Patterns of Emergency Shelter Stays in Calgary

Executive Summary

This report summarizes a study of shelter stay data from the Calgary Drop In and Rehab Centre (CDIC) from 2009-2012. It analyzes unique individuals, length of stay, number of episodes, and days per episode. Additionally, modelled after two seminal studies on shelter stay patterns, it groups shelter users into three clusters – transitional, episodic and chronic shelter users – and analyzes the data within each cluster.

The analysis shows that the transitional population makes up 83.7% of shelter users at CDIC, the episodic group is 14.2% and the chronic shelter users are 2.1%. Transitional shelter users have a small number of episodes (average of 1.59), and a small average total days stayed (13.04), with the average length of stay per episode at just over one week. Episodic users have a large total days stayed (87.2), a large average number of stays (6.98) and an average length of stay per episode of just over 2 weeks. Finally, chronic shelter stayers have a large number of average total days stayed (725.98), a small average number of episodes (3.07) and a large average days per episode (408.68). These findings are consistent with the typologies in both Kuhn and Culhane and Aubry et al's studies.

Background

Kuhn and Culhane's (1998) seminal study on patterns of shelter stays in New York and Philadelphia developed a typology of shelter stay patterns based on length of stay and rate of readmission by analyzing administrative data from public shelters over a three-year period. Shelter stayers were classified based on three distinct stay patterns: transitional, episodic and chronic.

- Transitional shelter users typically had a small number of episodes over a multi-year period.
- Episodic users had the most episodes of all typologies, with periods of time away from the shelter; this was hypothesized as resulting from periods of time spent in jails, hospitals and treatment centers.
- Chronic shelter users were characterized by fewer, yet longer episodes of homelessness.

Results from the New York site, with a sample of just over 73,000 shelter users, found 81% of shelter users had transitional shelter stay patterns, 9.1% had episodic patterns and 9.8% had chronic stay patterns.

In 2013, Ontario-based researchers replicated this study in three cities (Toronto, Ottawa and Guelph) (Aubry et al, 2013). Findings from the Toronto site, with a sample size of 56,533 found comparable results to the original Kuhn and Culhane study, with clusters of transitional homeless individuals at 87% of the total sample, episodic users at 8% and chronic at 4%.

At present, our understanding of the distribution, stay patterns and characteristics of the chronically, episodically and transitionally homeless is based on extrapolations from other existing research applied to the data available in Calgary. In order to accurately target chronically and episodically homeless persons for housing interventions, plan for housing and program models and better understand how shelters are being accessed, we need to establish a local knowledge base using

local data. This will allow the community to better understand the size and scope of our homeless population, which will inform what type of housing and programming is best suited to the client and how much of each type is needed.

The objective of this study is to analyze patterns of shelter stays in Calgary to determine if similar typologies can be identified for single adults as reported in Aubry et al (2013) and Kuhn and Culhane (1998).

Findings

The following brief summarizes statistical analysis of emergency shelter stays at the Calgary Drop-In and Rehab Centre (including only overnight stays in emergency shelter beds) from 2009 to 2012. The data set is based on check-in and check-outs for each client and each date. Observations include the following variables: client ID, check-in date, check-out data, date of birth, gender and ethnicity.

Table 1: Summary of Data Set (2009-2012)

Year	Number of Observations	Number of Unique Individuals
2009	281,501	13,852
2010	268,826	9,551
2011	238,605	9,237
2012	245,141	10,280
2009-2012	1,034,073	26,748

The first layer of analysis considers three variables separately: total and average days stayed, total and average number of episodes, and total and average days per episode.

- Total days stayed (TDS) refers to the number of cumulative days of shelter stay for each client

- Total episodes represents the number of episodes for each client. An episode is defined as at least one night in shelter and a new episode is started once a minimum of 30 consecutive days has lapsed since the last shelter stay. If fewer than 30 consecutive days have lapsed and the client returns to shelter, their stays are considered part of the same episode. This is consistent with the definitions used in Kuhn and Culhane, and Aubry et al., and is used because it assumes that an individual who left the shelter for less than 30 days has not solved their homelessness, and thus their return to shelter can be considered part of the same episode.

- Average days per episode was calculated by dividing total days stayed (TDS) by total episodes, to represent the average number of days per episode.

Table 2: Summary of Variables

	Minimum	Median	Mean	Maximum
Total days stayed	1 day	3 days	38.66 days	1,448 days
Total episodes	1 episode	1 episode	2.397 episodes	21 episodes
Average days per episode	1 day/episode	2 days/episode	17.13 days/episode	1,448 days/episode

These variables are also displayed as distributions.
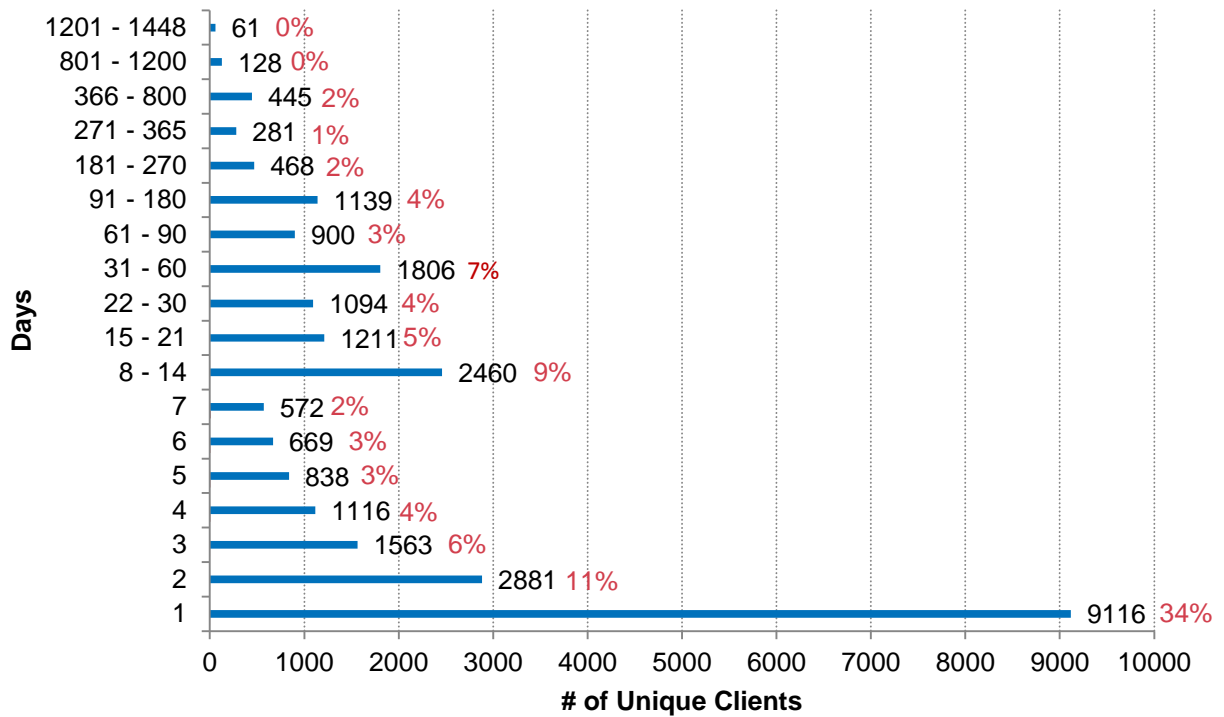
Figure 1: Total days stayed distribution (2009-2012)
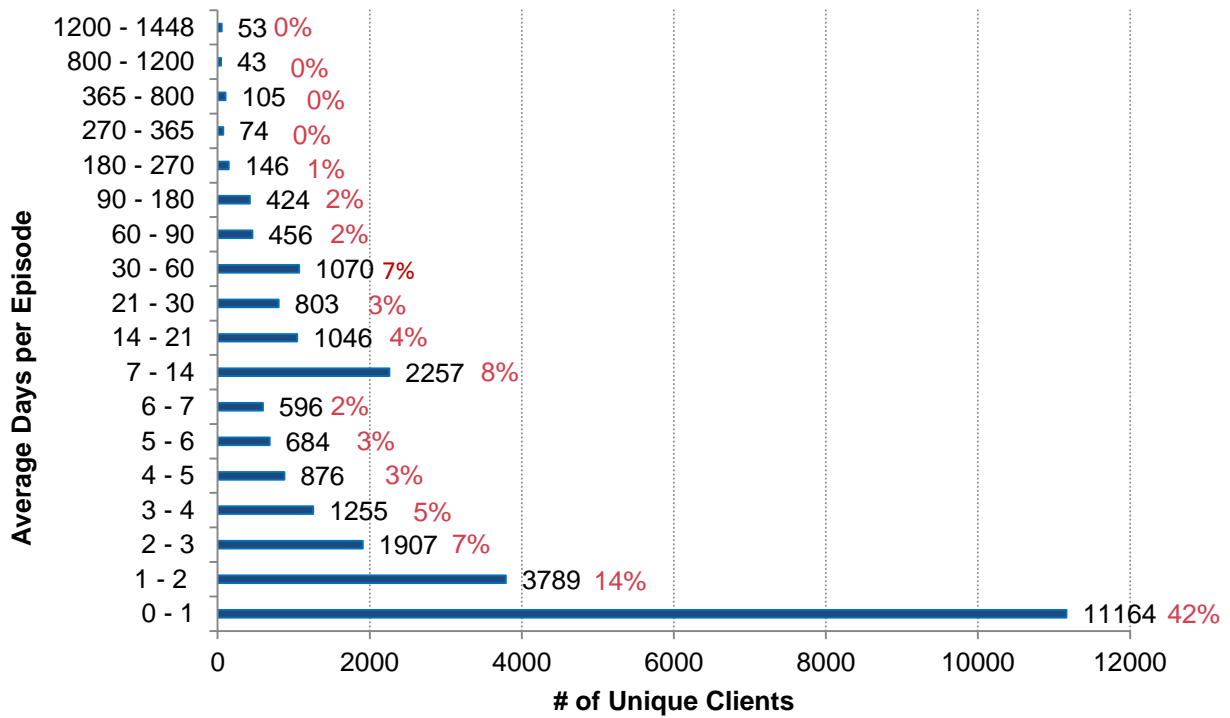
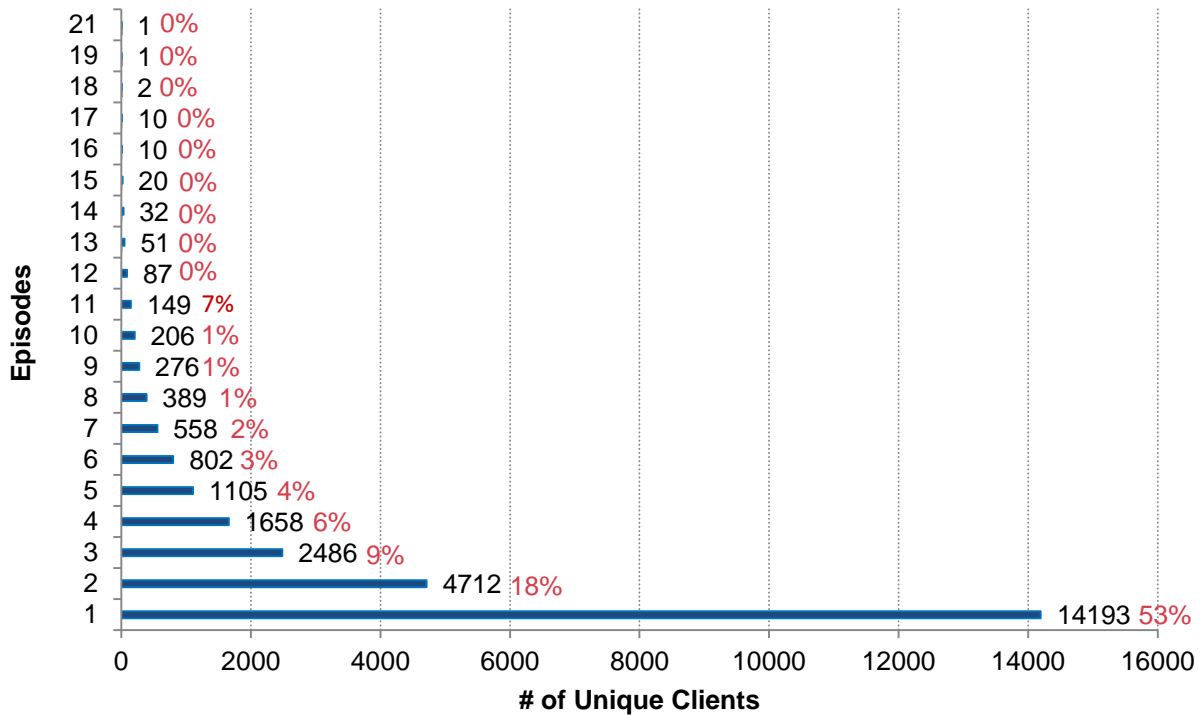**Figure 2: Average days per episode**

Figure 3: Total episodes (2009-2012)

The second major type of analysis that was done was based on two research studies – Kuhn and Culhane (1998) and Aubry et al (2013), which analyzed shelter data in major cities and established clusters to analyze shelter stay patterns.

Clusters were established using k-means cluster analysis, which uses standardized variables of total days stayed and total episodes to produce unique clusters.

Both studies produced the following conceptual typology:

Table 3: Typologies

	Small # of Episodes	Large # of Episodes
Small # of TDS	Transitional	Episodic
Large # of TDS	Chronic	-

This resulted in the following clusters:

- Transitional shelter stayers, who have a small number of total days in shelter and a small number of episodes
- Episodic shelter stayers, who have a small number of total days in shelter and a large number of shelter episodes
- Chronic shelter stayers, who have a large number of days stayed in shelter, and a small number of shelter episodes

The analysis had a sample size of 26,748 unique individuals over a four-year period (2009-2012). The clusters that resulted, and their associated data, are presented below:

Table 4: Clusters

Cluster	Transitional	Episodic	Chronic
Number of unique clients	22,382	3,809	557
Cluster as a percentage of the whole data set	83.7%	14.2%	2.1%
Average total days stayed	13.04 (34.00)	87.18 (94.47)	735.98 (296.03)
Average number of episodes	1.59 (0.90)	6.98 (2.40)	3.07 (1.86)
Average days per episode	7.85 (23.24)	14.36 (18.80)	408.68 (395.98)

Note: numbers in parentheses are standard deviations.

Further analysis can be done to understand how these clusters utilize shelter beds.

Cluster	Transitional	Episodic	Chronic
Number of occupied shelter bed night stays	292,059	332,070	409,944
Percentage of occupied shelter bed night stays	28.2%	32.1%	39.6%