

Analysis of Youth Runaways in Allegheny County between 2014-2016

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I. Overview

The main focus of this report is to better understand **youth who ran away from placement centers in Allegheny County between 2014-2016**. According to the National Runaway Safeline, 1.6 - 2.8 million youth run away each year in the United States.¹ Allegheny County is not immune to this challenge. A preliminary exploratory analysis showed the dataset contains:

- 2,849 records in total
- 477 records represented youth (15-23 years)
- 113 records classified as runaways
 - 25 runaways in 2014
 - 36 runaways in 2015
 - 52 runaways in 2016

An increase in the number of runaways between 2014-2016 calls for a more in-depth analysis.

Definitions:

- **Youth:** As per the United Nations, for all statistical purposes, 'youth' are individuals between 15-24 years of age.²
- **Runaway:** These are individuals with exit type XRY in the dataset.

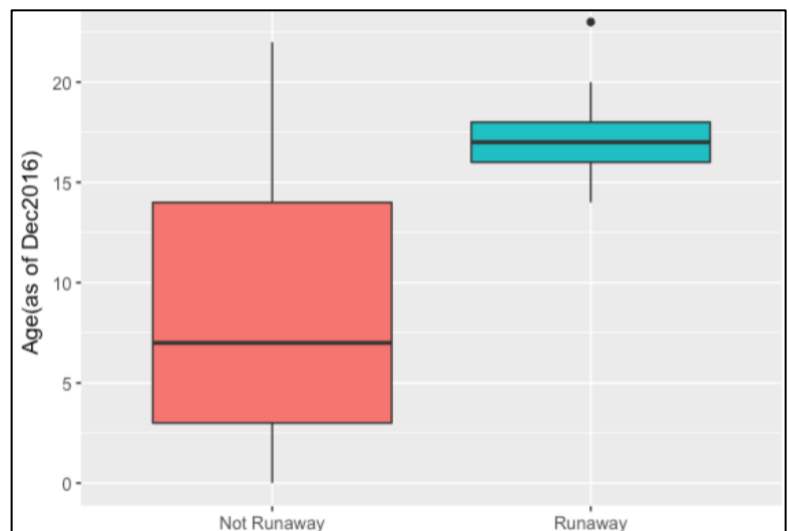
A chi-square test revealed the statistically significant dependence between age group and runaways ($p < 0.05$). From Fig. 1, we can see that the average age of children who ran away from placement centers was 17 years. It is important to note that all children who were runaways were within the ages 15-23. Runaways represented **4% of all children** and **24% of all youth** in placement care.

Research Question:

Therefore, this report focuses on answering the following two questions:

1. What are the demographics of runaways?
2. What are some statistically significant predictors of runaways?

Fig. 1: Average age difference between runaways and non-runaways



II. Key Findings and Analysis

a. Demographics:

Among individuals classified as runaways, 69% were female and 31% were male. Females and males represented 49% and 51% among all children in placement care respectively. Despite being slightly underrepresented in the overall population, the proportion of female runaways was greater than that of

¹ Frequently Asked Questions | Runaway Hotline and Online Crisis Service | National Runaway Safeline. (n.d.). Retrieved September 27, 2018, from <https://www.1800runaway.org/about-us/faq/>

² Frequently asked questions For Youth. (n.d.). Retrieved September 27, 2018, from <https://www.un.org/development/desa/youth/what-we-do/faq.html>

males with statistical significance ($p < 0.05$). From Table 1, we see that **black children represent the highest proportion (44%)** of all children in placement care. Combining race and gender, we can see that black females represent the highest proportion (34%) of runaways, followed by black males (19%) and white females (19%). Among the female youth population, blacks constitute the highest proportion (51%). This explains the high proportion of runaways among black females

Fig. 2: Proportion of female and male runaways

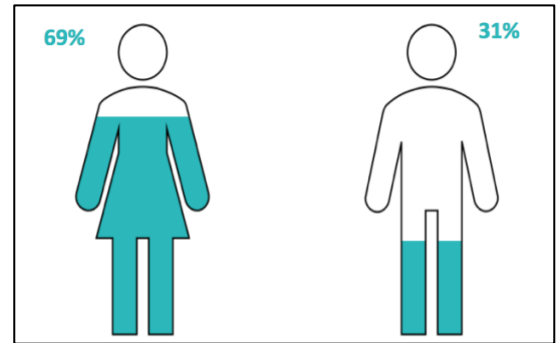


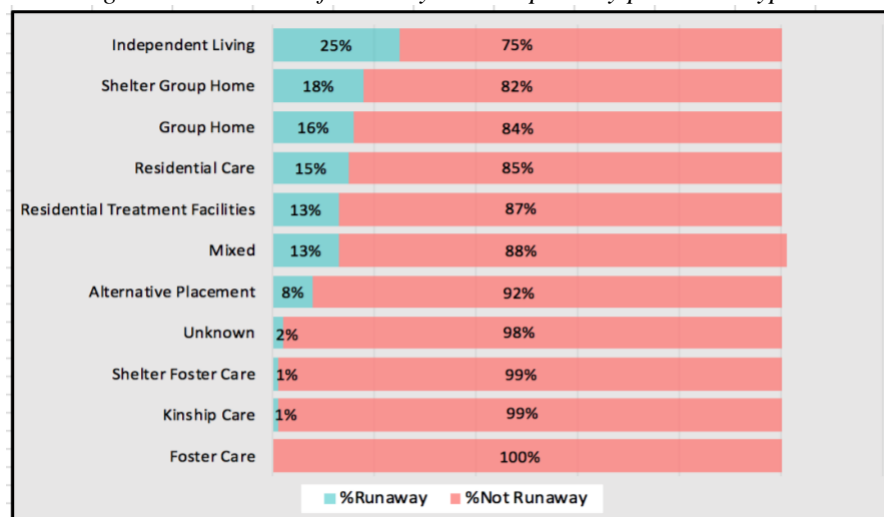
Table 1: Distribution of children who ran away from placement across race

Race	Total Children (0-23 years)	% Total Children (0-23 years)	Female			Male		
			Total Count (0-23 years)	% Youth (15-23 years)	%Runaways	Total Count (0-23 years)	% Youth (15-23 years)	%Runaways
Black	1,243	44%	594	51%	34%	649	56%	19%
White	996	35%	294	26%	19%	489	23%	6%
Other	610	21%	507	23%	17%	316	21%	6%

b. Placement Care Type:

Given that these are children who have been removed from their homes due to neglect and abuse, it is critical to evaluate if their alternative placement care type is a contributing factor to runaway episodes. Chi-square test results revealed a strong statistically significant dependence between primary placement care type of children and runaways ($p < 0.05$). From Fig. 4 we can see that the highest proportion of runaways (25%) were from Independent Living facilities and 0% runaways in Foster Care.

Fig. 3: Distribution of runaways across primary placement type



Kinship Care and Foster Care represented the highest (53%) and second highest (16%) proportion of all children in placement care respectively. But, only 1% of Kinship Care youth and 0% of Foster Care youth were classified as runaways. While the type of living conditions, staff training, nature of care provided etc. can have an impact on runaway episodes, the below table examines the potential impact of the proportion of youth and children in these facilities.

Table 2: Proportion of youth and runaways per primary placement care type

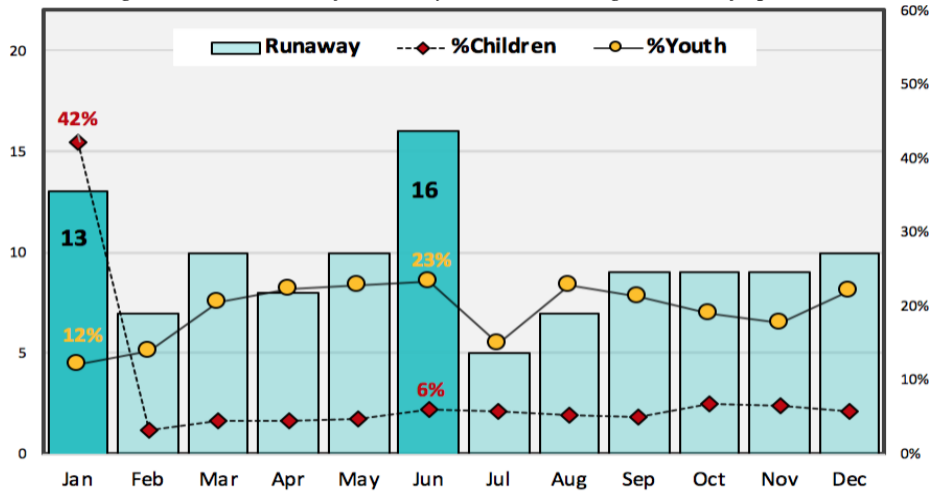
Placement Care Type	Total Children (0-23 years)	% Youth (15-24years)	%Runaways
Foster care	470	3%	0%
Kinship Care	1,514	8%	1%
Sheltered Group Home	281	61%	18%
Independent Living	20	100%	25%

In Table 2, we closely examine two placement facility types, each with the highest proportion (Independent Living and Sheltered Group Home) and lowest proportion (Foster Care and Kinship Care) of runaways. It is crucial to note that the **highest proportion of runaways are from placement types that also have the highest proportion of youths**. Especially, Independent Living where 100% of children placed were youths.

c. Month Spell Ended:

In an attempt to understand which other variables in the dataset are strong predictors of runaways, the **Random Forest algorithm** in R was employed on 23 parameters based on their practical significance. Among those, the ending month of placement spells emerged with a high prediction score (See Appendix).

Fig. 4: Distribution of runaways across ending months of spell



From Fig. 4 we can see that, June had the highest number of runaway cases (16). Although, January had the highest proportion (42%) of children (0-23 years) ending their placement spell, the proportion of youth ending their spell was highest in June (23%) relative to that in January (12%). It is also interesting to note how closely the “%Youth” line chart varies with “Runaway” bar chart, thereby providing a visual representation of the correlation between youth and runaways w.r.t the month that spells ended.

III. Conclusion:

A statistically significant correlation exists between runaway exit types and the children belonging to the youth age category (15-23 years). The following key observations were made through this analysis:

- **Demographics:** Females (69%) have a significantly higher likelihood of running away from out-of-home placement facilities than males (31%). Black females (34%) represented the highest proportion of runaways owing to the highest proportion of black youths (51%) among females.

- **Predictors of runaways:**

- Primary Placement Care: Independent Living facilities and Sheltered Group Homes had the highest proportion of youths (100% and 61% respectively) and also had the highest proportion of runaways.
- Month Placement Spell Ended: June had the highest proportion of youth ending their spell. The highest number of runaways also occurred in June despite the highest proportion of children (0-23 years) ending their spells in January.

Several other qualitative factors are necessary to gain a deeper understanding of why youths run away from placement care. Overlaying other datasets that can explain the educational outcomes, family backgrounds, pregnancy rates, mental health, economic levels etc. of this youth population can help provide a more holistic picture of this challenge, thereby paving way for further analysis.

Appendix

Random Forest: This is a supervised learning algorithm that creates randomized decision trees to measure variable importance. The accuracy of the model is measured by randomly shuffling predictor variables to determine their level of importance.

Below is the Variable Importance plot generated from the Random Forest output for the parameters displayed along the y-axis. We can see that IM (Month Spell Began) and OM (Month Spell Ended) have the highest importance in predicting runaways.

