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Vaccinating dogs for wildlife biosecurity in the Galápagos

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Abstract: Domestic dogs and cats are relevant to biosecurity planning in the Galápagos Islands because they live close to protected ecosystems and endemic wildlife and may contribute to conservation risks through pathogen transmission, predation, disturbance and population pressure. This article describes a door-to-door companion animal health campaign conducted from July to December 2024 in the main populated sectors of Santa Cruz Island, Galápagos, Ecuador. The campaign focused on canine vaccination and microchipping while also registering dogs and cats, documenting reproductive status and generating georeferenced records for spatial planning. A total of 5,393 companion animals were registered, including 3,554 dogs and 1,839 cats. Campaign vaccination coverage among registered dogs reached 86.3%, while documented vaccination status reached 91.6% when dogs recorded as previously vaccinated were included. Overall, 67.8% of dogs and 67.0% of cats were recorded as sterilised during the census, and dog microchipping coverage reached 75.3%. Human-to-dog and human-to-cat ratios varied among sectors, indicating spatial heterogeneity in registered companion animal burden relative to the resident human population. The campaign did not measure pathogen circulation, vaccine effectiveness or wildlife health outcomes and should therefore be interpreted as an operational intervention rather than a disease impact study. However, by linking vaccination with registration, individual identification, reproductive status documentation and georeferenced data, the programme generated a practical baseline for booster vaccination, traceability, dog and cat population management planning and One Health biosecurity preparedness in the Galápagos.

See abstracts in French and Spanish.

Keywords: Companion animals, Disease prevention, Georeferenced census, Island conservation, Microchipping, One Health, Population management, Santa Cruz Island.

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Introduction

The Galápagos Islands are a globally recognised conservation priority and home to endemic wildlife, expanding human settlements and domestic animals that coexist within a restricted island landscape. In this context, companion animals are not only a matter of animal welfare or urban management, but also a biosecurity concern. Domestic dogs and cats can affect wildlife through predation, disturbance, competition and pathogen transmission, and these risks are amplified in island ecosystems, where native species may have limited behavioural or immunological defences against introduced threats [1-4]. Previous studies in the Galápagos have shown that domestic animals are relevant to One Health and conservation planning: infectious agents of dogs and cats have been documented on inhabited islands, dog populations on Santa Cruz have shown exposure to canine distemper virus, canine parvovirus, adenovirus and other pathogens of concern, and canine distemper virus exposure has also been reported in Galápagos sea lions (*Zalophus wollebaeki*) [5-7]. More recently, genomic evidence from Galápagos dogs has highlighted how population management, regulation and human-mediated movement have shaped the modern dog population, reinforcing the importance of traceability and sustained management in this insular setting [8].

Vaccination is a core preventive tool for reducing the susceptible fraction of domestic animal populations, but its conservation value depends on how it is implemented, documented and maintained over time. In conservation-sensitive islands, canine vaccination is likely to be most useful when integrated with registration, individual identification, spatial data collection and reproductive status documentation, because these components allow authorities and partner institutions to identify coverage gaps, plan booster vaccination, monitor population turnover and prioritise follow-up actions. This integrated approach is consistent with broader dog population management and One Health principles, which emphasise that disease prevention, responsible ownership and population control should be addressed together rather than as isolated interventions. For the Galápagos, where domestic animals live in close proximity to protected ecosystems and endemic wildlife, vaccination programmes therefore have value not only as clinical preventive interventions, but also as operational tools for biosecurity planning, traceability and long-term population management.

Santa Cruz Island is the most populated island in the Galápagos and includes urban, peri-urban and rural settlements located near protected ecosystems. Previous work has described dog overpopulation on Santa Cruz and has emphasised the need for improved companion animal management to reduce risks to wildlife, domestic animals and people [6,9]. However, operational evidence on how high-coverage vaccination can be combined with registration, microchipping and georeferenced census data remains limited. This article describes a door-to-door companion animal health campaign conducted in the main populated sectors of Santa Cruz Island, Galápagos, Ecuador. The campaign focused on canine vaccination and microchipping while also registering dogs and cats and documenting demographic and reproductive-status indicators. Specifically, the aim was to estimate canine vaccination coverage, describe dog and cat population management indicators, quantify human-to-dog and human-to-cat ratios, and generate a georeferenced baseline to support follow-up vaccination, traceability, responsible ownership and wildlife biosecurity planning.

Materials and methods

Study area and design

Field records analysed in this article were collected between 22 July and 23 December 2024 across the main populated sectors of Santa Cruz Island, Galápagos, Ecuador: Puerto Ayora, Bellavista, Santa Rosa and El Cascajo. These sectors were selected because they constitute the principal areas of permanent settlement on the island where household-based companion animal interventions are applicable. Most areas outside these settlements are protected or non-residential areas, where routine door-to-door companion animal activities are not applicable. Human population denominators were obtained from the official 2022 Ecuadorian Population and Housing Census, using Puerto Ayora and Santa Rosa as census parishes with the same names and Bellavista together with El Cascajo for calculations requiring a human denominator, because El Cascajo was recorded as a separate operational campaign sector but is administratively recognised as a locality within Bellavista parish [10,11].

The campaign was implemented through inter-institutional cooperation between Worldwide Veterinary Services (WVS), the Decentralised Autonomous Municipal Government of Santa Cruz and the Galápagos Biosecurity Agency (Agencia de Regulación y Control de la Bioseguridad y Cuarentena para Galápagos; ABG). WVS was responsible for overall logistics and coordination of field activities; ABG was responsible for vaccine administration, completion of animal clinical records and vaccination cards; and the Municipal Government of Santa Cruz supported communication with the local community and awareness of the relevant municipal ordinance. Fieldwork was conducted from 14:00 to 19:00, corresponding to approximately five working hours per field day. The field team was organised into four brigades, with each brigade including one WVS veterinarian, one technician from the Urban Fauna Unit of the Municipal Government of Santa Cruz, one ABG technician and two field assistants. Vaccination and microchipping were provided free of charge to owners.

Vaccines were donated by Merck Sharp & Dohme and therefore generated no direct vaccine procurement cost for the campaign or the local population. The approximate retail reference price in Ecuador was US$ 5.40 per vaccine dose. Because the canine vaccination protocol included Nobivac DHP and Nobivac Lepto 2 (L2), this corresponded to an approximate replacement value of US$ 10.80 per vaccinated dog for vaccine products only. Applied to the 3,066 dogs vaccinated during the campaign, the donated vaccine replacement value was approximately US$ 33,113, excluding cold-chain logistics, veterinary labour, transport and other operational costs. Approximately 70% of microchips were donated, while the remaining 30% were purchased in Ecuador at an approximate cost of US$ 5.00 per microchip.

Animal registration and field procedures

For each registered dog and cat, field teams recorded animal-level information at the household level using the WVS mobile application. Variables included species, sex, estimated age, information related to ownership, reproductive status, vaccination history and microchipping status. The application automatically captured geographic coordinates for each registration, enabling spatial analysis and mapping by sector.

Dogs that could not be linked to a specific household during the visit were classified operationally as without household attribution; this classification did not confirm absence of ownership and was not considered equivalent to confirmed stray or ownerless status.

The field protocol differed between dogs and cats. Dogs were the target species for vaccination and microchipping during this campaign, whereas cats were included in the census component to document demographic information, reproductive status and geographic location when available. Vaccination and microchipping of cats were not included in the authorised operational scope of this intervention. Surgical sterilisation of dogs or cats was not performed during household visits; instead, reproductive status was documented during the census. Sterilisation indicators reported in this article therefore describe census-recorded reproductive status rather than surgical output from the 2024 door-to-door campaign.

Vaccination protocol

Dogs received the campaign vaccination protocol consisting of Nobivac DHP and Nobivac L2. Nobivac DHP is a live attenuated vaccine containing canine distemper virus, canine adenovirus type 2 and canine parvovirus components, while Nobivac L2 is an inactivated bacterial vaccine containing *Leptospira interrogans* serogroups Canicola and Icterohaemorrhagiae [12,13]. Vaccines were administered subcutaneously by trained veterinary personnel according to manufacturer instructions and routine field biosecurity procedures. Rabies vaccination was not included in the campaign. This reflected the Galápagos regulatory framework, under which ABG is authorised to control the entry and application of selected canine vaccines for diseases such as distemper, parvovirosis, adenovirus infection, leptospirosis and hepatitis, while the entry of rabies vaccine into the Galápagos Islands remains prohibited [14]. Accordingly, the vaccination results reported in this article refer to the authorised canine vaccination protocol applied during the campaign and should not be interpreted as rabies vaccination coverage.

Data analysis

Descriptive statistics were calculated for species composition, campaign vaccination, documented vaccination status, microchipping, census-recorded sterilisation, sex completeness, age structure and geographic distribution. Analyses were performed overall and by operational census sector. Sector assignment was based on georeferenced animal records and checked against the operational campaign summary. Human-to-dog and human-to-cat ratios were calculated by dividing the human population denominator by the number of registered animals in each corresponding sector or combined sector. These ratios were interpreted as descriptive indicators of registered companion animal burden relative to the resident human population, rather than as estimates of the total dog or cat population. Automatic timestamp metadata recorded by the WVS mobile application were used as an additional operational check of field activity. Unique recording dates with animal records were counted as data entry days, and the daily data entry window was calculated as the interval between the first and last animal record entered on each date. These timestamp-derived values were interpreted as proxy estimates of data entry activity rather than independent measures of total working time.

For animal-level proportions, percentages were calculated using the number of registered animals in the relevant species, sector and analytical subgroup as the denominator. Ninety-five percent confidence intervals were calculated using Wilson binomial methods for key dog indicators, including campaign vaccination, documented vaccination status, census-recorded sterilisation and microchipping. Age summaries were calculated among animals with recorded age information, and sex-specific sterilisation proportions were calculated among animals with confirmed sex information. Spatial outputs were generated using georeferenced animal records to visualise the distribution of registered dogs and cats and sector-level canine vaccination coverage. Data processing, statistical analysis and figure generation were performed in RStudio.

Ethical, regulatory and data considerations

The campaign was implemented as an operational companion animal health, registration and biosecurity intervention rather than as an experimental animal study. Animal handling was limited to routine procedures required for vaccination, microchipping and census registration and was performed by trained personnel using careful restraint to minimise stress and unnecessary handling. Data used in this article were derived from campaign records and analysed in aggregate form for epidemiological and programme evaluation purposes.

Results

A total of 5,393 companion animals were registered during the door-to-door campaign, comprising 3,554 dogs (65.9%) and 1,839 cats (34.1%). Among dogs with recorded age information, the distribution was concentrated in young and adult animals: 1,648 of 3,313 age-recorded dogs (49.7%) were between 2 and 5 years old, while 2,019 (60.9%) were younger than 5 years. When all registered dogs were used as the denominator, dogs younger than 5 years represented 56.8% of the registered dog population (Fig. 1). Campaign vaccination coverage among registered dogs reached 86.3% overall, with sector-level values exceeding 80% in all areas. Coverage ranged from 83.8% in Santa Rosa to 89.2% in Bellavista, including El Cascajo (Table I; Fig. 2). When dogs recorded as previously vaccinated were also considered, documented vaccination status reached 91.6% overall. Human-to-dog ratios varied by sector, with 6.03 humans per registered dog in Puerto Ayora, 3.31 in Bellavista including El Cascajo, and 2.23 in Santa Rosa. Expressed inversely, these values corresponded to 16.6, 30.2 and 44.9 registered dogs per 100 people, respectively (Table I). Automatic timestamp metadata identified 70 unique data entry days between 22 July and 23 December 2024, with a median daily data entry window of 3.44 hours.

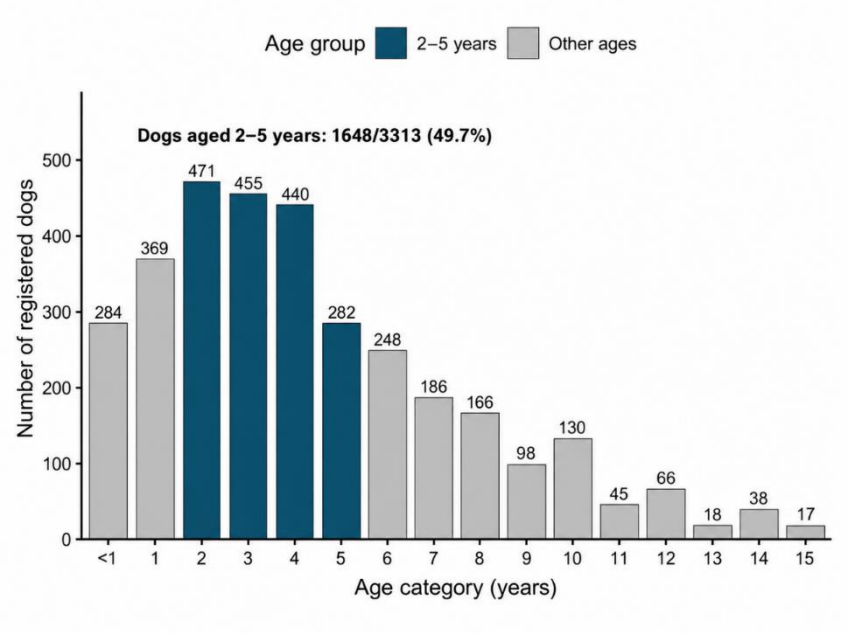

Figure 1. Age distribution of registered dogs, Santa Cruz Island, 2024

The bar chart shows the number of registered dogs by recorded age category. The highlighted bars indicate dogs aged 2–5 years. Records without age information were excluded.

Table I. Registered dogs, human-to-dog ratios and vaccination coverage by sector, Santa Cruz Island, 2024

Human-to-dog ratio was calculated using registered dogs and official 2022 human population denominators. It should be interpreted as a descriptive indicator of registered dog burden relative to the resident human population, not as an estimate of total dog abundance, free-roaming dog abundance or transmission risk.

Sector	Human population, 2022	Registered dogs	Human-to-dog ratio	Campaign vaccinated, *n* (%; 95% CI)	Documented vaccination status, *n* (%; 95% CI)
Puerto Ayora	12,737	2,112	6.03:1	1,794 (84.9%; 83.4–86.4)	1,940 (91.9%; 90.6–92.9)
Bellavista, including El Cascajo*	3,933	1,189	3.31:1	1,060 (89.2%; 87.3–90.8)	1,091 (91.8%; 90.1–93.2)
Santa Rosa	563	253	2.23:1	212 (83.8%; 78.8–87.8)	223 (88.1%; 83.6–91.6)
Total	17,233	3,554	4.85:1	3,066 (86.3%; 85.1–87.4)	3,254 (91.6%; 90.6–92.4)

CI: confidence interval. Campaign vaccinated refers to dogs vaccinated during the campaign. Documented vaccination status includes dogs vaccinated during the campaign and dogs recorded as previously vaccinated.

* El Cascajo was grouped with Bellavista for calculations requiring a human population denominator because it is administratively recognised as a locality within Bellavista parish rather than as an independent census parish.

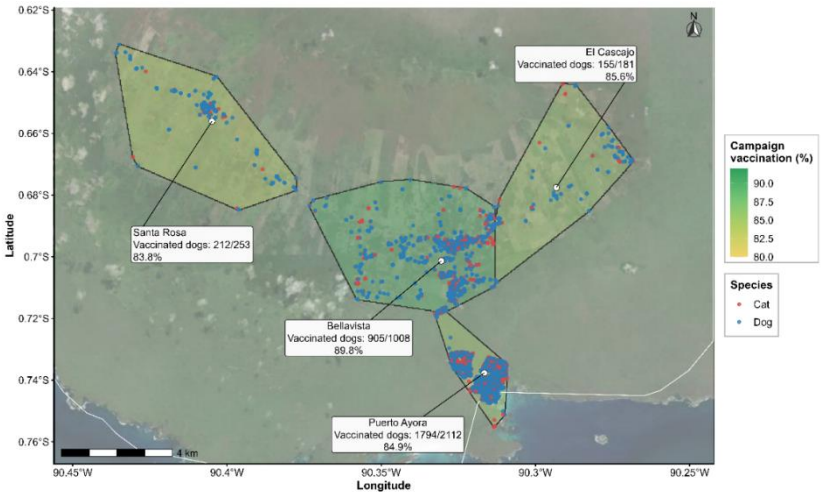

Figure 2. Registered companion animals and canine vaccination coverage, Santa Cruz Island, 2024

Map showing georeferenced dog and cat registrations and campaign vaccination coverage among registered dogs by operational census sector. Labels indicate vaccinated and registered dogs by sector. Shaded polygons represent operational census sectors derived from campaign records and should not be interpreted as official administrative boundaries. Basemap source: Esri World Imagery.

Dog sex distribution was broadly balanced, with males representing 49.7% and females 48.2% of the registered dog population; sex was undetermined in 2.1% of records. Census-recorded sterilisation reached 67.8% overall but differed by sex among dogs with confirmed sex information: 1,405 of 1,713 females (82.0%) and 1,005 of 1,765 males (56.9%) were recorded as sterilised. At sector level, total census-recorded sterilisation was highest in Bellavista (68.7%) and Puerto Ayora (68.6%), followed by El Cascajo (67.4%) and Santa Rosa (58.5%). Microchipping coverage reached 75.3% overall and was highest in Santa Rosa (84.6%), followed by El Cascajo (83.4%), Bellavista (81.4%) and Puerto Ayora (70.5%) (Table II; Fig. 3). Forty-three dogs (1.2%) could not be linked to a specific household during field registration, and this group was retained as an operational category rather than interpreted as confirmed stray or ownerless dogs.

Table II. Dog population management indicators by sector, Santa Cruz Island, 2024

Sector	Registered dogs	Sex unknown, *n* (%)	Sterilised females, *n*/N (%)	Sterilised males, *n*/N (%)	Total census-recorded sterilised, *n* (%)	Micro-chipped, *n* (%)
Puerto Ayora	2,112	58 (2.7%)	832/1,017 (81.8%)	616/1,037 (59.4%)	1,448 (68.6%)	1,490 (70.5%)
Bellavista	1,008	14 (1.4%)	411/490 (83.9%)	281/504 (55.8%)	692 (68.7%)	821 (81.4%)
Santa Rosa	253	0 (0.0%)	92/127 (72.4%)	56/126 (44.4%)	148 (58.5%)	214 (84.6%)
El Cascajo	181	4 (2.2%)	70/79 (88.6%)	52/98 (53.1%)	122 (67.4%)	151 (83.4%)
Total	3,554	76 (2.1%)	1,405/1,713 (82.0%)	1,005/1,765 (56.9%)	2,410 (67.8%)	2,676 (75.3%)

Census-recorded sterilised refers to reproductive status documented during the census; surgical sterilisation was not performed during household visits. Sex-specific sterilisation percentages were calculated using dogs with confirmed sex information in each sex category as the denominator. Microchipped refers to dogs with microchips recorded during the campaign dataset.

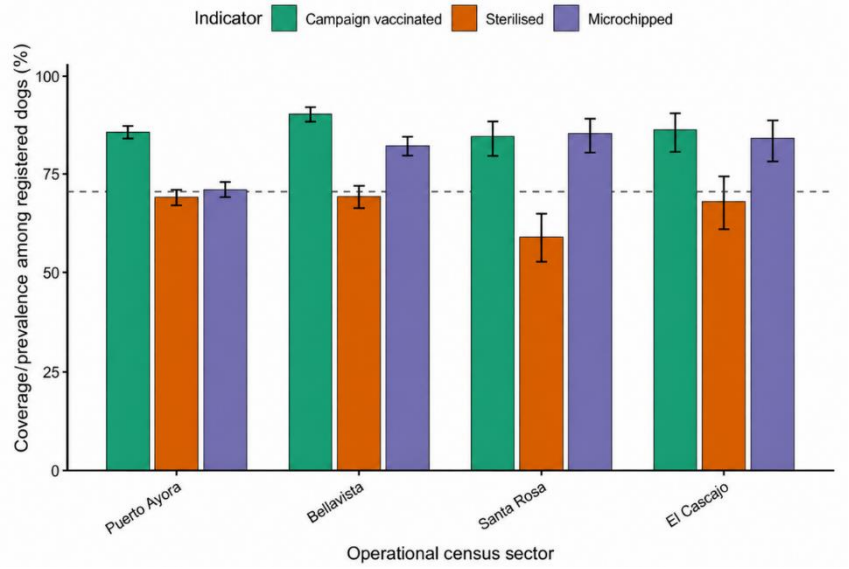

Figure 3. Dog vaccination, sterilisation and microchipping indicators by sector, Santa Cruz Island, 2024

The bar chart shows campaign vaccination coverage, census-recorded sterilisation prevalence and microchipping coverage among registered dogs. Error bars indicate 95% confidence intervals calculated using Wilson binomial methods. The dashed horizontal line indicates the 70% operational coverage reference commonly used for mass dog vaccination against dog-mediated rabies and is shown only as a comparative benchmark for field campaign coverage.

Among cats, Puerto Ayora accounted for the largest number of registrations, followed by Bellavista including El Cascajo and Santa Rosa. Overall, 67.0% of cats were recorded as sterilised, while 17.0% lacked confirmed sex information. Among cats with confirmed sex information, census-recorded sterilisation was 705 of 819 females (86.1%) and 528 of 707 males (74.7%). The proportion of cats with unknown sex was highest in Puerto Ayora (20.5%), followed by Bellavista including El Cascajo (11.0%) and Santa Rosa (4.9%). Using the same human population denominators applied to dog ratios, the human-to-cat ratio was 10.59 humans per registered cat in Puerto Ayora, 6.84 in Bellavista including El Cascajo, 9.23 in Santa Rosa and 9.37 overall (Table III). These feline indicators provided a complementary census baseline but were not interpreted as vaccination or microchipping outputs because cats were not included in those components of the campaign protocol.

Table III. Cat population and census indicators by sector, Santa Cruz Island, 2024

Sector	Human population, 2022	Registered cats	Human-to-cat ratio	Sex unknown, *n* (%)	Sterilised females, *n*/N (%)	Sterilised males, *n*/N (%)	Census-recorded sterilised, *n* (%)
Puerto Ayora	12,737	1,203	10.59:1	247 (20.5%)	460/525 (87.6%)	349/431 (81.0%)	809 (67.2%)
Bellavista, including El Cascajo*	3,933	575	6.84:1	63 (11.0%)	220/264 (83.3%)	161/248 (64.9%)	381 (66.3%)
Santa Rosa	563	61	9.23:1	3 (4.9%)	25/30 (83.3%)	18/28 (64.3%)	43 (70.5%)
Total	17,233	1,839	9.37:1	313 (17.0%)	705/819 (86.1%)	528/707 (74.7%)	1,233 (67.0%)

* El Cascajo was grouped with Bellavista for calculations requiring a human population denominator because it is administratively recognised as a locality within Bellavista parish rather than as an independent census parish.

Census-recorded sterilised refers to reproductive status documented during the census; surgical sterilisation was not performed during household visits. Sex-specific sterilisation percentages were calculated using cats with confirmed sex information in each sex category as the denominator.

Human-to-cat ratio was calculated using registered cats and official 2022 human population denominators and should be interpreted as a descriptive indicator of registered cat burden relative to the resident human population.

Spatially, registered companion animals were concentrated mainly in Puerto Ayora and Bellavista. Puerto Ayora accounted for 61.5% of all registered animals, followed by Bellavista (28.8%), Santa Rosa (5.8%) and El Cascajo (3.9%). The georeferenced dataset identified areas of high registration density and showed sector-level variation in canine vaccination coverage, providing a spatial baseline for booster vaccination, traceability and future One Health surveillance (Fig. 2). Sector-level microchipping and census-recorded reproductive status indicators are summarised in Table II and Figure 3. Field photographs illustrating canine vaccination, animal handling during household visits, field registration and owner engagement are displayed in Figure 4.

Figure 4. Door-to-door companion animal health campaign, Santa Cruz Island, 2024

Field photographs illustrate key components of the campaign: canine vaccination, animal handling during household visits, field registration and owner engagement. Photographs are printed with permission. Photo credit: Pan Animalia Galápagos/Worldwide Veterinary Services.

Discussion

The Santa Cruz campaign provides operational evidence that high canine vaccination coverage can be achieved in a conservation-sensitive island setting when vaccination is delivered through a coordinated, household-based and institutionally supported approach. Its relevance for the Galápagos lies not only in the number of dogs reached, but also in the fact that vaccination was implemented in an archipelago where domestic animals, people and protected wildlife coexist within a restricted landscape. Previous studies have documented infectious agents in dogs and cats from inhabited Galápagos islands, exposure of Santa Cruz dogs to canine distemper virus, canine parvovirus, adenovirus and other pathogens, and evidence of canine distemper virus exposure in Galápagos sea lions [5-7]. The present campaign did not measure pathogen circulation, vaccine-induced immunity or wildlife health outcomes; therefore, its contribution should not be interpreted as direct evidence of reduced transmission to wildlife. Rather, its value lies in reducing the susceptible fraction of the registered dog population for selected canine pathogens and in strengthening preparedness at the domestic animal–wildlife interface.

The level of coverage achieved also provides a useful operational benchmark for future vaccination programmes in the Galápagos. For dog-mediated rabies, international guidance commonly refers to vaccinating at least 70% of dogs in at-risk areas as a target for interrupting transmission [15,16]. The Santa Cruz intervention was not an anti-rabies campaign, and this benchmark should not be interpreted as a disease-specific protective threshold for canine distemper, canine parvovirus, adenovirus infection or leptospirosis. Nevertheless, it is a useful comparative reference for evaluating whether a field programme can reach a high proportion of the accessible dog population under real operational conditions. In this sense, the results suggest that door-to-door delivery, free vaccination, veterinary supervision and coordination among WVS, the Municipal Government of Santa Cruz and ABG can achieve broad reach across urban, peri-urban and rural settlements. Maintaining this level of protection will require periodic booster vaccination, rapid inclusion of newly acquired dogs, monitoring of unvaccinated pockets and continued alignment with the Galápagos regulatory framework.

A central lesson from this campaign is that vaccination becomes more valuable for biosecurity when it is linked to registration, microchipping and georeferenced data collection. Stand-alone vaccination can temporarily increase protection in the accessible dog population, but it provides limited information about which animals were vaccinated, where unvaccinated animals remain, and how coverage changes as animals are born, acquired, moved or lost. By linking vaccination to individual traceability and spatial records, the Santa Cruz model produced information that can be used for follow-up vaccination, owner engagement, targeted microchipping, reproductive management planning and surveillance at the domestic animal–wildlife interface. This is consistent with World Organisation for Animal Health principles for dog population management and rabies control, which emphasise the importance of registration, identification, vaccination status and responsible ownership as components of sustained dog population programmes [16,17]. Although the pathogens targeted here were not rabies virus, the same operational logic is relevant in the Galápagos: vaccination has greater long-term biosecurity value when vaccinated animals can be identified, located and followed over time.

The human-to-dog ratio added a complementary demographic perspective, but it should be interpreted cautiously. In this study, the ratio was used as a descriptive indicator of registered dog burden relative to the resident human population, not as an estimate of total dog abundance, free-roaming dog abundance, dog density or pathogen transmission risk. Differences among sectors may reflect variation in settlement structure, rural livelihoods, household composition, animal ownership practices, accessibility and previous population management history; however, the campaign dataset does not allow these explanations to be tested causally. Future work should therefore combine human-to-dog ratios with household denominators, dog density estimates, longitudinal registration data and direct surveys of free-roaming dogs. This distinction is important because owned confined dogs, owned free-roaming dogs, loosely supervised dogs and ownerless dogs may require different management approaches.

The reproductive management indicators also highlight the importance of analysing dogs and cats separately. In dogs, census-recorded sterilisation was higher among females than males, a pattern that may reflect owner preferences, previous campaign priorities, perceived reproductive risk or differences in access to sterilisation services, but these explanations remain hypotheses rather than conclusions from the available data.

The overall census-recorded dog sterilisation observed in Santa Cruz was higher than the 36.1% neutering reported for owned dogs in New Providence in the Bahamas, although differences in methods, time period and setting limit direct comparison [18]. In cats, the campaign provided a census baseline but not vaccination or microchipping outputs, because cats were not included in those authorised components of the field protocol. This distinction is important for responding to conservation concerns without overstating the intervention. Cats are highly relevant to island biosecurity because domestic and free-roaming cats can affect wildlife through predation and can contribute to pathogen risks, including *Toxoplasma gondii* exposure in Galápagos birds [4,19]. The relatively high proportion of cats with incomplete sex information also indicates that future feline work should strengthen handling, demographic verification, owner engagement and coordination with authorities to define appropriate identification, reproductive management and health interventions. Population control modelling in island cats further suggests that sustained and intensive management is needed for long-term demographic effects, particularly where immigration, reproduction and incomplete coverage can undermine short-term interventions [20].

As an operational implementation study, this campaign provides a large georeferenced baseline for companion animal vaccination, traceability and population management planning in Santa Cruz. The dataset represents animals reached through door-to-door field activities, and the resulting indicators should therefore be interpreted as coverage and management measures for the registered population rather than as probability-based estimates of total dog or cat abundance. Similarly, because households without companion animals were not consistently recorded, the human-to-animal ratios reported here are best understood as descriptive indicators of registered companion animal burden relative to the resident human population. The campaign was designed to document and deliver preventive action, including vaccination, microchipping, registration and reproductive status recording; assessment of pathogen circulation, immune response, vaccine effectiveness and wildlife health outcomes represents a logical next step for future surveillance rather than the objective of the present intervention.

Despite this operational scope, the Santa Cruz experience offers a practical model for conservation-sensitive islands: vaccination can be connected to traceability, spatial planning and responsible ownership, generating a platform for repeated interventions rather than a one-time activity. The donation of vaccines and most microchips was operationally important. Although vaccines generated no direct procurement cost for the campaign or the local population, their approximate retail replacement value in Ecuador represented a substantial contribution before considering cold-chain logistics, field transport, veterinary labour, microchipping and institutional coordination. This in-kind support, together with free service delivery and clearly distributed institutional responsibilities, likely strengthened community access and helped transform the campaign from a one-time vaccination activity into a broader platform for traceability, spatial planning and companion animal population management. Institutionalising this approach could help the Galápagos and similar island systems move from isolated campaigns towards sustained companion animal management for One Health and wildlife biosecurity.

Conclusion

The Santa Cruz campaign demonstrates that canine vaccination can be strengthened when delivered within an integrated companion animal management framework that also includes registration, microchipping, reproductive status documentation and georeferenced data collection. Although the campaign did not measure pathogen circulation or wildlife health outcomes, it generated operational information directly useful for follow-up vaccination, traceability, dog and cat population management planning and biosecurity preparedness. This approach is particularly relevant for island ecosystems where domestic animals, people and protected wildlife occur in close proximity, and it provides a practical One Health model that could support long-term biosecurity and conservation objectives in the Galápagos and other conservation-sensitive settings.

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Disclaimer

The authors declare no conflict of interest. The views expressed in this article are those of the authors and do not necessarily represent the official position of the institutions involved.

Vaccination des chiens pour la biosécurité de la faune sauvage dans les îles Galápagos

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Résumé

Les chiens et les chats domestiques doivent être pris en compte dans la planification de la biosécurité dans les îles Galápagos, car ils vivent à proximité d'écosystèmes protégés et d'espèces sauvages endémiques, et peuvent contribuer aux risques pour la conservation en raison de la transmission d'agents pathogènes, de la prédation, des perturbations et de la pression exercée sur les populations. Le présent article décrit une campagne de santé des animaux de compagnie menée de porte à porte de juillet à décembre 2024 dans les principaux secteurs habités de l'île Santa Cruz, aux Galápagos, en Équateur. La campagne était axée sur la vaccination des chiens et leur identification par micropuce, tout en permettant également d'enregistrer les chiens et les chats, de documenter leur statut reproductif et de produire des données géoréférencées pour la planification spatiale. Au total, 5 393 animaux de compagnie ont été enregistrés, dont 3 554 chiens et 1 839 chats. La couverture vaccinale obtenue par la campagne parmi les chiens enregistrés a atteint 86,3 %, tandis que la couverture vaccinale documentée s'est élevée à 91,6 % lorsque les chiens dont la vaccination antérieure avait été consignée ont été inclus. Au total, 67,8 % des chiens et 67,0 % des chats ont été déclarés stérilisés lors du recensement, et la couverture de l'identification par micropuce des chiens a atteint 75,3 %. Les ratios entre les populations humaines et les populations canines et félines variaient selon les secteurs, ce qui indique une hétérogénéité spatiale de la charge que représentent les animaux de compagnie enregistrés par rapport à la population humaine résidente. La campagne n'a mesuré ni la circulation des agents pathogènes, ni l'efficacité vaccinale, ni les effets sur la santé de la faune sauvage ; elle doit donc être interprétée comme une intervention opérationnelle plutôt que comme une étude d'impact sur les maladies. Toutefois, en associant la vaccination à l'enregistrement, à l'identification individuelle, à la documentation du statut reproductif et à des données géoréférencées, le programme a fourni une base de référence pratique pour la vaccination de rappel, la traçabilité, la planification de la gestion des populations canines et félines et la préparation en matière de biosécurité selon l'approche « Une seule santé » dans les îles Galápagos.

Mots-clés

Animaux de compagnie, Conservation insulaire, Gestion des populations, Identification par micropuce, Île Santa Cruz, Prévention des maladies, Recensement géoréférencé, Une seule santé.

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Vacunación de perros para la bioseguridad de la fauna silvestre en las Galápagos

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Resumen

Los perros y gatos domésticos son pertinentes para la planificación de la bioseguridad en las islas Galápagos, ya que viven cerca de ecosistemas protegidos y de fauna silvestre endémica, y pueden contribuir a los riesgos para la conservación mediante la transmisión de agentes patógenos, la depredación, las perturbaciones y la presión poblacional. En este artículo se describe una campaña de sanidad de animales de compañía puerta a puerta, realizada entre julio y diciembre de 2024 en los principales sectores poblados de la isla Santa Cruz, Galápagos, Ecuador. La campaña se centró en la vacunación canina e identificación mediante microchip, y también incluyó el registro de perros y gatos, la documentación de su estado reproductivo y la generación de registros georreferenciados para la planificación espacial. Se registraron en total 5 393 animales de compañía, incluidos 3 554 perros y 1 839 gatos. La cobertura de vacunación de los perros registrados durante la campaña alcanzó el 86,3%, mientras que la cobertura vacunal documentada alcanzó el 91,6% al incluir a los perros registrados como vacunados anteriormente. En el censo, se registró que el 67,8% de los perros y el 67,0% de los gatos estaban esterilizados, y la identificación mediante microchip en perros alcanzó el 75,3%. Las proporciones de habitantes por perro y por gato variaron entre los sectores, lo que indica una heterogeneidad espacial en la carga de animales de compañía registrados en relación con la población humana residente. La campaña no midió la circulación de agentes patógenos, la eficacia de las vacunas ni los resultados en materia de sanidad de la fauna silvestre, por lo que debe interpretarse como una intervención operativa y no como un estudio del impacto sobre las enfermedades. Sin embargo, al vincular la vacunación con el registro, la identificación individual, la documentación del estado reproductivo y los datos georreferenciados, el programa generó una base de referencia práctica para la vacunación de refuerzo, la trazabilidad, la planificación de la gestión de las poblaciones de perros y gatos y la preparación en materia de bioseguridad conforme al enfoque «Una sola salud» en las Galápagos.

Palabras clave

Animales de compañía, Censo georreferenciado, Conservación insular, Gestión de poblaciones, Identificación mediante microchip, Isla Santa Cruz, Prevención de enfermedades, Una sola salud.

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