

The Costs Associated With Homelessness in Phoenix, Arizona

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Cost Methods Appendix

As part of the Learning Accelerator for Tackling City Homelessness (LATCH) partnership, the American Institutes for Research (AIR) conducted a quick turnaround cost analysis to estimate the annual costs of serving individuals in a subset of emergency shelters and the costs of serving individuals experiencing unsheltered homelessness. The cost analysis had two main research questions:

1. What are the per-person costs the Office of Homeless Solutions and its partners incur when providing emergency shelter and its affiliated services, compared to the costs incurred when individuals experiencing homelessness remain unsheltered?
2. Which types of costs are the largest for each group?

The analysis team conducted the analysis between November 2025 and February 2026. Given the time and data constraints, the analysis team leveraged readily available aggregate data to generate estimates of dollars spent serving individuals in each group. In this appendix, we describe our approach to estimating the annual amount of dollars spent on each group.

A.1 Defining the Sample

The analysis team defined the groups for which we would estimate costs. The ideal approach to enumerating the emergency shelter group (hereafter referred to as the sheltered group) and the unsheltered group would have been to use individual-level data from the Homeless Management Information System (HMIS) and Street Outreach¹ data systems to effectively deduplicate the groups and assign individuals to groups based on the number of days they spent in emergency shelters, unsheltered, or in permanent housing. It is likely that some

¹ OHS's Street Outreach team connects individuals experiencing unsheltered homelessness to services and, to the extent possible, housing. It collects individual-level data on all the individuals it connects with over the course of the year and can deduplicate contacts to generate the annual number of unique individuals served.

individuals spent portions of the year both unsheltered and in emergency shelters and so would appear in both individual-level data sets. However, the analysis team was unable to obtain individual-level data. OHS requested an initial estimate by March 2026 to inform critical policy discussions. In compliance with local, state, and federal data privacy laws, the HMIS vendor used by the City of Phoenix has a data access process that typically requires several months to securely obtain individual-level data. As such, the analysis team could not access individual-level data in time to conduct this analysis.

Given the data limitations, we defined the sheltered and unsheltered groups in the following ways:

- **Sheltered group.** Given the time constraints, OHS recommended limiting the analysis to three focal shelters with readily available data on costs: the Phoenix Navigation Center, Safe Outdoor Space, and the Washington Street Shelter. Using actual 2025 usage data from HMIS, the analysis team defined the sheltered group as including all single adults who spent at least one night in one of the three focal emergency shelters between January 1 and December 31, 2025. The analysis team worked with aggregate data rather than individual-level data, which meant that it was unable to deduplicate individuals who may have stayed in more than one of the three focal shelters during 2025. Given the data limitations, we were unable to determine the extent to which individuals in the sheltered group used more than one focal shelter in 2025 and may have been double counted in the analysis as a result. If a subset of individuals in the sheltered group did use more than one focal shelter in 2025, they were double counted in the analysis, resulting in an overestimate of total costs and an underestimate of per-person costs for the sheltered group. The City of Phoenix reported the following data for 2025: 1,241 individuals spent at least one night at the Phoenix Navigation Center; 1,150 individuals spent at least one night at Safe Outdoor Space; and 919 individuals spent at least one night at the Washington Street Shelter. We summed these values and included 3,310 single adults in the sheltered group for this analysis.

To determine how sensitive the cost estimates were to a possible overcount of the people using emergency shelters due to duplication across shelters (i.e., individuals using more than one shelter in 2025), we conducted an additional sensitivity analysis. As we were unable to identify the number of individuals who appeared in one than more shelter, we assumed that 20% of the sheltered population used two shelters in 2025. We then reduced the sheltered population size by 10% to account for the assumed duplicate observation. Under this assumption, we estimated that the per-person cost spent on individuals in emergency shelters was between approximately \$14,160 (excluding infrastructure

investments) and \$15,300 (including infrastructure investments). This was still lower than the per-person costs spent on individuals who were unsheltered (\$15,970).

- **Unsheltered group.** Accurately counting the number of individuals experiencing unsheltered homelessness is a well-documented methodological challenge experienced by many organizations, including the U.S. Census Bureau (Stempowski, 2023; Tsai & Alarcón, 2022). After considering many options, the analysis team, in partnership with OHS, determined that annual 2025 Street Outreach contacts represented the best potential estimate of single adults experiencing unsheltered homelessness, because (a) these teams collect individual-level data on their contacts, allowing them to deduplicate individuals who receive multiple contacts; and (b) street contacts are primarily focused on individuals experiencing unsheltered homelessness. It is possible that some individuals who received street contacts eventually became housed in emergency shelters, transitional housing, permanent supportive housing, with family or friends, or in the private housing market. Without individual-level data to track the number of street contacts who exited to housing situations, we were unable to remove any unsheltered individuals who eventually moved to an alternative housing situation from the unsheltered group. Based on the number of deduplicated individuals who received at least one Street Outreach contact in 2025 while experiencing unsheltered homelessness, 11,174 single adults were included in the unsheltered group. These data were reported to us by OHS and were pulled from HMIS in March 2026.

After defining these groups at a high level, we needed to estimate the size of the chronically homeless group within both the sheltered and unsheltered groups because some of our resource-use estimates for healthcare services, criminal justice engagements, and other activities only applied to this group. For these estimates, the analysis team relied on the following federal definition:

- A chronically homeless individual is defined as a person “with a disability who has been continuously experiencing homelessness for one year or more or has experienced at least four episodes of homelessness in the last three years where the combined length of time experiencing homelessness on those occasions is at least 12 months” (de Sousa & Henry, 2024).

Using this definition and the Annual Homeless Assessment Report (AHAR) from the state of Arizona, we estimated that 41% of single adults in the sheltered group were chronically homeless by dividing the total number of single adults reporting chronic homelessness in the sheltered group (N=3,828) by the total number of single adults in the sheltered group (N=1,578) (U.S. Department of Housing and Urban Development, 2024). Using the federal

definition of chronic homelessness and the AHAR from the state of Arizona, we estimated that 28% of single adults in the unsheltered group were chronically homeless by dividing the number of single adults reporting chronic homelessness in the unsheltered group (N=1,894) by the total number of single adults in the unsheltered group (N=6,754).

As described in Section A.2, these estimates of the chronically homeless were necessary to estimate resource use for specific resources.

A.2 Identifying Data Sources to Estimate Resource Use and Prices

To estimate costs, we relied on the ingredients method (Levin et al., 2018) to systematically determine the costs of all human and material resources (i.e., ingredients) that the City of Phoenix and its partners used to support sheltered and unsheltered individuals. This approach—which we modified to fit the provided data—required a complete list of the types of resources that were used to support these two endeavors. Typically, each resource is calculated at the unit level and assigned a price, and the price is then multiplied by the quantity of the resource. These resource-level costs would then be summed to obtain the total cost of the resources used to support sheltered and unsheltered individuals.

However, because much of the data were provided in lump-sum estimates—some of which were projected and some of which were actual contracted values—we adjusted this approach to account for variability in the data and data quality by replacing the price and quantity for some resources with the given lump-sum value (e.g., emergency shelter operations at each shelter). This hybrid approach enabled us to identify potential data sources for estimating both the amount of resources each group was using (referred to in this document as resource use) and the price of each resource used. For this analysis, we leveraged data from the following sources:

- **OHS staff interviews.** Over the course of an in-person site visit and seven interviews, OHS staff helped us identify (a) a list of resources likely used by, or for, those in the sheltered or unsheltered group; and (b) which resources were likely used by which groups. Exhibit A1 includes a high-level description of the cost domains and types of resources included for each group in this analysis.
- **OHS contracts and invoices and City of Phoenix payroll data.** OHS contracts and invoices provided information on what OHS spent on a variety of resources for each group. We used them to estimate resource use and/or prices for emergency shelter infrastructure, emergency shelter operations, heat relief, OHS staffing, and supportive services. Contracts and invoices typically listed the total contract price for an entire effort. We reported these resources as lump-sum costs rather than identifying a price per unit of each resource used.

- **Administrative data.** We used administrative data from Maricopa County's Continuum of Care HMIS to determine the number of single adults served in the sheltered group in the three focal shelters in 2025. We used deduplicated counts of single adults served through the City of Phoenix's Street Outreach team to identify the number of people in the unsheltered group. We used Arizona data from the 2024 AHAR to determine the percentage of single adults in the sheltered and unsheltered groups who were (a) chronically homeless, and (b) veterans (U.S. Department of Housing and Urban Development, 2024). We used administrative data from other city departments to determine resource use for encampment clean-up and security, as well as the price of equipment used in these efforts.
- **Estimates from the extant literature to determine resource use for each group.** In some cases, OHS and its city department partners did not have estimates of resource use or prices for resources. This was especially true for local and state services like healthcare. In these cases, the analysis team located estimates for similar activities in the extant literature. We prioritized literature with estimates that (a) included resource use and/or price estimates for both individuals residing in emergency shelters and individuals experiencing unsheltered homelessness; (b) were as recent as possible; and (c) geographically favored the City of Phoenix, the state of Arizona, or the American Southwest. Our ability to include cost estimates for resources for which the City of Phoenix did not have usage or price estimates depended on the availability of these estimates in the extant literature. It should be noted that much of the extant literature provided estimates for individuals experiencing homelessness (rather than estimates differing by sheltered status), which limited the literature on which we could draw.

A.3 Identifying Resources Used and Assigning Use Estimates to Each Group

We worked with OHS staff to identify the set of resources each group was likely to use in a single year. Determined in consultation with OHS and AIR's subject matter experts, Exhibit A1 describes each domain, the resources involved within that domain, and our assumptions about which group used those resources while experiencing homelessness. We only applied the resources and their associated costs to the groups we list in the exhibit.

Exhibit A1. Phoenix Learning Accelerator for Tackling City Homelessness Cost Domains and Affiliated Resources, Sorted by Homelessness Status

Domain	Domain includes costs related to...	Costs applied to...
Criminal justice engagements	Jail visits and court appearances	Both groups
Emergency response	Responding to crisis situations, including police contacts, 911 calls, and ambulance rides	Both groups
Emergency shelter infrastructure	The physical space and/or land the shelter sits on; physical structures that provide shelter; materials, equipment, and maintenance	Sheltered group
Emergency shelter operations	Staff time, services, replacement equipment, and utilities required to operate three focal emergency shelters	Sheltered group
Encampment response	Addressing and removing encampments set up by unsheltered homeless people, including the cleaning of public and private spaces in response to such encampments	Unsheltered group
Healthcare services	Activities associated with providing healthcare to individuals experiencing homelessness, such as emergency care at a hospital or in-patient psychiatric care	Both groups
Heat relief	Cooling centers or additional space, equipment, or transportation required to protect individuals experiencing homelessness from the heat, and navigation services provided at heat relief centers	Both groups
Security	Activities associated with providing security for areas in which individuals experiencing homelessness are staying or seeking shelter, such as public parks	Unsheltered group
Staffing at the Office of Homeless Solutions (OHS)	OHS staff time to administer programs, oversee staff, deliver services, and otherwise address issues related to homelessness in the City of Phoenix	Both groups
Supportive services	Providing case management services, including support navigating workforce and justice systems	Both groups

Once we identified the set of likely resources, we leveraged data from OHS staff interviews, OHS contracts and invoices, data from other city departments, and estimates from the extant literature to determine domain-specific resource use for each group. Recognizing that the data we relied on came from a variety of sources and in a variety of forms, we applied reasonable assumptions to each domain to develop cost estimates within each domain. Exhibit A2 details resource-use assumptions for each group within each domain. For many of the resources, we

only applied usage to chronically homeless single adults (41% of individuals in the sheltered group and 28% of individuals in the unsheltered group) (U.S. Department of Housing and Urban Development, 2024). This group represents a subset of all sheltered and unsheltered individuals.

Exhibit A2. Annual Resource-Use Estimate for Sheltered and Unsheltered Groups

Cost domain	Resource	Usage estimation	Group applied to	Who received services in group?
Criminal justice engagements	Court appearance	We assumed every individual receiving a jail spell had one court appearance associated with each jail spell. ^a	Both groups	Only chronically homeless single adults ^h
	Jail stays	We assumed that on average: Individuals experiencing unsheltered homelessness had 14 jail stays per year. ^b Nine percent of individuals in emergency shelters had one jail stay per year. ^b	Both groups	Only chronically homeless single adults
Emergency response	Ambulance rides	We assumed that on average: Individuals experiencing unsheltered homelessness had six ambulance rides per year. Individuals in emergency shelters had two ambulance rides per year.	Both groups	Only chronically homeless single adults
	Police contact	We assumed that on average: Individuals experiencing unsheltered homelessness had 42 police contacts per year. ^b Individuals in emergency shelters had four police contacts per year. ^b	Both groups	Only chronically homeless single adults
	911 calls	We assumed that every individual receiving an ambulance ride had one 911 call.	Both groups	Only chronically homeless single adults

Cost domain	Resource	Usage estimation	Group applied to	Who received services in group?
Emergency shelter infrastructure	Establishing focal shelters	We assumed that shelters would be used for the following amounts of time: ^c Phoenix Navigation Center: 20 years Safe Outdoor Space: 10 years Washington Street Shelter: 10 years Temporary structure at Phoenix Navigation Center site: 3 months	Sheltered group only	All single adults
Emergency shelter operations	Annual operation costs for focal shelters	The shelter sample was equal to the sum of individuals who used each of the three focal shelters for at least one night, based on HMIS data. ^c	Sheltered group only	All single adults
Encampment response	Staff hours spent on encampment clean-up	We used estimated 2025 staff hours information provided by four city departments (Neighborhood Services, Parks and Recreation, Public Works, and Street Transportation) to determine the cost of staff time spent cleaning up encampments. ^d	Unsheltered group only	All single adults
	Equipment used for encampment clean-up	We included the dollar value of equipment used by four city departments (Neighborhood Services, Parks and Recreation, Public Works, and Street Transportation) to clean up encampments. When departments stated that equipment was reusable, we generated an annualized cost for that piece of equipment based on estimated years of use to measure the single-year cost. ^d	Unsheltered group only	All single adults
Healthcare services	Emergency room visits	We assumed that on average: Individuals experiencing unsheltered homelessness had 16 emergency room visits per year. ^b Individuals in emergency shelters had eight emergency room visits per year. ^b	Both groups	Only chronically homeless single adults
	In-patient psychiatric stays	We assumed that 0.357% of each group was institutionalized in psychiatric care, based on multi-state estimates of psychiatric care. Differences in resource usage by shelter status or homelessness status were not available. ^e We assumed the average psychiatric stay was 41 days. ^f	Both groups	All single adults

Cost domain	Resource	Usage estimation	Group applied to	Who received services in group?
	Veterans Affairs outpatient care	We assumed that each homeless veteran had 4.4 visits per year. Differences in resource usage by shelter status were not available. ^g	Both groups	Only veterans ^h
Heat relief	Heat relief shelters	We used actual dollars spent to support heat relief sites in the City of Phoenix in summer 2025. ^c	Both groups	All single adults
Security	Security in City of Phoenix parks	We estimated the cost of staff hours and equipment involved in responding to unsheltered homelessness, based on data provided by the City of Phoenix Parks and Recreation Department. ^d	Unsheltered group only	All single adults
Staffing at the Office of Homeless Solutions (OHS)	OHS staff time	OHS staff provided an estimated percentage of time each staff member spent serving individuals in each group so that the analysis team could apply staffing costs appropriately. ^c	Both groups	All single adults
Supportive services	Supportive services	Supportive service resources were provided in lump-sum costs, so we did not need usage information to estimate costs. ^c	Both groups	All single adults
	Outreach services	Supportive service resources were provided in lump-sum costs, so we did not need usage information to estimate costs. ^c	Unsheltered only	All single adults

Note: ^a Assumption based on information provided on the website for the Arizona Judicial Branch (n.d.). ^b Estimate from Rountree et al. (2019). ^c Data provided by the City of Phoenix Office of Homeless Solutions in interviews, contracts, or invoices. ^d Data provided by the City of Phoenix Departments of Neighborhood Services, Parks and Recreation, Public Works, or Street Transportation. ^e Estimate from Lee & Cohen (2021). ^f Estimate from Choi et al. (2022). ^g Estimate from Gabrielian et al. (2014). ^h Estimated numbers of chronically homeless single adults and veterans experiencing homelessness are based on the U.S. Department of Housing and Urban Development's (2024) report for Arizona.

A.4 Assigning a Price to Each Resource Used by Each Group

We identified a price for each resource used. Prices typically represent the monetary value of a unit of any one resource. We adhered to this valuation where possible. When presented with lump-sum contract values, we included those as reported. We adjusted all prices into 2025 Phoenix dollars using the Consumer Price Index (CPI). We also calculated an annual price for

each resource that was used in multiple years using an annualization formula. These adjustments are discussed in more detail below.

These adjustments matter because prices served as our common metric for comparing costs across groups. We used different approaches for personnel, materials, and lump-sum costs. For personnel, we relied on fully-loaded salaries provided by OHS to obtain an hourly rate. For material resources, we assigned market rates as reported in the extant literature, adjusting timing to obtain per-unit or annual prices, depending on the resource. For lump-sum costs, we applied the full cost as the level of effort required for that function, extrapolating or adjusting to ensure we reported annual rates. We identified prices using three types of data: OHS contracts and invoices, administrative data from other city departments, and the extant literature. Exhibit A3 describes the data we used to identify prices for each resource. The first column lists the domain and the second column lists the resource. We then describe where we obtained the price information from and whether we applied the price to one or both groups. Finally, we list the types of adjustments we applied to ensure comparability across prices.

Exhibit A3. Annual Price Estimate for Sheltered and Unsheltered Groups

Cost domain	Resource	We used prices from...	Group applied to	Price received adjustments?
Criminal justice engagements	Court appearances	Extant literature – Gillespie et al. (2021)	Both groups	Yes. Applied Consumer Price Index (CPI) adjustment to convert price from dollars in Denver in 2016 to dollars in Phoenix in 2025.
	Jail spells	Extant literature – Gillespie et al. (2021)	Both groups	Yes. Applied CPI adjustment to convert price from dollars in Denver in 2016 to dollars in Phoenix in 2025.
Emergency response	Ambulance rides	Extant literature – Gillespie et al. (2021)	Both groups	Yes. Applied CPI adjustment to convert price from dollars in Denver in 2016 to dollars in Phoenix in 2025.
	Police contact	Extant literature – Gillespie et al. (2021)	Both groups	Yes. Applied CPI adjustment to convert price from dollars in Denver in 2016 to dollars in Phoenix in 2025.
	911 call	Extant literature – Gillespie et al. (2021)	Both groups	Yes. Applied CPI adjustment to convert price from dollars in Denver in 2016 to dollars in Phoenix in 2025.

Cost domain	Resource	We used prices from...	Group applied to	Price received adjustments?
Emergency shelter infrastructure	Establishing focal shelters	Actual dollars spent on emergency shelter infrastructure investments at Phoenix Navigation Center, Safe Outdoor Space, and Washington Street Shelter from 2022 to 2025	Sheltered group only	Yes. Applied CPI adjustments to convert prices from 2022–2024 dollars to 2025 dollars and applied annualization adjustments.
Emergency shelter operations	Annual operation prices for focal shelters	Actual dollars spent to support operations at each shelter in the 2024–25 financial year, based on invoices and bills sent to the Office of Homeless Solutions (OHS)	Sheltered group only	Yes. Applied CPI adjustment to convert prices from 2024 dollars to 2025 dollars.
Encampment response	Staff hours spent on encampment clean-up	Average staff loaded salary information from four city departments (Neighborhood Services, Parks and Recreation, Public Works, and Street Transportation) to determine the price of staff time spent cleaning up encampments	Unsheltered only	Yes. Applied CPI adjustment to convert prices from 2024 dollars to 2025 dollars.
	Equipment used for encampment clean-up	Dollar value of equipment used by four city departments (Neighborhood Services, Parks and Recreation, Public Works, and Street Transportation) to clean up encampments	Unsheltered only	Yes. Applied annualization estimates to equipment that could be used over multiple years.
Healthcare services	Emergency room visits	Extant literature – Ho et al. (2019)	Both groups	Yes. Applied CPI adjustment to convert prices from 2017 dollars in Arizona to 2025 dollars in Phoenix.
	In-patient psychiatric stays	Extant literature – Morris & Kleinman (2020)	Both groups	Yes. Applied CPI adjustment to convert prices from 2016 dollars nationally to 2025 dollars in Phoenix.
	Veterans Affairs outpatient care	U.S. Department of Veterans Affairs (2025)	Both groups	Yes. Applied CPI adjustment to convert prices from 2024 dollars nationally to 2025 dollars in Phoenix.

Cost domain	Resource	We used prices from...	Group applied to	Price received adjustments?
Heat relief	Heat relief shelters	Actual dollars spent to support heat relief sites in the City of Phoenix in summer 2025	Unsheltered only	No
Security	Security in City of Phoenix parks	Data on the salaries of park rangers, their equipment, and contracted security staff and equipment provided by the City of Phoenix Parks and Recreation Department to determine the price of staff time spent providing security in parks in response to unsheltered homelessness	Unsheltered only	Yes. Applied CPI adjustment to convert prices from 2024 dollars to 2025 dollars.
Staffing at OHS	OHS staff time	OHS estimate of the percentage of time each staff member spent serving individuals in each group, enabling the analysis team to apply staffing prices appropriately	Both groups	No
Supportive services	Supportive services and outreach services	Actual dollars spent on supportive services in the 2024–25 financial year, based on invoices and bills sent to OHS	Both groups	Yes. Applied CPI adjustment to convert prices from 2024 dollars to 2025 dollars.

In the following paragraphs, we provide more detail on the types of variation in price estimates we observed and our strategy for adjusting prices.

- **Matching resource-use estimate units to price units.** Different sources of information recorded prices in different units. Some prices were recorded as the (lump-sum) total annual price for a resource or set of resources. In other cases, a price was provided for a single person during a specific time period (e.g., per person, per year). In addition, identified prices were not always retrieved from the same study that provided usage levels. This meant that in order to generate consistent estimates, the analysis team had to normalize prices so that the pricing unit matched the resource unit. For example, if emergency room usage was measured in days per year, we estimated a per-person, per-day price.
- **Converting all prices into 2025 real dollars.** Due to the nature of the available data, it was not always possible to identify 2025 estimates for a particular resource. Indeed, some of our

price estimates were from as far back as 1998. Because of inflation, a dollar spent in the past is worth more in today's dollars than a dollar spent today. To account for this, we applied year adjustments using information from the CPI to normalize all price estimates to a base year of 2025. We selected 2025 as the base year because it was the first year when all three emergency shelters included in this analysis were operating. This means that any price reported in a prior year was adjusted to 2025 dollars. To obtain 2025 prices, we multiplied the price estimate by a ratio consisting of the current year CPI divided by the reported year CPI. This is represented by the following equation:

$$Price_{2025} = (CPI_{Price_{2025}}/CPI_{Price_{PriceEstimateYear}}) * Price_Estimate$$

- **Converting all prices into Phoenix dollars.** Due to the nature of the available data, it was not always possible to identify Phoenix-specific estimates. Where possible, we privileged price estimates from Phoenix, Arizona, or other areas in the American Southwest. In some cases, we had to use estimates from other regions, where resources may be more or less expensive. To generate the most useful estimate for Phoenix, we normalized all price estimates to reflect Phoenix-area prices, using the regional dimension of the CPI to adjust prices to Phoenix. This is represented by the following equation:

$$Price_{Phoenix} = (CPI_{Price_{Phoenix}}/CPI_{Price_{PriceEstimateRegion}}) * Price_Estimate$$

- **Generating an annualized cost for resources used over multiple years.** In addition to year and regional adjustments, some resources—like facilities and work trucks—needed annualization adjustments because they could be used for multiple years. For example, emergency shelter infrastructure, largely purchased between 2022 and 2024, represents a substantial investment and can be used over a 10- to 20-year period. To capture the cost of these investments over their lifespan, we applied an annualization adjustment that spread the cost of the initial investment in these resources across the period of time when the resources would be used. This also accounted for the price of money over time.

To apply the adjustment, we first identified the number of years which we anticipated the resource would be used. Next, we applied the following formula:

$$Annualization\ Rate = \frac{(Discount\ Rate * (1 + Discount\ Rate)^{Years\ of\ Useful\ Life}}{(1 + Discount\ Rate)^{Years\ of\ Useful\ Life} - 1}$$

We assumed a 3% annual discount rate (standard in the field) and adjusted based on the number of years of usable life for the resource. This formula then created the rate (or multiplier) by which the price could be adjusted to ensure it represented the annual rather than total cost of the resource.

In addition to the price adjustments described above, the analysis team assumed that prices for resources used by both the sheltered and unsheltered groups remained the same. For example, we assumed that the price of a one-night emergency room visit was the same for someone in the sheltered group and someone in the unsheltered group. In reality, it is possible that prices for some resources were higher for one group than the other. In such cases, our price estimates for a particular resource may be an over- or underestimate.

A.4 Estimating Costs

Once we had identified resource-level prices and resource-level usage estimates, we estimated the adjusted resource-level costs for each resource used by each group. To do so, we multiplied the resource-level price by the appropriate resource-level usage estimate for each group. As noted in Sections A.2 and A.3, our analysis assumed a constant resource price and variable resource usage between the sheltered and unsheltered groups.

The resource-level estimation can be mathematically described as follows:

$$ResourceCost_{Unsheltered} = ResourcePrice_{Unsheltered} * NumberOfResourceUnits_{Unsheltered}$$

Once we estimated the resource-level costs for each group, we estimated the following:

- **Annual total costs for each group.** To do this, we summed the estimated costs of all resource costs across all domains that were specific to each group. This provided an overall cost estimate of the resources used for individuals in the three focal shelters and those experiencing unsheltered homelessness across the city.
- **Annual per-person costs for each group.** The annual per-person cost provides a mechanism for comparing costs across groups by comparing the costs of one person in one group to the costs of one person in the other group. To do so, we divided the total estimated cost for each group by the total number of people in each group in 2025.

This last step generated the estimated total and per-person costs for sheltered individuals in the three focal emergency shelters and for unsheltered individuals in the City of Phoenix.

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