Colorado Shelter Trends: Multi-Year Data Analysis

Exploring patterns and changes in Colorado's shelter system over time.

Tools Used & Methodology

Programming Language: **R** (Open Source)

Reporting Tool: **Quarto**, published via **Quarto Pub**

- Used to create professional reports, dashboards, and websites directly from R code.

Why Quarto:

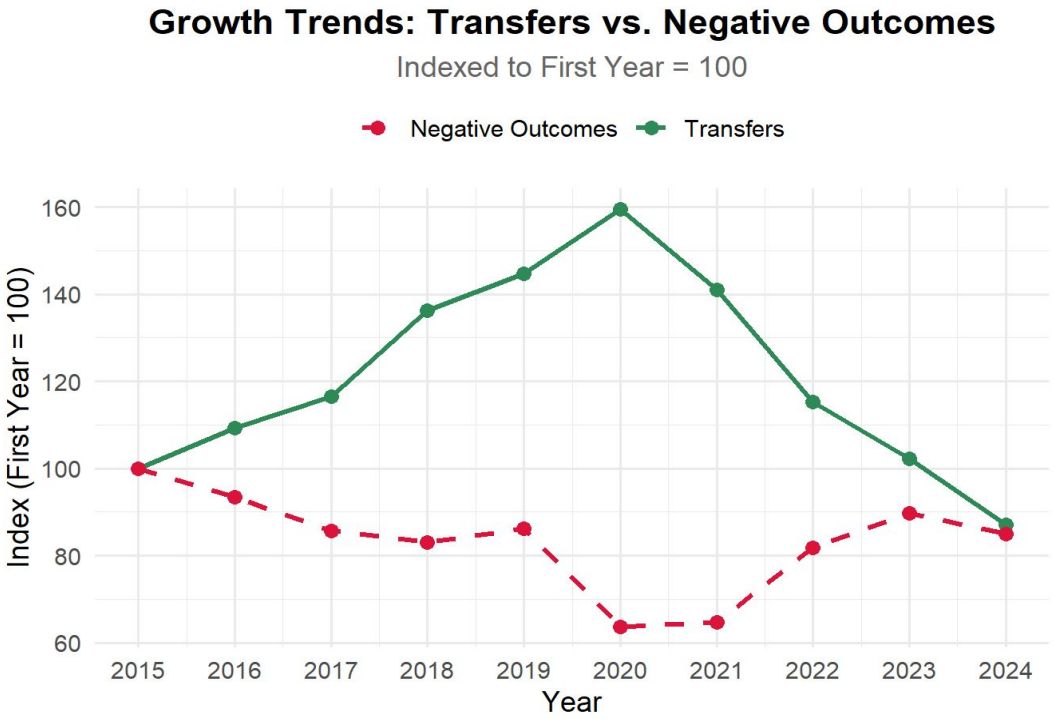
- Supports the concept of **Reproducible Analytic Pipelines (RAP)** keeping code, analysis, and explanations in one document.
- Ensures results update automatically when data changes.

Structure of the analysis

The analysis is structured around the four themes below that were in the analysis guide:

1. Transfers and negative outcomes
2. Adoption trends
3. Return-to-owner rates
4. Intake categories and trends over time

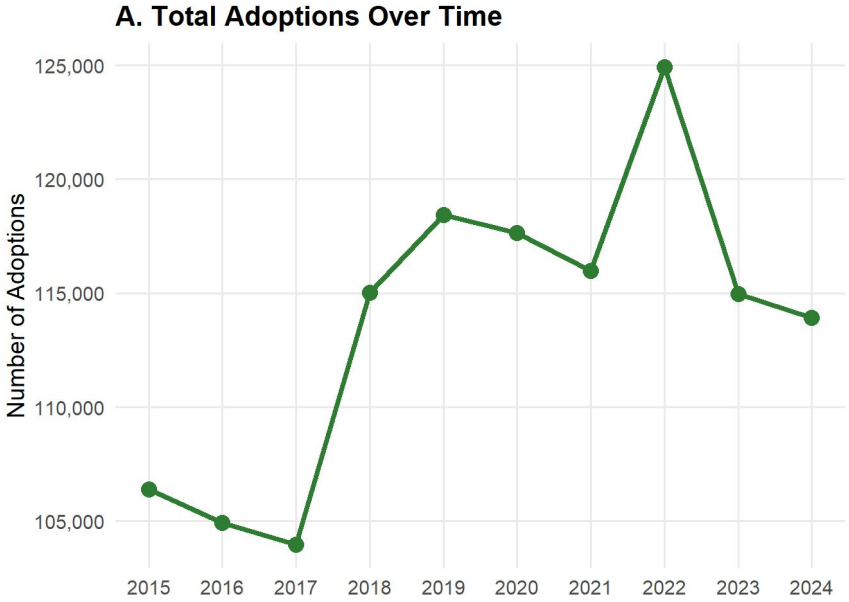
Transfers and Negative Outcomes

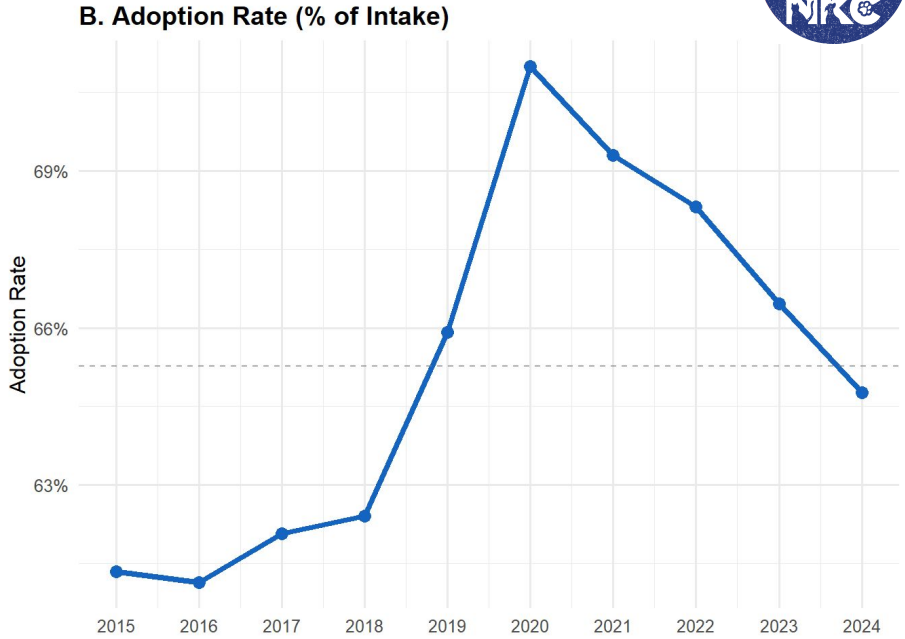


- Low correlation coefficient (r = 0.156).
- A higher number of transfers is not strongly associated with an increase in euthanasia, deaths, or missing animals.

- Transfers rose steadily until 2020, then dropped sharply.
- Negative outcomes fell until 2020 but increased afterward.
- **Interpretation:** The post-2020 rise in negative outcomes is likely due to factors like staffing or funding pressures, not transfer volumes.

Adoption Trends





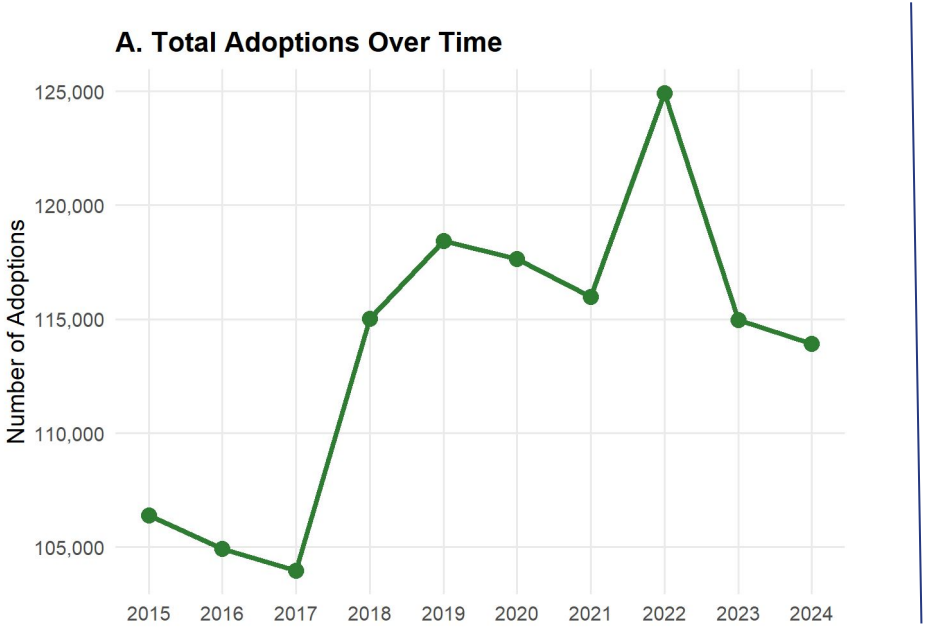
Raw adoptions rose from 104K to 125K (+20%).

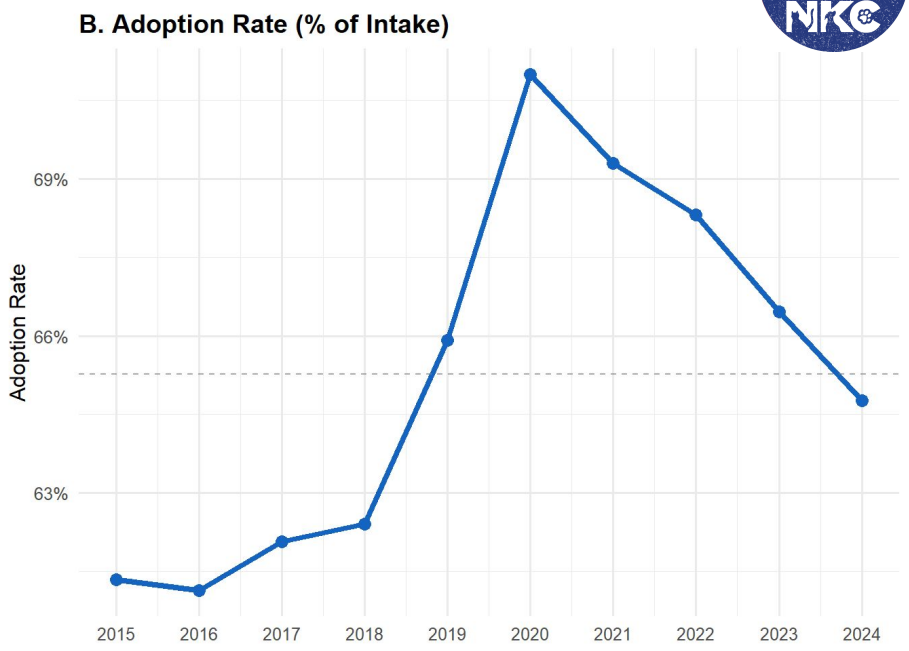
Adoption efficiency increased from 62% to 70% by 2020, then dropped to 65% by 2024.

Interpretation: Shelters placed more animals overall but became less efficient after 2020.

The 2020 peak aligns with the COVID-19 pandemic, when stay-at-home periods drove a surge in pet adoptions.

Adoption Trends



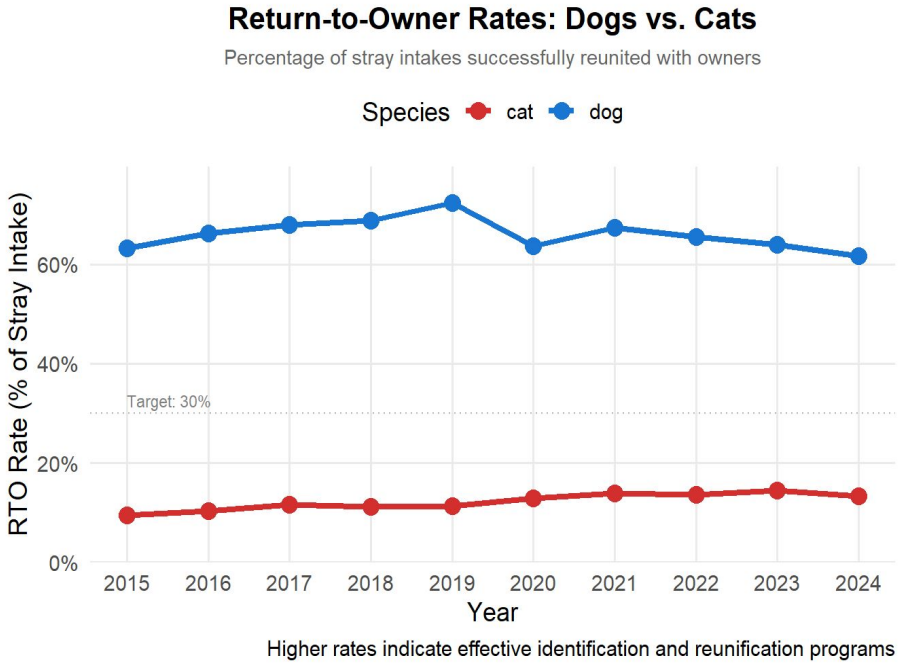


2022 shows the highest raw adoptions ever (125,000) but a decline in adoption rate to 68.5%:

- Intake grew faster than adoptions, likely due to post-pandemic pet surrenders or economic pressures.
- The system successfully processed record adoption volume but couldn't keep pace with intake growth, indicating underlying capacity limitations.

Return-to-Owner (RTO) Rates

- **Dogs vs Cats**: Dogs have consistently higher RTO rates (60–70%) than cats (10–15%), a gap of about 50–60 percentage points.
- **Dogs:** RTO rates rose slightly from 2015–2019, likely due to better identification (microchipping, online platforms), but declined after 2020 amid pandemic disruptions.
- **Cats:** Rates remained flat, showing little progress despite awareness efforts suggesting ongoing challenges like low microchip use and the perception that stray cats are "independent."
- Key Insight: Interventions have worked for dogs but not for cats. Future focus should target cat ID programs and community outreach to close the RTO gap.



Intake Categories and Shifts Over Time - Stray Intake

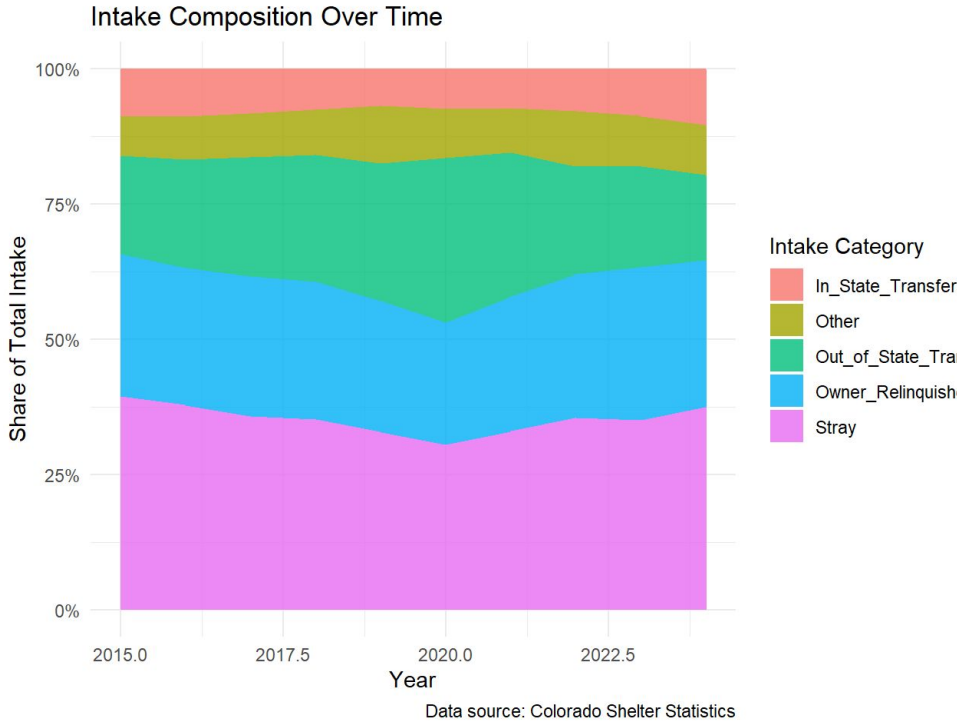
Largest category: Strays consistently make up **35–40%** of total intake.

Pandemic dip: Fell to ~30% in 2020, likely due to reduced field operations and public reporting during COVID-19.

Key insight: Persistent high levels suggest limited progress in:

- Spay/neuter coverage
- Lost-pet recovery infrastructure
- Owner identification systems

Despite years of data, **stray prevention remains a core gap** in shelter system performance.



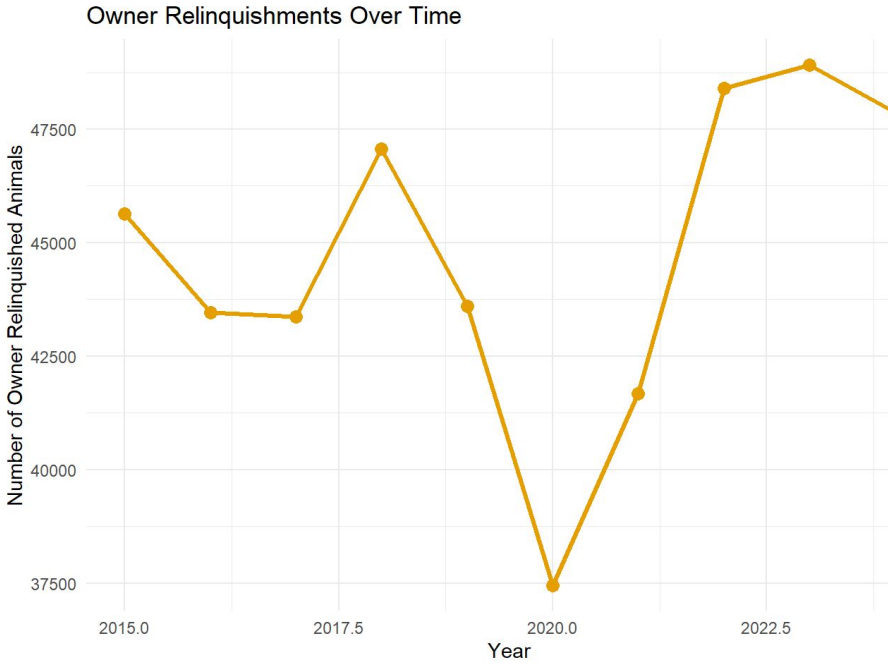
Intake Categories and Shifts Over Time - Owner Relinquishments

Trends: 47K (2018) → 37.5K (2020) → 49K (2023).

Pandemic dip (2020): Reflects shelter access restrictions, not improved retention.

Post-pandemic rebound: Driven by financial hardship, housing instability, and limited support services.

Concern: Relinquishments now **exceed pre-pandemic levels**, highlighting persistent economic and social stressors on pet ownership.



Recommendations

Overall, the analysis highlights a system that's strong but under pressure.

- Transfers aren't the problem but may stem from internal capacity and operational limits.
- Adoption numbers are strong, yet shelters are becoming less effective at converting intakes into adoptions.
- More targeted RTO strategies are needed for cats.
- The data shows we need more **prevention programs** to reduce how many animals end up in shelters.

Opportunities for Improvement

- **Additional data needed**: To deepen the analysis, more contextual information from shelters such as programs, policies, and operational details would be valuable.
    - **Enhancing reproducibility:** With more time, the analysis could be made more reproducible by:
    - Creating functions for visualizations
- Embedding code systematically within the report for easier updates
- Integrating other datasets (e.g., community demographics, funding levels) could provide richer insights and help identify drivers behind trends.