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Scoping the costs of homelessness in New Zealand

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Executive Summary

The cost of homelessness to society and to the individual is difficult to measure, which in turn makes it difficult to formulate and evaluate meaningful policy change to address rising homelessness and housing deprivation. This report reviews the international literature on quantifying the cost of homelessness, with a view to identifying methodologies (and the appropriate data) that may be useful in a New Zealand (NZ) context.

A recent report based on 2013 Census data estimated 41,705 people in NZ were severely housing deprived (Amore, 2016). Since 2006, the proportion of the population identified as homeless has increased from 0.8% to 1%. Several factors may have contributed to this increase – these potentially include the 2008/09 global financial crisis and housing shortages in both Christchurch and Auckland, leading to rising house and rental prices in recent years.

There are two components to this study. First, the relevant international literature is reviewed, with a focus on the different methods and measures used when quantifying the economic cost of homelessness. Second, we investigate the availability of data necessary for constructing an appropriate cost measure in NZ, as well as assess what data would be required when evaluating an intervention in this space

A total of 30 international studies on the cost of homelessness are reviewed. There were two types of studies – those that calculate the cost of homelessness to society; and economic evaluation studies that investigate the cost effectiveness of interventions. It was clear early in the review that there are various definitions of homelessness in the literature, making comparison across the studies difficult at times. Broadly speaking, definitions of homelessness fit across the following categories: Housing situation; temporal situation (eg chronic or temporary); social approach (such as primary, secondary or tertiary homelessness); and demographic group (such as youth, families). The definition provided by Statistics NZ is one we recommend adopting when assessing the cost of homelessness in NZ and it includes those in living situations “where people have no other options to acquire safe secure housing: are without shelter, in temporary accommodation, sharing accommodation with a household, or living in uninhabitable housing” (Statistics NZ, 2009, p.6).

Based on our survey of the literature we recommend that the average cost per homeless person in NZ be constructed based on their health, corrections, and government benefits usage – an integrated cost of homelessness approach focusing on the direct costs to institutional providers of support. As for the data scoping exercise within this report (part two), we propose (for the most part) following Amore et al’s (2013) methodology with respect to identifying homeless individuals in the Census. After which, given the newly available linked administrative data (Integrated Data Infrastructure) available from Statistics NZ, we have identified the key data sources and variables that should be linked with the Census, utilizing individuals’ unique identifier. This will allow both the economic cost of homelessness to be constructed, as well as permit cost/benefit analyses of intervention programs – both of which aid in growing the empirical evidence regarding the economic impact of this social issue.

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Part 1: Review of the international literature and its relevance for NZ

1. Introduction

This report aims to develop a greater understanding of different methodologies used to quantify the health, social service and criminal justice costs. The economic literature with respect to the cost of homelessness can be divided into two basic categories: an integrated cost of homelessness analysis (ICH); and economic evaluation of an intervention. The distinction is that ICH studies concentrate on cost exclusively: their aim is to identify the costs of homelessness for society and provide a complete accounting of the costs related to homelessness as a social issue. On the other hand, economic evaluation studies focus on specific homelessness interventions, and attempt the assessment of both costs and outcomes (perceived benefits). The economic evaluation concept can be further broken down into two main methods, where the distinction between them lies in the units of measurement used in the analysis. One is Cost-Benefit Evaluation (CBE) and the other is Cost-Effectiveness Evaluation (CEE). This distinction will be described in more detail in Section 6 of this report.

The following review is based on all the relevant studies that attempted to monetise the costs of homelessness or the benefits of programmes to address homelessness. This includes 30 studies, from which 19 use the ICH analysis and 11 are economic evaluations. 15 studies are from the United States, 6 from Canada, 2 from Australia, 3 from the UK, and one each from Europe and NZ (See Table 1).

Table 1: Summary of the types of study and their country origin

Type of study	Country	Author(s)
Integrated Cost of Homelessness (ICH)	United States	Beckett, B. et al. (2013)
		Dunford, J. et al. (2006)
		Fuehrlein, B. et al. (2013)
		Gill, C. and Harris, T. (2007)
		Kushel, MB. et al. (2002)
		Lewin Group (2004)
		Poulin, S. et al. (2010)
		Salit, A. et al. (1998)
		Spellman, B. et al. (2010)
	Canada	Eberle, M. et al. (2001)
		Hwang, SW. et al. (2011)
		IBI Group (2003)
		Pomeroy, S. and Focus Consulting Inc. (2005)
	UK	Pleace, N. (2015)
		Kenway, P. and Palmer, G. (2003)
	NZ	
		Committee for Auckland (2008)
Cost-Benefit Economic evaluation (CBE)	United States	
		Culhane, D. et al.(2002)
		Larimer, M. et al. (2009)
		Perlman, J. and Parvensky, J. (2006)
		Q2 Consulting (2007)
	Australia	
		Pinkney, S. and S. Ewing (1997)
Cost effectiveness Economic evaluation (CEE)	United States	Zaretzky, K. and Flatau, P. (2013)
		Mondello, M. et al. (2009)
	Canada	Padget, D. et al. (2006)
		Goering, P. et al. (2014)
	UK	Palermo, F. and al. (2006)
		Lewis, D. and Rowlatt P. (1996)

2. Defining homelessness

There is not a singular definition of homelessness or housing deprivation, and the subject is highly contentious (Amore et al, 2011). Indeed, the studies overviewed in this report often use differing definitions, creating challenges in generalising findings across studies. This section discusses the various approaches to defining homelessness. In general, homelessness is a term used to refer to people lacking a regular, fixed and physical shelter, and therefore it is a broad term that can encompass an extensive range of conditions. These can be understood on a continuum of types of housing situations, temporal situations, or group situations. The different definitions used across the studies reviewed here are presented overleaf in Table 2.

Some of the more widely-cited definitions of homelessness come from the European Typology on Homeless and Housing Exclusion (ETHOS), the United Nations definition of

homelessness, and MacKenzie and Chamberlain's (2008) cultural definition of homelessness. ETHOS is widely accepted in almost all European countries and was adopted by the European Federation of National Organisations Working with the Homeless (FEANTSA). It was used as the conceptual framework for the NZ definition of homelessness (Busch-Geertsema, 2010). The ETHOS definition of homelessness is "(1) rooflessness, or without shelter, (2) houselessness, or a temporary place to sleep in an institution or shelter (3) living in insecure housing, or (4) living in inadequate housing" (Amore et al, 2011, p.27).

Table 2: Typology of the definition of homelessness

Typology	Homeless nature	Definition
Housing situation	Absolute	Absolute homelessness describes the condition of people without physical shelter of their own, including those who stay in an emergency shelter (e.g. outside, in a vehicle, in parks, or parking garages, abandoned buildings or other places not intended for human habitation) (Tippie and Speak; 2005).
	Relative type	Relative homelessness includes people who have a physical shelter, but one that does not meet basic health and safety standards: such as protection from the elements; access to safe water and sanitation; security of tenure and personal safety; affordability; access to employment, education and health care; and the provision of minimum space to avoid overcrowding (Tippie and Speak; 2005).
Temporal situation	Chronically	This includes people on the periphery of society and who often face problems of drug / alcohol abuse or mental illness. (Kuhn & Culhane; 1998). Either (1) an unaccompanied homeless individual with a disabling condition who has been continuously homeless for a year or more, or (2) an unaccompanied individual with a disabling condition who has had at least four episodes of homelessness in the past 3 years (Defining chronic homelessness; 2007).
	Cyclical	This includes individuals who have lost their dwelling as a result of some change in their situation, such as the loss of a job, a move, a prison term or a hospital stay. Those who must from time to time use safe houses or soup kitchens include victims of family violence, runaway youths, and persons who are unemployed or recently released from a detention centre or psychiatric institution (Kuhn & Culhane; 1998).
	Temporary	Temporary homelessness includes those who are without accommodation for a relatively short period. Likely to be included in this category are persons who lose their home as a result of a disaster (fire, flood, war) and those whose economic and personal situation is altered by, for example, separation or loss of job. Some researchers do not consider this group as being truly homeless and exclude them from their studies (Kuhn & Culhane; 1998).
Severity	Primary	This includes people without conventional accommodation. This includes those sleeping rough or in improvised dwellings (Chamberlain and MacKenzie; 2003).
	Secondary	Secondary homelessness refers to people staying in or moving between various forms of temporary accommodation. This includes staying with friends or relatives with no other usual address and people staying in Specialist Homelessness Services (Chamberlain and MacKenzie; 2003).
	Tertiary	Tertiary homelessness includes people living in boarding houses or caravan parks with no secure lease and no private facilities, both short- and long-term (Chamberlain and MacKenzie; 2003).
Demographic Group	Youth	Some studies include youth aged from 16 to 24, others range as young as 14 extending to the early 30s. There is no consistency across studies regarding age parameters. However, it includes young people who are without a home and are living on the street, or living temporarily with others without housing stability (The Homeless Hub).
	Family	A homeless family represents a family with at least one parent or legal guardian, and one or more children under age 18; without a home and are living on the street, or living temporarily with others without housing stability (The Homeless Hub).
	Co-existing Problems	This includes people with a substance use disorder, serious mental illness, developmental disability, or chronic physical disability. In more specific terms, serious mental illness is a condition that impacts a person's thinking, feeling or mood and may affect the ability to relate to others and function on a daily basis. Substance use disorder refers to all types of drug and alcohol abuse that results in impairment in daily life or noticeable distress (The Homeless Hub).

Mackenzie and Chamberlain's (2008); Australian Bureau of Statistics, 2012), and the United Nations (United Nations, 2009) definitions of homelessness include distinct categories of severity: (1) Primary; (2) Secondary; and (3) Tertiary homelessness. The primary homeless are those without shelter, or living in an improvised dwelling. The secondary homeless are those who frequently move from one type of temporary accommodation to another. The tertiary homeless are those staying in accommodation that falls below the minimum community standards. The key idea is that homelessness is a social concept based on shared community standards of minimum housing. This definition is utilised in the Australian studies (Flatau and Zaretsky, 2013; Pinkney and Ewing, 1997). Several of the studies reviewed in this report (Eberle et al. 2001; Goering et al., 2014; IBI group, 2003; Palermo et al., 2006) use a definition derived from this but divided into two categories: absolute homelessness and relative homelessness. Focusing on a typology of an individual's housing situation, this definition is, however, criticised for being too broad, and not detailed enough for applicability in a research context.

It is important to note that definitions of homelessness often also contain the element of time. The issue of duration is significant in evaluation of the varied levels of homelessness. This framework was influenced by Kuhn and Culhane (1998), when their typology of the temporal nature of homelessness was developed and popularised in the United States (Kuhn and Culhane, 1998). The typology consists of categorizing the homeless population into three subgroups: the chronically homeless; the cyclically homeless; and the temporary homeless. Furthermore, the Department of Housing and Urban Development (HUD) in the United States used Kuhn and Culhane's framework to develop a more specific definition of chronic homelessness, which has been used in many subsequent studies (Beckett et al., 2013; Culhane et al., 2002; Larimer et al., 2009; Mondello et al., 2009; Poulin et al., 2010).

Homelessness affects a diverse range of people, there have been many attempts to define sub-populations within Homeless. These include youth (Lewis and Rowlatt (1996); Pinkney and Ewing (1997)), families (Mondello et al.(2009); Spellman et al.(2010)), and people with co-existing problems (Culhane et al. 2002; Dunford et al. 2006; Larimer et al. 2009; Padget et al. 2006; Perlman and Parvensky, 2006).

In discussing homelessness it is also necessary to be aware of the different types of housing (or lack of) referred to across the studies. These are outlined in Table 3.

Table 3: Definition of types of housing

Type of housing	Definition
Emergency shelter	Any facility the primary purpose of which is to provide temporary or transitional shelter for the homeless in general (The Homeless Hub).
Supported housing	A form of affordable housing with support services (income assistance, counselling, medical care, life skills and employment training, etc) attached to help a client perform daily living functions that may not otherwise be possible (The Homeless Hub).
Transitional housing	A housing that aims to facilitate the movement of homeless people to permanent housing within a reasonable amount of time, usually 24 months (The Homeless Hub).
Affordable housing	Housing that costs a household less than 30% of its pre-tax income on adequate shelter (Canada Mortgage and Housing Company, 2016).

3. An overview of homelessness in NZ

This section provides an overview of homelessness in NZ that can be used in comparison to the studies that will be evaluated in the following sections. As indicated earlier, the definition of homelessness used by Statistics NZ is those in living situations “where people have no other options to acquire safe secure housing: are without shelter, in temporary accommodation, sharing accommodation with a household, or living in uninhabitable housing” (Statistics NZ, 2009, p.6). This is similar to the Australian Bureau of Statistics, who define homelessness as living situations where people have no suitable accommodation. Alternatives are: (1) living in an inadequate dwelling; (2) without tenure, or their initial tenure is short and not extendable; or (3) in a living arrangement that does not allow them to have control of, and access to space for social relations (Australian Bureau of Statistics, 2012). Given that the Statistics NZ definition was developed in order to enable comparison across various sources of NZ administrative data, and is similar to Australian definitions, this is the one that will be used in this report.

A University of Otago report using NZ 2013 Census data found that 41,705 people could be classified as being ‘severely housing deprived’ (Amore et al, 2016). This is approximately 1 in 100 NZers who do not have access to adequate housing. Other key findings from this report show that approximately half of homeless adults (52%) are working, studying, or both; around half the homeless population are younger than 25; and new migrants are particularly at risk of homelessness.

In comparing the overall figure for homelessness based on the 2013 Census data and the 2006 data, Amore and her team find that the prevalence of homelessness grew by 15% between those two timelines. In terms of region, Nelson, Auckland and Wellington experienced the largest increases in homelessness; while there were falls for Southland, Waikato and Taranaki. With respect to ethnicity, Pasifika, Maori, or Asian groups appear to be more likely to be in

the homeless population, compared to European New Zealanders. When viewing the family status information across the census dates from 2001, 06, and 13; Amore (2016) finds that the prevalence of sole parents with dependent children in the homeless population to have risen markedly across this twelve-year timeframe.

Besides the statistics from Amore et al (2013) and Amore (2016), there are other sources of information pointing to a rise in the number of homelessness in NZ. For instance, reports from homeless service providers confirm such an increase. In 2011 about 12 new people per month engaged with the Lifewise housing support team (150 people per year). In 2015, around 20 new people per month were engaging (236 last year), an increase of 66 per cent (Lifewise 2016). Additionally, a report commissioned by Statistics NZ estimated that between 12,900 and 21,100 houses would be required to house the 2006 housing deprived population, significantly higher than the rate of new housing being built (Amore et al, 2011).

Services and support for the homeless

There are a number of services and support in NZ that are offered to assist those experiencing homelessness. These include accommodation services, financial assistance and budgeting support, food, advocacy and advice for retaining secure housing, health services, and wrap around services. Some of the providers of these services are outlined in Table 4 below. A substantial proportion of rough sleepers and homeless people in NZ receive some form of financial assistance from the government (Harris, 2015).

Table 4. Examples of organisations providing assistance to the homeless

Service/Support	Organisation
Financial Assistance	Work and Income NZ
Budgeting services & support	Auckland City Mission, Mangere Budgeting Service Trust, The New Zealand Federation of Family Budgeting Services, C.A.R.E Waitakere Trust, CareRanui Budgeting service, Vision West Community Trust, The Salvation Army, Presbyterian Support Northern Budgeting Service, Papakura Budgeting Service
Emergency shelter	Eg. James Liston Hostel (Auckland) Wellington Night Shelter; Wellington Homeless Women's Trust; Wellington Women's Refuge; Dwell Housing Trust, 2016 (Wellington); Monte Cecilia Housing Trust (Auckland); Tai Tokerau Emergency Housing (Whangarei); Nelson Community Night Shelter; Dunedin Night Shelter; Addington Supportive Accommodation Services (Christchurch); The Salvation Army (Auckland, Palmerston North, Porirua, Hutt City, Wellington and Christchurch)
Food	Suzanne Aubert Compassion Centre Wellington, 2016 (free breakfast; affordable dinner); Lifewise, Auckland (affordable meals); Auckland City Mission (Meals); 0800 Hungry Ministries (Christchurch)
Wrap around services	Lifewise (Auckland); Auckland City Mission (Auckland); Downtown Community Ministry, 2016 (Wellington); Wellington Homeless Women's Trust; Wellington City Mission; The People's Project (Hamilton); PACT, 2016 (Otago, Southland, the West Coast and Wellington); Christchurch City Mission.

Housing NZ Corporation is tasked with providing housing to the housing deprived, and as of 2015, Housing NZ had a portfolio of 66, 215 homes (Housing NZ Corporation, 2015). Some NZers are also eligible for a separate accommodation supplement¹ to help them pay rent, board or the cost of owning a home if they have low income or meet other requirements (Work and Income, 2015). Additionally, community-housing providers in NZ (including councils and non-profit organizations) provide at least 4,021 homes throughout NZ (Community Housing, 2015). Local government contributes a further 13,400 homes (Community Housing, 2015).

It is generally agreed that there is insufficient emergency accommodation in NZ. For example, a feasibility study on emergency housing in Whangarei predicted a shortfall of 55 beds per night in 2008 (Gravitas Research and Strategy Ltd, 2009). There are reports of boarding houses and hostels that are used as emergency accommodation being “disgusting” and in very poor condition (Maas, 2011). This resulted in a Parliamentary inquiry into such boarding houses (Social Services Committee, 2014). Night shelters and other emergency accommodation do exist in most major NZ cities. Some of these accommodation providers offer additional services to people experiencing homelessness to help them achieve independence.

Many wrap-around service providers help people experiencing homelessness to access services, either by referrals or providing them in-house. More specific services are essential for housing deprived people, who have much higher rates of health and addiction concerns than the general population. A number of organisations provide wrap-around services (intensive, individualised care packages that address multiple needs of the individual) for people experiencing homelessness, to help them become independent. These often provide access to food, budgeting, support to access benefits and social services, and help accessing healthcare as well as help finding secure housing.

Other services for NZers experiencing homelessness include tenancy protection associations such as the Tenants Protection Association (in Auckland and Christchurch). The Association gives advice, assistance resolving disputes, and access to information for tenants. Inner City Agency Trust, also in Christchurch, offers a day centre with practical facilities such as showers and a laundry for people without safe and secure accommodation (Community Information Christchurch, 2016).

¹ Figures from the Ministry of Social Development (2012) indicate 304,117 individuals receiving the accommodation supplement in 2012.

Despite what could appear to be multiple avenues of support for those experiencing homelessness in NZ, there is no national strategy to end homelessness (Richards, 2009). The homelessness problem in New Zealand becomes even more apparent when looking at the data from the 45 top ranked countries in the Human Development Index 2014 rankings (The Human Development Index, 2014). In fact, New Zealand presents the 2nd highest percentage of homeless people as a proportion of the total population, with 1 in 120 people being homeless. The other countries with the highest proportion of homeless are Germany (with 1 in 93 people), Canada (with 1 in 152 people) and Australia (with 1 in 224 people) (UNICEF, 2014; The World Bank, 2014). The NZ Coalition to End Homelessness suggests that, unlike in Australia, Canada, the UK and most Western European countries, there is a lack of recognition in NZ of the benefits of investing in the prevention of homelessness (Richards, 2009). This is partly due to low public awareness, a lack of policy direction and a low profile of the issue due to the hidden nature of homelessness in New Zealand. There have been growing calls for a national strategy, as the numbers of those experiencing homelessness rise (Furley, 2016).

Many government departments are involved with people experiencing homelessness, including the Housing NZ Corporation, Child Youth and Family Services, and the Corrections Department as well as District Health Boards (Richards, 2009). However, there is no single government department who has responsibility for homelessness, nor one who coordinates services or funding.

Roberts (1987) suggests that the low profile of homelessness stems from governments treating housing as a commodity rather than a social need or a human right. A review of NZ research on homelessness (Leggat-Cook, 2007) suggests that homelessness is often presented as a result of personal failings, and preventing it is the responsibility of the individual. The provision of social housing, and perceptions of relatively low levels of chronic homelessness in NZ may also be reducing the pressure to respond to homelessness.

A number of recent articles about the growing numbers of people experiencing homelessness have been featured in media outlets (Davidson, 2016; Auckland City Mission, 2016; Radio New Zealand, 2016; Clarke, 2016) indicating a growing awareness of the issue. As street homelessness becomes more visible and publications draw attention to the extent of the issue, it is likely that both public concern and desire for policy change will grow.

4. Costing homelessness: Integrated costs of homelessness

This section reviews the studies based on the cost analysis methodology, focusing on integrated cost. The integrated cost of homelessness (ICH) represents the cost examination of all service use, and should therefore examine the areas of health, welfare, justice, education and employment assistance (Berry et al., 2003). From the 19 studies using ICH, 14 focused on the integrated cost of homelessness. This review also highlights the use of different data approaches: data collection from service providers (2 studies), service unit cost from administrative databases (3 studies), service unit costs applied to illustrative vignettes (2 studies), self-reported data collection from service recipients (1 study), as well as self-report data collection combined with administrative databases (3 studies). It is important to point out that across these studies different populations were analysed, for instance people experiencing homelessness or chronic homelessness, and families experiencing homelessness (See Table 2).

Among integrated cost analysis studies, one of the methods used is data collection from service providers, also referred to as agency-report data. This approach was adopted in the study *The Societal Cost of Homelessness* conducted by IBI Group (2003) in Calgary and Edmonton, which is an integrated consulting firm in Canada. Their study collected expenditure data on homeless clients directly from the service providers in the province of Alberta. They surveyed public and private agencies serving the homeless on the use and cost of the services provided. Overall, 68 agencies responded to the survey, and the data was analysed through three valuations: service provision costs, cost avoidance and emergency shelter capital costs. As a result, the total annual cost of homelessness calculated was CAD 67.5 million in Calgary and CAD 46.9 million in Edmonton. The main inconvenience of obtaining data from the service providers was that many agencies lack the necessary accounting and recording systems needed for providing detailed data (IBI Group, 2003). Consequently, the initial per person cost approach had to be changed for a per agency cost approach because of the absence of unduplicated tracking data.

Similarly, Pomeroy (2005) examined the costs of service responses in four Canadian cities using data from service providers. The aim in his research was to compare the service costs depending on the level of response to homelessness: institutional, emergency, transitional and supportive. Institutional responses include psychiatric hospitals and detention/corrections facilities, while emergency response consists of shelter services. He

found that institutional responses, as in prison and psychiatric hospitals, have significantly higher expenditures, ranging from CAD 66,000 to CAD 120,000 annually, compared to affordable housing with a cost of CAD 5,000 to CAD 8,000. Even though the study did not offer a total cost per homeless person, it gave a good portrait on the magnitude of the costs depending on service provider type. Relying on service provider data has limitations in terms of accuracy and as Pomeroy (2005) warned:

One issue in using the costs of existing service providers is that they typically operate in premises that are either owned outright by the operator, or were funded and receive ongoing subsidies based on historic building costs that are no longer realistic. Accordingly, a second step in the costing process involved the development of cost estimates assuming the premises were built at today's costs (Pomeroy, 2005; p.iii).

On the other hand, it is possible to quantify the cost of homelessness by associating the amounts of service unit used from service providers to the unit costs. The unit costs represent the average monetary value of the services per client. It is the aggregation of direct, indirect and capital-related costs.² Indirect cost estimation can be achieved in two ways: a usage or benefit approach, and a pro-rata approach. The usage or benefit approach is the most accurate method for indirect costs, and consists of allocating costs on the basis of the resource consumption of each activity. When it is impossible to isolate the resource usage from an indirect cost pool, the pro-rata approach is useful in allocating on a proportionate basis using measures like the percentage of total staff or percentage of the total budget.

One of the most complete studies developed on the method of service unit costs from administrative databases was undertaken by Poulin et al. (2010). Using shelter and street outreach records from Philadelphia, the researchers were able to identify 2,703 persons corresponding to the definition of chronic homelessness. They then matched their records to administrative databases, and collected information about their service utilization including shelter, health care, psychiatric treatment and incarceration. The average cost per service unit was calculated based on the average cost from city-wide databases. Then, the service units were multiplied by the average cost per service unit, so that the researchers were able to find an approximate cost per person. As a result, the city of Philadelphia paid approximately USD 20 million per year in services to support the homeless population, representing USD

² The direct cost is the cost of the service itself, while the indirect costs are the costs around the service like administration, management salary and information technology. The capital-related costs include the costs of land, building, construction and equipment used in the rendering of the service. (WA Department of Treasury and Finance, 2007:6-17)

7,455 per person on average. It is important to notice that the sample was developed from the shelter and street outreach records, so it excluded individuals who did not use services from shelter providers. Also, the databases were incomplete for the medical sector, leading to possible significant underestimation.

Another method of estimating the costs of homelessness via unit costs is that of the vignette study or scenario approach. This method consists of calculating the cost associated with different vignettes or scenarios of homelessness. These illustrative vignettes, broadly representative of some diverse types and experiences of people experiencing homelessness, are not used to calculate the total cost of homelessness in a region. Rather, they are used to demonstrate that the costs of homelessness are sizeable on an individual level, vary from case to case, escalate the longer an individual remains homeless, and exceed the costs of particular prevention and early intervention. Two recent studies from England exemplify this method.

Pleace (2015) applies unit costs estimated in longitudinal studies to four vignettes broadly representative of single people who are experiencing homelessness. The four vignettes are: (1) a young homeless woman, (2) a rough sleeping man in his 30s, (3) a man with a learning difficulty who lost his home, and (4) a woman in her 20s escaping domestic violence. The estimates of costs for these scenarios were sourced from three longitudinal studies tracking the progress of homeless people accessing services in England (Pleace & Bretherton, 2013; Bretherton & Pleace, 2015; Pleace & Bretherton, 2014) and actual costs of homelessness services from eight local authorities. For each vignette, the additional cost of the person's homelessness is calculated in the situation when homelessness is prevented or rapidly resolved and when homelessness continues for one year. For a person with an equivalent pattern of service use to vignette (1), preventing homelessness costs the public sector an additional £1,558, while allowing it to continue for one year costs £11,733. For vignettes (2), (3), and (4), these costs are £1,426 compared to £20,128, £4,726 compared to £12,778 and £1,554 compared to £4,668 respectively.

Similarly, Kenway and Palmer (2003) apply their estimated unit costs to six vignettes of single people experiencing homelessness in England. Each of the artificial scenarios represents a common pathway through homelessness. In one scenario, for example, a 22-year-old man leaves home because of problems with his parents and becomes homeless when he cannot find alternative accommodation. Based on the vignettes, they estimate the cost per year per single homeless person ranges between £9,000 and £41,500.

Data collection from service recipients have also been used in the assessment of the costs related to homelessness. The *Welcome Home Billings*' study, a US study, is a good example of a self-report study where a sample of persons experiencing homelessness were surveyed to obtain information about their service usage during 2006. The individuals were asked about the number of days of services they utilised, including transitional shelter, emergency shelter, substance dependency treatment, mental health treatment, medical treatment and jail. According to the mean service cost, individuals experiencing homelessness represented an average charge of USD 15,534 per person. Not only had the study estimated the cost for the total homeless population, but also for the chronically homeless subgroup which accounts for 12% of the total homeless population. This helps to show that the subgroup of persons experiencing chronic homelessness are actually heavier users of service, with an average cost of USD 115,690 per person. The significant difference illustrates the importance of segmented sampling. Adjusting for both overall and chronically homeless, the annual cost to serve individuals experiencing homelessness in Billings exceeded USD 54 million in 2006. Nevertheless, it is important to remember that in the context of self-reported data from service recipients there is a high risk of inaccurate data due to incorrect recollection.

To overcome the difficulty of obtaining reliable self-reported data, Eberle et al. (2001) implemented a new approach to calculating service use costs, which consisted of an empirical case study combined with administrative data. The main advantage of this approach is that it provides accurate estimations since information obtained from the interviews is confirmed by the administrative databases. Also, the study's design enabled comparison between two subsets of people: homeless people and housed formerly homeless people. After analysing a small sample of 15 homeless persons, the study concluded that a difference of 33% in costs exists between homeless individuals and housed individuals (where most of the housed individuals were in supportive housing). Individuals in supportive housing had lower service costs than a homeless individual, CAD 18,000 CAD compared to CAD 24,000. The small sample size means that it is difficult to draw generalised assumptions from that data.

Fuehrlein et al. (2013) improved Eberle et al.'s (2001) approach by employing a random sample of 255 persons experiencing homelessness in Missouri and following them for two years. Again, accuracy was assured by the use of both self-report and agency-report data. The novelty of Fuehrlein et al.'s (2013) study lay in determining the cost using SASCAP methodology, known as the Substance Abuse Services Cost Analysis Program (Zarkin, Dunlap and Homsy, 2004). The SASCAP method uses two data components: programme costs and

revenue data, and labour data on staff time allocated per services. This approach to services cost estimation produces estimates that take into account the cost of direct service, but also the cost of indirect labour resources. Therefore, Fuehrlein et al (2013) extracted the indirect and non-labour costs from the service providers' financial data, and added the average hourly wage of the service. The researchers then computed specific algorithms generating the labour input for a full year, which resulted in the service unit costs per hour. The analysis of the sample revealed an average cost per person of USD 7,811 in year 1, and USD 5,519 in year 2. A common weakness shared with Poulin et al. (2010) is the lack of sufficient data collection. For Fuehrlein et al. (2013), the lack of data is related to the criminal justice services, and could potentially lead to an underestimation of the total costs as this sector is a significant cost driver. Yet, Fuehrlein et al. (2013) acknowledged the significant contribution to the methodology in the field:

The current study represents an important step forward in developing methods that accurately represent costs associated with services for homeless populations. [...] Further research is required to clarify the gains in precision from this improved method over less extensive costing methods using administrative data.

Another study focuses on the comparison between homeless individuals and homeless families (Spellman et al., 2010). The family experiencing homelessness most frequently has one adult member (typically female) and an average of 3 to 3.5 members. The mainstream service costs of first-time homeless families were examined in six communities: Iowa, Texas, Florida, Michigan, South Carolina and Washington. It should be noted that the geographic divisions were used to compare the differences within locations in the United States. Also, this study used the Homeless Management Information System (HMIS) data. The HMIS is an information technology system that confidentially aggregates data on homeless populations in the United States by collecting client-level data on the characteristics and service needs of persons experiencing homelessness (US Department of Housing and Urban Development). With the HMIS, the researchers were able to identify the individuals and families entering homelessness and accessing the services for the first time. Using service unit costs methodology, similar to Poulin et al. (2010), the total cost was derived from the combination of service and costs data. The study results showed that families have fewer stays in homeless programmes than individuals, but those stays are longer. In fact, families stay 3 to 10 months on average compared to 5 to 10 weeks for individuals. It is not surprising to note that the average cost for families is much higher, ranging from USD 3,184 to USD 20,031 (costs are

expressed in 2006 dollars) for families, and from USD 1,634 to USD 2,308 (costs are expressed in 2006 dollars) for individuals.

5. Health care costs

This section reviews the cost analysis studies that focused on health care costs instead of integrated cost. Research indicates that primary costs associated with chronic homelessness are related to health care services, most often substance abuse and mental health services (Wright, 2006). It is then not surprising that among homelessness studies, a number focused specifically on the cost related to health care services. In fact, from the 14 studies using a cost methodology, five of them concentrated on the health care area. The reviewed studies were selected because of their strong methodology and their specific characteristics that enable a deeper understanding of the cost of homelessness approach.

One important study in the field of health care costs related to homelessness was that carried out by Salit et al. (1998) in New York. Using data from New York City 'public general hospitals' databases, the researchers obtained information about the lengths of stay and the causes of admissions of approximately 19,000 homeless patients. In order to adjust the socioeconomic effect of poverty on hospitalization costs, the homeless patients were compared with two-control groups of low-income patients, including public-hospital patients and private-hospital patients. As a result of the unavailability of the individual costs per day for public-hospital, the researchers created a cost per day estimation, controlling for differences in demographics and diagnoses. Accordingly, it was calculated by multiplying the cost per day of the medical service by the ratio of the intensity weights of the cost, according to DRG (Diagnosis Related Groups), for homeless patients to the average DRG-weighted cost for all public patients.

The study found that on average the homeless patients stayed approximately 4 days or 36% longer than other patients. This translated into an additional cost per discharge of \$4,094 for psychiatric patients, and USD 2,414 for all types of patients. Moreover, Salit et al. (1998) found that longer stays were usually not related to treatment, but to the lack of housing for homeless psychiatric patients. While this study succeeds in illustrating the nature of the health problems among homeless patients, the total costs are possibly underestimated due to the exclusion of chronic health care patients.

Hwang et al. (2011) also analysed the costs of hospital discharges for homeless patients using a similar method to Salit et al (1998). This Canadian study used the database of St Michael's

Hospital in Toronto, where people experiencing homelessness were identified in the system as “no fixed address”, “undomiciled” or if the postal code matched a shelter or a place-holder reserved for homeless individuals. For each admission of a person experiencing homelessness, the researchers collected discharge information for a period spanning five years using Ontario Case Costing Initiative (OCCI). The OCCI referred to a methodology that presents case costing information at the patient level, distinguishing direct costs from indirect costs of administration. This method allows a total cost to be calculated that includes both direct and indirect costs based on the relative unit value. The data was then analysed through linear regression analysis, adjusting the hospital cost and housing status relation, to age, sex, resource intensity weight and length of stay.³

The major difference with the previous New York study, where hospital length of stay was used to determine the hospitalization cost gap between homeless and housed patients, is that this research used the cost for each patient. However, the results showed minimal disparity; an increase of CAD 2559 per hospital discharge for homeless compared with housed patients in the Canadian study, compared to similar increase of USD 2414 in the American study.

The emergency department use among persons experiencing homelessness has been a specific subject of interest in the research field, particularly in relation to mental health and abuse problems. Following the interview process of 2578 persons experiencing homelessness, Kushel et al. (2002) established that 40% of homeless persons used emergency services over a year, which is 3 times higher than the US annual norm according to the National Centre for Health Statistics.

In the same area of study, Dunford et al. (2005) documented the emergency services utilization over 4 years of 529 homeless chronic alcoholics in San Diego. The data collected demonstrated that 77% of the 529 homeless chronic alcoholics used the emergency department services at least once, and the total of emergency visits was 3,318 (with an average of 8.2 visits per person). Also, from the 529 individuals participating in the research, 58% of them used emergency medical transport services at least once, and accumulated a total of 2,335 emergency medical transports (with an average of 7.6 transports per person). The services use for those 529 individuals resulted in a cost of USD 17.7 million. Moreover,

³ Linear regression is a basic and commonly used predictive analysis to describe data and to explain the relationship between one dependent variable and one or more independent variables.

Dunford's study allows a deeper understanding of whether a particular programme - Serial Inebriate Programme - in which homeless chronic alcoholics could choose treatment instead of jail time reduced health care utilization and costs. Ultimately, the programme implementation showed a reduction of 50% in emergency visits and transports, along with total monthly savings of USD 73,352. That is to say that each dollar invested in the Serial Inebriate Program generated a \$1.44 savings.

6. Economic evaluations

This section reviews studies based on their economic evaluation approach. As explained at the beginning of this report, the economic evaluation approach assesses both costs and outcomes of a specific homelessness programme, usually in order to determine whether the programme generates a net benefit. The economic evaluation concept relies on two main, similar methods: cost-benefit evaluation (CBE) and cost-effectiveness evaluation (CEE), with the distinction between them being in the units of measurement used in the analysis.

Under CBE the cost of a programme is compared with the programme's benefits in dollar value. This method implies the conversion of all the benefits and costs of a proposed or existing programme into monetary terms, and compares them to determine whether it benefits society overall. The net benefit of each alternative option is then given by the difference between the costs and benefits. If the value of the benefits exceeds that of the costs, the project is considered worthwhile, and the best option is the one with the highest net present value. However, some benefits or costs are intangible and difficult to estimate in monetary terms, for example reduction in mortality rates or lives saved.

The CEE approach has a similar aim to CBE but it compares the cost of a given intervention to its key outcome or benefits rather than a monetary unit. Unlike the CBE, CEE analysis measures the outcome in "natural units", for example in terms of lives saved, illnesses prevented or years of life gained. This method proves to be useful when it is too difficult to place dollar values on particular human outcomes.

In recent years, widespread support for Housing First programmes has stimulated the development of economic evaluation studies with the aim of evaluating such initiatives / interventions. These studies have demonstrated the significant reduction in service utilization associated with partial or even total costs offset. Housing First programmes have emerged as an effective way to prevent and end homelessness, through the immediate provision of

permanent housing supplemented with support services to individuals who are homeless (Pinkney and Ewing, 2006). This section will present 11 recent studies based on the economic evaluation approach, of which 6 are based in the United States.

One main factor in the success of these studies in the United States is the access to wide administrative databases that can provide a range of information about the service utilization. Because these databases contain client identifiers, they can be linked across systems. Using administrative databases, Larimer et al. (2009) conducted a study on a Housing First programme for persons experiencing chronic homelessness having severe alcohol problems in Seattle. They found that the decrease in the utilization of shelter, health care, criminal justice and other services more than offset the cost of the Housing First programme. They further found that the 95 participants diminished their service costs by an average of USD 3,569 per month relative to control participants. The housing costs were \$1120 per month, yielding a total average cost offset of USD 2,449 per person per month. This represents more than USD 4 million savings annually.

Another study in New York (Culhane et al., 2002) has examined the mainstream service administrative databases of nearly 5,000 participants who gained access to housing as part of the NY/NY grant in New York. The researchers concluded that participants in such programmes reduced their service use to the point that 95% of housing and support costs were offset by the service reduction. Similarly, Perlman and Parvensky (2006) conducted a study in Denver using a sample of 50 homeless persons with disabilities that they linked to administrative database. The total two-year costs for the programme were USD 26,800. The findings demonstrated that with the implementation of the programme, the total emergency costs decreased from USD 43,239 to USD 11,694, which led to a net cost saving in service usage averaging USD 4,745 per person. While most studies focus on urban context, recent research by Mondello et al. (2009) concentrated on homelessness in rural Maine. Like its urban equivalents, this study established that there were significant reductions in services when homeless persons were placed in permanent supportive housing, with a decrease of USD 5,925 (from \$18,629 to \$12,704 on a six-month timeframe). With the cost of the housing programme being USD 4,577 for six months, the cost offset per person was USD 1,348. Mondello definitely extends the traditional area of study and increases the understanding of homelessness in rural areas.

Following the growing evidence of effectiveness of Housing First in the United States and Canada (plus the upcoming Winter Olympics⁴), the Mental Health Commission of Canada funded and implemented a randomised controlled field trial of the Housing First programme. The Canadian study (Goering et al., 2014), called 'At Home/Chez Soi', followed more than 2,000 individuals over a period of two years. The research methodology included both self-reported data from interviews held every three months, and administrative data from national and provincial databases for health and justice services. The participants were divided into three groups, high need (HN), moderate need (MN) and control group. The study found that the programme came close to paying for itself among the HN participants, where the reduction in services' cost was CAD 21,375. This means that for every \$1 invested in the housing programme, there was a reduction in the cost of \$0.96. However, the cost offsets were much more modest for the MN participants, with a reduction of CAD 4,849 or CAD 0.34 savings per dollar invested. As well, the researchers pointed out that the most significant savings came from the intensive service users, representing 10% of the homeless population, with average savings of \$2.17 for every dollar invested.

A similar study was conducted in British Columbia (Eberle et al., 2001) using a combination of case histories and service records for two groups, a homeless group and a housed homeless group. The findings estimated that the cost of services for the people experiencing homelessness before the programme ranged from CAD 30,000 to CAD 40,000 on average per person per year, while after the programme the cost of both services and housing programme ranged from CAD 22,000 to CAD 28,000. The researchers concluded that the housing programme generated a cost offset between CAD 8,000 and CAD 12,000 on average per person. These offsets were found despite the researchers having limited data from employment and justice sectors.⁵ It is likely that the cost offsets were even higher.

Another Canadian study used a methodology based on data collection from service providers. Palermo et al. (2006) collected information about the support provided and their associated costs. Designed as a cost-saving comparison, the study examined the costs for six mainstream services including shelter, jail, prison, hospital, psychiatric hospital and supportive housing. To establish the comparison, the frequency of service statistics from Culhane's study (2002) was applied to Halifax. As a result, supportive housing proved to reduce the total cost of service by 41%, from CAD 31,846 to CAD 18,787 (including the costs of the supportive housing

⁴ Padgett et al. 2016

⁵ With thanks to Nevil Pierse for this insight.

of CAD 13,302) after the programme. This resulted in a net cost offset of CAD 13,059 on average per person per year.

Australia, while in early development of homelessness economic evaluation studies, recently put efforts into the assessment of the cost of homelessness programmes. The Australian Housing and Urban Research Institute (AHURI) study, *The cost of homelessness and the net benefit of homelessness programme* by Zaretsky and Flatau (2013) established the extent to which government funded homelessness programmes are cost effective in the Australian context. The methodology was based on two longitudinal surveys of homelessness programme clients, supported by cost data from programme budgets and support agencies. The study examined four different cohorts for a total of 61 participants, including single men, single women, tenancy support group, and street-to-home programmes. While the mean savings of the programme was estimated to be AUD 3,685 per person, the study showed a wide variation between cohorts. For single men under the programme, there was a decrease of AUD 6,447 in justice costs, although health costs increased by AUD 4,620. This increase in health services suggests a response to unmet need, probably due to the difficulties of accessing such services while being homeless. As a result, supportive housing programme cost for single men was partly offset with a net annual cost of AUD 1,633 per person. Another important finding is that the programme cost for single women was completely covered by the reduction in services, but also resulted in net annual saving of \$5,898 per person. Finally, the tenancy support group showed the highest net cost of AUD 3,904. Zaretsky and Flatau (2013) concluded that on the whole the programme generated great outcomes and recommended such programmes to be continued.

Another Australian economic evaluation study of homelessness is Pinkney and Ewing (1997) who provided a cost-based analysis of youth homelessness in terms of early school leaving. The researchers calculated the cost of youth experiencing homelessness and the potential net benefits of early school intervention using data from the census of homeless school students. They created 12 different outcome measures with costing assumptions and a conservative estimate. Pinkney and Ewing (1997) found out that an early intervention strategy aimed at keeping students at school would offer a total global benefit of AUD 473 million per year, while the total global cost of youth homelessness would be AUD 573 million per year, calculated in terms of the population of young homeless people. Additionally, the programme showed a break-even of the cost at a success rate of 21%.

Service utilization evaluations of homelessness have contributed to a better understanding of the dynamics of homelessness and the impacts that prevention programmes have on it. However, part of the challenge in identifying the costs associated with homelessness is finding accurate and sufficient data. A first limitation lies in the collection of data, and what can be described as a lack of standardised data collection, which makes the generalization across studies difficult. Clearly, the different data collection methods all have inherent limitations: while consumer self-report methods present reliability issues, administrative database methods pose limited accessibility and misclassification problems.

A second issue in comparing studies is the variation in the sample of the populations studied. Several studies (Culhane et al., 2002; Lewis Group, 2004; Q2 Consulting, 2007) point out that about 10% of chronically homeless persons utilise services at a far higher rate than the population in general. As a result, depending on the proportion of these intensive service users in the sample, cost estimates can vary enormously. Another limitation of these studies is that they measure only mainstream services and do not attempt to measure the broader costs of homelessness to society as a whole. For instance, the costs of higher mortality rates for homeless individuals, or the costs to business owners that may result from a concentration of homeless individuals in the city.

Given these limitations, Berry et al. (2003) argued in the report *Counting the costs of Homelessness*, a perfect approach “would require a very large study and entail a very significant commitment of resources” (Berry et al., 2003, p.4). Nevertheless, taking into account the NZ context, the development of an appropriate economic evaluation method should incorporate the most important aspects. The data should range over a long enough period and cover mainstream services, including housing, health, welfare, justice and employment assistance.

Part 2: Economic cost of homelessness in NZ - Data scoping

7. Introduction

In part one of this report, we reviewed 30 international studies on the cost of homelessness. This provided a useful review of alternative methodologies available for two potential purposes – constructing the economic cost of homelessness to society; and conducting an economic evaluation of intervention programmes. Based on these findings, we recommend an integrated cost of homelessness approach when attempting to construct the average cost per person experiencing homelessness. This would be based on the direct costs to institutional providers of support and requires the quantification of relevant health, social service and criminal justice costs.

The aim of part two of this report is to identify what data is available for such an exercise in NZ⁶. To begin this task, we first outline an appropriate method for identifying the target population. Subsequent to this, we indicate likely datasets and variables within those datasets with potential for use in calculating the economic cost of homelessness in NZ. Additionally, we outline how best to link these data sets within the Integrated Data Infrastructure⁷ (IDI). Overall, we find that based on the data dictionaries within the IDI, it is clearly feasible to construct an average cost per homeless person. It is important to note however that any average cost will not capture the likely non-linear impacts for individuals above or below this average.

This report concludes by assessing how the data could be utilised for an alternative purpose, in evaluating the effectiveness of the Housing First intervention, and indicates what considerations are needed if pursuing this research pathway in the future.

⁶ An alternative to using administrative data is to conduct a survey of homeless people. Examples of studies that have employed this methodology include Fuehrlein et al. (2013), Kushel et al. (2002), and Poulin et al. (2010). The purpose of these types of surveys is to ascertain directly from the concerned individual what their service usage is. The main drawback of such an approach is that interviewing/surveying a sufficient number of people experiencing homelessness to be able to provide generalizable findings would be both costly and time consuming.

⁷ See www.stats.govt.nz/browse_for_stats/snapshots-of-nz/integrated-data-infrastructure/idi-datasets.aspx

8. Identifying the target population

As indicated in part one, homelessness is a term used to refer to people lacking a regular, fixed and physical shelter, and therefore it is a broad term that encompasses an extensive range of conditions. In other words, the people sleeping rough or on the streets are only a fraction of the homeless. Night shelters, emergency housing, marae and refugee housing are all important housing types to take into account when referring to homelessness. The Statistics NZ (2009) definition of homelessness describes homelessness as “*living situations where people with no other options to acquire safe and secure housing: are without shelter, in temporary accommodation, sharing accommodation with a household or living in uninhabitable housing*” (Statistics NZ, 2009, p.6). Having four potential living situations presents a methodological challenge when trying to evaluate all people included in this definition. Therefore, the first step in constructing the methodology for this project is to determine which of the data sources most accurately identify homeless individuals. Amore et al. (2013) has developed a robust methodology for determining homelessness status from Census data⁸, as well as administrative data from emergency housing providers. Their definition of homelessness is closely aligned to that of Statistics NZ, and is potentially more comprehensive. They focus on people living in severely inadequate housing due to a lack of access to minimally adequate housing (LAMAHA).

Following the approach by Amore et al (2013) we propose using Census data as the spine of an administrative integrated data set. The subject population should be sourced from data on the *Statistical Standard for Occupied Dwelling Type* on Census night. The data will then need to exclude three groups: absentees, residents of other institutions including camps, and residents of misclassified student accommodation as detailed in Table 5.⁹

⁸ 97.4% response rate ($\pm 0.5\%$) in 2013. Note that we would expect that homeless would have a higher undercount than other groups in Census data (Statistics NZ, 2013).

⁹ More details about the reasons of exclusion are available in *Severe Housing Deprivation: The problem and its measurement* (Amore et al., 2013).

Table 5: Exclusion restrictions required for subject population

Absentee	Living in other institutions, including camps	Misclassified student accommodation
Excluded to avoid double counting	Excluded because people living in an institution due to LAMAH cannot be identified in census data	Excluded because student accommodation is a type of institution not targeted to people who LAMAH
Individual_rec_type_code= 1 Absentee	Dwell_type_code= 2111 Residential care for older people OR 2112 Public hospital OR 2113 Private hospital 2114 Residential and community care OR 2115 Welfare institution OR 2116 Educational institution OR 2117 Religious institution OR 2118 Prison or penal institution OR 2119 Defense establishment OR 2214 Work, construction or training camp OR 2215 Youth, school, or scout/guide camp OR 2216 Communal staff quarters	Dwell_type_code= 2211 Hotel, motel, guest accommodation OR 2212 Boarding house OR 2217 Commercial vessel If at least 75% of the population in the dwelling is full-time student, the dwelling is classified as student accommodation, and is therefore excluded of the subject population. $n \text{ (Full-time study / Census night residents)} > 0.75$

Amore's methodology also excluded the night shelter category from the population, arguing that this category includes a broader population. Instead her study measured the night shelter population through client data collected directly by night shelters. In the context of our research purpose, a direct-from-provider data collection would not be the best option since we believe that linking datasets with the Census is preferable. Consequently, we believe that including the night shelter category in the subject population would not be an issue since the subsequent filters applied to the subject population would exclude the misclassified subjects, and hence identify the target population.

Next, the subject population is divided by an algorithm into three categories: severely housing deprived or undetermined housing deprivation status and those not severely housing deprived as illustrated in Figure 1. Of those classified in the first two of these categories, two additional criteria are used to categorise their housing situation: (1) living in severely inadequate housing (2) lacking of access to minimally adequate housing. As detailed in Amore et al (2013) two additional proxies can then be utilised to clearly identify those who lack access to minimally adequate housing. These are *having no other place to live* (2a in Figure 1), and *having a low income* (2b in Figure 1). For temporary residents of permanent private dwellings, the extra proxy *severe crowding* (2c in Figure 1) was used to determine the sharing necessity. Each of these proxies are described in detail next.

Proxy 1. Living in severely inadequate housing

In Census housing categories, it is possible to associate six categories with the condition of *living in severely inadequate housing*. The table below (Amore et al, 2013) shows the housing types related to severely inadequate housing, and the corresponding census dwelling types and codes.

Table 6: Housing types in which severely housing deprived people can be identified using census data, and the corresponding census dwelling types

Housing type	Census dwelling type ⁽¹⁾
a. Living rough (not in an enclosed structure) & b. Housing that is enclosed but lacks one or more basic amenities (in which residents lack minimally adequate security of tenure)	1314 Roofless or rough sleeper 1313 Improvised dwelling or shelter 1312 Mobile dwelling not in a motor camp
g. Camping ground or motor camp	1311 Dwelling in a motor camp 2213 Motor camp/camping ground
h. Other commercial accommodation	2211 Hotel, motel, or guest accommodation 2212 Boarding house 2217 Commercial vessel
i. Other non-private accommodation	2218 Marae complex
j. (Temporary resident in a) private dwelling that has all basic amenities	10 Occupied private dwelling, not further defined 11 Separate house 12 Two or more flats / units / townhouses / apartments / houses joined together

1. Statistics NZ (2009c).

Source: Amore et al. (2013)

It is important to note that for the housing type *j*, which relates to private dwellings, extra filters need to be applied to identify the temporary nature of the tenure. Those two census variables are:

- Not an owner of the dwelling or in an owner's nuclear family
- Not the reference person or in the reference person's nuclear family

If the answers to both variables are negative, the person is acknowledged as temporary residents in permanent private dwellings, and potentially severely housing deprived.

Proxy 2. Lack of access to minimally adequate housing

The first criterion proxy identifies people living in severely inadequate housing. Yet, it does not automatically indicate severe housing deprivation (or homelessness). So, it is important to consider circumstantial factors that can be translated using two proxies: having no other

place to live, and having a low income. Also, an extra proxy is applied only for temporary residents in permanent private dwellings: severely crowded dwellings.

Proxy 2. a) Having no other place to live

The filter “no other place to live” is applied to people already identified as living in severely inadequate housing. The population is then limited to those with no other address, answering by either “same as census night address” or “no fixed abode”.

Proxy 2. b) Having a low income

The “low income” filter is applied to people previously identified as living in severely inadequate housing with no other place to live. The determination of the low-income threshold is based on the NZDep (deprivation) index (Crampton, Salmond & Kirkpatrick, 2004; Salmond, Crampton & Atkinson, 2007), where the poverty threshold is estimated at 60 percent of the median equivalised disposable income measure (JEAH)¹⁰ before adjusting for housing costs.

Proxy 2. c) Living in a severely crowded dwelling (applied only to temporary residents in conventional dwellings)

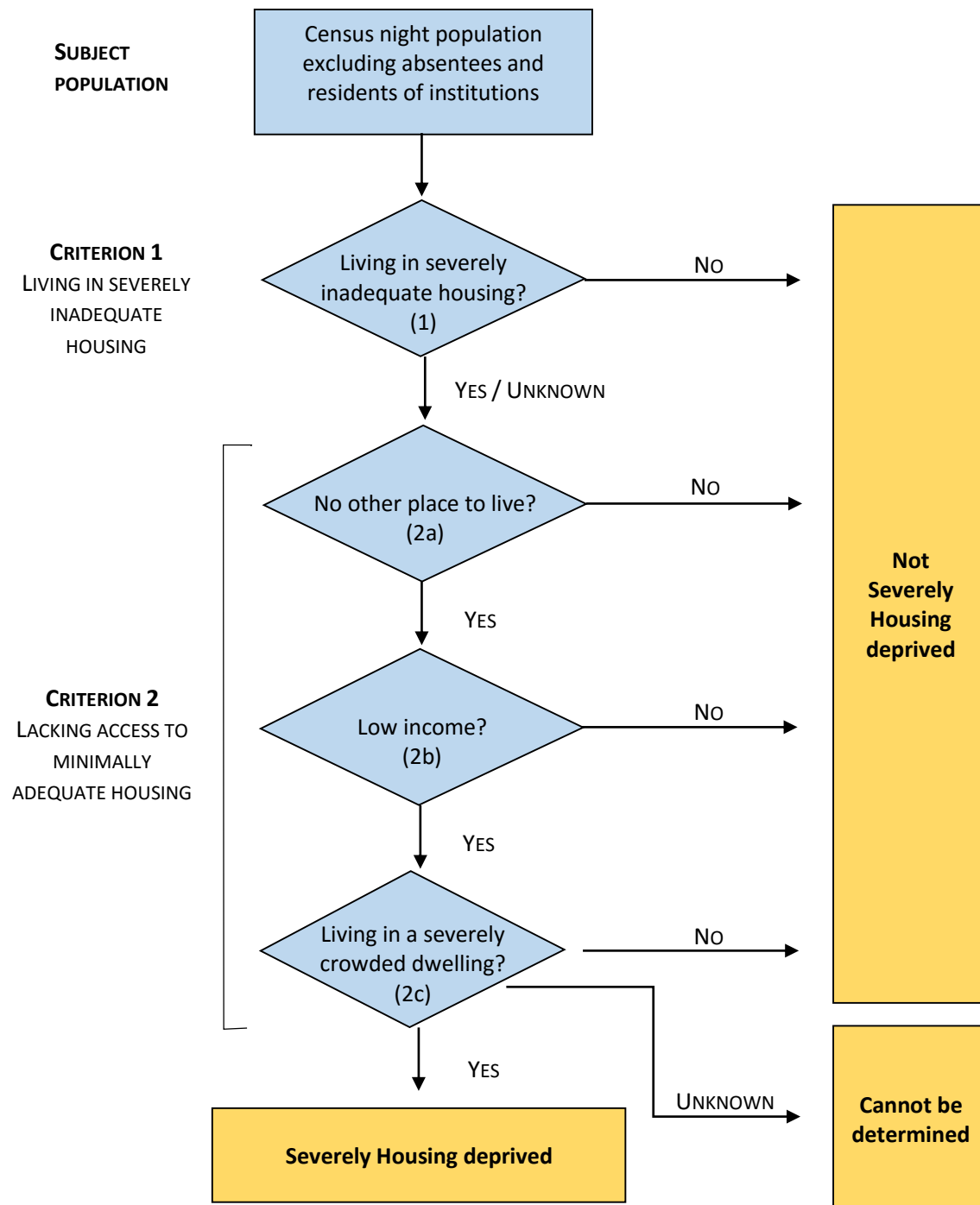
The extra filter “living in a severely crowded dwelling” is only used for temporary residents in permanent private dwellings, with no other place to live and low income, to identify people who are sharing by necessity.

Overall, we recommend adopting the method developed by Amore et al (2013) of identifying homelessness, with the exception of including the night shelter category in the subject population instead of using client data collection to ensure internal data consistency. This method has been illustrated with the following flow chart in Figure 1.

The main limitations of this method is that two percent of the New Zealand population is not reflected because they did not answer key census questions. Furthermore, it is also likely that a proportion of severely housing deprived people did not fill out census forms, which would further generate an underestimation in the data.

¹⁰ JEAH refers to household incomes equivalised according to the size and composition of the households using the Revised Jensen Index (Jensen, 1988), which is the standard equivalisation index used in NZ

Figure 1: Algorithm for identifying severely housing deprived population in Census



9. Key data sources

The idea behind our methodology is to use the Census data as described as the spine to identify homeless people, and then link them through other data sets. Statistics NZ uses a global unique identifier (*snz_uid*) for each distinct identity in the Integrated Data Infrastructure (IDI). The benefit is that all datasets in the IDI are linked via that identifier, which makes it possible to track a specific targeted group.

As shown in Table 7 below, we believe that additional variables from health, justice and social services will be the most relevant for quantifying the cost of homelessness in NZ.

Table 7: Source of other administrative data in the IDI

Category of services	Source of administrative data	IDI Data Dictionary	Variable	Variable definition
<i>Health services</i>	Ministry of Health	Publicly funded hospital discharges – event and diagnosis/ procedure information	moh_evt_adm_type_code	Type of admission for a hospital healthcare event
			moh_evt_hlth_spec_code	Nature of the services being provided
			moh_evt_los_nbr	Length of stay (LOS) in a facility in days.
			moh_evt_tot_icu_hours_nbr	Total duration of stay (hours) in an Intensive Care Unit (ICU)
			moh_evt_cost_wgt_code	Cost weight
		National non-admitted patient collection data	moh_nnp_service_type_code	Service type
			moh_nnp_date_of_service_text	Date of service
		Programme for the Integration of Mental Health Data	moh_mhd_organisation_id_code	Healthcare services to the healthcare user
			moh_mhd_referral_id_code	Identifier for the mental health referral that can be used to link all relevant activity records for that referral.
			moh_mhd_activity_type_code	Type of healthcare activity provided.
		General Medical	moh_evt_drg_31_code	Diagnosis-related group code
			moh_evt_los_nbr	Length of stay

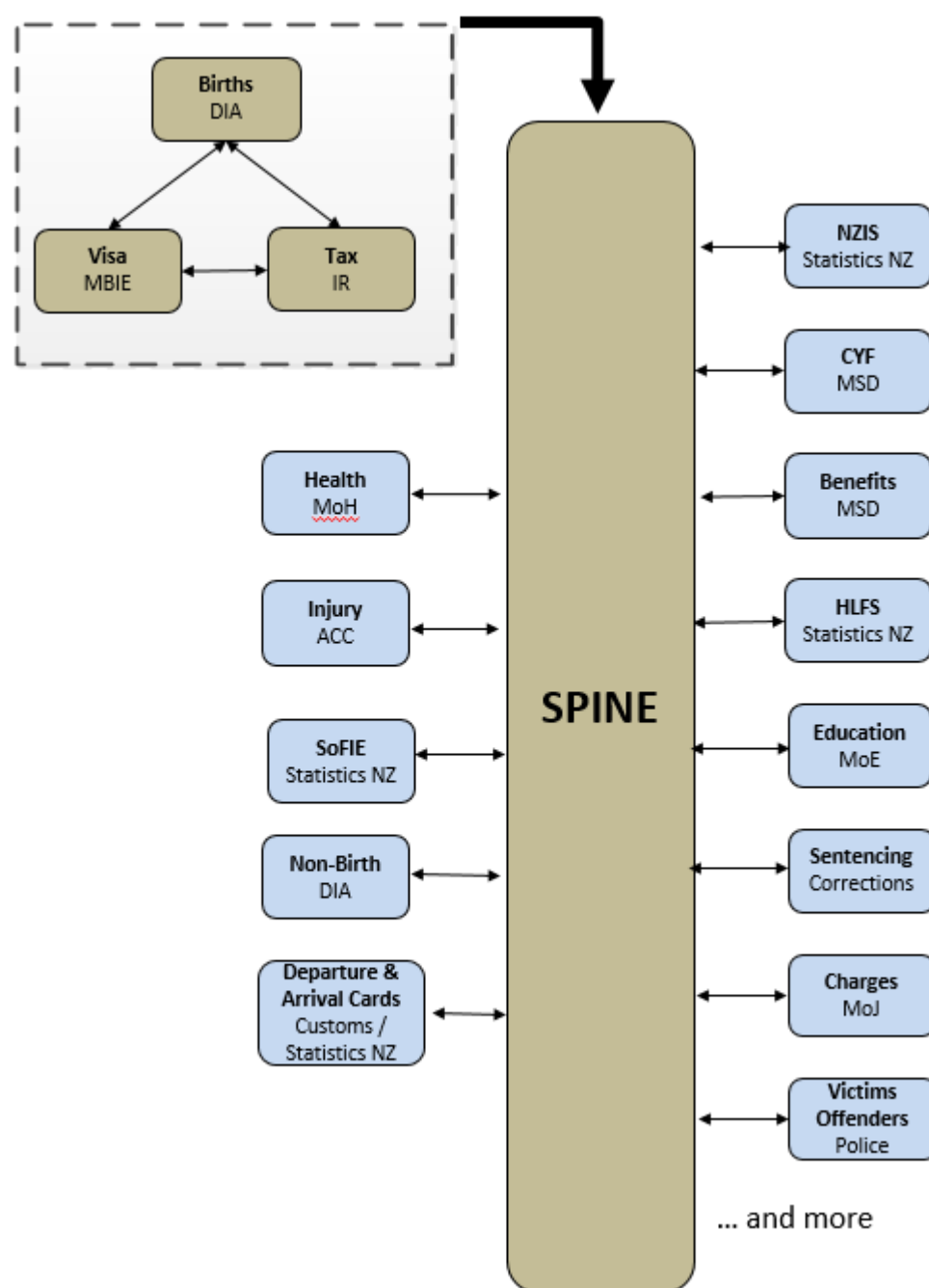
		Services claims data	moh_evt_hmvc_nbr	Total hours on mechanical ventilation
			moh_dia_clinical_sys_code moh_evt_drg_31_code	Procedure codes
			moh_dia_diagnosis_type_code	Diagnosis codes.
			moh_evt_cost_weight_amt	Costweight
		ACC injury claims data	acc_cla_injury_cause_text	Injury cause
			acc_cla_claim_costs_to_date_ex_gst_amt	Claim costs
<i>Justice Services</i>	Department of corrections	Sentencing and remand data	Offender_aliases_all	Analysis unit is one record per alias
			Ov_periods	Analysis unit is by event. This table shows the start and end points for all events for an offender
	Ministry of Justice	Court charges data	snz_moj_charge_uid	Unique record number that enables all charges for a particular person to be identified
			moj_chg_first_court_hearing_date	Court date where the first hearing was held
			moj_chg_last_court_hearing_date	Court date where the last hearing was held
	New Zealand Police	Recorded crime offenders data	snz_pol_occurrence_uid	Occurrence ID identifies a single criminal incident / event
			pol_pro_anzsoc_offence_code	Offence type for which an alleged offender is proceeded against by police
		Recorded crime victims data	snz_pol_occurrence_uid	Occurrence ID identifies a single criminal incident / event
			pol_prv_anzsoc_offence_code	Offence type
<i>Social services entitlements</i>	Ministry of Social Development	Benefit dynamics data	benefit_rate_code	Basic rate of benefit payable at the beginning of the spell
			period_in_days	Derived from benefit_start_date to benefit_end_date using the formula: benefit_end_date – benefit_start_date +1.
			payment_amount	The dollar amount granted

The Health and Justice measures have standard cost-weighted codes (e.g. WIES codes for Healthcare) linked to the categories and these can be utilised to build a total cost of service for these two groups. The benefit dynamics data includes benefit rate and duration data that will combine into direct benefit costs.

10. Evaluating an intervention

While not part of the initial research scope of this report, we believe it important to highlight how the IDI could be utilised to evaluate an intervention. Statistics NZ has indicated that identification information that already exists in their systems (such as individuals' National Health Index Number - NHI) or good quality demographic information (such as individuals' name, date of birth and gender) could be encrypted to provide the corresponding *snz_uid*. This will allow a researcher to look at people across different datasets, which would effectively be connected in the same fashion as shown in Figure 2 below.

Figure 2: Linking external data with the IDI



Source: Statistics NZ

One potential approach therefore would be to provide identification information to Statistics NZ regarding participants in an intervention programme; and then track these individuals relative to the likely counterfactual – individuals flagged as severely housing deprived (based on Figure 1’s flow chart) using the Census data, living in the same region, and not undergoing the intervention.

While this is theoretically possible, Statistics NZ has flagged certain considerations that a researcher needs to take into account with this type of approach:

- (i) Timing – Additions of data to the IDI have to be negotiated in advance. Additions are made at the discretion of the Government Statistician and a business case must be drawn up. Timing also depends on the amount of work required in linking the datasets, which partially depends on the source of the identifying information – for example, linking via good quality demographic information may take a lot longer than NHI information, particularly given the population of interest.
- (ii) Confidentiality – Analytical populations need to be large enough that confidentialised output can be produced. Therefore, a sample size smaller than several hundred may not be suitable for this research avenue.
- (iii) Purpose of linking – All analysis must be for the public good.

References

- Amore, K. Baker, M., and Howden-Chapman, P. (2011). The ETHOS Definition and Classification of Homelessness: An Analysis. *European Journal of Homelessness*, 5(2), 19-37.
- Amore K, Viggers H, Baker, MG, and Howden-Chapman, P (2013). *Severe housing deprivation: The problem and its measurement*, Official Statistics Research Series, 6. Retrieved from www.statisphere.govt.nz.
- Amore K. (2016). *Severe housing deprivation in Aotearoa/New Zealand: 2001-2013*. He Kainga Oranga/Housing & Health Research Programme, University of Otago, Wellington.
- Auckland City Mission. (2016). Auckland's rough sleeper population reaches record high [Press release]. Retrieved from <http://www.scoop.co.nz/stories/AK1606/S00191/aucklands-rough-sleeper-population-reaches-record-high.htm>
- Australian Bureau of Statistics. (2012). There is no one definition of homelessness. Retrieved from www.homelessnessaustralia.org.au/index.php/about-homelessness/what-is-homelessness
- Beckett, B., Woods, L., Guarino, J., Dye, M., Mowry, J., Culver, J, Kooistra-Manning, A. and Parker, H. (2013) Welcome Home Billings. Mayor's Committee on Homelessness. Community Development Division. City of Billings, Montana.
- Berry et al (2003) A Systematic Review of Cost Effectiveness and Cost Benefit Studies of Homelessness. Issue 24, June 2003.
- Bretherton, J., and Pleace, N. (2015). *Housing First in England: An Evaluation of Nine Services*. York: University of York. Retrieved from www.york.ac.uk/media/chp/documents/2015/Housing%20First%20England%20Report%20February%202015.pdf
- Busch-Geertsema, V. (2010). Defining and Measuring Homelessness. *Homelessness Research in Europe*, 19-39.
- Canada Mortgage and Housing Company. (2016). Affordable Housing. Retrieved from <https://www.cmhc-schl.gc.ca/en/inpr/afhoce/>
- Chamberlain, C. and MacKenzie, D. (2003). *Counting the Homeless 2001*, Australian Bureau of Statistics, No. 2050, Canberra.
- Clarke, M. (2016). Plans for more homes but is it enough. Maori Television. Retrieved from <https://www.maoritelevision.com/news/regional/plans-more-homes-it-enough>
- Committee for Auckland. (2008). *Auckland's Million dollar Murray*. Auckland. Quantifying the cost of homelessness. Committee for Auckland.
- Community Housing. (2015). A snapshot of the community housing sector in New Zealand. Retrieved from <http://communityhousing.org.nz/about-us/what-does-community-housing-sector-nz-look/>

Community Information Christchurch. (2016). Day centers. Retrieved from <http://www.cinch.org.nz/categories/a-z/a/1909/entries>

Culhane, D., Metraux S. and Hadley T. (2002) Public Service Reductions Associated with Placement of Homeless Persons with Severe Mental Illness in Supportive Housing University of Pennsylvania

Davidson, I. (2016). Homeless numbers rising in New Zealand. NZ Herald. Retrieved from http://m.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=11650103

Defining Chronic Homelessness: A Technical Assistance Guide for HUD Programs. Washington, DC, US Department of Housing and Urban Development, Office of Special Needs Assistance Programs, 2007.

Downtown Community Ministry. (2016). How we do this. Retrieved from <http://www.dcm.org.nz/howdowedothis.html>

Dunford, J., Castillon, E., Chan, T., Vilke, GM., Jenson, P. and Lindsay, SP. (2006). Impact of the San Diego Serial Inebriate Program on use of emergency medical resources. Annals of Emergency Medicine, April, 2006.

Dwell Housing Trust. (2016). Affordable quality homes. Retrieved from <http://dwell.org.nz/>

Eberle, M., Hulchanski, D. and Pomeroy, S. (2001). Homelessness: Causes & Effects. The costs of homelessness in Bristish Colombia. Vancouver, British Columbia, Ministry of Community, Aboriginal and Women's Services.

Fuehrlein, B., Cowell, A., Pollio, D., Cupps, L., Balfour, M., and North, C. (2013). Deriving costs of service use among an urban homeless population. Journal of Substance Abuse Treatment, Volume 46, Issue 4, University of Florida Department of Psychiatry.

Furley, T. (2016). Homelessness a 'national problem'. Retrieved from <http://www.radionz.co.nz/news/national/300038/homelessness-'a-national-problem'>

Gill, C. and Harris, T. (2007). Examination of the Costs of Homelessness and Issues Related to Determining the Cost-Effectiveness of Supportive Services and Housing in Washoe County, NV.

Goering, P., Veldhuizen, S., Watson, A., Adair, C., Kopp, B., Latimer, E., Aubry, T., Nelson, G., MacNaughton, E., Streiner, D., Rabouin, D., Ly, A. and Powell, G. (2014). National final report: Cross-site At Home/ Chez Soi project. Mental Health Commission of Canada.

Gravitas Research and Strategy Ltd. (2009). A Review of the New Zealand Housing Sector. Auckland, New Zealand: Author.

Harris, R. (2015). Hard times: A Glimpse into Homelessness in West Auckland: The Salvation Army Social Policy and Parliamentary Unit.

Hwang SW, Weaver J, Aubry T. and Hoch JS. (2011). Hospital costs and length of stay among homeless patients admitted to medical, surgical, and psychiatric services. Med Care.

IBI Group. (2003). Societal Cost of Homelessness. Released for Information to the Edmonton Joint Planning Committee on Housing and the Calgary Homelessness Foundation.

Kenway, P. and Palmer, G. (2003). How many, how much? Single homelessness and the question of numbers and costs. London: Crisis.

Kuhn, R. and Culhane, D.P. (1998). Applying cluster analysis to test of a typology of homelessness: Results from the analysis of administrative data. American Journal of Community Psychology.

Kushel, MB., Perry, S., Bangsberg, D., Clark, R. and Moss, AR. (2002). Emergency department use among the homeless and marginally housed: results from a community-based study. American Journal of Public Health.

Larimer, M., Malone, D., Garner, M., Atkins, D., Burlingham, B., Lonczak, H., Tanzer, K., Ginzler, J., Clifasefi, D., Hobson, W. and Marlatt, A. (2009). Health care and public service use and costs before and after provision of housing for chronically homeless persons with severe alcohol problems. Journal of the American Medical Association.

Leggat-Cook, C. (2007). Homelessness in New Zealand: a discussion and synthesis of research findings. Methodist Ministry Northern. Retrieved from <http://www.mmn.org>.

Lewin Group. (2004). Costs of Serving Homeless Individuals in Nine Cities. The Partnership to End Long-Term Homelessness.

Lewis, D. and Rowlatt P. (1996). Estimating the Costs and Benefits of Youth Homelessness. A. Evans (Ed.) We Don't Choose to be Homeless: The Inquiry into Preventing Youth Homelessness. London.

Lifewise. (2016). Our Services. Retrieved from <http://www.lifewise.org.nz/about-lifewise/our-services>

MacKenzie, D. and Chamberlain, C. (2008) *Youth Homelessness in Australia 2006*, Melbourne: Counting the Homeless 2006 project.

Maas, A. 'Disgusting' hostel must clean up. (2011, August 10). Auckland Now. Retrieved from <http://www.stuff.co.nz/auckland/local-news/5422205/Disgusting-hostel-must-clean-up>

Ministry of Social Development (2012). The Statistical Report. For the Year Ending June 2012. Available at <http://statistical-report-2012.msd.govt.nz/>

Mondello, M., Bradley, J., Chalmers, T. and Shore, N. (2009). Cost of rural homelessness: Rural permanent supportive housing cost analysis. State of Maine.

Monte Cecilia Housing Trust. (2016). What we do. Retrieved from <http://montececilia.org.nz/what-we-do/>

PACT. (2016). About Us. Retrieved from http://www.pactgroup.co.nz/about_us.html

- Padget, D., Gulcur, L. and Tsemberis, S. (2006). Housing First Services for People Who are Homeless with Co-occurring Serious Mental Illness and Substance Abuse. New York University School of Social Work.
- Palermo, F., Dera, B., Clyne, D., Ternoway, H., Lewis, B., Harrison, R. and Kostiuk, R. (2006). The cost of Homelessness: The value of investment in housing support services in Halifax. Dalhousie University School of planning.
- Perlman, J. and Parvensky, J. (2006). Cost benefit analysis and program outcomes report. Colorado Coalition for the homeless.
- Pinkney, S. and Ewing S. (1997). Responding to Youth Homelessness: The economic costs and benefits of school based early intervention. Melbourne, Centre for Youth Affairs Research and Development in association with the Queen's Trust for Young Australians.
- Pinkney, S. and Ewing, S. (2006). Costs and Pathways of Homelessness: Developing policy-relevant economic analyses for the Australian homelessness service system. Institute for social Research.
- Pleace, N. (2015). At what cost? An estimation of the financial cost of single homelessness in the UK. London: Crisis.
- Pleace, N. and Bretherton, J. (2013) Camden Housing First: A 'Housing First' Experiment in London. York: University of York
www.york.ac.uk/media/chp/documents/2013/Camden%20Housing%20First%20Final%20Report%20NM2.pdf
- Pleace, N. and Bretherton, J. (2014). Crisis Skylight An Evaluation: Year 1 Interim Report. London: Crisis.
- Pomeroy, S. and Focus Consulting Inc. (2005). The Cost of Homelessness: Analysis of Alternate Responses in Four Canadian Cities. Canada, National Secretariat on Homelessness.
- Poulin, S., Maguire, M., Metraux, S. and Culhane D. (2010). Service use and costs for persons experiencing chronic homelessness in Philadelphia: A population-based study. Psychiatric services.
- Q2 Consulting. (2007). The Relative Cost of Supportive Housing Services for Chronically Homeless Populations in Tulsa Oklahoma.
- Radio New Zealand. (2016). Homelessness for older people flagged. Retrieved from <http://www.radionz.co.nz/news/national/306288/homelessness-for-older-people-flagged>
- Richards, S. (2009). Homelessness in Aotearoa: Issues and Recommendations. (Report for New Zealand Coalition to End Homelessness). Wellington: Regional Public Health
- Roberts, C. (1987). Housing Policy: A values approach. Paper presented at Housing and homelessness, SSRFC Symposium, Wellington.

Salit, A., E. Kuhn, Hartz, AJ., Vu, JM and Mosso AL. (1998). Hospitalization Costs Associated with Homelessness in New York City. The New England Journal of Medicine 338(24): 1734-1740

Social Services Committee. (2014). Inquiry into boarding houses in New Zealand. Wellington, New Zealand: Social Services Committee.

Spellman, B. and al. (2010). Costs Associated with First-Time Homelessness for families and individuals. U.S. Department of Housing and Urban Development.

Statistics New Zealand. (2009). New Zealand Definition of Homelessness. Wellington: Author.

Statistics New Zealand. (2013). 2013 Census Usually Resident Population Counts – Media Release.

Supportive Services and Housing in Washoe County, (2007) NV. University of Nevada, Nevada Small Business Development Centre.

Suzanne Aubert Compassion Centre. (2016) About. Retrieved from: <http://www.soupkitchen.org.nz/our-work/outreach-and-work-with-other-agencies/>

Tenants Protection Association (Christchurch) Inc. (2016). What We Do. Retrieved from <http://www.tpa.org.nz/page/about-tpa>

The People's Project. (2016). The People's Project. Retrieved from <http://www.thepeoplesproject.org.nz/about/the-peoples-project>

The Salvation Army. (2016). Supportive Accommodation. Retrieved from www.salvationarmy.org.nz/need-assistance/accommodation/supportive-accommodation

Tipple, G. and Speak, S. (2005). "Definitions of homelessness in developing countries". Habitat International, Elsevier.

United Nations. Enumeration of Homeless People, United Nation Economic and Social Council, 18 August 2009, Economic Commission for Europe Conference of European Statisticians, Group of Experts on Population and Housing Censuses, Twelfth Meeting, 28-30 October 2009

Wellington City Mission. (2016). What we do. Retrieved from: <http://www.wellingtoncitymission.org.nz/index.php/what-we-do/>

Wellington Homeless Women's Trust. (2016). About Us. Retrieved from: <http://www.homeless.org.nz/about.html>

Wellington Night Shelter. (2016). What We Do. Retrieved from: <http://wellingtonnightshelter.org.nz/what-we-do/>

Wellington Women's Refuge. (2016). Our Services. Retrieved from: <https://www.wellingtonwomensrefuge.co.nz/our-services/>

Work and Income. (2015). Accommodation Supplement. Retrieved from: www.workandincome.govt.nz/individuals/a-z-benefits/accommodation-supplement.html

Zaretsky, K. and Flatau, P. (2013). The cost of homelessness and the net benefit of homelessness programs: a national study. Australian Housing and urban research institute.

Appendix 1: Literature summary of research design and cost measure

Study	Location	Researchers	Research design	Cost measure
Responding to Youth Homelessness: The economic costs and benefits of school-based early intervention (1997)	Australia	Pinkney, S. and Ewing S.	Cross-sectional study	Service utilization data Service unit costs data
The cost of homelessness and the net benefit of homelessness programs: a national study (2013)	Australia	Zaretsky, K. and Flatau, P..	Quasi-experimental study, non-randomised controlled-trial	Service utilization data Average service unit cost data
Homelessness: Causes & Effects. The costs of homelessness in Bristish Colombia (2001)	Canada Vancouver	Eberle, M. et al.	Cross-sectional analytical study	Service utilization data Service unit cost data
Hospitalization Costs Associated With Homelessness in Canada (2011)	Canada Toronto	Hwang SW. et al.	Cross-sectional descriptive study	Cost per hospital discharge data
National final report: Cross-site At Home/ Chez Soi project (2014)	Canada Vancouver, Toronto, Winnipeg, Montreal, Moncton	Goering, P. et al.	Experimental study with randomised controlled trial design	Service utilization data Service unit cost data
Societal Cost of Homelessness (2003)	Canada Edmonton	IBI Group	Descriptive study	Service provision cost data Cost avoidance estimate Emergency shelter capital costs
The Cost of Homelessness: Analysis of Alternate Responses in Four Canadian Cities (2005)	Canada Toronto, Vancouver, Montreal and Halifax	Pomeroy, S. and Focus Consulting Inc.	Cross-sectional descriptive study	Service unit cost data
The cost of Homelessness: The value of investment in housing support services in Halifax (2006)	Canada Halifax	Palermo, F. and al.	Cross-sectional analytical study	Clients served data Cost per person per day
Auckland's million dollar Murray (2008)	NZ Auckland	Comittee for Auckland.	Longitudinal case study	Service unit cost data Service utilization data
Costs of Serving Homeless Individuals in Nine Cities (2004)	United State Atlanta, Boston, Chicago, Columbus, Los Angeles, New York, Phoenix, San Francisco, Seattle	Lewin Group	Cross-sectional descriptive study	Average cost of providing one day of service
Cost benefit analysis and program outcomes report (2006)	United States Denver	Perlman, J. and Parvensky, J.	Quasi-experimental study, non-randomised controlled-trial	Service utilization data Service unit cost data
Cost of rural Homelessness (2009)	United States Maine	Mondello, M. et al.	Cross-sectional analytical study	Service utilization data Billing and payer records
Costs Associated with First-Time Homelessness for families and individuals (2010)	United States Iowa, Texas, Florida, Michigan, South Carolina; Washington.	Spellman, B. and al.	Cross-sequential analytical study	Mainstream system utilization data Mainstream systems costs data Homeless program usage data Homeless program daily cost data

Study	Location	Researchers	Research design	Cost measure
Deriving costs of service use among an urban homeless population (2013)	United States Missouri	Fuehrlein, B. et al.	Longitudinal descriptive study	Service unit cost data Service utilization data
Emergency department use among the homeless and marginally housed: results from a community-based study (2002)	United States San Francisco	Kushel, MB. and al.	Cross-sectional descriptive study	Frequency of use of medical and emergency services data
Examination of the Costs of Homelessness and Issues Related to Determining the Cost-Effectiveness of Supportive Services and Housing in Washoe County, NV (2007)	United States Nevada	Gill, C. and Harris, T.	Descriptive study	Annual number of patients served Costs per service data Annual financial costs/revenues
Health care and public service use and costs before and after provision of housing for chronically homeless persons with severe alcohol problems (2009)	United States Seattle	Larimer, M. et al.	Quasi-experimental study, non-randomised controlled-trial	Service utilization data Average service unit cost data
Hospitalization Costs Associated with Homelessness in New York City (1998)	United States New York	Salit, A. et al.	Cohort study	Length of stay in hospital date Estimated cost per day data
Housing First Services for People Who are Homeless with Co-occurring Serious Mental Illness and Substance Abuse (2006)	United States New York	Padget, D. et al.	Experimental study with randomised controlled trial design	Service utilization data Housing program costs
Impact of the San Diego Serial Inebriate Program on use of emergency medical resources (2006)	United States San Diego	Dunford, J. et al.	Quasi-experimental study, non-randomised controlled-trial	Utilization record data Billing and payer records
Public Service Reductions Associated with Placement of Homeless Persons with Severe Mental Illness in Supportive Housing (2002)	United States New York	Culhane, D. et al.	Quasi-experimental study, non-randomised controlled-trial	Service utilization data Service unit cost data
Service use and costs for persons experiencing chronic homelessness in Philadelphia: A population-based study (2010)	United States Philadelphia	Poulin, S. et al.	Cross-sectional descriptive study	Service utilization data Service unit cost data
Welcome Home Billings (2013)	United States Montana	Beckett, B., et al.	Descriptive study	Service utilization data Service unit cost data
The Relative Cost of Supportive Housing Services for Chronically Homeless Populations in Tulsa Oklahoma (2007)	United States Tulsa Oklahoma	Q2 Consulting.	Cross-sectional analytical study	Service utilization data Service unit cost data
At what cost? An estimation of the financial cost of single homelessness in the UK (2014)	UK England	Pleace, N.	Descriptive study	Average service unit cost data
How many, how much? Single homelessness and the question of numbers and cost (2003)	UK England	Kenway, P., and Palmer, G.	Descriptive study	Average service unit cost data

Appendix 2: Literature summary of data sources by country

Study	Administrative Data	Service Provider Data	Participant (homeless) data
United States			
Costs of Serving Homeless Individuals in Nine Cities (2004)	Hospital Jail Mental hospital Prison Shelter Supportive Housing	Department of correction Hospitals Housing providers Mental hospitals	Annual financial costs/revenues from the service providers
Cost benefit analysis and program outcomes report (2006)	Detoxification services Emergency room services Emergency Shelter stays Incarceration stays Inpatient hospital visits Outpatient medical services	Medical, psychiatric, legal and substance treatment records	Service use of homeless enrolled in the Housing First program for 24 or more months
Cost of rural Homelessness (2009)	Community support contacts Emergency healthcare services Emergency shelter stay Healthcare services Jail stays Police interactions Psychiatric hospitalization	Department of correction Fire Departments Health Clinics Hospitals Mental Health Centers Police Departments Shelters Sheriff Departments	Service use of homeless enrolled in the housing program for a minimum of one year and have a current diagnosis of a long-term disability, such as a mental illness, substance abuse, physical disability, or co-occurring disorders.
Costs Associated with First-Time Homelessness for families and individuals (2010)	Criminal justice services Emergency shelter stays Income supports Medicaid Mental health cares Substance abuse treatments	Child-protection services Food stamps and TANF entitlements Homeless Management Information System (HMIS) Hospitals and primary health care centers Law enforcement and criminal justice department Mental health centers Substance abuse centers	Service use of first-time homeless
Deriving costs of service use among an urban homeless population (2013)	Emergency shelter stays Medical health services Mental health cares Substance abuse treatments	Homeless shelters Medical centers (including inpatient, outpatient, and emergency treatment facilities) Mental health treatment facilities Substance abuse treatment agencies	Service use of homeless persons who use shelter
Emergency department use among the homeless and marginally housed: results from a community-based study (2002)	Ambulatory care services Emergency department encounters Inpatient hospitalization	Interview with the participants	Service use

Examination of the Costs of Homelessness and Issues Related to Determining the Cost-Effectiveness of Supportive Services and Housing in Washoe County, NV (2007)	Health care services	HAWC Outreach Medical Clinic Northern Nevada Medical Center Renown Health St. Mary's Regional Medical Center The Healthcare Center (formerly Washoe Medical Center) VA Sierra Nevada Health Care System Washoe County Department of Social Services	Annual financial costs/revenues from the service providers
Health care and public service use and costs before and after provision of housing for chronically homeless persons with severe alcohol problems (2009)	Days incarcerated Emergency medical services Hospital-based medical services Jail bookings Medicaid-funded services Publicly funded alcohol and drug detoxification Shelter Sobering center use	Downtown Emergency Service Center Harborview Medical Center (HMC) HMC emergency department King County Correctional Facility, Public Health–Seattle & King County Medicaid data Washington Department of Social and Health Services	Service use for Housing First participants
Hospitalization Costs Associated with Homelessness in New York City (1998)	Hospital-discharge	New York City Health and Hospitals Corporation	Hospital discharges for homeless patients discharged from NYC public general hospitals
Housing First Services for People Who are Homeless with Co-occurring Serious Mental Illness and Substance Abuse (2006)	Mental health treatments Substance abuse treatments Use of alcohol and illegal drugs	Interviews with the participants	Service use for Housing First participants
Impact of the San Diego Serial Inebriate Program on use of emergency medical resources (2006)	Ambulance transports Hospital inpatient visits	San Diego Scripps Mercy Hospital	Health care utilization records
Public Service Reductions Associated with Placement of Homeless Persons with Severe Mental Illness in Supportive Housing (2002)	Hospitals visits Jail stays Medicaid Prison days Psychiatric hospital services Shelter stays Veterans hospital visits	NYC Department of Corrections (NYCDOC) NYC Department of Homeless Services (DHS) NYC Health and Hospitals Corporation (HHC) NYS Department of Correctional Services (NYSDOCS) NYS Office of Mental Health (OMH) NYS Office of Mental Health (OMH) U.S. Department of Veterans Affairs (VA)	Service use for homeless with severe mental illness
Service use and costs for persons experiencing chronic homelessness in Philadelphia: A population-based study (2010)	Case management services Crisis response center visits Incarceration days Medicaid-reimbursements Mental health and substance abuse services Psychiatric services	Bethesda Project database City of Philadelphia's Office of Supportive Housing (OSH) Office of Mental Health (OMH) Outreach Coordinating Center (OCC) database Philadelphia Prison System	Service use for chronic homeless persons

	Shelter stays		
Welcome Home Billings (2013)	Ambulance services Crisis center visits Emergency room visits Jail stays Psychiatric hospital stays Shelter stays Substance abuse treatments	Survey	Service use
The Relative Cost of Supportive Housing Services for Chronically Homeless Populations in Tulsa Oklahoma (2007)	Case management services Incarceration days Inpatient psychiatric stays Medicaid-reimbursements Medical hospitalizations Shelter stays	Criminal justice department Homeless Management Information System (HMIS) Hospitals Mental health centers Psychiatric centers	Service use
Canada			
Hospitalization Costs Associated With Homelessness in Canada (2011)	Hospital visits	St. Michael's Hospital	Hospital discharges for homeless patients
Homelessness: Causes & Effects. The costs of homelessness in British Columbia (2001)	Ambulance services Downtown Community Health Clinic visits Downtown South Community Emergency department visits Admissions to all provincial acute hospitals Fire department emergency response. Health Clinic visits Medical Service Plan services Mental Health Services Pharmacare prescriptions Psychiatric hospital admissions	BC ambulance Downtown Community Health Clinic Downtown South Community Health Clinic Hospitals Riverview and Venture psychiatric hospital St. Paul's Hospital emergency department Vancouver Community Mental Health center Vancouver fire department	Service use
National final report: Cross-site At Home/ Chez Soi project (2014)	Addiction treatment facilities Drop-in centres for meals and other services Emergency room visits Hospital visits Prisons and jails stays Shelters use	Interview with the participants	Service use for Housing First participants
Societal Cost of Homelessness (2003)	Counselling visits Criminal justice/corrections stays Emergency Medical Services Employment-related services Food and clothing services. Health services Housing assistance services Outreach services	Department of correction Hospitals No-profit organizations Outreach centers Shelter providers	Annual financial statements from the service providers

	Temporary shelters stays Transitional housing stays		
The Cost of Homelessness: Analysis of Alternate Responses in Four Canadian Cities (2005)	Emergency shelters Prison/detention centers Psychiatric hospitals Supportive and transitional housing Treatment centers	Emergency shelters Prison/detention centers Psychiatric hospitals Supportive and transitional housing Treatment centers	Annual financial statements from the service providers
The cost of Homelessness: The value of investment in housing support services in Halifax (2006)	Emergency shelter stays Hospital services Jail and prison stays Psychiatric hospital services Supportive housing	Adsum Court Alice Housing Homebridge Youth Society Lesbian, Gay and Bi-Sexual Youth Project Metro Community Housing Association Metro Non-Profit Housing Association MISA Nova Scotia Department of Community Services Phoenix House Regional Residential Services Society Saint Leonard's Society Salvation Army Tawaak Housing Association.	Service use
Australia			
Responding to Youth Homelessness: The economic costs and benefits of school-based early intervention (1997)	Crime and criminal services Early intervention program Education programs Health related services Production Loss Shelter stays	Various	Service use
The cost of homelessness and the net benefit of homelessness programs: a national study (2013)	Emergency services Hospital services Jail and prison stays Mental health care Psychiatric services Shelter stays Substance abuse services	ABS Census of Population and Housing Department of Corrective Services Department of Education. Homelessness and criminal justice services Specialist Homelessness Services (SHS) collection WA Drug and Alcohol Office WA Health	Service use
NZ			

Auckland's million dollar Murray (2008)	Ambulance transportation Days in holding cells Hospital stay Housing NZ stays Imprisonment stays Income support	Auckland district health board costs Child youth and families Counties Manukau district health board Department of corrections: imprisonment Housing NZ Ministry social development NZ police St-John ambulance costs Waitemata district health board	Service use
UK			
At what cost? An estimation of the financial cost of single homelessness in the UK (2014)	(plus data from previous studies)	Prevention intervention Floating support Outreach Health costs Crime related costs Accommodation services Administration costs	
How many, how much? Single homelessness and the question of numbers and cost (2003)	Tenancy related, Audit Commission Police and criminal justice, Court Service Potential resettlement Unemployment (plus data from previous studies)	Temporary accommodation Health services Support services	