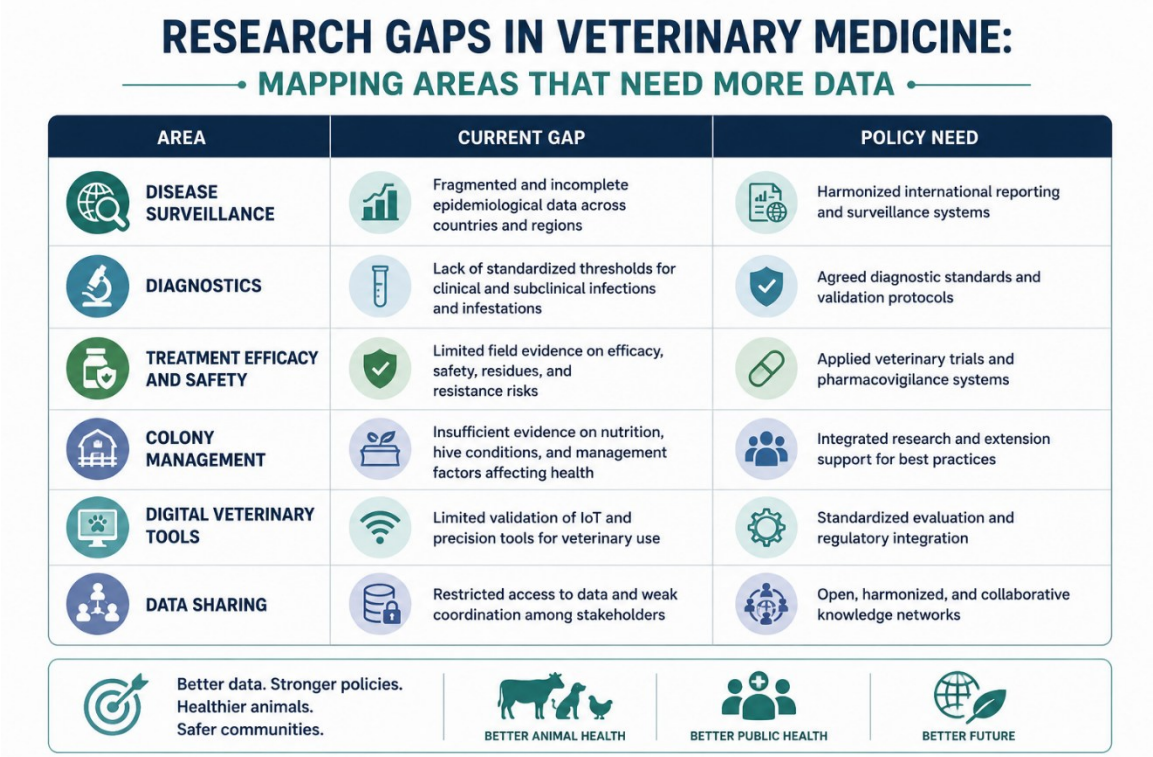

Figure 1. Priority areas, major evidence gaps, and corresponding policy needs for veterinary medicine in apiculture.

10. Key Stakeholders

- Veterinary authorities and official veterinary services
- Veterinary researchers, universities, institutes, and diagnostic laboratories
- Beekeepers and beekeeper associations
- International organizations, regulators, and research funders

Authors and Contributors

Developed by members of the Apimondia Working Group on Good Veterinary Practice in Apiculture (AWG GVPA): Violeta Santrac, violeta.santrac@virs-vb.com; Egehan Onat Özfen, egehan.ozfen@ucdconnect.ie; Franco Mutinelli, fmutyinelli@izsvenezie.it; Michela bertola, mbertola@izsvenezie.it, Maja Ivana Smodiš Šker, maja.smodis.skerl@kis.si, Aleš Gregorc, ales.gregorc@um.si; Christophe Roy, roille@orange.fr.

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