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FELINE PANLEUKOPENIA IN KITTENS: CLINICAL DETERIORATION AND PREVENTIVE MANAGEMENT IN A HOUSEHOLD CASE CLUSTER

Feline Panleukopenia pada Anak Kucing: Perburukan Klinis dan Penatalaksanaan Preventif pada Klaster Kasus Rumah Tangga

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Abstract

Feline panleukopenia virus (FPV) remains one of the most serious infectious diseases in cats, particularly in kittens, because of their immature immune systems and the rapid progression of disease after exposure. This study employed an exploratory qualitative household case study design based on caretaker observation and literature-informed analysis. It describes a household case cluster of feline panleukopenia involving eight kittens and interprets the observed clinical course in relation to veterinary literature on transmission, diagnosis, treatment, and prevention. Case information was obtained from the household caretaker's direct observation during routine home care and from veterinary consultation after the kittens developed acute illness. The diagnosis was made by a veterinarian based on clinical examination, visible clinical signs, and the clustered progression of illness in the household setting. The observed course began with sudden weakness and refusal to eat, followed by vomiting, diarrhea, dehydration, progressive clinical deterioration, and sequential death despite prescribed medication and supportive home care. All eight affected kittens died over the following weeks, resulting in a case fatality rate of 100% in this household cluster. The shared household environment, including common living space, feeding areas, bedding, surfaces, and human handling, represented a plausible setting for repeated indirect exposure and cross-contamination. Literature-informed analysis indicates that FPV is environmentally persistent, spreads efficiently through fecal-oral and fomite transmission, and is most effectively controlled through timely vaccination, parvocidal disinfection, early isolation, and prompt veterinary management. This study highlights that once overt clinical disease develops, treatment is often supportive rather than curative. The findings emphasize the importance of prevention-oriented household management and suggest that reducing FPV-related mortality in kittens depends primarily on integrated biosecurity rather than treatment alone.

Keywords: feline panleukopenia virus, kittens, household case cluster, caretaker observation, prevention

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Abstrak

Virus panleukopenia kucing (*feline panleukopenia virus*/FPV) merupakan salah satu penyakit infeksi serius pada kucing, terutama anak kucing, karena sistem imun yang belum matang dan progres penyakit yang cepat. Studi ini menggunakan desain studi kasus rumah tangga kualitatif eksploratif berbasis pengamatan pengasuh dan analisis literatur. Studi ini mendeskripsikan klaster kasus FPV pada delapan anak kucing di lingkungan rumah tangga serta menafsirkan perjalanan klinisnya berdasarkan literatur kedokteran hewan tentang penularan, diagnosis, pengobatan, dan pencegahan. Informasi kasus diperoleh dari pengamatan langsung pengasuh selama perawatan rutin di rumah dan konsultasi dokter hewan setelah anak kucing menunjukkan gejala akut. Diagnosis ditegakkan oleh dokter hewan berdasarkan pemeriksaan klinis, tanda klinis yang tampak, dan pola penyakit berkelompok. Kasus diawali kelemahan mendadak dan tidak mau makan, kemudian diikuti muntah, diare, dehidrasi, perburukan klinis progresif, dan kematian berurutan meskipun telah diberikan obat serta perawatan suportif di rumah. Seluruh delapan anak kucing mati dalam beberapa minggu, sehingga angka fatalitas kasus mencapai 100% pada klaster ini. Lingkungan rumah tangga bersama, termasuk ruang hidup, area makan, tempat tidur, permukaan benda, dan penanganan manusia, memungkinkan terjadinya paparan tidak langsung dan kontaminasi silang. Analisis literatur menunjukkan bahwa FPV persisten di lingkungan, menyebar melalui rute fekal-oral dan fomit, serta paling efektif dikendalikan melalui vaksinasi tepat waktu, disinfeksi parvosidal, isolasi dini, dan penanganan dokter hewan secara cepat. Temuan ini menegaskan bahwa penurunan mortalitas akibat FPV pada anak kucing lebih bergantung pada biosekuriti terpadu daripada pengobatan semata.

Kata Kunci: feline panleukopenia virus, anak kucing, klaster kasus rumah tangga, pengamatan pengasuh, pencegahan

INTRODUCTION

Feline panleukopenia is a highly contagious and often fatal viral disease of cats caused by a parvovirus with marked tropism for rapidly dividing cells, particularly those in the intestinal crypts, lymphoid tissues, and bone marrow (Greene & Sykes, 2023). This tropism contributes to severe enteritis, leukopenia, immunosuppression, dehydration, and rapid systemic decline, especially in kittens whose immune defenses are still developing (Decaro & Buonavoglia, 2012; Greene & Sykes, 2023). Although well recognized in veterinary medicine, FPV remains clinically important because outbreaks continue to occur and mortality can still be high when vaccination coverage, environmental sanitation, and early recognition are inadequate (Jacobson *et al.*, 2021; Rehme *et al.*, 2022).

The widespread use of core vaccination has reduced the overall burden of disease, but FPV has not disappeared. The virus continues to persist where vaccination is incomplete, environmental contamination is not effectively controlled, cats are housed in groups, and early clinical signs are not recognized promptly (Rehme *et al.*, 2022; Stone *et al.*, 2020). Kittens are particularly susceptible because maternal antibodies decline over time while active immunity may not yet be fully established before completion of the vaccine series (Kruse *et al.*, 2010; Stone *et al.*, 2020). This vulnerability is relevant not only in shelters and clinics, but also in households, foster settings, rescue environments, and small-scale breeding contexts where kittens often share feeding utensils, bedding, litter areas, and floor surfaces.

In Indonesia, feline panleukopenia remains clinically relevant because cases continue to be reported in veterinary practice and vaccination implementation among cat owners is not always optimal. A retrospective report from Jakarta documented 236 cats diagnosed with FPV in one veterinary clinic in 2017, with a high proportion of affected cats being under one year of age

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and a substantial non-survival rate (Kusumawardhani *et al.*, 2018). Recent Indonesian veterinary literature also notes that feline panleukopenia remains commonly encountered, may increase in certain periods, and requires stronger vaccination awareness among cat-keeping communities (Purnamaningsih *et al.*, 2025). This national context makes household-level prevention especially important, because owners and small-scale caretakers are often the first to recognize early clinical signs before a complete clinical workup is available.

Two features make FPV especially difficult to control. First, the virus is environmentally resilient and can remain infectious outside the host for prolonged periods, allowing contaminated surroundings to serve as an important source of transmission even when direct cat-to-cat contact is limited (Decaro & Buonavoglia, 2012; Rehme *et al.*, 2022). Second, the early clinical signs are often non-specific. Lethargy, anorexia, pyrexia, vomiting, and diarrhea may initially resemble less severe gastrointestinal or nutritional problems, even though the disease can progress rapidly to dehydration, immunosuppression, and death (Greene & Sykes, 2023; Jacobson *et al.*, 2021). In owner-managed environments, this combination of environmental persistence and non-specific presentation can delay effective intervention until viral exposure is already well established.

Veterinary studies have examined FPV in relation to prognosis, diagnostics, shelter outbreaks, molecular epidemiology, and treatment response. Several studies have identified prognostic markers associated with survival, including leukocyte count, platelet count, serum albumin, potassium, inflammatory indicators, and other biochemical abnormalities (Kruse *et al.*, 2010; Yanar *et al.*, 2024). Other work has clarified the strengths and limitations of point-of-care fecal antigen tests in comparison with PCR, showing that false-negative results may occur in clinically affected cats and that diagnosis therefore requires careful interpretation (Abd-Eldaim *et al.*, 2009; Citarová *et al.*, 2024; Jacobson *et al.*, 2021; Jeba *et al.*, 2025). Additional studies have also emphasized the importance of isolation, hygiene, and outbreak management in group-housing settings (Jacobson *et al.*, 2021; Rehme *et al.*, 2022).

However, much of the published literature is centered on hospital, shelter, or laboratory settings. While that body of work is essential, it does not always show how FPV is first recognized and managed in household care environments, where illness is often first detected through observable behavioral change, appetite loss, weakness, vomiting, or diarrhea before a complete diagnostic workup is available. In such settings, mortality risk is shaped not only by the biological severity of FPV, but also by the interaction among vaccination status, hygiene, crowding, environmental contamination, and delayed response. A household case perspective is therefore useful for translating veterinary evidence into prevention priorities that are understandable and actionable for owners, rescuers, and small-scale caregivers.

This article presents a veterinarian-confirmed clinical household case cluster of feline panleukopenia in eight kittens and uses published veterinary evidence to interpret the observed clinical course, likely shared-environment exposure, treatment limitations, and prevention priorities relevant to home-care settings. The article describes the observable pattern of illness and mortality from the caretaker perspective, relates the case to existing veterinary knowledge on transmission, diagnosis, treatment, vaccination, hygiene, and isolation, and develops a prevention-centered interpretation for household biosecurity and kitten care. By focusing on a household cluster rather than a shelter or hospital outbreak, this article shows that integrated household biosecurity, including timely vaccination, early isolation, parvocidal disinfection, controlled handling, and prompt veterinary response, is central to reducing FPV-related mortality in multi-kitten care settings.

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RESEARCH METHODS

Research design

This study employed an exploratory qualitative household case study design based on caretaker observation and literature-informed analysis. This design was selected because the study aimed to describe and interpret the observable clinical deterioration of kittens in a household case cluster of feline panleukopenia, rather than to estimate disease prevalence, test treatment efficacy, or reconstruct complete individual medical records. The household case study approach was considered appropriate because the illness was first recognized in a home-care setting through visible changes in appetite, activity, hydration, gastrointestinal signs, and response to supportive care. The literature-informed component was used to interpret the observed clinical pattern, household transmission context, treatment limitations, and prevention priorities in relation to established veterinary knowledge on feline panleukopenia.

Case description and data sources

The case involved eight young household-owned pet kittens kept in the same home environment under the care of the household caretaker. Case information was obtained from direct caretaker observation during routine home care and from veterinary consultation after the kittens developed acute weakness and refusal to eat. The caretaker observations focused on visible clinical changes, including appetite loss, weakness, reduced activity, vomiting, diarrhea, hydration condition, feeding behavior, response to prescribed medication and supportive home care, and overall outcome.

Based on the available caretaker record, the diagnosis of feline panleukopenia was made by a veterinarian through clinical examination, visible clinical signs, and the clustered progression of illness among kittens living in the same household environment. Documented PCR or rapid antigen test results were not available in the caretaker records; therefore, the case is reported as a veterinarian-confirmed clinical household case cluster rather than a laboratory-confirmed outbreak.

Because the observation was conducted in a household care context rather than as a prospective veterinary registry, individual metadata such as breed, exact age, sex, litter relationship, complete vaccination history, and exact individual onset-to-death interval were not systematically recorded for each kitten. Accordingly, the analysis was limited to information available from caretaker observation and veterinary consultation, with emphasis on the cluster-level pattern of clinical deterioration, sequential mortality, and household prevention implications.

Literature sources

To support the literature-informed analysis, relevant veterinary literature was identified through targeted searches in Google Scholar and PubMed, complemented by manual checking of reference lists. Searches were conducted in August and September 2025 using the keywords “feline panleukopenia virus”, “FPV kittens”, “feline panleukopenia diagnosis”, “feline vaccination guidelines”, “parvovirus environmental persistence”, “shelter outbreak”, and “feline panleukopenia prognosis”. The search prioritized literature published between 2010 and 2025, while earlier foundational references were retained when they remained widely cited and clinically relevant.

Sources were included when they directly addressed feline panleukopenia in cats or kittens and contributed to at least one analytical domain of this study: pathogenesis, clinical signs, diagnosis, prognosis, transmission, environmental persistence, treatment, vaccination, hygiene, isolation, or prevention in shared animal-care environments. Priority was given to peer-

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reviewed journal articles, feline vaccination guidelines, veterinary infectious disease textbooks, and authoritative veterinary reference sources.

Sources were excluded when they did not directly discuss feline panleukopenia or parvoviral disease relevance to cats, lacked clear scientific or veterinary authority, focused on unrelated feline diseases, or did not contribute to the interpretation of household or shared-environment prevention. Based on these criteria, relevant sources were retained for the final literature-informed analysis.

Data analysis

The caretaker observation data were analyzed thematically and interpreted through literature-informed analysis. First, the available observation notes were reviewed to identify repeated clinical and care-related patterns, including appetite loss, weakness, reduced activity, vomiting, diarrhea, hydration decline, response to supportive home care, and outcome. Second, these observations were organized into analytical domains: clinical presentation, disease progression, household exposure context, supportive management, mortality pattern, and prevention implications.

The identified patterns were then compared with veterinary literature on feline panleukopenia to interpret their clinical and preventive significance. This comparison focused on the consistency between the household observations and established knowledge regarding FPV pathogenesis, environmental persistence, transmission through shared spaces and fomites, treatment limitations, vaccination, isolation, and hygiene. The analysis did not aim to establish statistical causality, but to develop a clinically grounded interpretation of the observed household case cluster.

Analytical boundaries

The interpretation was limited to the observable household case pattern and the veterinary consultation information available in the caretaker records. This study did not attempt to reconstruct unavailable individual medical records, laboratory parameters, or the exact virological source of exposure. It also did not seek to determine the independent contribution of each household condition to disease transmission or mortality. Therefore, the findings should be understood as a literature-informed interpretation of a veterinarian-confirmed clinical household case cluster, rather than as a laboratory-confirmed outbreak investigation or a controlled causal analysis.

The analytical focus was placed on the cluster-level pattern of clinical deterioration, sequential mortality, shared-environment exposure, supportive home care, and prevention implications. This boundary was applied to maintain accuracy, avoid retrospective overstatement, and ensure that the interpretation remained consistent with the available caretaker observation and veterinary consultation data.

Ethical considerations

No experimental procedures or research-induced interventions were performed on the animals. The observations reported in this study arose from routine household care, and veterinary consultation was sought when the kittens developed acute illness. The kittens received care in the form of prescribed medication and supportive home management according to the available caretaker record. The case is presented for educational and preventive purposes, with emphasis on improving owner awareness, household biosecurity, timely veterinary response, and prevention of feline panleukopenia in shared kitten environments. Identifying personal information about the caretaker, household, veterinarian, or clinic was not disclosed.

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RESULTS AND DISCUSSION

Results

Case observation findings from the household caretaker perspective

Caretaker observations indicated a rapid and severe clinical course among eight young household-owned pet kittens kept in the same home environment. The illness was first recognized at the cluster level when all eight kittens were observed to be extremely weak and refused to eat on the same morning. The caretaker then sought veterinary consultation, and after clinical examination, the veterinarian informed the caretaker that the kittens were affected by feline panleukopenia. Based on the available caretaker record, the diagnosis was therefore treated as a veterinarian-confirmed clinical diagnosis rather than a laboratory-confirmed outbreak.

Following veterinary consultation, the kittens received prescribed medication and supportive home care. Home care included monitoring appetite, hydration condition, activity level, feeding behavior, visible gastrointestinal signs, and general response to treatment. Despite these efforts, the kittens did not show sustained clinical improvement. The observed clinical course included sudden weakness, anorexia, reduced activity, vomiting, diarrhea, declining hydration condition, and progressive deterioration.

The mortality pattern was sequential. Although the illness was recognized in the eight kittens at the same general time point, the deaths did not occur simultaneously. Instead, the kittens died one by one over the following weeks. All eight affected kittens died, resulting in a case fatality rate of 100% in this household cluster. No kitten was observed to enter a stable recovery phase. This pattern suggests that once overt clinical disease became visible in the household setting, supportive treatment and home care were insufficient to reverse the clinical decline.

The household environment provided an important context for interpreting the cluster. The kittens shared living space, bedding, feeding and water areas, floor surfaces, and human handling. From the caretaker perspective, these shared conditions made repeated indirect exposure and cross-contamination plausible, especially because the illness affected multiple kittens within the same household context. However, the available caretaker record did not allow reconstruction of the exact source of infection, the individual day of onset for each kitten, or the precise time from first sign to death for each kitten. Therefore, the results are reported at the cluster level, with emphasis on observable clinical deterioration, sequential mortality, and household prevention implications. Table 1 summarizes the available case observation data and clarifies which case details were recorded at the cluster level.

Literature synthesis findings

The literature-informed analysis identified four major themes relevant to the household case cluster.

First, feline panleukopenia is consistently described as a severe and rapidly progressive disease in kittens. FPV targets rapidly dividing cells, particularly in intestinal crypts, lymphoid tissues, and bone marrow, leading to gastrointestinal injury, leukopenia, immunosuppression, dehydration, and increased vulnerability to secondary complications (Greene & Sykes, 2023; Sykes, 2014). This biological pattern helps explain why the affected kittens showed sudden weakness, anorexia, gastrointestinal signs, dehydration, and rapid clinical decline.

Second, shared environments can amplify FPV transmission. Veterinary literature emphasizes that FPV can spread through fecal-oral exposure and contaminated objects, including bowls, bedding, litter areas, surfaces, hands, and handling materials. The virus is environmentally

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persistent and may resist routine cleaning when parvocidal disinfection is not applied (Decaro & Buonavoglia, 2012; Rehme *et al.*, 2022). This finding is relevant to the present case because the kittens shared household space, bedding, feeding areas, floor surfaces, and human handling.

Third, prevention is more decisive than late-stage treatment. Published veterinary guidance identifies FPV vaccination as a core preventive measure for cats, especially kittens, and emphasizes the importance of age-appropriate vaccination schedules, booster administration, hygiene, isolation, and environmental control (Scherk *et al.*, 2013; Stone *et al.*, 2020). This supports the interpretation that reducing mortality in household kitten clusters depends primarily on integrated prevention rather than treatment after overt clinical disease appears.

Fourth, treatment for clinically affected kittens is primarily supportive. Veterinary literature describes fluid therapy, antiemetic support, nutritional support, antimicrobial coverage when indicated, warmth, and close monitoring as important components of management, but these measures do not function as a specific antiviral cure (Greene & Sykes, 2023; Porporato *et al.*, 2018). In the present household cluster, the sequential death of all eight kittens despite prescribed medication and supportive home care reinforces the limitation of reactive treatment once clinical deterioration has become advanced.

Integrated results

Integration of the household observations with veterinary literature revealed three main interpretive patterns.

The first pattern was clinical vulnerability. The sudden weakness, anorexia, gastrointestinal signs, dehydration, and progressive deterioration observed in the kittens were consistent with the recognized clinical and pathological features of feline panleukopenia in young cats. FPV is known to affect rapidly dividing cells, particularly in intestinal and hematopoietic tissues, which can contribute to gastrointestinal damage, leukopenia, immunosuppression, dehydration, and rapid systemic decline (Greene & Sykes, 2023; Kruse *et al.*, 2010; Sykes, 2014). Because kittens have limited physiological reserves and immature immune protection, visible clinical decline in a multi-kitten setting should be treated as an urgent warning sign.

The second pattern was shared-environment amplification. Although the exact source of exposure could not be reconstructed from the caretaker records, the shared household environment provided plausible conditions for repeated indirect exposure and cross-contamination. Shared bedding, feeding and water areas, floor surfaces, and human handling may function as transmission pathways when a persistent virus such as FPV is introduced into a multi-kitten setting. This interpretation is consistent with veterinary sources describing FPV environmental persistence and with outbreak literature showing that hygiene, husbandry, and infection management influence disease spread in shared animal-care environments (Decaro & Buonavoglia, 2012; Rehme *et al.*, 2022).

The third pattern was prevention dependence. The 100% case fatality rate in this household cluster indicates that prescribed medication and supportive home care were not sufficient to reverse the clinical course once overt disease became visible. This finding should not be generalized beyond the present cluster, but it supports the prevention-oriented interpretation that vaccination, early isolation, appropriate disinfection, and prompt veterinary response are essential before household transmission becomes established. Feline vaccination guidelines identify FPV vaccination as a core preventive measure, while clinical references describe treatment for affected kittens as primarily supportive rather than curative (Greene & Sykes, 2023; Porporato *et al.*, 2018; Scherk *et al.*, 2013; Stone *et al.*, 2020).

Table 2 summarizes the integrated interpretation between the observed household case pattern,

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relevant veterinary evidence, and prevention implications. The table is presented as an analytical synthesis rather than a source-by-source literature list.

Discussion

This study examined a veterinarian-confirmed clinical household case cluster of feline panleukopenia involving eight kittens and interpreted the observed pattern through caretaker observation and literature-informed analysis. The findings show that the case was characterized by sudden weakness, anorexia, gastrointestinal signs, declining hydration, progressive deterioration, and sequential mortality among all affected kittens. The observed case fatality rate was 100% in this household cluster. This figure should not be generalized to all feline panleukopenia cases, but it indicates the severity of the observed episode and reinforces the importance of prevention-oriented management in multi-kitten household settings.

One important implication concerns the speed of clinical decline in kittens. The caretaker observations showed that weakness and refusal to eat were early warning signs, followed by vomiting, diarrhea, dehydration, reduced activity, and death. This pattern is consistent with the known pathophysiology of feline panleukopenia. FPV targets tissues with high mitotic activity, especially intestinal crypt cells, lymphoid tissues, and bone marrow, which can result in enteritis, leukopenia, immunosuppression, dehydration, and rapid systemic decline (Greene & Sykes, 2023; Kruse *et al.*, 2010; Sykes, 2014). In kittens, limited physiological reserves and immature immune protection may make deterioration particularly rapid once infection becomes clinically apparent.

The observed clinical pattern also supports the need to treat sudden anorexia and weakness in multi-kitten environments as urgent warning signs. Early FPV signs may initially appear non-specific to caretakers, but the disease can progress quickly once gastrointestinal injury, immune suppression, and dehydration occur (Greene & Sykes, 2023; Sykes, 2014). In the present case, the caretaker recognized acute weakness and refusal to eat before seeking veterinary consultation. This sequence highlights the practical importance of early recognition, especially in household settings where several kittens share the same environment and may be exposed at the same time.

A second implication concerns the relationship between treatment and prevention. In this case, the kittens received prescribed medication and supportive home care after veterinary consultation, but no sustained recovery phase was observed. This finding is consistent with veterinary literature describing FPV treatment as primarily supportive rather than curative once overt disease has developed. Supportive care may include fluid therapy, antiemetic management, nutritional support, antimicrobial therapy when indicated, warmth, and close monitoring, but these measures cannot replace effective immunity or reverse exposure that has already occurred (Greene & Sykes, 2023; Kruse *et al.*, 2010; Porporato *et al.*, 2018). The sequential death of all eight affected kittens therefore supports a prevention-first interpretation of household FPV management.

This prevention-first interpretation is strongly supported by feline vaccination guidelines. FPV vaccination is classified as a core vaccine for cats, and vaccination guidelines emphasize age-appropriate kitten vaccination and booster administration as central components of disease prevention (Scherk *et al.*, 2013; Stone *et al.*, 2020). In the present household cluster, complete vaccination history was not systematically available in the caretaker records; therefore, this study cannot determine the individual contribution of vaccination status to each kitten's outcome. Nevertheless, the case demonstrates why uncertain or incomplete preventive protection in a multi-kitten environment should be treated as a serious concern. Prevention must be implemented before exposure becomes established, not only after clinical disease appears.

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The household environment also has important epidemiological relevance. Although the case occurred in a private household rather than a shelter, the kittens shared living space, bedding, feeding and water areas, floor surfaces, and human handling. These shared conditions may allow indirect exposure and cross-contamination when a persistent virus such as FPV is introduced into a multi-kitten setting. Veterinary literature shows that parvoviruses can persist in the environment and that hygiene, husbandry, isolation, and infection management influence disease spread in shared animal-care environments (Decaro & Buonavoglia, 2012; Litster & Benjanirut, 2014; Rehme *et al.*, 2022). Therefore, the present household case should not be interpreted as identical to a shelter outbreak, but it can be understood through a similar shared-environment transmission logic.

The findings also emphasize the difference between general cleanliness and disease-specific biosecurity. A household may appear visually clean but still remain vulnerable to FPV contamination if routine cleaning is not combined with appropriate parvocidal disinfection, early isolation, and separation of equipment. Parvoviruses are known for environmental stability and resistance to many ordinary cleaning practices, making targeted disinfection and infection-control procedures essential in multi-cat settings (Decaro & Buonavoglia, 2012; Rehme *et al.*, 2022). For household kitten care, prevention should therefore include separate feeding equipment, controlled handling between sick and apparently healthy kittens, isolation of suspected cases, and disinfection practices appropriate for parvoviral contamination.

Diagnostic interpretation also needs to be reported cautiously. In this study, documented PCR or rapid antigen test results were not available in the caretaker records; therefore, the case was not presented as a laboratory-confirmed outbreak. Instead, it was reported as a veterinarian-confirmed clinical household case cluster based on veterinary examination, visible clinical signs, and clustered progression of illness. This distinction is important because diagnostic studies show that test interpretation in feline panleukopenia requires clinical judgment, particularly when point-of-care antigen tests or confirmatory PCR results are unavailable, incomplete, or context-dependent (Abd-Eldaim *et al.*, 2009; Citarová *et al.*, 2024; Jacobson *et al.*, 2021). The purpose of the present article is therefore not to compare diagnostic test accuracy, but to interpret an observed household pattern and translate it into prevention guidance.

The study also shows both the value and limitation of caretaker observation. Owner or caretaker observations are often the first source of information when disease emerges in a household setting. In this case, the caretaker observations captured clinically meaningful signs, including appetite loss, weakness, gastrointestinal disturbance, hydration decline, progressive deterioration, and sequential mortality. However, these observations were not originally designed as a prospective veterinary registry. As a result, individual metadata such as breed, exact age, sex, litter relationship, vaccination history, laboratory parameters, and exact onset-to-death interval for each kitten were not systematically available. The strength of the study therefore lies not in reconstructing complete individual medical records, but in documenting a household-level pattern and interpreting it carefully through established veterinary literature.

The results further suggest that FPV prevention works best as an integrated system rather than as isolated actions. Vaccination strengthens host protection, hygiene reduces environmental contamination, isolation limits transmission opportunities, separate equipment reduces indirect exposure, and early veterinary response shortens the period of unmanaged clinical deterioration. This integrated logic is consistent with vaccination guidelines and outbreak-management literature emphasizing prevention, sanitation, isolation, and coordinated care in shared animal environments (Pacini *et al.*, 2023; Rehme *et al.*, 2022; Scherk *et al.*, 2013; Stone *et al.*, 2020). When one component is weak or delayed, the protective value of the entire system may be

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reduced.

These findings have practical implications for veterinary communication. Veterinary professionals should not only recommend vaccination, but also provide simple and actionable household biosecurity guidance for owners caring for multiple kittens. Such guidance may include early isolation of weak or anorexic kittens, separate feeding and water bowls, restricted handling between sick and apparently healthy kittens, appropriate parvocidal disinfection, monitoring of appetite and hydration, and urgent reassessment when gastrointestinal signs appear. Clear communication is especially important because early clinical signs may appear mild or non-specific to owners, even though FPV can progress rapidly and cause severe outcomes in susceptible kittens (Greene & Sykes, 2023; Rehme *et al.*, 2022; Stone *et al.*, 2020).

From a broader animal health perspective, the study highlights the need to extend FPV prevention education beyond clinics and shelters. Household owners, foster caregivers, rescuers, and small-scale kitten caretakers may face practical challenges similar to institutional settings, including limited isolation space, incomplete records, uncertain vaccination history, and delayed recognition of early warning signs. Although household clusters are smaller than shelter outbreaks, they can still produce severe mortality when several vulnerable kittens are exposed in the same environment. Evidence from shelter and multi-cat outbreak studies remains useful as a comparative basis for understanding shared-environment transmission and prevention needs, provided that the household context is interpreted cautiously (Litster & Benjanirut, 2014; Pacini *et al.*, 2023; Rehme *et al.*, 2022).

These conclusions should be read within the study's analytical boundaries. This article is based on a single veterinarian-confirmed clinical household case cluster and caretaker observation supported by literature-informed analysis. It cannot determine the precise source of exposure, reconstruct unavailable laboratory parameters, rule out co-infections, or quantify the independent contribution of each household condition to mortality. The findings should therefore be understood as a clinically grounded interpretation rather than a controlled causal model. Even so, the convergence between the observed household pattern and established veterinary literature supports practical conclusions regarding early recognition, vaccination, isolation, sanitation, and prompt veterinary response.

Future research should build on these limitations by collecting more structured data from household, foster, rescue, and shelter settings. Prospective studies could record individual kitten characteristics, vaccination history, diagnostic test results, clinical timeline, treatment details, and outcomes. Applied veterinary research could also develop simple owner-friendly recording tools or mobile applications that allow household caretakers and foster caregivers to document early signs, vaccination status, treatment, and outcomes more accurately. Such tools would improve the quality of future household case data and strengthen prevention strategies for feline panleukopenia in non-institutional care settings.

CONCLUSION AND SUGGESTIONS

Conclusion

This study described an exploratory qualitative household case study of feline panleukopenia involving eight kittens in a shared home environment. The observed case was characterized by sudden weakness, anorexia, vomiting, diarrhea, declining hydration, progressive clinical deterioration, and sequential death despite prescribed medication and supportive home care. All eight affected kittens died, resulting in a case fatality rate of 100% in this household cluster. Although this figure should not be generalized to all feline panleukopenia cases, it demonstrates the severity that may occur when several vulnerable kittens are exposed in the

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same household environment. The findings indicate that household-scale kitten care can carry serious outbreak-like risks when multiple kittens share bedding, feeding areas, floor surfaces, water sources, and human handling. Interpreted alongside veterinary literature, the case reinforces that FPV prevention depends primarily on integrated biosecurity, including timely vaccination, early isolation, parvocidal disinfection, controlled handling, separate equipment, and prompt veterinary response. Treatment remains important, but it should not be regarded as a substitute for prevention once clinical disease has progressed.

Suggestions

Cat owners, foster caregivers, rescuers, and small-scale kitten caretakers should prioritize prevention before clinical disease appears by ensuring age-appropriate vaccination, isolating suspected cases immediately, separating bowls, bedding, litter areas, towels, and handling equipment, and using appropriate parvocidal disinfection rather than routine cleaning alone. Veterinarians should support owners of multiple kittens with a practical household biosecurity checklist that includes vaccination status, early warning signs, isolation steps, separate feeding and drinking equipment, disinfection procedures, handling order between healthy and sick kittens, hydration monitoring, and criteria for urgent veterinary reassessment. Future research should collect more structured data from household, foster, rescue, and small-scale kitten-care environments, including individual kitten characteristics, vaccination history, diagnostic method, clinical timeline, treatment details, and outcome. Applied veterinary research could also develop an owner-friendly medical recording tool or mobile application that helps household caretakers and foster caregivers document symptoms, vaccination status, medication, hydration, appetite, and outcome in real time, thereby improving the accuracy of future household case reports and strengthening FPV prevention outside hospital and shelter settings.

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Tables

Table 1. Summary of available household case observation data

Observation domain	Available case information
Number of affected kittens	Eight young kittens in the same household environment
Care context	Household care setting under direct caretaker observation
Caretaker role	Household caretaker/owner as the primary observer during routine home care
Initial recognition of illness	All eight kittens were observed to be extremely weak and refused to eat on the same morning
Veterinary input	Veterinary consultation was sought after acute weakness and anorexia appeared
Diagnostic basis	Veterinarian-confirmed clinical diagnosis based on examination, visible clinical signs, and clustered progression
PCR or rapid antigen test record	Not available in the caretaker record
Main clinical signs observed	Weakness, anorexia, reduced activity, vomiting, diarrhea, declining hydration condition, and progressive deterioration
Home management	Prescribed medication and supportive home care, including monitoring appetite, hydration, feeding behavior, activity, and visible clinical changes
Mortality outcome	All eight affected kittens died
Case fatality rate	8/8 kittens, or 100%
Mortality pattern	Sequential death over the following weeks
Recovery observation	No stable recovery phase was observed
Shared household context	Shared space, bedding, feeding and water areas, floor surfaces, and human handling
Origin/stray status	The kittens were household-owned pet cats and were not recorded as stray cats
Individual kitten metadata	Breed, exact age, sex, litter relationship, complete vaccination history, and exact individual onset-to-death interval were not systematically recorded in the caretaker record
Analytical implication	The case was analyzed at the cluster level to avoid retrospective reconstruction of unverifiable individual clinical details

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Table 2. Integrated interpretation of household case observations and veterinary literature

Observed household case pattern	Literature-informed interpretation	Prevention implication	Supporting references
Sudden weakness and refusal to eat were observed in eight kittens in the same household setting	FPV can cause rapid systemic decline in kittens through intestinal and hematopoietic involvement	Sudden anorexia and weakness in a multi-kitten household should prompt urgent veterinary response	Greene & Sykes (2023); Sykes (2014); Kruse *et al.* (2010)
Vomiting, diarrhea, reduced activity, and declining hydration were observed during the illness course	Gastrointestinal injury and dehydration are consistent with clinical feline panleukopenia	Owners should monitor appetite, hydration, activity, vomiting, and diarrhea as warning signs	Greene & Sykes (2023); Sykes (2014)
All eight affected kittens died, resulting in a case fatality rate of 100%	Mortality can be high in clinically affected cats, although the 100% rate applies only to this cluster	Prevention before exposure is more reliable than reactive care after severe clinical signs appear	Kruse *et al.* (2010); Porporato *et al.* (2018); Stone *et al.* (2020)
The kittens shared bedding, feeding and water areas, floor surfaces, and human handling	Shared environments may permit indirect exposure through contaminated surfaces and fomites when FPV is introduced	Household biosecurity should include isolation, separate equipment, controlled handling, and parvocidal disinfection	Decaro & Buonavoglia (2012); Rehme *et al.* (2022)
Prescribed medication and supportive home care were provided, but no sustained recovery was observed	FPV treatment is primarily supportive and may be insufficient once severe deterioration occurs	Veterinary treatment should be combined with prevention-centered household management	Greene & Sykes (2023); Porporato *et al.* (2018)
Diagnosis was based on veterinary clinical assessment, while laboratory test documentation was not available in caretaker records	In observation-based household cases, diagnostic certainty should be reported cautiously and not overstated as laboratory confirmation	Suspected FPV clusters should be managed cautiously while veterinary assessment and diagnostic decisions are pursued	Abd-Eldaim *et al.* (2009); Jacobson *et al.* (2021); Citarová *et al.* (2024)

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