# Crisis Indicator: Triage Tool for Identifying Homeless Adults in Crisis

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Triage Tool for Identifying Homeless Adults in Crisis


Economic Roundtable
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2011

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# Executive Summary

The triage tool, or *crisis indicator*, identifies homeless individuals in hospitals and jails who have continuing crises in their lives that create very high public costs. This redesigned tool is four times more accurate than the earlier screening tool released in 2010. The tool is developed for use in jails, hospitals and clinics where homeless individuals with high levels of need and high public costs are most likely to be found.

Discovery of the exceptionally high public costs for people in the 10th cost decile has led to interest in identifying these individuals and giving them high priority for access to permanent supportive housing. This group accounts for well over half of all public costs for homeless adults, and their costs decrease by 86 percent when they live in permanent supportive housing.

The triage tool was developed based on two key propositions. The first proposition is that the greatest risk to homeless individuals is of continuing crises in their lives, particularly crises that cause encounters with hospitals and jails. The second proposition is that the most compelling basis for prioritizing access of homeless individuals to the scarce supply of permanently subsidized supportive housing is the public costs that will be avoided when they are housed.

The triage tool is a *system-based* tool for identifying the one-tenth of homeless persons with the highest public costs, and the acute ongoing crises that create those high costs. This is the highest need segment of a much larger homeless population needing supportive housing.

This tool equips *gatekeeper institutions* to identify accurately individuals experiencing homelessness whose acute needs create the greatest public costs, and to make credible requests to housing providers that these individuals be given first priority for the scarce supply of affordable housing with supportive services (permanent supportive housing).

Many separate pieces of information provide evidence about the likelihood that someone will be in the 10th decile, but no single piece of evidence by itself provides enough information to identify this population with adequate certainty. The triage tool addresses this problem by combining the predictive power of 27 pieces of information to produce an estimate of the likelihood that an individual is in the 10th decile. This includes demographic characteristics, medical diagnoses, and use of hospital and jail facilities.

The most powerful components of the model are the number of days spent in hospitals as an inpatient or in jail mental health facilities as an inmate. Health conditions have a tipping effect in the model, some disorders increase and others diminish the likelihood that an individual is in the 10th decile.

To our knowledge, this is the only tool for prioritizing the needs of homeless individuals that is based on cost data for a generally representative sample of homeless persons. This was made possible by a unique and exceptionally valuable database created by Los Angeles County's Chief Executive Office that links service and cost records across county departments for a representative sample of General Relief recipients, 70 percent of whom were homeless during the data window provided by the linked records.

The new triage tool has a *shortfall* rate of 0.22. This means that for every five people correctly flagged as being in the 10th decile, there will be one false negative – one person who is in the 10th decile will be incorrectly excluded.

The tool has a *burden* rate of 0.27. This means that for every five people flagged as being in the 10th decile, there will be one false positive – one person who is not in the 10th decile will be incorrectly included.

The triage tool is in Excel format and can be downloaded from the Economic Roundtable web site: *www.economicrt.org*.

An initiative to identify homeless individuals with the greatest need for housing is being spearheaded by the 100,000 Homes Campaign, which mobilizes communities using a screening tool called the *vulnerability index*. Eighty-seven communities have participated in outreach and screening campaigns, in which local volunteer teams are trained to use an interview questionnaire based on the index to survey homeless residents and gather information for identifying homeless individuals at **greatest risk of death.** Information collected through the surveys carried out in these campaigns is used to develop health registries of individuals who are most likely to die on the street and who should have priority access to housing.

It is possible to use the *system-based* triage tool as a second layer of screening for registries developed using the *street-based* vulnerability index in order to identify multiple tiers of need within the overall universe of at-risk homeless persons. A third of the people identified by the vulnerability index as being vulnerable persons fall into the 10th cost decile, and two-thirds are in lower deciles.

Multiple tiers of need within the population of vulnerable individuals can be delineated through follow-on screening using the triage tool. This combination of screening tools is a potential way of integrating the strengths of street-based campaigns that reach the overall population of unsheltered homeless residents with the rich body of system-based information held by gatekeeper institutions so that access to the scarce supply of permanent supportive housing can be prioritized based on public cost and potential cost savings.

An important contribution of the triage tool is to bring individuals with mental disorders into the population that is assessed. Only 59 percent of the persons diagnosed with a psychosis meet the vulnerability index criteria of being at-risk. The triage tool identifies and assesses the full population of high-need individuals suffering from delusions and hallucinations that distort their perception of themselves and their surrounding, often with great personal pain and sometimes with disruptions to their social environment.

Despite the desire of most homeless individuals to be housed, the transition from the street into housing may well be difficult. At a minimum, it means changing basic habits about eating, sleeping and co-existing with other people. These changes can be very challenging for an individual who is mentally and physically ill, addicted, and wary of the intentions of others. Immediate access to case management and health services along with housing is critical for helping the high-need, severely disabled individuals in the 10th decile make this transition.

A pilot project is underway to refine and validate procedures for using the triage tool. The project was planned jointly by the Corporation for Supportive Housing (CSH) and the Economic Roundtable, and is supported by the Conrad N. Hilton Foundation. The sites for the pilot are California Hospital Medical Center in downtown Los Angeles and Ocean Park Community Center (OPCC) Project HEARTH with Saint John's Health Center and Venice Family Clinic in Santa Monica. CSH has organized teams at each site to provide immediate, comprehensive services for 10th decile homeless patients.

# Crisis Indicator

*Triage Tool for Identifying Homeless Adults in Crisis*

## Overview

This paper presents a triage tool, or *crisis indicator*, for identifying homeless individuals in jails, hospitals and clinics who have continuing crises in their lives that create very high public costs. This is a redesigned and much more accurate version of the screening tool presented in an earlier paper, "*Tools for Identifying High-Cost, High-Need Homeless Persons*." This new tool enables gatekeeper institutions such as hospitals, clinics and jails to identify accurately individuals experiencing homelessness whose acute needs create the greatest public costs, and to make credible requests to housing providers that these individuals be given first priority for the scarce supply of affordable housing with services (permanent supportive housing).

The crisis indicator grew out of earlier work[1] that broke out the costs of different public agencies for a representative sample of adults experiencing homelessness, ranked them by their public costs and divided them into ten groups of equal size (deciles). The highest cost decile accounted for 56 percent of all public costs for homeless single adults.[2]

The earlier analysis as well as this paper were made possible by a unique and exceptionally valuable database that the Los Angeles County Chief Executive Office created by linking service and cost records across county departments for a representative sample of 13,176 General Relief recipients. This project is now known as the Enterprise Linkages Project (ELP). Among these destitute individuals, 9,186 had an episode of homelessness during the 22-month data window available for all of the linked records.[3] The ELP database has made it possible to create a new kind of screening tool based on ranking the public costs for homeless adults with many different combinations of attributes.

The supply of permanent supportive housing is far smaller than the population of disabled homeless persons who need this combination of affordable housing and supportive services. This is largely because permanent supportive housing requires significant subsidies – about $1,000 a month per unit to cover capital and operating costs.[4] Linking housing needs to public costs is valuable in this era of shrinking public budgets.

Often, the scarce supply of permanent supportive housing is rented out to the eligible population of disabled homeless persons on a first-come, first-served basis without any system of priorities. This need-blind approach tends to favor less impaired individuals who are better able to negotiate the application and documentation process for this housing. Given the differing degrees of need among homeless persons and the large impact this housing can have on reducing public costs, there is a strong argument for using screening tools to identify individuals who should have first priority for access to permanent supportive housing.

The triage tool was developed based on two key propositions. The first proposition is that the greatest risk to homeless individuals is of continuing crises in their lives, particularly crises that cause encounters with hospitals and jails. The second proposition is that the most compelling basis for prioritizing access of homeless individuals to permanently subsidized supportive housing is the public costs that will be avoided when they are housed.

The triage tool is a *system-based* tool that enables *gatekeeper institutions* to identify the one-tenth of homeless individuals with the highest public costs, and the acute ongoing crises that create those high costs. This is the highest need segment of a substantially larger homeless population that needs housing and supportive services. **The triage tool assesses the risk that an individual currently has acute crises that create high public costs.**

The triage tool is an information-rich method of prioritizing access to scarce housing. It calls for gatekeeper institutions such as jails, hospitals and clinics that have contact with the most acutely distressed homeless individuals to use the valuable information they possess to identify the most severely impacted individuals. The high public costs resulting from these individuals' crises provide the basis for requesting that they be given immediate access to permanent supportive housing.

Because the remarkable data from the county's ELP Project reliably represents a complete population of homeless single adults, it is possible to rank the public costs for a given homeless individual against the overall population of single adults experiencing homelessness.[5] To our knowledge, this is the only tool for prioritizing the needs of homeless individuals that is based on cost data that has been validated against a representative sample of homeless persons.

## Background

Discovery of the exceptionally high public costs for homeless individuals in the 10th decile has led to interest in identifying these individuals and giving them top priority for permanent supportive housing.[6]

There are *four* reasons for this interest. *First*, individuals in the 10th cost decile have very high public costs, accounting for 56 percent of all public costs for homeless adults.

*Second*, there are very large cost savings when homeless individuals obtain permanent supportive housing along with the safety and stability it provides. Public costs for individuals in the 10th decile decrease by 86 percent when they live in permanent supportive housing.

*Third*, these individuals often need special efforts on their behalf to gain access to permanent supportive housing. This is because 68 percent have mental disabilities that often are a barrier to completing multiple detailed applications for benefits and housing, as well as documenting their personal identity, income and disability status. Furthermore, fair housing laws are often interpreted to require

**10th Decile Case #1**
*Young Mentally Ill Man with Health Problems and Jail History*

- Average monthly public costs: $19,429
- Year of birth: 1987
- Place of birth: California
- Sex: Male
- Ethnicity: White
- Mental illness: Yes
- Substance abuse: Yes
- 26 LA County Health Services encounters in past 3 years: 4 outpatient, 11 ER, 25 inpatient days, with the following medical diagnoses:
  - Pulmonary tuberculosis
  - Drug-induced mental disorders
  - Other nonorganic psychoses
  - Nondependent abuse of drugs
  - Depressive disorder, not elsewhere classified
  - Acute upper respiratory infections of multiple or unspecified sites
  - Carbuncle and furuncle
  - Other cellulitis and abscess
  - Fracture of rib(s), sternum, larynx, and trachea
  - Open wound of hand
- Jail encounters in past 3 years:
  - 71 days in general jail facilities
  - 8 days in jail medical facilities
  - 414 days in jail mental health facilities

renting these units on a first-come, first-served basis, creating a barrier to prioritizing high-need individuals.

*Fourth*, high public costs are the result of ongoing crises in individuals' lives that are resolved in expensive institutional settings – jails and hospitals. Increasing the level of stability and reducing the frequency and severity of crises through permanent supportive housing greatly improves the quality of these individuals' lives.

An earlier paper provided tools for screening individuals in the 10th cost decile out of the overall population of homeless single adults.[7] This paper provides an improved tool that is more accurate and designed to identify persons in the 10th decile in settings where they are most likely to be found – *jails, hospitals and clinics.*

Compared to homeless adults who have not visited a *hospital* in the past two years, the odds of being in the 10th decile are 2 times greater for those who have visited an emergency room and 4 times greater for those who have been hospital inpatients.

Compared to homeless adults who have not been in *jail* in the past three years, the odds of being in the 10th decile are twice as great for those who have been in a general jail facility and 5 times greater for those who have been in a jail mental health facility.

This paper provides a triage tool and methodology for identifying high-cost, high-

**10th Decile Case #3**
*Older Diabetic Woman with Jail History*

- Average monthly public costs: $10,628
- Year of birth: 1959
- Place of birth: California
- Sex: Female
- Ethnicity: African American
- Mental illness: Yes
- Substance abuse: Yes
- 13 LA County Health Services encounters in past 3 years: 6 outpatient, 6 ER, 13 inpatient days, with the following medical diagnoses:
  - Diabetes mellitus
  - Pneumonia, organism unspecified
  - Other disorders of urethra and urinary tract
  - Other and unspecified disorders of back
- Jail encounters in past 3 years:
  - 215 days in general jail facilities
  - 21 days in jail medical facilities
  - 170 days in jail mental health facilities

**10th Decile Case #2**
*Older Man with Diabetic Complications*

- Average monthly public costs: $14,400
- Year of birth: 1957
- Place of birth: California
- Sex: Male
- Ethnicity: African American
- Mental illness: No
- Substance abuse: Yes
- 108 LA County Health Services encounters in past 3 years: 23 outpatient, 39 ER, 186 inpatient days, with the following medical diagnoses:
  - Diabetes with ketoacidosis
  - Diabetes with peripheral circulatory disorders
  - Diabetes with neurological manifestations
  - Diabetic hypoglycemia NOS
  - Other chronic pain
  - Hypertensive chronic kidney disease
  - Acute venous embolism and thrombosis of deep vessels of proximal lower extremity
  - Reflux esophagitis
  - Acute kidney failure, unspecified
  - other Cystitis: abscess of bladder
  - Other disorders of urethra, urinary tract
  - Other cellulitis and abscess, leg
  - Diseases of hair and hair follicles
  - Lumbago
  - Other tenosynovitis of hand, wrist
  - Symptoms involving respiratory system and chest pain
  - Diarrhea
  - Retention of urine, unspecified
  - Bacteremia
  - Other urinary problems
- Jail encounters in past 3 years: None

need homeless adults in the settings where they are most likely to be found, and for minimizing needless screening of individuals who are not in the highest need group

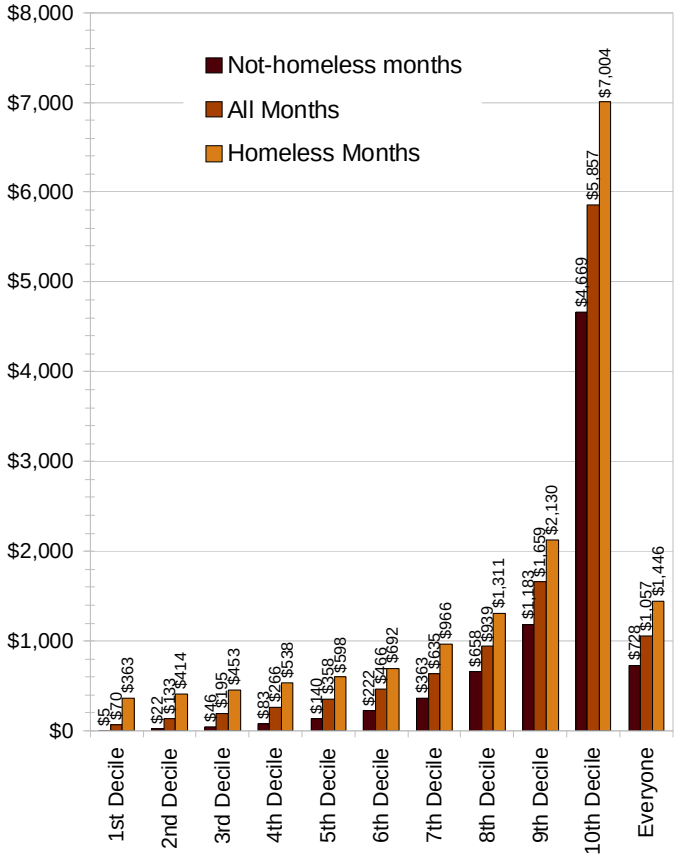
## Ongoing Problems and New Cost Deciles

The triage tool uses a decile breakout based on costs in all months, rather than just in homeless months, as the old screening tool did.[8] Examination of discrete cases in the 10th decile reveals health problems that often are both chronic and acute, with much of individuals' time spent in institutional care. The decile breakout used for the triage tool fits the types of information that can be obtained when screening to identify high-need homeless persons.

**10th Decile Case #4**
*Mentally Ill Young Woman with Jail History*

- Average monthly public costs: $7,581
- Year of birth: 1980
- Place of birth: California
- Sex: Female
- Ethnicity: Other
- Mental illness: Yes
- Substance abuse: Yes
- 9 LA County Health Services encounters in past 3 years: 6 ER, 51 inpatient days, with the following medical diagnoses:
  - Drug-induced mental disorders
  - Episodic mood disorders
  - Other nonorganic psychoses
- Jail encounters in past 3 years:
  - 313 days in general jail facilities
  - 99 days in jail mental health facilities

Figure 1
Average Monthly Public Costs for Homeless Single Adults Using New Cost Deciles Based on *All* Months




*Source: 9,186 homeless General Relief recipients in Los Angeles County. Costs in 2008 dollars. Deciles based on costs in all months for persons with an episode of homelessness in the 2-year cost window.*

Cases 1 to 4 in the text boxes illustrate the types of problems found among individuals in the 10th decile and the urgency of this population's need for housing and services. These cases demonstrate why it is informative to look at costs in all months in carrying out screening to identify individuals in the 10th decile, and why it is difficult to parse their homeless and housed intervals.[9]

Case #1 had drug-induced mental disorders, was psychotic, had tuberculosis and was injured on multiple occasions. In the previous two years, this man was treated in emergency rooms 11 times, spent 25 days in the hospital as an inpatient and 493 days in jail, including 414 days in jail mental health facilities.

Case #2 had diabetic, kidney, circulatory, metabolic, digestive, and

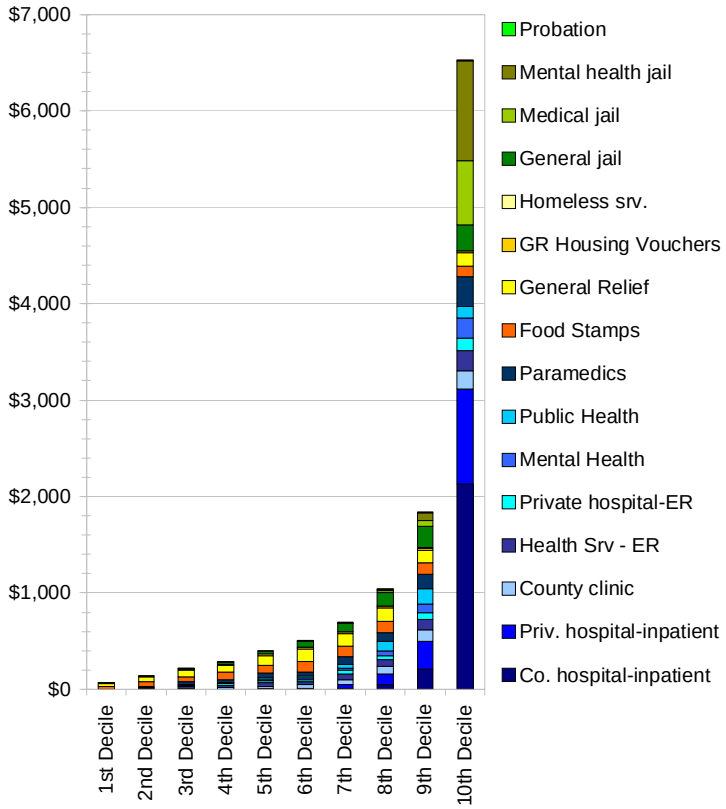
substance abuse disorders. In the past two years, this man was treated in emergency rooms 39 times and was a hospital inpatient for 186 days.

Case #3 had diabetic, respiratory, urinary, mental health, and substance abuse disorders. In the past two years, this woman was treated in emergency rooms 6 times, spent 13 days as a hospital inpatient and 406 days in jail, including 170 days in jail mental health facilities.

Case #4 had organic brain disorders due to drug use and was psychotic. Over the past two years, this woman was treated in emergency rooms 6 times, spent 51 days as a hospital inpatient and 412 days in jail, including 99 days in a jail mental health facility.

These kinds of long-term chronic health problems result in ongoing need for health care services. When screening to identify these high need individuals, it is critically important that immediate housing, outpatient medical care, and social services be available.

Figure 2
Average Monthly Public Costs for Homeless Single Adults Treated at Hospitals in the Past Two Years




*Source: 2,907 homeless General Relief recipients in Los Angeles County with no employment in the past 3 years who were cared for at a clinic or hospital of the Los Angeles County Department of Health Services. Costs are for all months, whether homeless or non-homeless.*

Using the new decile breakout based on costs in all months, Figure 1 shows costs for each decile using three different frames of reference: homeless months, non-homeless months and all months. This last frame of reference – costs in all months – was used to develop the triage tool. The average monthly cost in all months for all homeless single adults in Los Angeles County is $1,057. For individuals in the 10th decile, it is $5,857.

The triage tool was developed to make use of health data, including individuals' medical conditions and use of health care services, and to exclude people with recent work histories.[10] This shrank the sample from 9,186 total homeless individuals to 2,907 homeless individuals who had been treated at a clinic or hospital of Los Angeles County's Department of Health Services, thus for whom medical diagnostic codes were available, and who had not worked in the past three years. This sample was used to develop the triage tool presented in this paper, which draws much of its predictive power from data about medical diagnoses and amount of time spent in hospitals and jails.[11]

The average monthly cost in *all* months, broken out by public agency for individuals in each decile of the population with health data, is shown in Figure 2 (supporting data is provided in the endnote).[12] The average monthly cost for the 10th decile in this population that used

county hospitals, $6,529, is higher than the comparable cost of $5,857 for the 10th decile in the overall homeless population shown in Figure 1. One explanation is that we have more data about health care costs for the smaller population of county hospital system users shown in Figure 2 than for the total population.

Sixty-five percent of costs for the 10th decile population shown in Figure 2 are for health care services and 30 percent for jails.[13] The share of total costs for each service and the average monthly cost for each service for individuals in the *10th decile* are:

| *Service* | *% of Total Costs* | *Average Monthly Cost* |
|---|---|---|
| ***County hospital-inpatient*** | ***33%*** | ***$2,125*** |
| Private hospital-inpatient | 15% | $995 |
| ***County clinic*** | ***3%*** | ***$188*** |
| ***County hospital emergency room*** | ***3%*** | ***$203*** |
| Private hospital emergency room | 2% | $129 |
| ***County mental health*** | ***3%*** | ***$211*** |
| ***County public health*** | ***2%*** | ***$119*** |
| Paramedics | 5% | $306 |
| Food Stamps | 2% | $114 |
| General Relief | 2% | $136 |
| General Relief housing vouchers | 0.3% | $18 |
| Homeless services | 0.04% | $3 |
| ***General jail*** | ***4%*** | ***$266*** |
| ***Medical jail*** | ***10%*** | ***$671*** |
| ***Mental health jail*** | ***16%*** | ***$1,032*** |
| ***Probation*** | ***0.2%*** | ***$13*** |
| *TOTAL* | *100%* | *$6,529* |

Seventy-seven percent of these costs are paid by counties – the items highlighted in italicized bold font.[14] These costs decrease markedly when individuals are living in permanent supportive housing.

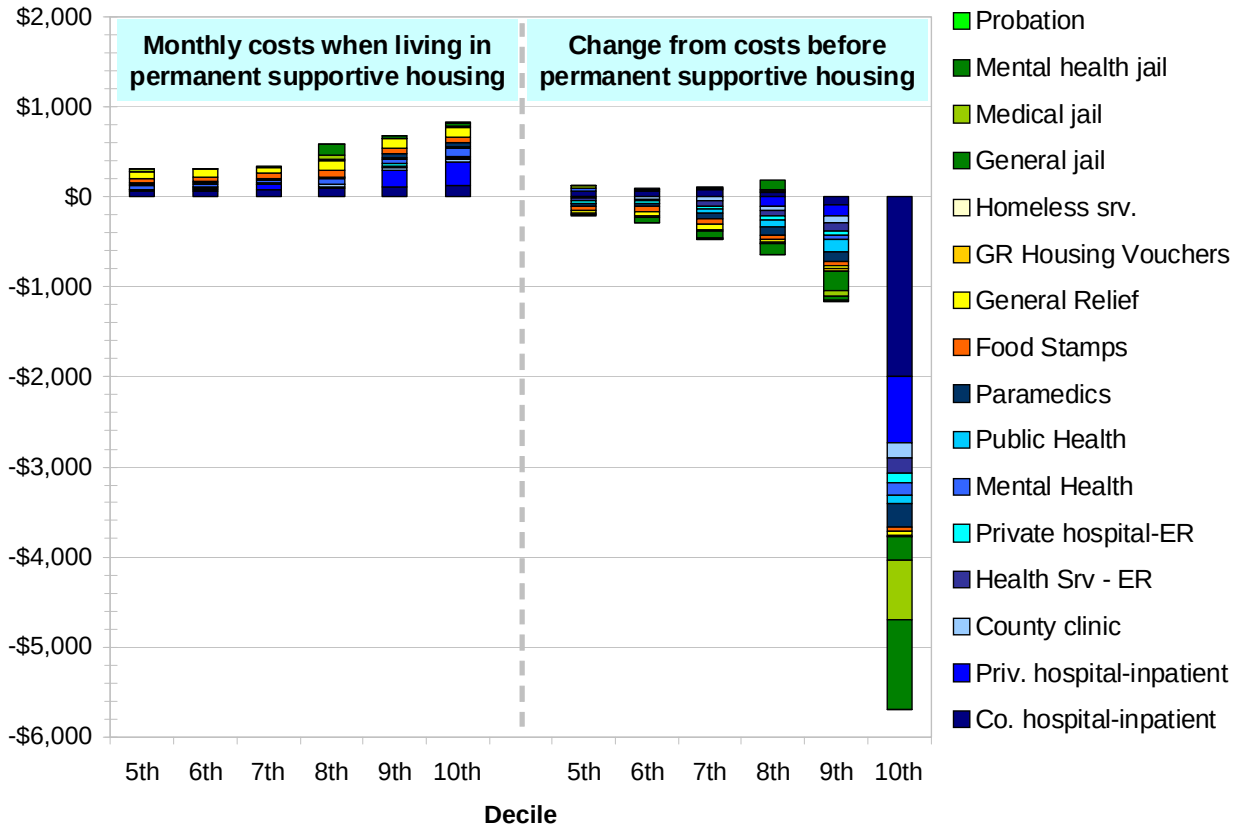
Costs for individuals in the fifth through tenth deciles when they are in permanent supportive housing, and the decline in costs compared to the period before they entered housing, are shown in Figure 3.[15] These cost changes are based on 652 pairs of similar individuals, matched based on *propensity scores*, with one person in each pair homeless and the other similar individual living in permanent supportive housing.[16]

When people in the 10th decile are living in permanent supportive housing, jail costs decrease 97 percent and health care costs decrease 86 percent.[17] It is important to note that these cost savings are contingent on retaining people in permanent supportive housing, which is facilitated by higher rather than lower levels of on-site services, particularly given the severe problems of many individuals in the 10th decile.[18]

**Triage Tool**

We can look at how a particular attribute affects the likelihood that an individual will be in the 10th decile by identifying the *probability* associated with that attribute. Probability looks

Figure 3
Change in Monthly Public Costs when Living in Permanent Supportive Housing




*Source: 652 matched pairs of homeless General Relief recipients in Los Angeles County and individuals living in supportive housing. Matched pairs were created based on propensity scores. Deciles are based on costs in all months. Costs are in 2008 dollars.*

at the percent of homeless individuals with an attribute who are in the highest decile, as shown in Figure 4.

The highest probability is for persons diagnosed with HIV – half of individuals with this diagnosis are in the 10th decile. The lowest probability is for persons 18 to 29 years of age – a sixth of this population of young homeless hospital patients is in the 10th decile.

The key point from this chart is that many separate pieces of information provide evidence about the likelihood that someone will be in the 10th decile, but no single piece of evidence by itself provides enough information to identify this population with adequate certainty.

The triage tool addresses this problem by combining the predictive power of multiple factors to produce an estimate of the likelihood that an individual is in the 10th decile. These factors are shown in Figure 5.[19]

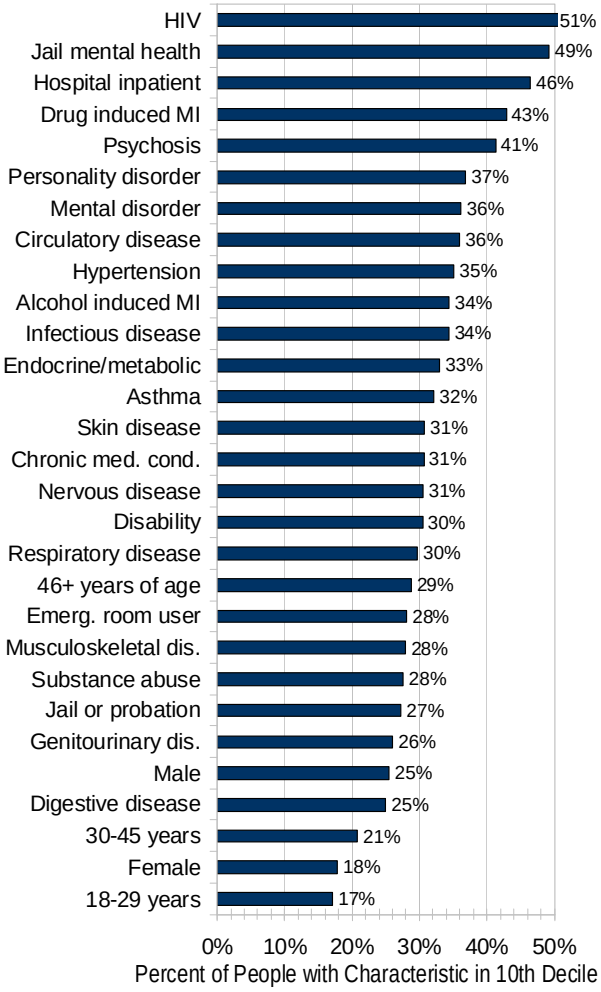
Three dimensions of information about each factor used in the triage tool are shown in Figure 5. The share of the overall homeless population seen in hospitals and jails that has each attribute is represented on the *bottom axis*. For example, 69 percent have been in jail or on probation in the past three years.

The probability that a person with the attribute will be in the 10th decile is represented on the *vertical axis*. For example, 49 percent of homeless individuals who have been incarcerated in jail mental health facilities in the past three years are in the 10th decile.

The relative size of the 10th decile homeless population seen in hospitals and jails that has each attribute is represented by the *bubble size*. For example, 81 percent of homeless individuals in the 10th decile have been in jail or on probation in the past three years.

Some factors are used multiple ways; for example, the model uses both number of inpatient admissions and number of inpatient days. The most powerful components of the model are the number of days spent in hospitals as an inpatient or in jail mental health facilities as an inmate.[20] Health conditions have a tipping effect in the model, some increasing and others diminishing the likelihood that an individual is in the 10th decile.

Figure 4
Percent with Characteristic who Are in 10th Decile



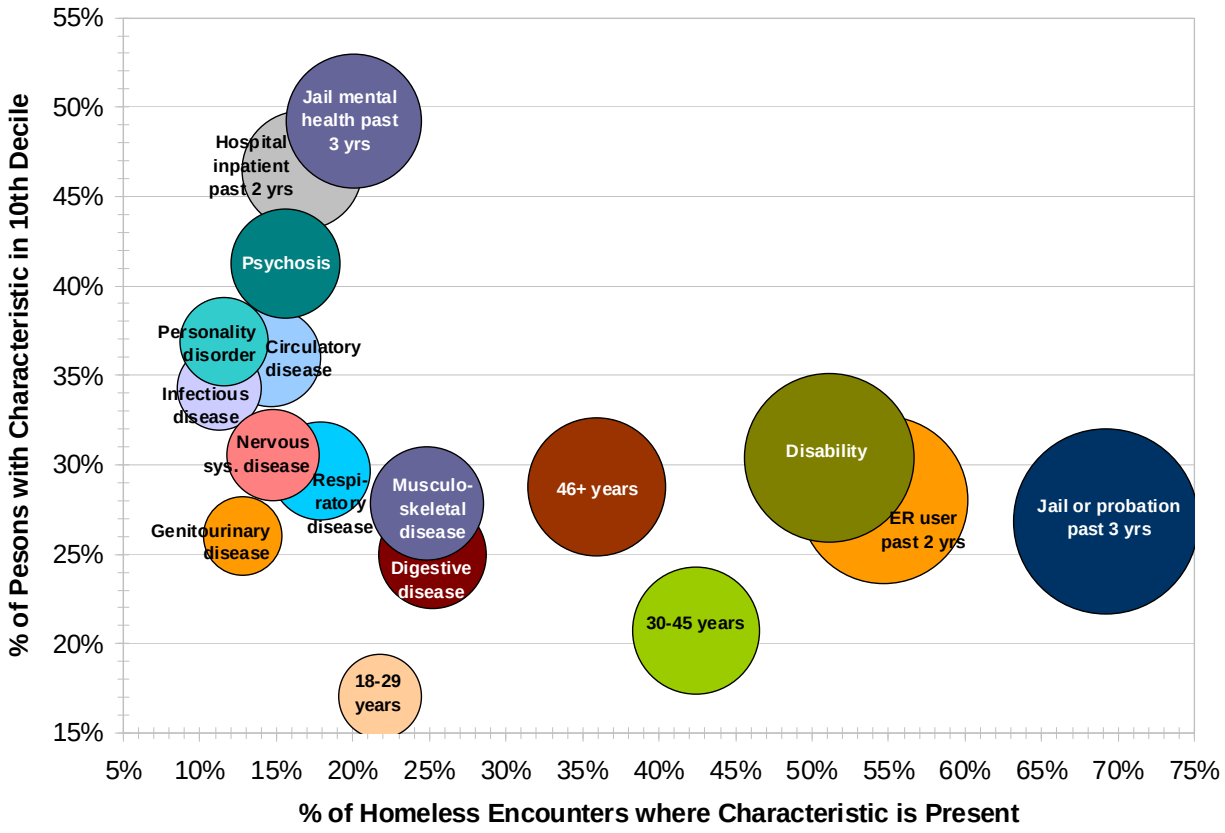

*Source: 2,907 homeless General Relief recipients cared for at a hospital of the Los Angeles County Department of Health Services*

### *High-risk Medical Conditions*

There is a strong probability that hospital patients diagnosed with any of the 17 medical conditions shown in Figure 6 will be in the 10th decile, particularly if the person has been admitted as a hospital inpatient. However, most these conditions occur infrequently, accounting for less than 1 percent of homeless hospital inpatients or emergency room patients, and consequently, only three of these conditions are discrete data items in the triage tool, with most of the remainder rolled up into broader diagnostic categories. Two of the conditions are not represented in the model because they were not found to add to the predictive power provided by other variables already in the model.[21] However, the screening process outlined later includes flagging the presence of any of these medical conditions and including this factor in making the final assessment of whether it is probable that the individual is in the 10th decile.

A separate *Diagnostic Appendix* is included at the end of this report. It shows how many of the 9,359 emergency room encounters and 2,060 inpatient admissions at Los Angeles County Department of Health Services hospitals in the database for this study included individuals in the 10th decile. These 11,419 health system encounters represent a total of 3,224 unduplicated

Figure 5
Factors Used in Triage Tool to Identify Homeless Adults in the Tenth Decile
*Number of patients in 10th decile represented by size of circle*




*Source: 2,907 homeless General Relief recipients with no employment in the past 3 years who were treated at a hospital of the Los Angeles County Department of Health Services*

homeless adults who were treated in 2006 and 2007. The information is broken out by treatment setting for 522 discrete diagnostic codes.

Patients with the same diagnosis are twice as likely to be in the 10th decile if they have been admitted as an inpatient rather than simply treated in the emergency room. The admissions screening for indigent patients functions as a triage process, with only the sickest patients admitted to the hospital as inpatients. When using the *Diagnostic Appendix* to assess the cost implications of a patient's condition, it is important to pay attention to whether the individual has ever been admitted to a hospital as an inpatient because of the condition.

The *Diagnostic Appendix* is valuable for understanding the public balance sheet implications of different health conditions, however, users should take note of the number of hospital encounters represented for different diagnoses. In many instances, the samples are too small to provide reliable information about the probability that homeless patients seen in a particular treatment setting and diagnosed with a particular condition are in the 10th decile. A sample size of at least 30 is often used as a benchmark for the minimum number of cases needed to provide reliable information. Most of the 522 3-digit diagnostic codes have fewer cases than

this. However, because we know of no other source for the data provided in the *Appendix*, we are providing this information in unabridged form.

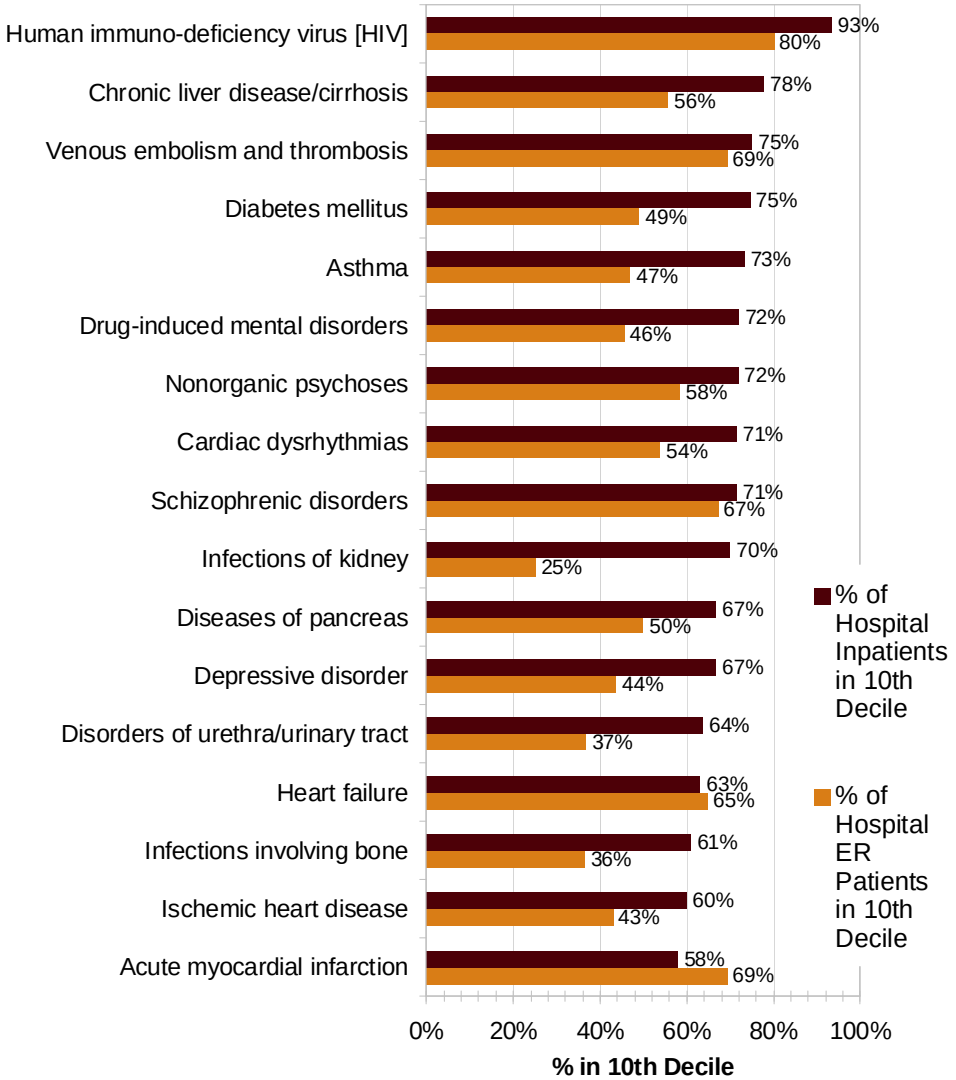
Suggestions for dealing with small samples when using this *Appendix* include:

1. Consult the rolled-up data for the diagnostic subgroup in which a specific diagnostic code is found. The subgroup is likely to provide a larger sample of similar cases.
2. Combine the emergency room and inpatient samples to obtain a larger sample.
3. As sample size diminishes, place increasing emphasis on using the data as an indicative rather than conclusive source of information.

*Using the Triage Tool*

The user interface of the triage tool is depicted in Figure 7. The tool is in Excel format and uses 27 items of information. An Excel file with the working tool can be downloaded from the Economic Roundtable web site: *www.economicrt.org*. The first 20 items call for entering a lower-case "y" for yes when the characteristic describes a patient or jail inmate. The last seven variables call for numeric information about the frequency and duration of hospital and jail use. After information for a person is entered into the Excel spreadsheet, the

Figure 6
Percent of Hospital Patients with Specific Diagnoses Who Are In the 10th Decile




*Source: 2,907 homeless General Relief recipients cared for at a hospital of the Los Angeles County Department of Health Services*

Figure 7

## TRIAGE TOOL FOR IDENTIFYING PERSONS IN THE 10TH COST DECILE

The tool is for single adults 18 years of age or older with homeless episodes and hospital or jail stays in the past two years and no employment in the past 3 years.

Partitioned by age (18-29, 30-45, 46+), with separate coefficients for each partition. The model includes constant terms, which account for the small probability values when characteristics are specified.

DIRECTIONS: Enter the respective value for variables that indicate #days or #admissions. Otherwise, enter lower-case 'y' if the case has the listed characteristic. Mark all variables that apply, even though some seem redundant.

| **CHOOSE ONE AGE GROUP PER CASE:** | **Case 1** | **Case 2** | **Case 3** | **Case 4** | **Case 5** |
|---|---|---|---|---|---|
| **Age 18-29** | y | | | | |
| **Age 30-45** | | y | | y | |
| **Age 46+** | | | y | | y |
| **CURRENT HEALTH STATUS:** | | | | | |
| **Disability** | y | y | y | y | y |
| **Mental illness (case records)** | y | | | | y |
| **Hypertension** | | y | | | |
| **Drug induced mental illness** | | | | | y |
| **Psychoses** | y | | | | |
| **Alcohol induced mental illness** | | | | | |
| **Personality disorder** | | | | | y |
| **Urinary disease** | | | | | |
| **Respiratory disease** | | | y | | |
| **Asthma** | | | y | | |
| **Mental disorder (diagnosis)** | y | | | | y |
| **Disease of nervous system** | | | | | |
| **Disease of circulatory system** | | y | | | |
| **Disease of digestive system** | | | | | |
| **Disease of musculo-skeletal system** | | | | y | |
| **IN PAST 3 YEARS:** | | | | | |
| **Jail or probation record** | y | y | y | y | |
| **Jail mental health inmate** | y | | | | y |
| **IN PAST 2 YEARS:** | | | | | |
| **Clinic outpatient, Dr's office (#visits)** | | 4 | | 1 | |
| **Emergency Room (#admissions)** | | | 6 | 4 | 2 |
| **Hospital inpatient (#admissions)** | | 1 | | 2 | 1 |
| **Hospital inpatient (#days)** | | 5 | | 7 | 6 |
| **Jail, mental health facility (#days)** | 40 | | | | 15 |
| **Jail, medical facility (#days)** | | 15 | 17 | | |
| **Jail, not medical or mental facility (#days)** | | | 30 | | 20 |
| **Estimated probability for 10th Decile** | **0.53** | **0.44** | **0.39** | **0.38** | **0.74** |

*Source: 2,907 homeless General Relief recipients with no employment in the past 3 years who were treated at a hospital of the Los Angeles County Department of Health Services. The triage tool is derived from logistic regressions that specify the best variables from this dataset for each of the three age groups.*

tool shows the estimated probability that the person is in the 10th decile. As is explained in the *Statistical Appendix*, the estimate for any particular person does not employ every information item listed on the user interface; some items will remain unused even if invoked by the tool user. Information for five hypothetical cases, and the resulting probability that each case is in the 10th decile is shown in Figure 7.

The first three items are age range options for different age groups. These are very important because different factors are used for each age group. A "y" is entered in the row that corresponds with a person's age:

1. Age 18-29
2. Age 30-45
3. Age 46+

The next 15 items describe a person's current health status. The first two of these items, disability and mental illness, can draw on information from nonmedical sources, including self-descriptions provided by the person being screened:

4. Disability
5. Mental illness (case records)

The remaining 13 health information items draw on medical diagnoses, some for a discrete medical condition and others for groups of medical conditions affecting a particular body system or subsystem. The specific diagnostic categories and ICD-9-CM codes (used by health providers to categorize medical diagnoses) corresponding with these 13 variables are:

6. Hypertensive Disorder – codes 391-405
7. Drug Induced Mental Illness – code 292
8. Psychoses – codes 295-299
9. Alcohol Induced Mental Illness – code 291
10. Personality Disorders – codes 290, 293, 294, 300-319
11. Urinary Disease – codes 590-599
12. Respiratory Disease – codes 460-519
13. Asthma – code 493
14. Mental disorders – entire body system - codes 290-313
15. Diseases of the nervous system and sense organs – entire body system - codes 320-289
16. Diseases of the circulatory system – entire body system - codes 390-459
17. Diseases of the digestive system – entire body system - codes 520-579
18. Diseases of the musculoskeletal system – entire body system - codes 710-739

The last two items that call for a "y" answer when the item matches a person's characteristics have to do with justice system involvement in the past three years:

19. Jail or probation record
20. Jail mental health inmate

The final seven items call for quantitative information about health and jail system encounters in the past two years. These factors have the most weight in the model, so it is particularly important to obtain this information and enter it into the tool.

21. Clinic outpatient, doctor's office (#visits)
22. Emergency room (#admissions)

23. Hospital inpatient (#admissions)
24. Hospital inpatient (#days)
25. Jail, mental health facility (#days)
26. Jail, medical facility (#days)
27. General jail facility, not medical or mental facility (#days)

The bottom row of the triage tool shows the estimated probability that the person is in the 10th decile. **The recommended threshold for inclusion in the 10th decile is a probability level of 0.35, or 35 percent.** We choose this criterion because, based on the sample data, at this cut-off level the likelihood of false positives are about equal to the likelihood of false negatives.

The user interface shown in Figure 7 is linked to another section of the spreadsheet that contains formulas for combining data and calculating the estimated probability that a person is in the 10th decile. This computational part of the tool is partitioned into three discrete models that use different sets of coefficients depending on a person's age. There is one model for persons 18 to 29 years of age, a second model for persons 30 to 45 years of age, and a third model for persons 46 years of age or older.

The triage tool draws on information from the entire study population seen in hospitals to capture joint influences of all of the variables shown in Figure 7. Because the tool has been developed through statistical analysis of the strength of association between all of these variables, it can produce estimates for types of cases that are encountered infrequently.

It is important that all of the information that is applicable to an individual be entered into the tool. When less information is entered, the calculating tool usually produces outcomes that are more conservative. In the absence of the information, the model treats the missing variables as indicating that these characteristics do not apply to the person being screened. In other words, when a variable is not entered, the tool assumes the opposite – that is, a non-yes means no. For example, if a very serious medical condition is entered but no data about emergency room visits or hospitalizations, the model will "assume" that the person has not been sick enough to require health care at a hospital.

A separate *Statistical Appendix* is included at the end of this report. It provides information about the coefficients used to calculate probabilities and the reliability of those coefficients, as well as information about how the tool was developed.

**Using the Triage Tool in Combination with Other Tools to Prioritize Access to Housing**

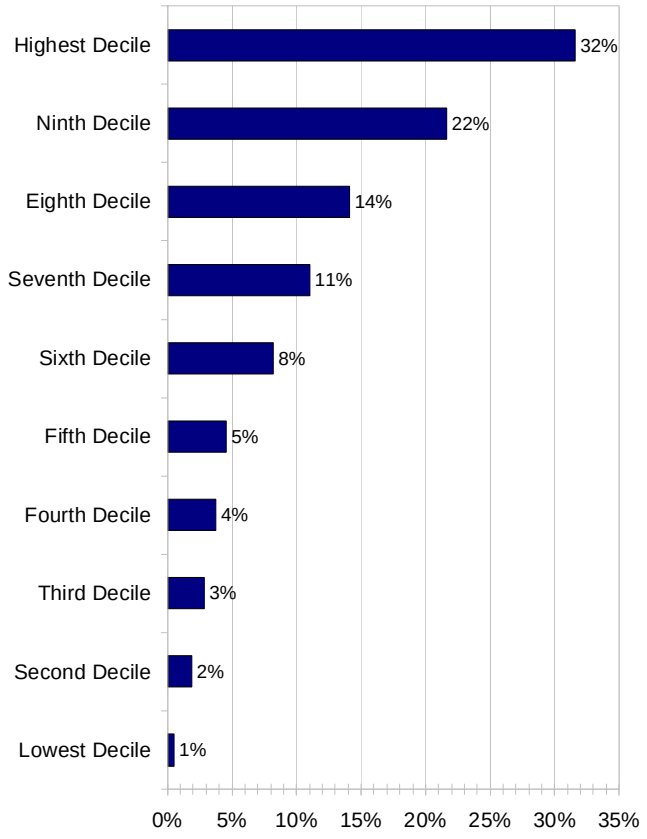
An initiative to identify homeless individuals with the greatest need for housing is being spearheaded by the 100,000 Homes Campaign, which mobilizes communities using a screening tool called the *vulnerability index*. Eighty-seven communities have participated in outreach and screening campaigns, in which local volunteer teams are trained to use an interview questionnaire based on the index to survey homeless residents and gather information for identifying homeless individuals at **greatest risk of death.** Information collected through the surveys carried out in these campaigns is used to develop health registries of individuals who are most likely to die on the street and who should have priority access to housing.

The origins of the vulnerability index go back to a study in Boston that compared 558 homeless adults who died over the five-year period from 1988 to 1993, to a group of similar

homeless adults who did not die.[22] The individuals who died represented 3.5 percent of 17,292 patients seen by the Boston Health Care for the Homeless Program over the five-year period.

In a subsequent study, the Boston Health Care for the Homeless Program has followed a high-risk cohort of 119 chronically homeless persons who had lived on the streets for at least six consecutive months and had conditions identified in the preceding study as being associated with increased risk of early death. At the end of 5 years, 28 percent of the persons in this high-risk cohort had died. An analysis of conditions associated with deaths in this cohort was used to define eight risk factors listed in Table 1 that are used to identify vulnerable persons in community surveys using the vulnerability index.[23] Individuals with any of these eight risk factors are included in an unranked pool of vulnerable persons who need housing.

Figure 8
Decile Distribution of 972 Vulnerable Homeless Persons in Los Angeles County's ELP Database Who Meet Vulnerability Index Criteria
*Decile Distribution Based on Public Costs in All Months*




*Source: 972 homeless General Relief recipients who were treated at a clinic or hospital of the Los Angeles County Department of Health Services and had one or more of the eight conditions screened for by the vulnerability index.*

It is possible to use the *system-based* triage tool as a second layer of screening for registries developed using the *street-based* vulnerability index to identify multiple tiers of need within the overall universe of at-risk homeless persons. This combination of screening tools is a potential way of integrating the strengths of street-based campaigns that reach the overall population of unsheltered homeless residents with the rich body of system-based information held by gatekeeper institutions in order to prioritize access to the scarce supply of permanent supportive housing based on public cost and potential cost savings. There is an unfortunate need to rank at-risk individuals in the vulnerable population because many communities do not yet have an adequate supply of permanent supportive housing.

A third of the people identified by the vulnerability index as being vulnerable persons appear to fall into the 10th cost decile, based on two sources of information. The first source of information is Project 50, which was initiated by the Los Angeles County Board of Supervisors to move fifty of the most acutely vulnerable chronically homeless persons living in Los Angeles' Skid Row into permanent housing with supportive services.[24] Forty-four participants who were originally screened into using the vulnerability index were also assessed using the triage tool to determine their decile ranking.

All of the individuals screened into Project 50 using the vulnerability index needed permanent supportive housing. All had disabilities, 89 percent were living on the street, and 98 percent were chronically homeless. Yet there were multiple tiers of need within this population of vulnerable individuals. Thirty-four percent are estimated to have been in the 10th decile and 66 percent are estimated to have been in lower deciles.[25]

The second source of information for overlaying screening outcomes from the triage tool on those from the vulnerability index is the database of linked records from Los Angeles County's ELP Project. This database includes 4,958 homeless persons with all of the information factors used when screening with the vulnerability index, including medical diagnostic codes for patients treated by the county's Department of Health Services.

When vulnerability index screening criteria were applied to the records of 4,958 homeless persons in the county's ELP database, a fifth of the homeless population (19.6 percent) met the criteria for being at-risk, as shown in Table 1.[26] Of this at-risk population, 32 percent were in the 10th decile.

The decile distribution of the 19.6 percent of the persons who meet the vulnerability index criteria for being at-risk is shown in Figure 8. The varying levels of need within this population based on level of public cost indicates that participation of gatekeeper institutions in follow-on screening using the triage tool is likely to result in identifying multiple tiers of need within the at-risk population.

The strength of association between different screening factors used in the vulnerability index and the 10th decile population ranges from a low of 19 percent for persons 60 years of age

Table 1

Profile of At-Risk Homeless Persons Meeting Vulnerability Index Criteria in Los Angeles County Linked Records and in Four Community Surveys Using the Vulnerability Index

| | **Los Angeles County Database** *4,958 Linked Records of Homeless Persons with Department of Health Services Diagnostic Codes* | | | **Vulnerability Index Survey Results** *Percent of Persons Found to Have Each Condition* | | | |
|---|---|---|---|---|---|---|---|
| **Vulnerability Index Criteria** | Number of Homeless Persons with Condition | Percent of Homeless Persons with Condition | Percent of Persons with Condition in 10th Decile | Venice | Santa Monica | Hollywood | Glendale |
| 1. More than 3 inpatient hospitalizations in a year | 57 | 1.1% | 40% | 32% | 3% | 14% | 19% |
| 2. More than 3 emergency room visits in the previous three months | 155 | 3.1% | 32% | 30% | 8% | 9% | 12% |
| 3. Age 60 or older | 129 | 2.6% | 19% | 7% | 17% | 10% | 7% |
| 4. Cirrhosis of the liver | 30 | 0.6% | 43% | 7% | 10% | 9% | 7% |
| 5. End-stage renal disease | 12 | 0.2% | 50% | 5% | 3% | 3% | 5% |
| 6. History of frostbite, immersion foot, or hypothermia | 3 | 0.1% | 33% | 9% | 7% | 9% | 7% |
| 7. HIV/AIDS | 76 | 1.5% | 38% | 1% | 1% | 4% | 2% |
| 8. Tri-morbidity: co-occurring psychiatric, substance abuse, and chronic medical conditions | 655 | 13.2% | 35% | 34% | 21% | 23% | 28% |
| **Total Vulnerable** | **972** | **19.6%** | **32%** | **44%** | **42%** | **43%** | **44%** |

*Source: 4,958 homeless General Relief recipients who were treated at a clinic or hospital of the Los Angeles County Department of Health Services and vulnerability index surveys in four communities.*

or older to a high of 50 percent for persons with end-stage renal disease, as shown in Table 1.

Differences between the frequency of vulnerability index factors found in the county's ELP database and in four vulnerability index surveys conducted in the county identify areas in which the triage tool can usefully augment information collected through vulnerability index surveys. The bottom line difference is that community surveys identified more than twice as many people as being vulnerable as the analysis of linked county records – 19.6 percent vs. 42 to 44 percent. Some of this may be due to a higher concentration of vulnerable individuals among persons living on the street than among the overall homeless population represented in the county's database. However, it appears that most of this difference is attributable to over-reporting of hospital usage and medical conditions in the surveys. For example, a tenth of a percent of persons in the county's medical records had been diagnosed with frostbite, immersion foot, or hypothermia (these fall under medical diagnostic code 991, effects of reduced temperature), compared to 7 to 9 percent of respondents in the community surveys. This discrepancy is readily explained by the fact that it is very difficult to elicit survey responses from laypersons that verify the presence or absence of technically defined medical conditions.

An important contribution of the triage tool is to bring individuals with mental disorders into the population that is assessed, and then to rank the overall population based on public cost. Only 59 percent of the persons in the county database who had been diagnosed with a psychosis met the vulnerability index criteria of being at-risk. This is because the two Boston studies found very little correlation between mental illness and increased risk of death.[27] Among psychiatric conditions, the only significant predictor of death was a history of a suicide attempt; consequently, mental disorders do not have significant weight in vulnerability index assessments unless they are co-occurent with substance abuse and a chronic medical condition, or reflected in use of hospitals.

When we look at all homeless patients admitted to California hospitals in 2008 and 2009, mental disorders accounted for over half (56 percent) of all inpatient admissions.[28] Eighty-seven percent of these admissions were for individuals diagnosed with psychotic conditions. These individuals suffer from delusions and hallucinations that distort their perception of themselves and their surrounding, often with great personal pain and sometimes with disruptions to their social environment. Mental disorders have significant weight in assessments using the triage tool because of the health and justice system costs associated with these conditions.

**Screening Process Using the Triage Tool**

As this paper is being written, a pilot project is underway to refine and validate procedures for using the triage tool. The sites for the pilot are California Hospital Medical Center in downtown Los Angeles and Ocean Park Community Center (OPCC) Project HEARTH with Saint John's Health Center and Venice Family Clinic in Santa Monica. The project is supported by the Conrad N. Hilton Foundation and is being carried out jointly with the Corporation for Supportive Housing (CSH), which has organized teams at each site to provide immediate, comprehensive services for 10$^{th}$ decile homeless patients. This complete package of services is critical given the high level of need among these patients. The services include:

- Immediate *case management and housing navigation* services for helping individuals make the transition into housing, obtain needed services, and obtain immediate temporary

housing followed by long-term permanent supportive housing. This is being done by Housing Works in downtown LA and OPCC in Santa Monica.

- *Health services* are provided by JWCH Institute and LA Christian Clinic in downtown LA and Venice Family Clinic in Santa Monica; all three are Federally Qualified Health Centers (FQHCs).
- Assistance in qualifying for *SSI benefits* is provided by JWCH Institute's BEST program.
- Immediate *temporary housing* is provided by SRO Housing in downtown LA and OPCC in Santa Monica.
- *Permanent supportive housing* is provided by SRO Housing and Skid Row Housing Trust in downtown LA and OPCC in Santa Monica.

The housing contracts that have been arranged by CSH provide guaranteed housing slots for individuals in the 10th decile without having to place these individuals on waiting lists that are otherwise be required under fair housing laws. This is because it is permissible for housing providers to enter into contracts to accept a specified number of referrals from entities such as jails, hospitals and clinics.

The primary purpose of the pilot is to train hospital and clinic staff in using the triage tool, and to build referral relationships with housing and community health care providers that can be handed off to the hospitals and clinics when the pilot ends. By using the triage tool, hospitals can document the urgency of their 10th decile patients' needs and the benefit to the public of giving these patients high priority for access to permanent supportive housing. At the outset, the Economic Roundtable carried out most of the screening activities in collaboration with medical staff. As the pilot progressed, hospital and clinic staff transitioned into lead roles in conducting the screenings. Steps in the screening process are shown in Figure 9 and described below. Documents used in the screening process are included in a separate *Client Documents Appendix* at the end of this report.

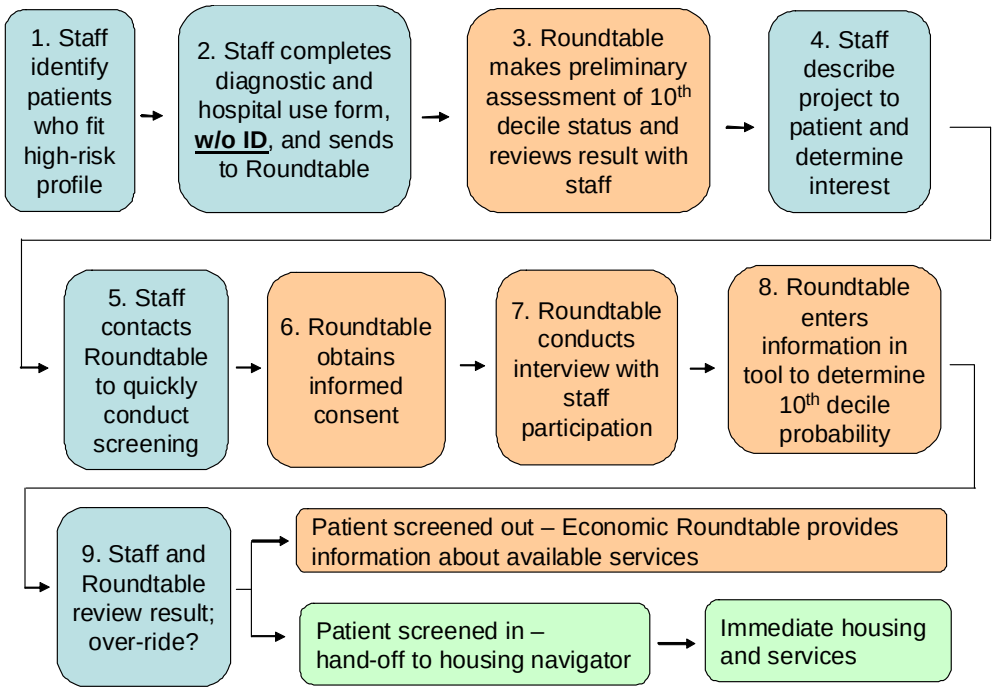
*Pre-screening (Steps 1-4 in Figure 9)*

Medical staff identifies patients who fit the profile of individuals in the 10th decile. Often this is done by hospital social workers. The key elements of the profile are that patients are homeless and have above-average use of hospital services. For example, aside from any other health factors and without any jail time, a patient who has visited the emergency room 14 or more times in the past two years would be in the 10th decile, even if he or she had not been admitted as an inpatient. Similarly, a patient who had been admitted to the hospital as an inpatient three times and stayed in the hospital a total of nine days would be in the 10th decile.

An important reason for the pre-screening is to minimize or entirely prevent instances when the program is presented to patients and their hopes are raised about having a place of their own in which to live, but then are disappointed when they are screened out of the program because they are not in the 10th decile.

After a patient who fits the 10th decile profile is identified, hospital or clinic staff complete a form with check-off boxes for information used in the triage tool. The key pieces of information are the patient's age, diagnosed medical conditions, and number of visits to the hospital over the past two years. If available, information is also obtained about use of other

Figure 9
Pilot Project Flow Chart of Steps in Hospital and Clinic Screening




hospitals and jail stints. A copy of the form used to compile this information is included in the *Client Documents Appendix*.[29]

At the start of the pilot, this form was completed and sent to the Economic Roundtable without the patient's name (because the patient had not yet signed a HIPAA authorization to release medical information) and Roundtable staff entered the information into the triage tool to determine whether the patient was a good candidate for screening. As the pilot progressed, responsibility for carrying out the pre-assessment was assumed by hospital and clinic staff.

If it appears likely that the patient is in the 10th decile, hospital or clinic staff describes the project to the patient and explains that it is possible he or she may be able to get a place of their own in which to live. If the patient is interested, he or she is formally screened.

*Screening (Steps 5-9 in Figure 9)*

Early in the pilot, the Economic Roundtable carried out the screening, beginning by obtaining an informed consent and HIPAA authorization from the patient, and then interviewing the patient to obtain the information used in the triage tool, with particular attention paid to obtaining information about visits to other hospitals and time spent in jail. These steps followed procedures in research protocols approved by Economic Roundtable and hospital institutional review boards to protect patient privacy and ensure that patients' consent is fully informed. A copy of the interview questionnaire is included in the *Client Documents Appendix*.[30] As the pilot progressed, responsibility for carrying out the screening was assumed by hospital and clinic staff.

Information that cannot be provided by the hospital, for example, time spent in jail, must be obtained through self-declaration by the patient during the interview. Some patients are unable or unwilling to provide detailed information about services received at other hospitals or time spent in jail. Some of this is due to mental impairments and some to reticence about disclosing stigmatizing information. As a result, some information is often missing and other

information must be estimated. For example, if a patient is psychotic and spent time in jail, it can be estimated that they were incarcerated in a jail mental health facility.

The pilot project that is underway has shown that to the extent that patients are able to provide information, it is usually accurate. However, some mentally impaired patients are able to provide very little information. The overall effect of reliance on patients to provide information appears to be to skew screening outcomes toward slightly more conservative estimates of whether individuals are in the 10th decile.[31]

Six barriers can prevent individuals from having access to permanent supportive housing because of limitations on publicly funded housing subsidies, or restrictions of the insurance companies that cover housing providers, or the program design of supportive housing itself. During the screening interview, these barriers are identified and the patient is asked if any of them apply to him or her. At a minimum, this provides fair warning to the patient about these barriers, should they come up while seeking to qualify the individual for permanent supportive housing. The barriers are:

1. Undocumented immigration (barrier to local, state and federal subsidies)
2. Being on parole for a violent crime (barrier to federal subsidies)
3. Conviction for arson (prohibited by housing providers' liability insurance)
4. Conviction for operating a methamphetamine lab (prohibited by housing providers' liability insurance)
5. Convicted for an offense that requires registering as a sex offender (prohibited by housing providers' liability insurance)
6. Not expected to recover from a disorder or injury to the extent that the individual will be able to live independently without continuing nursing care (constraint of supportive housing, which is for individuals who can live independently with the help of supportive services)

After the interview with the patient is completed, diagnostic and service use information from the hospital is reconciled with interview information and entered into the triage tool to obtain the estimated probability that the patient is in the 10$^{th}$ decile. If the probability is less than 0.35, the cut-off point, the reasonableness of this outcome is reviewed with medical staff. If warranted, negative results from the triage tool can be overridden based on clinical judgment. *The triage tool is designed to assess the current level of public costs for a patient, not to predict future costs.* If a patient were recently diagnosed with one of the high-cost medical conditions shown in Figure 6, for example, this would be an important factor to take into consideration in deciding whether to override a negative result from the triage tool and include the patient in the 10$^{th}$ decile group that received access to permanent supportive housing.

*Follow-up with Patient (Last Step in Figure 9)*

The patient interview, triage tool assessment, and follow-up counseling with the patient all occur within two hours. This is necessary because the hospital often needs the bed for another patient, and also because the patient may be restless to leave the hospital. For example, patients may be addicts or alcoholics and may want to return to the street to self medicate.

If the patient is not in the 10$^{th}$ decile, this outcome is explained and the patient is provided with a directory of homeless services in the immediate vicinity and counseled about

how to gain access to needed services, including applying independently for permanent supportive housing. The patient is also provided with a gift card for a meal at a local restaurant.

If the patient is in the 10th decile, the case manager/housing navigator is called to the hospital and assumes immediate responsibility for assisting the individual. This includes assessing what type of temporary housing that is needed and providing transportation to the housing site, visiting a Federally Qualified Health Center to arrange follow-up care, and beginning the process of applying for permanent supportive housing. These services are provided by knowledgeable and empathic staff, using a Housing First approach.[32]

Despite the desire of most homeless individuals to be housed, the transition from the street into housing may be difficult. At a minimum, it means changing basic habits about eating, sleeping and co-existing with other people. These changes may well be challenging for an individual who is mentally and physically ill, addicted, and wary of the intentions of others. The immediate engagement of a skilled case manager/housing navigator is critical for helping the individual make this transition.

**Accuracy of Triage Tool**

As applied to the 2,907 sample records, the triage tool is four times more accurate than the first generation screening tool released in June 2010, which accompanied a paper titled, "*Tools for Identifying High-Cost, High-Need Homeless Persons*."[33]

The new triage tool offers marked improvements reliability of the estimates it produces, with far fewer individuals who are in the highest cost decile *mistakenly excluding*, and also far fewer individuals who are not in the highest cost decile *mistakenly included*. The factor of erroneous exclusion, or false negatives, is known as "*shortfall*." The factor of erroneous inclusion, or false positives, is known as "*burden.*"

The trade-offs between shortfall and burden at different cut-off points for the minimum proportion individuals who will be considered to be in the 10th cost decile is shown in Figure 10.[34] A low cut-off point creates a disproportionate number of false positives; a high cut-off point creates a disproportionate number of false negatives.

At a low cut-off point that is very inclusive, 0.10, for every 20 people correctly identified as being in the 10th decile, there is only one false negative but there are 14 false positives.

At the other extreme, using a high cut-off point that is very restrictive, 0.70, for every 13 people correctly identified as being in the 10th decile, there is only one false positive but there are eight false negatives.

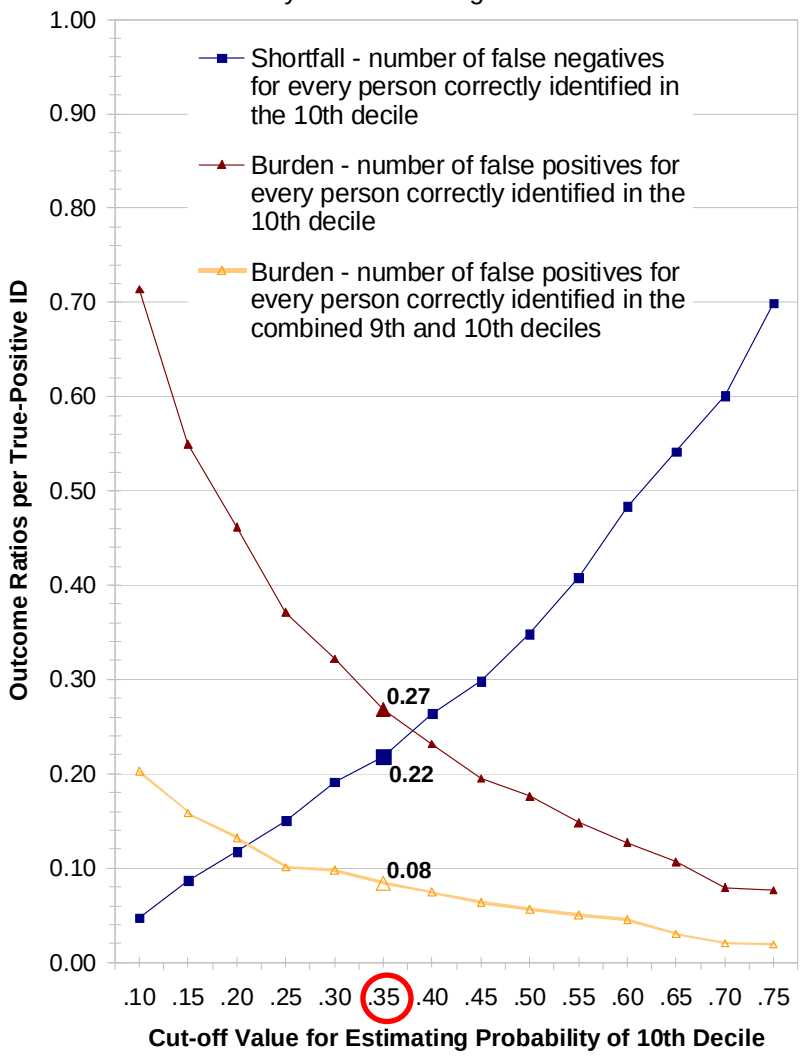
Burden and shortfall intersect in Figure 10 at the 0.35 cut-off point, meaning that there is a 35 percent estimated probability that a person will be in the 10th decile.

Using a 0.35 cut-off value for the estimated probability of being in the 10th decile, the new triage tool has a *shortfall* rate of 0.22. This means that for every five people correctly flagged as being in the 10th decile, there will be one false negative – one person will be incorrectly excluded.

With the same 0.35 cut-off value, the triage tool has a *burden* rate of 0.27. This means that for every four people correctly flagged as being in the 10th decile, there will be one false positive – one person will be incorrectly included.

Thinking broadly about the issue of burden vs. shortfall, it is likely to be a beneficial outcome if people in the ninth cost decile are caught up in the 10th decile selection net. Figure 3 showed that public costs for people in the ninth decile are reduced by over $1,100 a month when they are in supportive housing and many people in this decile may well be on a trajectory toward the 10th decile if they do not receive help. If we accept inclusion of ninth decile individuals in the selection process as a reasonable outcome, the level of burden is reduced by more than two-thirds; at the 0.35 cut-off level, the burden rate for the combined 9th and 10th deciles is 0.08, as shown in Figure 10. This burden rate of 0.08 means that out of 13 people flagged as being in the 10th decile, one person outside of the 9th and 10th deciles will be incorrectly included.

Figure 10
Cut-off Probability Value for Assignment to 10th Decile




*Source: Derived from logistic regressions of records for 2,907 homeless General Relief recipients over 18 years of age with no employment in the past 3 years who were treated at a hospital of the Los Angeles County Department of Health Services.*

The *Statistical Appendix* describes how the revised model was developed, how medical diagnostic and service usage data was added to the model, and the statistics behind the model for the triage tool.

*Useful Life Span of the Triage Tool*

The triage tool will be reliable until incarceration or hospitalization practices change, or there are more effective treatments for medical conditions that are factors in the model. For example, the introduction of combination drug therapy for HIV in 1996, greatly extended life expectancy for individuals with this infection, with the requirement for ongoing high levels of health care services. If there are comparable advances in the effectiveness of medical treatment

that reduce the level of health care services required for any of the medical conditions that are part of the triage tool, the tool will become dated.

The record linkage carried out by Los Angeles County's Adult Linkage Project, now the Enterprise Linkages Project, was the essential prerequisite for creating this tool. Future linkage projects will be needed to verify that the model is performing satisfactorily and, if necessary, update it. These projects have the potential to create comparable screening tools for other high-need populations, including youth in the probation and foster care systems that are at future risk of homelessness.

**Next Steps**

An assessment report on the pilot project is being prepared to provide information about best practices for screening, identifying, housing, and meeting urgent service needs of the 10$^{th}$ decile population. This report will be released after the pilot is completed.

Preliminary results show the triage tool to be reliable and effective for identifying high-need homeless hospital patients. The greatest challenges have been to add pre-screening and formal screening into the time-sensitive flow of patients through hospitals, and then to ensure the immediate availability of housing and services for these high-need individuals after they are identified and discharged from medical settings.

Four follow-on steps are planned to support increased use of the triage tool. First, technical support will be provided for additional hospitals. Second, complete institutional databases will be prescreened to code entire populations for probability of being in the 10$^{th}$ decile. Third, inmates being discharged from jail, particularly mental health jail facilities will be screened to identify and house high-need individuals. Fourth, additional versions of the tool will be developed that are adapted for use by medical clinics and frontline homeless service providers.

# Diagnostic Appendix

## Tenth Decile Frequency by Diagnosis and Treatment Setting

*3,229 homeless adults treated and diagnosed at Los Angeles County Hospitals 2005 to 2008*
*Unduplicated count of patients within each diagnostic code and treatment setting*

| Group | Sub-Group | Code and Name of Principal Diagnosis | Total number of persons with diagnosis: Emergency Room | Total number of persons with diagnosis: Hospital Inpatient | % of persons with diagnosis in 10th Decile: Emergency Room | % of persons with diagnosis in 10th Decile: Hospital Inpatient |
|---|---|---|---|---|---|---|
| *A* | | *INFECTIOUS AND PARASITIC DISEASES (001-139)* | 138 | 45 | 38% | 67% |
| | | *A01 INTESTINAL INFECTIOUS DISEASES (001-009)* | 7 | 4 | 71% | 75% |
| | | 003 Other salmonella infections | | 1 | | 100% |
| | | 007 Other protozoal intestinal diseases | 1 | | 100% | |
| | | 008 Intestinal infections due to other organisms | 4 | 2 | 50% | 50% |
| | | 009 Ill-defined intestinal infections | 2 | 1 | 100% | 100% |
| | | *A02 TUBERCULOSIS (010-018)* | 2 | 6 | 50% | 50% |
| | | 011 Pulmonary tuberculosis | 2 | 6 | 50% | 50% |
| | | *A03 OTHER BACTERIAL DISEASES (030-041)* | 11 | 4 | 45% | 100% |
| | | 020 Plague | 1 | | | |
| | | 034 Streptococcal sore throat and scarlet fever | 5 | | 20% | |
| | | 038 Septicemia | 3 | 3 | 100% | 100% |
| | | 041 Bacterial infection in conditions classified elsewhere and of unspecified site | 2 | 1 | 50% | 100% |
| | | *A04 HUMAN IMMUNODEFICIENCY VIRUS (HIV) INFECTION (042)* | 7 | 10 | 71% | 90% |
| | | 042 Human immunodeficiency virus [HIV] disease | 7 | 10 | 71% | 90% |
| | | *A05 POLIOMYELITIS AND OTHER NON-ARTHROPOD-BORNE VIRAL DISEASES AND PRION DISEASES OF CENTRAL NERVOUS SYSTEM (045-049* | | 2 | | |
| | | 047 Meningitis due to enterovirus | | 2 | | |
| | | *A06 VIRAL DISEASES GENERALLY ACCOMPANIED BY EXANTHEM (050-059)* | 15 | 3 | 27% | |
| | | 052 Chickenpox | 2 | 1 | | |
| | | 053 Herpes zoster | 5 | 1 | 40% | |
| | | 054 Herpes simplex | 7 | 1 | 29% | |
| | | 057 Other viral exanthemata | 1 | | | |
| | | *A08 OTHER DISEASES DUE TO VIRUSES AND CHLAMYDIAE (070-079)* | 45 | 8 | 27% | 63% |
| | | 070 Viral hepatitis | 14 | 7 | 29% | 57% |
| | | 074 Specific diseases due to Coxsackie virus | 1 | | | |
| | | 077 Other diseases of conjunctiva due to viruses and Chlamydiae | 1 | | | |
| | | 078 Other diseases due to viruses and Chlamydiae | 4 | | 25% | |
| | | 079 Viral and chlamydial infection in conditions classified elsewhere and of unspecified site | 25 | 1 | 28% | 100% |
| | | *A10 SYPHILIS AND OTHER VENEREAL DISEASES (090-099)* | 3 | 1 | 67% | |
| | | 097 Other and unspecified syphilis | 1 | | 100% | |
| | | 098 Gonococcal infections | | 1 | | |
| | | 099 Other venereal diseases | 2 | | 50% | |
| | | *A12 MYCOSES (110-118)* | 38 | 6 | 42% | 100% |
| | | 110 Dermatophytosis | 26 | 1 | 42% | 100% |
| | | 112 Candidiasis | 10 | 1 | 30% | 100% |

| Group | Sub-Group | Code and Name of Principal Diagnosis | *Total number of persons with diagnosis* | | *% of persons with diagnosis in 10th Decile* | |
|---|---|---|---|---|---|---|
| | | | Emergency Room | Hospital Inpatient | Emergency Room | Hospital Inpatient |
| | | 114 Coccidioidomycosis | 2 | 4 | 100% | 100% |
| | *A14 OTHER INFECTIOUS AND PARASITIC DISEASES (130-136)* | | 16 | 2 | 25% | 50% |
| | | 131 Trichomoniasis | 3 | | 33% | |
| | | 132 Pediculosis and phthirus infestation | 2 | | 50% | |
| | | 133 Acariasis | 9 | 1 | 22% | 100% |
| | | 135 Sarcoidosis | 1 | 1 | | |
| | | 136 Other and unspecified infectious and parasitic diseases | 1 | | | |
| *B NEOPLASMS (140-239)* | | | 30 | 35 | 33% | 49% |
| | *B01 MALIGNANT NEOPLASM OF LIP, ORAL CAVITY, AND PHARYNX (140-149)* | | | 1 | | 100% |
| | | 143 Malignant neoplasm of gum | | 1 | | 100% |
| | *B02 MALIGNANT NEOPLASM OF DIGESTIVE ORGANS AND PERITONEUM (150-159)* | | 5 | 7 | 60% | 43% |
| | | 153 Malignant neoplasm of colon | 3 | 4 | 33% | 50% |
| | | 154 Malignant neoplasm of rectum, rectosigmoid junction, and anus | 2 | 1 | 100% | 100% |
| | | 155 Malignant neoplasm of liver and intrahepatic bile ducts | | 1 | | |
| | | 157 Malignant neoplasm of pancreas | | 1 | | |
| | *B02 MALIGNANT NEOPLASM OF RESPIRATORY AND INTRATHORACIC ORGANS (160-165)* | | 5 | 5 | 100% | 100% |
| | | 162 Malignant neoplasm of trachea, bronchus, and lung | 5 | 5 | 100% | 100% |
| | *B03 MALIGNANT NEOPLASM OF BONE, CONNECTIVE TISSUE, SKIN, AND BREAST (170-176)* | | 1 | 2 | | 100% |
| | | 171 Malignant neoplasm of connective and other soft tissue | | 1 | | 100% |
| | | 174 Malignant neoplasm of female breast | 1 | 1 | | 100% |
| | *B04 MALIGNANT NEOPLASM OF GENITOURINARY ORGANS (179-189)* | | 2 | 6 | | 17% |
| | | 180 Malignant neoplasm of cervix uteri | 1 | 2 | | |
| | | 182 Malignant neoplasm of body of uterus | | 2 | | 50% |
| | | 184 Malignant neoplasm of other and unspecified female genital organs | | 1 | | |
| | | 185 Malignant neoplasm of prostate | 1 | | | |
| | | 186 Malignant neoplasm of testis | | 1 | | |
| | *B05 MALIGNANT NEOPLASM OF OTHER AND UNSPECIFIED SITES (190-199)* | | 2 | 3 | | 33% |
| | | 191 Malignant neoplasm of brain | | 1 | | 100% |
| | | 193 Malignant neoplasm of thyroid gland | | 1 | | |
| | | 197 Secondary malignant neoplasm of respiratory and digestive systems | 1 | | | |
| | | 199 Malignant neoplasm without specification of site | 1 | 1 | | |
| | *B06 MALIGNANT NEOPLASM OF LYMPHATIC AND HEMATOPOIETIC TISSUE (200-208)* | | 2 | 2 | 50% | 50% |
| | | 200 Lymphosarcoma and reticulosarcoma | 1 | | 100% | |
| | | 202 Other malignant neoplasms of lymphoid and histiocytic tissue | 1 | 1 | 100% | 100% |
| | | 204 Lymphoid leukemia | 1 | 1 | | |
| | *B08 BENIGN NEOPLASMS (210-229)* | | 12 | 7 | | 29% |
| | | 211 Benign neoplasm of other parts of digestive system | | 1 | | 100% |
| | | 212 Benign neoplasm of respiratory and intrathoracic organs | | 1 | | |

| Group | Sub-Group | Code and Name of Principal Diagnosis | Total number of persons with diagnosis: Emergency Room | Total number of persons with diagnosis: Hospital Inpatient | % of persons with diagnosis in 10th Decile: Emergency Room | % of persons with diagnosis in 10th Decile: Hospital Inpatient |
|---|---|---|---|---|---|---|
| | | 213 Benign neoplasm of bone and articular cartilage | 3 | 1 | | |
| | | 214 Lipoma | 4 | 1 | | 100% |
| | | 218 Uterine leiomyoma | 5 | 3 | | |
| | *B10 NEOPLASMS OF UNCERTAIN BEHAVIOR (235-238)* | | 2 | 4 | 50% | 75% |
| | | 235 Neoplasm of uncertain behavior of digestive and respiratory systems | | 2 | | 100% |
| | | 237 Neoplasm of uncertain behavior of endocrine glands and nervous system | 1 | 1 | 100% | 100% |
| | | 238 Neoplasm of uncertain behavior of other and unspecified sites and tissues | 1 | 1 | | |
| *C ENDOCRINE, NUTRITIONAL AND METABOLIC DISEASES, AND IMMUNITY DISORDERS (240-279)* | | | 115 | 50 | 36% | 56% |
| | *C01 DISORDERS OF THYROID GLAND (240-246)* | | 5 | 4 | | 25% |
| | | 241 Nontoxic nodular goiter | 1 | 1 | | |
| | | 242 Thyrotoxicosis with or without goiter | 4 | 2 | | |
| | | 244 Acquired hypothyroidism | | 1 | | 100% |
| | | 246 Other disorders of thyroid | 1 | | | |
| | *CO2 DISEASES OF OTHER ENDOCRINE GLANDS (249-259)* | | 90 | 37 | 34% | 59% |
| | | 250 Diabetes mellitus | 86 | 37 | 36% | 59% |
| | | 251 Other disorders of pancreatic internal secretion | 4 | | | |
| | | 256 Ovarian dysfunction | 1 | | | |
| | *C04 OTHER METABOLIC AND IMMUNITY DISORDERS (270-279)* | | 20 | 10 | 50% | 50% |
| | | 273 Disorders of plasma protein metabolism | 1 | | | |
| | | 274 Gout | 7 | 1 | 43% | |
| | | 276 Disorders of fluid, electrolyte, and acid-base balance | 12 | 9 | 58% | 56% |
| *D DISEASES OF THE BLOOD AND BLOOD-FORMING ORGANS (280-289)* | | | 22 | 16 | 41% | 44% |
| | | 280 Iron deficiency anemias | 10 | 10 | 40% | 50% |
| | | 284 Aplastic anemia and other bone marrow failure syndromes | 1 | | 100% | |
| | | 285 Other and unspecified anemias | 6 | 2 | 33% | 50% |
| | | 287 Purpura and other hemorrhagic conditions | 1 | 1 | 100% | 100% |
| | | 288 Diseases of white blood cells | 3 | 2 | 33% | |
| | | 289 Other diseases of blood and blood-forming organs | 3 | 2 | 33% | 50% |
| *E MENTAL DISORDERS (290-319)* | | | 723 | 176 | 35% | 55% |
| | *E01 PSYCHOSES (290-299)* | | 599 | 162 | 39% | 59% |
| | *E01.1 ORGANIC PSYCHOTIC CONDITIONS (290-294)* | | 138 | 52 | 36% | 56% |
| | | 290 Dementias | 1 | | | |
| | | 291 Alcohol-induced mental disorders | 55 | 34 | 38% | 53% |
| | | 292 Drug-induced mental disorders | 81 | 19 | 38% | 63% |
| | | 293 Transient mental disorders due to conditions classified elsewhere | 7 | 1 | | |
| | | 294 Persistent mental disorders due to conditions classified elsewhere | 1 | | | |
| | *E01.2 OTHER PSYCHOSES (295-299)* | | 461 | 110 | 40% | 60% |
| | | 295 Schizophrenic disorders | 58 | 26 | 62% | 69% |
| | | 296 Episodic mood disorders | 237 | 62 | 41% | 56% |

| Group | Sub-Group | Code and Name of Principal Diagnosis | Total number of persons with diagnosis: Emergency Room | Total number of persons with diagnosis: Hospital Inpatient | % of persons with diagnosis in 10th Decile: Emergency Room | % of persons with diagnosis in 10th Decile: Hospital Inpatient |
|---|---|---|---|---|---|---|
| | | 297 Delusional disorders | 2 | | 100% | |
| | | 298 Other nonorganic psychoses | 276 | 28 | 44% | 68% |
| | *E02 NEUROTIC DISORDERS, PERSONALITY DISORDERS, AND OTHER NONPSYCHOTIC MENTAL DISORDERS (300-316)* | | 298 | 30 | 36% | 47% |
| | | 300 Anxiety, dissociative and somatoform disorders | 48 | 1 | 35% | 100% |
| | | 301 Personality disorders | 3 | 1 | 67% | 100% |
| | | 302 Sexual and gender identity disorders | 1 | | | |
| | | 303 Alcohol dependence syndrome | 32 | 5 | 34% | 20% |
| | | 304 Drug dependence | 19 | 2 | 42% | 50% |
| | | 305 Nondependent abuse of drugs | 100 | 11 | 39% | 36% |
| | | 307 Special symptoms or syndromes, not elsewhere classified | 4 | 1 | 25% | |
| | | 308 Acute reaction to stress | 1 | | | |
| | | 309 Adjustment reaction | 24 | 3 | 38% | 33% |
| | | 310 Specific nonpsychotic mental disorders due to brain damage | 2 | | 50% | |
| | | 311 Depressive disorder, not elsewhere classified | 95 | 10 | 38% | 70% |
| | | 312 Disturbance of conduct, not elsewhere classified | 3 | | | |
| | | 314 Hyperkinetic syndrome of childhood | 3 | | 67% | |
| | E03 MENTAL RETARDATION (317-319) | | 1 | | | |
| | | 317 Mild mental retardation | 1 | | | |
| *F DISEASES OF THE NERVOUS SYSTEM AND SENSE ORGANS (320-389)* | | | 214 | 33 | 31% | 48% |
| | *F01 INFLAMMATORY DISEASES OF THE CENTRAL NERVOUS SYSTEM (320-326)* | | 2 | 3 | 50% | 67% |
| | | 320 Bacterial meningitis | | 1 | | 100% |
| | | 323 Encephalitis, myelitis, and encephalomyelitis | 1 | 1 | | |
| | | 324 Intracranial and intraspinal abscess | 1 | 1 | 100% | 100% |
| | *F02 ORGANIC SLEEP DISORDERS (327)* | | 2 | 2 | | |
| | | 327 Organic sleep disorders | 2 | 2 | | |
| | *F03 HEREDITARY AND DEGENERATIVE DISEASES OF THE CENTRAL NERVOUS SYSTEM (330-337)* | | 5 | 4 | 40% | 75% |
| | | 331 Other cerebral degenerations | 2 | 3 | 50% | 67% |
| | | 333 Other extrapyramidal disease and abnormal movement disorders | 2 | | 50% | |
| | | 336 Other diseases of spinal cord | 1 | 1 | | 100% |
| | *F04 PAIN (338)* | | 26 | 3 | 54% | 33% |
| | | 338 Pain, not elsewhere classified | 26 | 3 | 54% | 33% |
| | F06 OTHER DISORDERS OF THE CENTRAL NERVOUS SYSTEM (340-349) | | 38 | 9 | 34% | 56% |
| | | 340 Multiple sclerosis | 2 | 2 | 50% | 50% |
| | | 344 Other paralytic syndromes | 1 | 1 | 100% | 100% |
| | | 345 Epilepsy and recurrent seizures | 19 | 4 | 37% | 50% |
| | | 346 Migraine | 13 | | 23% | |
| | | 348 Other conditions of brain | 3 | 2 | 33% | 50% |
| | *F07 DISORDERS OF THE PERIPHERAL NERVOUS SYSTEM (350-359)* | | 23 | 2 | 17% | 100% |
| | | 350 Trigeminal nerve disorders | 2 | | | |
| | | 351 Facial nerve disorders | 5 | | 20% | |

| Group | Sub-Group | Code and Name of Principal Diagnosis | Total number of persons with diagnosis | | % of persons with diagnosis in 10th Decile | |
|---|---|---|---|---|---|---|
| | | | Emergency Room | Hospital Inpatient | Emergency Room | Hospital Inpatient |
| | | 354 Mononeuritis of upper limb and mononeuritis multiplex | 9 | | 11% | |
| | | 355 Mononeuritis of lower limb | 5 | | 20% | |
| | | 356 Hereditary and idiopathic peripheral neuropathy | 1 | | | |
| | | 357 Inflammatory and toxic neuropathy | | 1 | | 100% |
| | | 358 Myoneural disorders | 1 | 1 | 100% | 100% |
| | *F08* | *DISORDERS OF THE EYE AND ADNEXA (360-379)* | 89 | 11 | 29% | 36% |
| | | 360 Disorders of the globe | | 1 | | 100% |
| | | 361 Retinal detachments and defects | 3 | 1 | 33% | |
| | | 362 Other retinal disorders | 2 | | 50% | |
| | | 364 Disorders of iris and ciliary body | 3 | | | |
| | | 365 Glaucoma | 5 | 1 | 60% | 100% |
| | | 366 Cataract | 2 | | | |
| | | 367 Disorders of refraction and accommodation | 4 | | | |
| | | 368 Visual disturbances | 11 | 2 | 45% | 50% |
| | | 369 Blindness and low vision | 9 | | 33% | |
| | | 370 Keratitis | 3 | 3 | 33% | |
| | | 371 Corneal opacity and other disorders of cornea | 2 | | 50% | |
| | | 372 Disorders of conjunctiva | 22 | | 27% | |
| | | 373 Inflammation of eyelids | 11 | | 18% | |
| | | 375 Disorders of lacrimal system | 1 | | | |
| | | 376 Disorders of the orbit | 3 | 2 | 33% | 50% |
| | | 377 Disorders of optic nerve and visual pathways | | 1 | | |
| | | 379 Other disorders of eye | 15 | | 40% | |
| | *F09* | *DISEASES OF THE EAR AND MASTOID PROCESS (380-389)* | 41 | 1 | 32% | 100% |
| | | 380 Disorders of external ear | 17 | | 29% | |
| | | 381 Nonsuppurative otitis media and Eustachian tube disorders | 1 | | | |
| | | 382 Suppurative and unspecified otitis media | 7 | 1 | 57% | 100% |
| | | 384 Other disorders of tympanic membrane | 3 | | | |
| | | 386 Vertiginous syndromes and other disorders of vestibular system | 5 | | 40% | |
| | | 388 Other disorders of ear | 6 | | 33% | |
| | | 389 Hearing loss | 2 | | | |
| *G* | | *DISEASES OF THE CIRCULATORY SYSTEM (390-459)* | 201 | 137 | 39% | 54% |
| | *G02* | *CHRONIC RHEUMATIC HEART DISEASE (393-398)* | 1 | 1 | | |
| | | 398 Other rheumatic heart disease | 1 | 1 | | |
| | *G03* | *HYPERTENSIVE DISEASE (401-405)* | 81 | 21 | 36% | 67% |
| | | 401 Essential hypertension | 71 | 7 | 31% | 71% |
| | | 402 Hypertensive heart disease | | 2 | | |
| | | 403 Hypertensive chronic kidney disease | 6 | 9 | 83% | 78% |
| | | 404 Hypertensive heart and chronic kidney disease | 4 | 5 | 50% | 60% |
| | *G04* | *ISCHEMIC HEART DISEASE (410-414)* | 36 | 41 | 44% | 49% |
| | | 410 Acute myocardial infarction | 11 | 16 | 64% | 56% |
| | | 411 Other acute and subacute forms of ischemic heart disease | 19 | 9 | 37% | 56% |

| Group | Sub-Group | Code and Name of Principal Diagnosis | Total number of persons with diagnosis: Emergency Room | Total number of persons with diagnosis: Hospital Inpatient | % of persons with diagnosis in 10th Decile: Emergency Room | % of persons with diagnosis in 10th Decile: Hospital Inpatient |
|---|---|---|---|---|---|---|
| | | 413 Angina pectoris | 4 | 6 | 50% | 100% |
| | | 414 Other forms of chronic ischemic heart disease | 9 | 20 | 44% | 45% |
| | *G05* | *DISEASES OF PULMONARY CIRCULATION (415-417)* | 2 | 2 | | 50% |
| | | 415 Acute pulmonary heart disease | 2 | 2 | | 50% |
| | *G06* | *OTHER FORMS OF HEART DISEASE (420-429)* | 39 | 47 | 46% | 49% |
| | | 424 Other diseases of endocardium | 1 | 3 | 100% | 33% |
| | | 425 Cardiomyopathy | 4 | 2 | 25% | |
| | | 427 Cardiac dysrhythmias | 9 | 9 | 44% | 56% |
| | | 428 Heart failure | 29 | 35 | 48% | 51% |
| | *G07* | *CEREBROVASCULAR DISEASE (430-438)* | 16 | 17 | 50% | 65% |
| | | 430 Subarachnoid hemorrhage | 2 | 2 | 50% | 50% |
| | | 431 Intracerebral hemorrhage | 1 | 1 | 100% | 100% |
| | | 432 Other and unspecified intracranial hemorrhage | | 3 | | 67% |
| | | 433 Occlusion and stenosis of precerebral arteries | 1 | 1 | | |
| | | 434 Occlusion of cerebral arteries | 6 | 7 | 67% | 71% |
| | | 435 Transient cerebral ischemia | 5 | 3 | 60% | 67% |
| | | 436 Acute, but ill-defined, cerebrovascular disease | 1 | | 100% | |
| | | 437 Other and ill-defined cerebrovascular disease | 1 | | | |
| | | 438 Late effects of cerebrovascular disease | 1 | | | |
| | *G08* | *DISEASES OF ARTERIES, ARTERIOLES, AND CAPILLARIES (440-449)* | 2 | 4 | 50% | 100% |
| | | 440 Atherosclerosis | 1 | 2 | 100% | 100% |
| | | 441 Aortic aneurysm and dissection | | 1 | | 100% |
| | | 443 Other peripheral vascular disease | 2 | 2 | 50% | 100% |
| | | 446 Polyarteritis nodosa and allied conditions | | 1 | | 100% |
| | *G09* | *DISEASES OF VEINS AND LYMPHATICS, AND OTHER DISEASES OF CIRCULATORY SYSTEM (451-459)* | 39 | 14 | 44% | 64% |
| | | 451 Phlebitis and thrombophlebitis | 2 | | 100% | |
| | | 453 Other venous embolism and thrombosis | 11 | 11 | 64% | 64% |
| | | 454 Varicose veins of lower extremities | 3 | | 33% | |
| | | 455 Hemorrhoids | 14 | 1 | 21% | |
| | | 456 Varicose veins of other sites | 3 | 1 | 67% | 100% |
| | | 458 Hypotension | 7 | 1 | 43% | 100% |
| *H* | | *DISEASES OF THE RESPIRATORY SYSTEM (460-519)* | 325 | 91 | 30% | 56% |
| | *H01* | *ACUTE RESPIRATORY INFECTIONS (460-466)* | 147 | 4 | 28% | 75% |
| | | 459 Other disorders of circulatory system | 5 | 2 | 40% | 100% |
| | | 460 Acute nasopharyngitis [common cold] | 1 | | | |
| | | 461 Acute sinusitis | 2 | | 50% | |
| | | 462 Acute pharyngitis | 38 | | 21% | |
| | | 463 Acute tonsillitis | 4 | 1 | 50% | |
| | | 464 Acute laryngitis and tracheitis | 4 | | 25% | |
| | | 465 Acute upper respiratory infections of multiple or unspecified sites | 67 | 1 | 24% | 100% |

| Group | Sub-Group | Code and Name of Principal Diagnosis | *Total number of persons with diagnosis* | | *% of persons with diagnosis in 10th Decile* | |
|---|---|---|---|---|---|---|
| | | | Emergency Room | Hospital Inpatient | Emergency Room | Hospital Inpatient |
| | | 466 Acute bronchitis and bronchiolitis | 36 | | 44% | |
| | *H02* | *OTHER DISEASES OF THE UPPER RESPIRATORY TRACT (470-478)* | 36 | 8 | 39% | 63% |
| | | 470 Deviated nasal septum | 2 | | | |
| | | 471 Nasal polyps | | 2 | | 50% |
| | | 472 Chronic pharyngitis and nasopharyngitis | 2 | | 100% | |
| | | 473 Chronic sinusitis | 18 | 1 | 44% | 100% |
| | | 474 Chronic disease of tonsils and adenoids | 1 | | | |
| | | 475 Peritonsillar abscess | 5 | 1 | 20% | |
| | | 477 Allergic rhinitis | 4 | | 25% | |
| | | 478 Other diseases of upper respiratory tract | 5 | 4 | 60% | 75% |
| | *H03* | *PNEUMONIA AND INFLUENZA (480-488)* | 52 | 38 | 38% | 55% |
| | | 481 Pneumococcal pneumonia [Streptococcus pneumoniae pneumonia] | 2 | 2 | 100% | 50% |
| | | 482 Other bacterial pneumonia | 1 | 4 | | 75% |
| | | 483 Pneumonia due to other specified organism | 1 | 1 | | |
| | | 485 Bronchopneumonia, organism unspecified | 3 | | 33% | |
| | | 486 Pneumonia, organism unspecified | 43 | 32 | 35% | 53% |
| | | 487 Influenza | 4 | | 75% | |
| | *HO4* | *CHRONIC OBSTRUCTIVE PULMONARY DISEASE AND ALLIED CONDITIONS (490-496)* | 134 | 33 | 34% | 52% |
| | | 490 Bronchitis, not specified as acute or chronic | 49 | 1 | 43% | 100% |
| | | 491 Chronic bronchitis | 22 | 9 | 45% | 44% |
| | | 492 Emphysema | 4 | 2 | 25% | |
| | | 493 Asthma | 68 | 24 | 28% | 58% |
| | | 496 Chronic airway obstruction, not elsewhere classified | 6 | 1 | 33% | 100% |
| | *HO5* | *PNEUMOCONIOSES AND OTHER LUNG DISEASES DUE TO EXTERNAL AGENTS (500-508)* | 1 | 1 | 100% | 100% |
| | | 507 Pneumonitis due to solids and liquids | 1 | 1 | 100% | 100% |
| | *H06* | *OTHER DISEASES OF RESPIRATORY SYSTEM (510-519)* | 12 | 11 | 67% | 73% |
| | | 511 Pleurisy | 6 | 4 | 67% | 75% |
| | | 512 Pneumothorax | | 3 | | 33% |
| | | 513 Abscess of lung and mediastinum | 1 | 2 | 100% | 100% |
| | | 518 Other diseases of lung | 4 | 2 | 75% | 100% |
| | | 519 Other diseases of respiratory system | 2 | | 50% | |
| *I* | | *DISEASES OF THE DIGESTIVE SYSTEM (520-579)* | 348 | 107 | 26% | 50% |
| | *I01* | *DISEASES OF ORAL CAVITY, SALIVARY GLANDS, AND JAWS (520-529)* | 112 | 4 | 19% | 75% |
| | | 520 Disorders of tooth development and eruption | 4 | | 50% | |
| | | 521 Diseases of hard tissues of teeth | 20 | | 30% | |
| | | 522 Diseases of pulp and periapical tissues | 17 | 1 | 18% | |
| | | 523 Gingival and periodontal diseases | 7 | | 14% | |
| | | 524 Dentofacial anomalies, including malocclusion | 3 | | | |
| | | 525 Other diseases and conditions of the teeth and supporting structures | 44 | | 16% | |

| Group | Sub-Group | Code and Name of Principal Diagnosis | *Total number of persons with diagnosis* | | *% of persons with diagnosis in 10th Decile* | |
|---|---|---|---|---|---|---|
| | | | Emergency Room | Hospital Inpatient | Emergency Room | Hospital Inpatient |
| | | 526 Diseases of the jaws | 8 | 1 | 25% | 100% |
| | | 527 Diseases of the salivary glands | 1 | 1 | | 100% |
| | | 528 Diseases of the oral soft tissues, excluding lesions specific for gingiva and to | 13 | 1 | 31% | 100% |
| | | 529 Diseases and other conditions of the tongue | 2 | | | |
| | *I02* | *DISEASES OF ESOPHAGUS, STOMACH, AND DUODENUM (530-538)* | 58 | 18 | 40% | 61% |
| | | 530 Diseases of esophagus | 17 | 5 | 24% | 60% |
| | | 531 Gastric ulcer | 3 | 4 | 67% | 50% |
| | | 532 Duodenal ulcer | 3 | 4 | 67% | 50% |
| | | 533 Peptic ulcer, site unspecified | 4 | 1 | 50% | 100% |
| | | 535 Gastritis and duodenitis | 20 | 2 | 45% | 100% |
| | | 536 Disorders of function of stomach | 13 | 1 | 46% | |
| | | 537 Other disorders of stomach and duodenum | 1 | 1 | 100% | 100% |
| | *I03* | *APPENDICITIS (540-543)* | 2 | 5 | | 20% |
| | | 540 Acute appendicitis | 2 | 4 | | 25% |
| | | 541 Appendicitis, unqualified | | 1 | | |
| | *I04* | *HERNIA OF ABDOMINAL CAVITY (550-553)* | 47 | 8 | 19% | 38% |
| | | 550 Inguinal hernia | 28 | 2 | 18% | |
| | | 553 Other hernia of abdominal cavity without mention of obstruction or gangrene | 20 | 6 | 25% | 50% |
| | *I05* | *NONINFECTIOUS ENTERITIS AND COLITIS (555-558)* | 30 | 8 | 23% | 63% |
| | | 555 Regional enteritis | | 1 | | 100% |
| | | 556 Ulcerative colitis | 2 | 2 | 50% | 50% |
| | | 558 Other and unspecified noninfectious gastroenteritis and colitis | 28 | 5 | 21% | 60% |
| | *I06* | *OTHER DISEASES OF INTESTINES AND PERITONEUM (560-569)* | 49 | 20 | 39% | 50% |
| | | 560 Intestinal obstruction without mention of hernia | 4 | 11 | 75% | 55% |
| | | 562 Diverticula of intestine | 3 | 2 | | |
| | | 564 Functional digestive disorders, not elsewhere classified | 19 | 1 | 42% | 100% |
| | | 565 Anal fissure and fistula | 3 | | 33% | |
| | | 566 Abscess of anal and rectal regions | 8 | 3 | 13% | 33% |
| | | 567 Peritonitis and retroperitoneal infections | 1 | 1 | | |
| | | 569 Other disorders of intestine | 13 | 2 | 46% | 100% |
| | *I07* | *OTHER DISEASES OF DIGESTIVE SYSTEM (570-579)* | 69 | 51 | 29% | 51% |
| | | 570 Acute and subacute necrosis of liver | | 3 | | 100% |
| | | 571 Chronic liver disease and cirrhosis | 14 | 12 | 43% | 67% |
| | | 572 Liver abscess and sequelae of chronic liver disease | 1 | | | |
| | | 573 Other disorders of liver | 4 | 1 | 25% | 100% |
| | | 574 Cholelithiasis | 26 | 17 | 4% | 24% |
| | | 575 Other disorders of gallbladder | 3 | 1 | 33% | |
| | | 577 Diseases of pancreas | 9 | 10 | 33% | 50% |
| | | 578 Gastrointestinal hemorrhage | 15 | 8 | 53% | 75% |
| *J* | | *DISEASES OF THE GENITOURINARY SYSTEM (580-629)* | 249 | 56 | 27% | 43% |

| Group | Sub-Group | Code and Name of Principal Diagnosis | *Total number of persons with diagnosis* | | *% of persons with diagnosis in 10th Decile* | |
|---|---|---|---|---|---|---|
| | | | Emergency Room | Hospital Inpatient | Emergency Room | Hospital Inpatient |
| | *J01* | *NEPHRITIS, NEPHROTIC SYNDROME, AND NEPHROSIS (580-589)* | 6 | 11 | 83% | 73% |
| | | 584 Acute renal failure | 4 | 7 | 75% | 57% |
| | | 585 Chronic kidney disease (CKD) | 2 | 4 | 100% | 100% |
| | *J02* | *OTHER DISEASES OF URINARY SYSTEM (590-599)* | 98 | 22 | 32% | 45% |
| | | 590 Infections of kidney | 14 | 7 | 29% | 57% |
| | | 591 Hydronephrosis | 2 | 2 | 50% | 50% |
| | | 592 Calculus of kidney and ureter | 13 | 5 | 38% | 20% |
| | | 593 Other disorders of kidney and ureter | 4 | 2 | 50% | 100% |
| | | 595 Cystitis | 4 | 1 | | 100% |
| | | 597 Urethritis, not sexually transmitted, and urethral syndrome | 12 | | 8% | |
| | | 599 Other disorders of urethra and urinary tract | 57 | 8 | 35% | 50% |
| | *J03* | *DISEASES OF MALE GENITAL ORGANS (600-608)* | 53 | 7 | 40% | 43% |
| | | 600 Hyperplasia of prostate | 1 | | | |
| | | 601 Inflammatory diseases of prostate | 2 | | 50% | |
| | | 603 Hydrocele | 2 | | 50% | |
| | | 604 Orchitis and epididymitis | 16 | 2 | 50% | 100% |
| | | 607 Disorders of penis | 13 | | 31% | |
| | | 608 Other disorders of male genital organs | 23 | 5 | 39% | 20% |
| | *J04* | *DISORDERS OF BREAST (610-612)* | 10 | 1 | 10% | |
| | | 611 Other disorders of breast | 10 | 1 | 10% | |
| | *J05* | *INFLAMMATORY DISEASE OF FEMALE PELVIC ORGANS (614-616)* | 33 | 7 | 24% | 57% |
| | | 614 Inflammatory disease of ovary, fallopian tube, pelvic cellular tissue, and peritoneum | 13 | 4 | 23% | 50% |
| | | 616 Inflammatory disease of cervix, vagina, and vulva | 22 | 3 | 23% | 67% |
| | *J06* | *OTHER DISORDERS OF FEMALE GENITAL TRACT (617-629)* | 64 | 11 | 17% | 18% |
| | | 617 Endometriosis | 1 | 1 | | |
| | | 618 Genital prolapse | 4 | 1 | 25% | |
| | | 620 Noninflammatory disorders of ovary, fallopian tube, and broad ligament | 10 | 5 | 20% | 20% |
| | | 623 Noninflammatory disorders of vagina | 22 | | 14% | |
| | | 625 Pain and other symptoms associated with female genital organs | 12 | 1 | 17% | 100% |
| | | 626 Disorders of menstruation and other abnormal bleeding from female genital tract | 16 | 3 | 13% | |
| | | 627 Menopausal and postmenopausal disorders | 8 | | 38% | |
| *K* | | *COMPLICATIONS OF PREGNANCY, CHILDBIRTH, AND THE PUERPERIUM (630-679)* | 84 | 55 | 18% | 27% |
| | *K01* | *ECTOPIC AND MOLAR PREGNANCY (630-633)* | 11 | 2 | | |
| | | 631 Other abnormal product of conception | 3 | | | |
| | | 632 Missed abortion | 5 | | | |
| | | 633 Ectopic pregnancy | 3 | 2 | | |
| | *K02* | *OTHER PREGNANCY WITH ABORTIVE OUTCOME (634-639)* | 10 | 3 | 40% | 67% |
| | | 634 Spontaneous abortion | 8 | 1 | 38% | 100% |
| | | 635 Legally induced abortion | 1 | 2 | | 50% |

| Group | Sub-Group | Code and Name of Principal Diagnosis | Total number of persons with diagnosis: Emergency Room | Total number of persons with diagnosis: Hospital Inpatient | % of persons with diagnosis in 10th Decile: Emergency Room | % of persons with diagnosis in 10th Decile: Hospital Inpatient |
|---|---|---|---|---|---|---|
| | | 637 Unspecified abortion | 1 | | 100% | |
| | *K03 COMPLICATIONS MAINLY RELATED TO PREGNANCY (640-649* | | 70 | 27 | 21% | 33% |
| | | 640 Hemorrhage in early pregnancy | 11 | 1 | | |
| | | 641 Antepartum hemorrhage, abruptio placentae, and placenta previa | 3 | | | |
| | | 642 Hypertension complicating pregnancy, childbirth, and the puerperium | 2 | 3 | 50% | |
| | | 643 Excessive vomiting in pregnancy | 4 | 1 | 25% | |
| | | 644 Early or threatened labor | 5 | 2 | 20% | |
| | | 645 Late pregnancy | 3 | 2 | 33% | |
| | | 646 Other complications of pregnancy, not elsewhere classified | 16 | 6 | 13% | 17% |
| | | 647 Infectious and parasitic conditions in the mother classifiable elsewhere, but co | 4 | | 25% | |
| | | 648 Other current conditions in the mother classifiable elsewhere, but complicating | 21 | 11 | 38% | 64% |
| | | 649 Other conditions or status of the mother complicating pregnancy, childbirth, or the puerperium | 1 | 1 | | 100% |
| | *K04 NORMAL DELIVERY, AND OTHER INDICATIONS FOR CARE IN PREGNANCY, LABOR, AND DELIVERY (650-659)* | | 19 | 15 | 21% | 20% |
| | | 652 Malposition and malpresentation of fetus | 2 | 2 | | |
| | | 654 Abnormality of organs and soft tissues of pelvis | 3 | 3 | | |
| | | 655 Known or suspected fetal abnormality affecting management of mother | 3 | | 33% | |
| | | 656 Other fetal and placental problems affecting management of mother | 4 | 4 | | |
| | | 657 Polyhydramnios | 1 | 1 | 100% | 100% |
| | | 658 Other problems associated with amniotic cavity and membranes | 2 | 3 | 50% | 33% |
| | | 659 Other indications for care or intervention related to labor and delivery, not el | 5 | 3 | 20% | 33% |
| | *K05 COMPLICATIONS OCCURRING MAINLY IN THE COURSE OF LABOR AND DELIVERY (660-669)* | | 6 | 15 | | 20% |
| | | 661 Abnormality of forces of labor | | 1 | | |
| | | 663 Umbilical cord complications | | 1 | | 100% |
| | | 664 Trauma to perineum and vulva during delivery | 5 | 11 | | 9% |
| | | 665 Other obstetrical trauma | 1 | 2 | | 50% |
| | *K06 COMPLICATIONS OF THE PUERPERIUM (670-677)* | | 1 | 1 | | |
| | | 672 Pyrexia of unknown origin during the puerperium | 1 | 1 | | |
| *L* | *DISEASES OF THE SKIN AND SUBCUTANEOUS TISSUE (680-709)* | | 413 | 126 | 25% | 50% |
| | *L01 INFECTIONS OF SKIN AND SUBCUTANEOUS TISSUE (680-686)* | | 316 | 122 | 28% | 48% |
| | | 680 Carbuncle and furuncle | 7 | | 29% | |
| | | 681 Cellulitis and abscess of finger and toe | 42 | 17 | 33% | 47% |
| | | 682 Other cellulitis and abscess | 260 | 104 | 27% | 48% |
| | | 684 Impetigo | 2 | | | |
| | | 686 Other local infections of skin and subcutaneous tissue | 12 | 1 | 42% | 100% |
| | *L02 OTHER INFLAMMATORY CONDITIONS OF SKIN AND SUBCUTANEOUS TISSUE (690-698)* | | 46 | 1 | 20% | 100% |
| | | 690 Erythematosquamous dermatosis | 1 | | | |

| Group | Sub-Group | Code and Name of Principal Diagnosis | *Total number of persons with diagnosis* | | *% of persons with diagnosis in 10th Decile* | |
|---|---|---|---|---|---|---|
| | | | Emergency Room | Hospital Inpatient | Emergency Room | Hospital Inpatient |
| | | 691 Atopic dermatitis and related conditions | 4 | | | |
| | | 692 Contact dermatitis and other eczema | 28 | | 25% | |
| | | 693 Dermatitis due to substances taken internally | 4 | 1 | 50% | 100% |
| | | 696 Psoriasis and similar disorders | 2 | | | |
| | | 698 Pruritus and related conditions | 10 | | 20% | |
| | *L03* | *OTHER DISEASES OF SKIN AND SUBCUTANEOUS TISSUE (700-709)* | 72 | 6 | 26% | 83% |
| | | 700 Corns and callosities | 1 | | 100% | |
| | | 701 Other hypertrophic and atrophic conditions of skin | 4 | | | |
| | | 703 Diseases of nail | 15 | | 20% | |
| | | 704 Diseases of hair and hair follicles | 20 | | 35% | |
| | | 705 Disorders of sweat glands | 4 | | | |
| | | 706 Diseases of sebaceous glands | 11 | | 9% | |
| | | 707 Chronic ulcer of skin | 9 | 5 | 56% | 80% |
| | | 708 Urticaria | 9 | | 22% | |
| | | 709 Other disorders of skin and subcutaneous tissue | 2 | 1 | | 100% |
| *M* | | *DISEASES OF THE MUSCULOSKELETAL SYSTEM AND CONNECTIVE TISSUE (710-739)* | 478 | 73 | 28% | 53% |
| | *M01* | *ARTHROPATHIES AND RELATED DISORDERS (710-719)* | 165 | 11 | 36% | 55% |
| | | 710 Diffuse diseases of connective tissue | 3 | | 100% | |
| | | 711 Arthropathy associated with infections | 1 | 2 | 100% | 100% |
| | | 714 Rheumatoid arthritis and other inflammatory polyarthropathies | 2 | 1 | 100% | 100% |
| | | 715 Osteoarthrosis and allied disorders | 21 | 5 | 38% | 20% |
| | | 716 Other and unspecified arthropathies | 23 | | 39% | |
| | | 717 Internal derangement of knee | 10 | | 40% | |
| | | 718 Other derangement of joint | 10 | | 20% | |
| | | 719 Other and unspecified disorders of joint | 122 | 3 | 37% | 67% |
| | *M02* | *DORSOPATHIES (720-724)* | 188 | 20 | 29% | 50% |
| | | 721 Spondylosis and allied disorders | 7 | 5 | 57% | |
| | | 722 Intervertebral disc disorders | 4 | 5 | 25% | 60% |
| | | 723 Other disorders of cervical region | 18 | 3 | 33% | 67% |
| | | 724 Other and unspecified disorders of back | 169 | 8 | 29% | 75% |
| | *M03* | *RHEUMATISM, EXCLUDING THE BACK (725-729)* | 166 | 21 | 34% | 62% |
| | | 726 Peripheral enthesopathies and allied syndromes | 22 | 3 | 32% | 67% |
| | | 727 Other disorders of synovium, tendon, and bursa | 13 | 4 | 31% | 75% |
| | | 728 Disorders of muscle, ligament, and fascia | 12 | 5 | 42% | 60% |
| | | 729 Other disorders of soft tissues | 122 | 9 | 35% | 56% |
| | *M04* | *OSTEOPATHIES, CHONDROPATHIES, AND ACQUIRED MUSCULOSKELETAL DEFORMITIES (730-739)* | 26 | 26 | 27% | 54% |
| | | 730 Osteomyelitis, periostitis, and other infections involving bone | 10 | 15 | 40% | 53% |
| | | 733 Other disorders of bone and cartilage | 12 | 12 | 17% | 58% |
| | | 736 Other acquired deformities of limbs | 4 | | 25% | |
| | | 737 Curvature of spine | 1 | | | |

| Group | Sub-Group | Code and Name of Principal Diagnosis | *Total number of persons with diagnosis* | | *% of persons with diagnosis in 10th Decile* | |
|---|---|---|---|---|---|---|
| | | | Emergency Room | Hospital Inpatient | Emergency Room | Hospital Inpatient |
| | | 738 Other acquired deformity | | 1 | | |
| *N* | | *CONGENITAL ANOMALIES (740-759)* | 2 | 1 | 50% | |
| | | 744 Congenital anomalies of ear, face, and neck | | 1 | | |
| | | 746 Other congenital anomalies of heart | 1 | | 100% | |
| | | 755 Other congenital anomalies of limbs | 1 | | | |
| O | | CERTAIN CONDITIONS ORIGINATING IN THE PERINATAL PERIOD (760-779) | 2 | | 50% | |
| | | O02 OTHER CONDITIONS ORIGINATING IN THE PERINATAL PERIOD (764-779) | 2 | | 50% | |
| | | 764 Slow fetal growth and fetal malnutrition | 1 | | 100% | |
| | | 765 Disorders relating to short gestation and low birthweight | 1 | | | |
| *P* | | *SYMPTOMS, SIGNS, AND ILL-DEFINED CONDITIONS (780-799)* | 672 | 91 | 29% | 53% |
| | *P01* | *SYMPTOMS (780-789)* | 652 | 91 | 29% | 53% |
| | | 780 General symptoms | 146 | 21 | 34% | 52% |
| | | 781 Symptoms involving nervous and musculoskeletal systems | 4 | | 75% | |
| | | 782 Symptoms involving skin and other integumentary tissue | 52 | 3 | 35% | 67% |
| | | 784 Symptoms involving head and neck | 96 | 1 | 30% | |
| | | 785 Symptoms involving cardiovascular system | 10 | 2 | 10% | 50% |
| | | 786 Symptoms involving respiratory system and other chest symptoms | 218 | 58 | 31% | 50% |
| | | 787 Symptoms involving digestive system | 35 | 2 | 37% | 100% |
| | | 788 Symptoms involving urinary system | 16 | 1 | 31% | 100% |
| | | 789 Other symptoms involving abdomen and pelvis | 173 | 8 | 34% | 75% |
| | *P02* | *NONSPECIFIC ABNORMAL FINDINGS (790-796)* | 27 | 1 | 41% | 100% |
| | | 790 Nonspecific findings on examination of blood | 18 | 1 | 39% | 100% |
| | | 792 Nonspecific abnormal findings in other body substances | 1 | | 100% | |
| | | 793 Nonspecific abnormal findings on radiological and other examination of body structure | 1 | | | |
| | | 794 Nonspecific abnormal results of function studies | 1 | | | |
| | | 795 Other and nonspecific abnormal cytological, histological, immunological and DNA | 1 | | 100% | |
| | | 796 Other nonspecific abnormal findings | 3 | | 33% | |
| | | 799 Other ill-defined and unknown causes of morbidity and mortality | 2 | | 50% | |
| *Q* | | *INJURY AND POISONING (800-999)* | 890 | 282 | 27% | 51% |
| | *Q01* | *FRACTURES (800-829)* | 252 | 102 | 27% | 49% |
| | | 801 Fracture of base of skull | 5 | 10 | 60% | 70% |
| | | 802 Fracture of face bones | 33 | 29 | 39% | 48% |
| | | 803 Other and unqualified skull fractures | 2 | 1 | 50% | |
| | | 804 Multiple fractures involving skull or face with other bones | | 1 | | |
| | | 805 Fracture of vertebral column without mention of spinal cord injury | 5 | 4 | | 25% |
| | | 806 Fracture of vertebral column with spinal cord injury | 1 | 1 | | |
| | | 807 Fracture of rib(s), sternum, larynx, and trachea | 13 | 4 | 31% | 50% |
| | | 808 Fracture of pelvis | 3 | 5 | | 20% |
| | | 810 Fracture of clavicle | 4 | 1 | | |

| Group | Sub-Group | Code and Name of Principal Diagnosis | Total number of persons with diagnosis: Emergency Room | Total number of persons with diagnosis: Hospital Inpatient | % of persons with diagnosis in 10th Decile: Emergency Room | % of persons with diagnosis in 10th Decile: Hospital Inpatient |
|---|---|---|---|---|---|---|
| | | 812 Fracture of humerus | 10 | 5 | 30% | 40% |
| | | 813 Fracture of radius and ulna | 29 | 8 | 34% | 38% |
| | | 814 Fracture of carpal bone(s) | 8 | | 13% | |
| | | 815 Fracture of metacarpal bone(s) | 57 | 8 | 19% | 63% |
| | | 816 Fracture of one or more phalanges of hand | 26 | | 31% | |
| | | 817 Multiple fractures of hand bones | 5 | | 40% | |
| | | 820 Fracture of neck of femur | 2 | 4 | | 25% |
| | | 821 Fracture of other and unspecified parts of femur | 2 | 5 | 100% | 80% |
| | | 822 Fracture of patella | 5 | 2 | 60% | 100% |
| | | 823 Fracture of tibia and fibula | 11 | 8 | 9% | 13% |
| | | 824 Fracture of ankle | 17 | 16 | 29% | 31% |
| | | 825 Fracture of one or more tarsal and metatarsal bones | 22 | 5 | 9% | 60% |
| | | 826 Fracture of one or more phalanges of foot | 8 | | 50% | |
| | | 829 Fracture of unspecified bones | 1 | | | |
| | *Q02* | *DISLOCATION (830-839)* | 18 | 6 | 22% | 33% |
| | | 830 Dislocation of jaw | 2 | | | |
| | | 831 Dislocation of shoulder | 4 | 1 | 50% | 100% |
| | | 833 Dislocation of wrist | 1 | 2 | | |
| | | 834 Dislocation of finger | 5 | 2 | 20% | 50% |
| | | 836 Dislocation of knee | 4 | 1 | 25% | |
| | | 838 Dislocation of foot | 1 | | | |
| | | 839 Other, multiple, and ill-defined dislocations | 1 | 1 | | |
| | *Q03* | *SPRAINS AND STRAINS OF JOINTS AND ADJACENT MUSCLES (840-848)* | 113 | 4 | 30% | 75% |
| | | 840 Sprains and strains of shoulder and upper arm | 13 | 1 | 46% | 100% |
| | | 841 Sprains and strains of elbow and forearm | 1 | | | |
| | | 842 Sprains and strains of wrist and hand | 12 | 1 | 8% | 100% |
| | | 843 Sprains and strains of hip and thigh | 4 | | 50% | |
| | | 844 Sprains and strains of knee and leg | 11 | 1 | 18% | 100% |
| | | 845 Sprains and strains of ankle and foot | 32 | | 38% | |
| | | 846 Sprains and strains of sacroiliac region | 6 | 1 | 17% | |
| | | 847 Sprains and strains of other and unspecified parts of back | 31 | | 35% | |
| | | 848 Other and ill-defined sprains and strains | 8 | | 13% | |
| | *Q04* | *INTRACRANIAL INJURY, EXCLUDING THOSE WITH SKULL FRACTURE (850-854)* | 24 | 16 | 25% | 50% |
| | | 850 Concussion | 19 | 4 | 21% | |
| | | 851 Cerebral laceration and contusion | 1 | 4 | | 50% |
| | | 852 Subarachnoid, subdural, and extradural hemorrhage, following injury | 4 | 8 | 50% | 63% |
| | | 853 Other and unspecified intracranial hemorrhage following injury | | 3 | | 33% |
| | | 854 Intracranial injury of other and unspecified nature | | 1 | | |
| | *Q05* | *INTERNAL INJURY OF THORAX, ABDOMEN, AND PELVIS (860-869)* | 12 | 20 | 75% | 70% |
| | | 860 Traumatic pneumothorax and hemothorax | 3 | 6 | 100% | 67% |

| Group | Sub-Group | Code and Name of Principal Diagnosis | *Total number of persons with diagnosis* | | *% of persons with diagnosis in 10th Decile* | |
|---|---|---|---|---|---|---|
| | | | Emergency Room | Hospital Inpatient | Emergency Room | Hospital Inpatient |
| | | 861 Injury to heart and lung | | 2 | | 50% |
| | | 862 Injury to other and unspecified intrathoracic organs | 2 | 1 | | |
| | | 863 Injury to gastrointestinal tract | 3 | 8 | 100% | 75% |
| | | 864 Injury to liver | 1 | 2 | 100% | 50% |
| | | 865 Injury to spleen | 1 | 3 | 100% | 33% |
| | | 866 Injury to kidney | 1 | 2 | | |
| | | 867 Injury to pelvic organs | 1 | 1 | 100% | 100% |
| | *Q06 OPEN WOUNDS (870-897)* | | 253 | 62 | 27% | 44% |
| | | 870 Open wound of ocular adnexa | 8 | 3 | 50% | |
| | | 871 Open wound of eyeball | 1 | 1 | | |
| | | 872 Open wound of ear | 6 | | 33% | |
| | | 873 Other open wound of head | 104 | 14 | 26% | 36% |
| | | 874 Open wound of neck | 2 | 2 | | |
| | | 875 Open wound of chest (wall) | 3 | 3 | | 33% |
| | | 876 Open wound of back | 1 | 2 | 100% | 50% |
| | | 877 Open wound of buttock | 2 | 3 | 50% | 33% |
| | | 878 Open wound of genital organs (external), including traumatic amputation | 2 | 1 | 50% | |
| | | 879 Open wound of other and unspecified sites, except limbs | 9 | 6 | 22% | 17% |
| | | 880 Open wound of shoulder and upper arm | 10 | 4 | | 25% |
| | | 881 Open wound of elbow, forearm, and wrist | 24 | 6 | 25% | 67% |
| | | 882 Open wound of hand except finger(s) alone | 19 | 4 | 32% | |
| | | 883 Open wound of finger(s) | 32 | 10 | 19% | 60% |
| | | 884 Multiple and unspecified open wound of upper limb | 4 | | 25% | |
| | | 885 Traumatic amputation of thumb (complete) (partial) | 1 | 1 | | |
| | | 886 Traumatic amputation of other finger(s) (complete) (partial) | 2 | 1 | | |
| | | 890 Open wound of hip and thigh | 10 | 6 | 60% | 50% |
| | | 891 Open wound of knee, leg [except thigh], and ankle | 20 | 6 | 35% | 50% |
| | | 892 Open wound of foot except toe(s) alone | 5 | | | |
| | | 893 Open wound of toe(s) | 4 | 1 | | 100% |
| | | 894 Multiple and unspecified open wound of lower limb | 2 | | | |
| | *Q07 INJURY TO BLOOD VESSELS (900-904)* | | 2 | 5 | | 20% |
| | | 901 Injury to blood vessels of thorax | | 1 | | |
| | | 902 Injury to blood vessels of abdomen and pelvis | | 1 | | |
| | | 903 Injury to blood vessels of upper extremity | 1 | 3 | | |
| | | 904 Injury to blood vessels of lower extremity and unspecified sites | 1 | 3 | | 33% |
| | Q08 LATE EFFECTS OF INJURIES, POISONINGS, TOXIC EFFECTS, AND OTHER EXTERNAL CAUSES (905-909) | | 1 | | | |
| | | 905 Late effects of musculoskeletal and connective tissue injuries | 1 | | | |
| | *Q09 SUPERFICIAL INJURY (910-919)* | | 40 | 4 | 38% | 50% |
| | | 910 Superficial injury of face, neck, and scalp except eye | 7 | 1 | | |
| | | 911 Superficial injury of trunk | 5 | 1 | 20% | 100% |

| Group | Sub-Group | Code and Name of Principal Diagnosis | *Total number of persons with diagnosis* | | *% of persons with diagnosis in 10th Decile* | |
|---|---|---|---|---|---|---|
| | | | Emergency Room | Hospital Inpatient | Emergency Room | Hospital Inpatient |
| | | 912 Superficial injury of shoulder and upper arm | 1 | | 100% | |
| | | 913 Superficial injury of elbow, forearm, and wrist | 3 | 2 | | |
| | | 914 Superficial injury of hand(s) except finger(s) alone | 6 | | 83% | |
| | | 915 Superficial injury of finger(s) | 1 | | 100% | |
| | | 916 Superficial injury of hip, thigh, leg, and ankle | 6 | 1 | 50% | 100% |
| | | 917 Superficial injury of foot and toe(s) | 5 | | 60% | |
| | | 918 Superficial injury of eye and adnexa | 6 | | 17% | |
| | | 919 Superficial injury of other, multiple, and unspecified sites | 3 | | | |
| | *Q10 CONTUSION WITH INTACT SKIN SURFACE (920-924)* | | 131 | 11 | 31% | 45% |
| | | 920 Contusion of face, scalp, and neck except eye(s) | 48 | 6 | 38% | 17% |
| | | 921 Contusion of eye and adnexa | 10 | | 20% | |
| | | 922 Contusion of trunk | 18 | 2 | 28% | 100% |
| | | 923 Contusion of upper limb | 25 | | 40% | |
| | | 924 Contusion of lower limb and of other and unspecified sites | 35 | 3 | 20% | 67% |
| | *Q12 EFFECTS OF FOREIGN BODY ENTERING THROUGH ORIFICE (930-939)* | | 16 | 1 | 6% | |
| | | 930 Foreign body on external eye | 8 | | | |
| | | 931 Foreign body in ear | 7 | | 14% | |
| | | 937 Foreign body in anus and rectum | | 1 | | |
| | | 939 Foreign body in genitourinary tract | 1 | | | |
| | *Q13 BURNS (940-949)* | | 11 | 2 | 36% | 100% |
| | | 940 Burn confined to eye and adnexa | 1 | | 100% | |
| | | 941 Burn of face, head, and neck | 1 | | | |
| | | 942 Burn of trunk | 1 | | | |
| | | 943 Burn of upper limb, except wrist and hand | 1 | 1 | | 100% |
| | | 944 Burn of wrist(s) and hand(s) | 6 | 1 | 50% | 100% |
| | | 947 Burn of internal organs | 1 | | | |
| | *Q14 INJURY TO NERVES AND SPINAL CORD (950-957)* | | 5 | 3 | 60% | 67% |
| | | 952 Spinal cord injury without evidence of spinal bone injury | 1 | 2 | 100% | 50% |
| | | 955 Injury to peripheral nerve(s) of shoulder girdle and upper limb | 4 | 1 | 50% | 100% |
| | | 956 Injury to peripheral nerve(s) of pelvic girdle and lower limb | | 1 | | |
| | *Q15 CERTAIN TRAUMATIC COMPLICATIONS AND UNSPECIFIED INJURIES (958-959)* | | 70 | 8 | 30% | 63% |
| | | 958 Certain early complications of trauma | 1 | 1 | | 100% |
| | | 959 Injury, other and unspecified | 69 | 7 | 30% | 57% |
| | *Q16 POISONING BY DRUGS, MEDICINAL AND BIOLOGICAL SUBSTANCES (960-979)* | | 26 | 25 | 35% | 48% |
| | | 962 Poisoning by hormones and synthetic substitutes | 1 | | | |
| | | 965 Poisoning by analgesics, antipyretics, and antirheumatics | 11 | 12 | 18% | 42% |
| | | 966 Poisoning by anticonvulsants and anti-Parkinsonism drugs | 2 | 1 | 50% | 100% |
| | | 968 Poisoning by other central nervous system depressants and anesthetics | 2 | 1 | 50% | |
| | | 969 Poisoning by psychotropic agents | 1 | 4 | | 50% |
| | | 970 Poisoning by central nervous system stimulants | 8 | 6 | 63% | 50% |

| Group | Sub-Group | Code and Name of Principal Diagnosis | Total number of persons with diagnosis: Emergency Room | Total number of persons with diagnosis: Hospital Inpatient | % of persons with diagnosis in 10th Decile: Emergency Room | % of persons with diagnosis in 10th Decile: Hospital Inpatient |
|---|---|---|---|---|---|---|
| | | 976 Poisoning by agents primarily affecting skin and mucous membrane, ophthalmologic | 1 | | | |
| | | 977 Poisoning by other and unspecified drugs and medicinal substances | | 1 | | 100% |
| | Q17 | TOXIC EFFECTS OF SUBSTANCES CHIEFLY NONMEDICINAL AS TO SOURCE (980-989) | 6 | | 33% | |
| | | 980 Toxic effect of alcohol | 2 | | 50% | |
| | | 983 Toxic effect of corrosive aromatics, acids, and caustic alkalis | 1 | | | |
| | | 989 Toxic effect of other substances, chiefly nonmedicinal as to source | 3 | | 33% | |
| | *Q18* | *OTHER AND UNSPECIFIED EFFECTS OF EXTERNAL CAUSES (990-995)* | 26 | 7 | 23% | 43% |
| | | 991 Effects of reduced temperature | 2 | 1 | | 100% |
| | | 992 Effects of heat and light | 2 | 2 | | |
| | | 995 Certain adverse effects not elsewhere classified | 22 | 4 | 27% | 50% |
| | *Q19* | *COMPLICATIONS OF SURGICAL AND MEDICAL CARE, NOT ELSEWHERE CLASSIFIED (996-999)* | 32 | 37 | 53% | 70% |
| | | 996 Complications peculiar to certain specified procedures | 14 | 21 | 57% | 81% |
| | | 997 Complications affecting specified body systems, not elsewhere classified | 2 | 1 | 50% | |
| | | 998 Other complications of procedures, NEC | 16 | 16 | 50% | 63% |
| *R* | | *SUPPLEMENTARY CLASSIFICATION OF FACTORS INFLUENCING HEALTH STATUS AND CONTACT WITH HEALTH SERVICES (V01-V89)* | 460 | 39 | 33% | 62% |
| | R01 | PERSONS WITH POTENTIAL HEALTHHAZARDS RELATED TO COMMUNICABLE DISEASES (V01-V06) | 3 | | 33% | |
| | | V01 Contact with or exposure to communicable diseases | 2 | | | |
| | | V02 Carrier or suspected carrier of infectious diseases | 1 | | 100% | |
| | RO2 | PERSONS WITH NEED FOR ISOLATION, OTHER POTENTIAL HEALTH HAZARDS AND PROPHYLACTIC MEASURES (V07-V09) | 2 | | 50% | |
| | | V08 Asymptomatic human immunodeficiency virus [HIV] infection status | 2 | | 50% | |
| | R03 | PERSONS WITH POTENTIAL HEALTH HAZARDS RELATED TO PERSONAL AND FAMILY HISTORY (V10-V19) | 2 | | 50% | |
| | | V12 Personal history of certain other diseases | 1 | | 100% | |
| | | V15 Other personal history presenting hazards to health | 1 | | | |
| | R04 | PERSONS ENCOUNTERING HEALTH SERVICES IN CIRCUMSTANCES RELATED TO REPRODUCTION AND DEVELOPMENT (V20-V29) | 30 | | 20% | |
| | | V22 Normal pregnancy | 23 | | 17% | |
| | | V23 Supervision of high-risk pregnancy | 8 | | 25% | |
| | | V24 Postpartum care and examination | 1 | | | |
| | R06 | PERSONS WITH A CONDITION INFLUENCING THEIR HEALTH STATUS (V40-V49) | 4 | | | |
| | | V44 Artificial opening status | 1 | | | |
| | | V45 Other postprocedural states | 3 | | | |
| | *R07* | *PERSONS ENCOUNTERING HEALTH SERVICES FOR SPECIFIC PROCEDURES AND AFTERCARE (V50-V59)* | 162 | 37 | 31% | 59% |
| | | V53 Fitting and adjustment of other device | 2 | | 100% | |
| | | V54 Other orthopedic aftercare | 85 | 16 | 31% | 44% |
| | | V55 Attention to artificial openings | 1 | 3 | | 100% |

| Group | Sub-Group | Code and Name of Principal Diagnosis | *Total number of persons with diagnosis* Emergency Room | Hospital Inpatient | *% of persons with diagnosis in 10th Decile* Emergency Room | Hospital Inpatient |
|---|---|---|---|---|---|---|
| | | V57 Care involving use of rehabilitation procedures | | 13 | | 54% |
| | | V58 Encounter for other and unspecified procedures and aftercare | 77 | 5 | 32% | 100% |
| | *R08 PERSONS ENCOUNTERING HEALTH SERVICES IN OTHER CIRCUMSTANCES (V60-V69)* | | 184 | 2 | 42% | 100% |
| | | V60 Housing, household, and economic circumstances | 1 | | 100% | |
| | | V61 Other family circumstances | 1 | | | |
| | | V62 Other psychosocial circumstances | 5 | 1 | 60% | 100% |
| | | V64 Persons encountering health services for specific procedures, not carried out | 21 | | 43% | |
| | | V65 Other persons seeking consultation | 17 | 1 | 65% | 100% |
| | | V67 Follow-up examination | 24 | | 46% | |
| | | V68 Encounters for administrative purposes | 124 | | 39% | |
| | *R09 PERSONS WITHOUT REPORTED DIAGNOSIS ENCOUNTERED DURING EXAMINATION AND INVESTIGATION OF INDIVIDUALS AND POPULATIONS (V70-V82)* | | 110 | 1 | 33% | |
| | | V70 General medical examination | 13 | | 31% | |
| | | V71 Observation and evaluation for suspected conditions not found | 32 | 1 | 38% | |
| | | V72 Special investigations and examinations | 25 | | 12% | |
| | | V73 Special screening examination for viral and chlamydial diseases | 1 | | | |
| | | V74 Special screening examination for bacterial and spirochetal diseases | 5 | | 80% | |
| | | V77 Special screening for endocrine, nutritional, metabolic, and immunity disorders | 1 | | | |
| | | V79 Special screening for mental disorders and developmental handicaps | 30 | | 40% | |
| | | V80 Special screening for neurological, eye, and ear diseases | 2 | | 50% | |
| | | V81 Special screening for cardiovascular, respiratory, and genitourinary diseases | 2 | | 50% | |
| | | V82 Special screening for other conditions | 2 | | 50% | |
| *S SUPPLEMENTARY CLASSIFICATION OF EXTERNAL CAUSES OF INJURY AND POISONING (E000-E999)* | | | 1 | | 100% | |
| | *S24 HOMICIDE AND INJURY PURPOSELY INFLICTED BY OTHER PERSONS (E960-E969)* | | 1 | | 100% | |
| | | E96 Rape | 1 | | 100% | |
| *TOTAL* | | | 2,991 | 1,024 | 22% | 44% |

*NUMBER OF COUNTY HOSPITAL ENCOUNTERS PER PATIENT OVER FOUR YEARS*

| | | Emergency Room | Hospital Inpatient |
|---|---|---|---|
| Range | | 0-82 | 0-167 |
| Mean | All hospital patients | 2.6 | 0.6 |
| | 10th decile hospital patients | 4.6 | 1.6 |
| Median | All hospital patients | 1 | 0 |
| | 10th decile hospital patients | 3 | 1 |

# Client Documents Appendix

## Hospital Diagnostic and Service Use Data

Patient Name _____ Birth date _____ Place of Birth _____

Staff Name: _____ Date _____ Hospital/Clinic _____

Instructions: Please review the patient's medical records and check (☑) all diagnoses that apply. Check (☑) only in the diagnoses in **bold** with check boxes next to them; the others are for reference.

☑ **Group Sub-Group ICD-9-CM Code and Name of Principal Diagnosis**

***1. INFECTIOUS AND PARASITIC DISEASES (001-139)***

- ❑ **Pulmonary Tuberculosis (011)**
- ❑ **Human Immunodeficiency Virus (HIV) Infection (042)**

***3. ENDOCRINE, NUTRITIONAL AND METABOLIC DISEASES, AND IMMUNITY DISORDERS (240-279)***

- ❑ **250 Diabetes mellitus**

❑ ***5. MENTAL DISORDERS (290-319)***

- ❑ ***Psychoses (290-299)***

*Organic Psychotic Conditions (290-294)*

- ❑ **291 Alcohol-induced mental disorders**
- ❑ **292 Drug-induced mental disorders**

- ❑ ***Other Psychoses (295-299)***

295 Schizophrenic disorders
296 Episodic mood disorders
298 Other nonorganic psychoses

- ❑ ***Neurotic Disorders, Personality Disorders, & Other Nonpsychotic Mental Disorders (300-316)***

300 Anxiety, dissociative and somatoform disorders

- ❑ **303 Alcohol dependence syndrome**
- ❑ **304 Drug dependence**

305 Nondependent abuse of drugs
309 Adjustment reaction
311 Depressive disorder, not elsewhere classified

Mental Retardation (317-319)

❑ ***6. Diseases of the Nervous System & Sense Organs (320-389)***

*Inflammatory Diseases of the Central Nervous System (320-326)*
*Organic Sleep Disorders (327)*
*Hereditary & Degenerative Diseases of the Central Nervous System (330-337)*
*Pain (338)*
338 Pain, not elsewhere classified
*Other Disorders of the Central Nervous System (340-349)*
345 Epilepsy & Recurrent Seizures
346 Migraine
*Disorders of the Peripheral Nervous System (350-359)*
354 Mononeuritis of Upper Limb & Mononeuritis Multiplex
*Disorders of the Eye And Adnexa (360-379)*
368 Visual Disturbances

| ☑ | Group | Sub-Group | ICD-9-CM Code and Name of Principal Diagnosis |
|---|---|---|---|
| | | | 372 Disorders of Conjunctiva |
| | | | 373 Inflammation of Eyelids |
| | | | 379 Other Disorders of Eye |
| | | *Diseases of the Ear And Mastoid Process (380-389)* | |
| | | | 380 Disorders of external ear |
| ❑ | ***7. Diseases of the Circulatory System (390-459)*** | | |
| | ❑ | **Chronic Rheumatic Heart Disease (393-398)** | |
| | ❑ | **Hypertensive Disease (401-405)** | |
| | | | 401 Essential hypertension |
| | | | 403 Hypertensive chronic kidney disease |
| | | *Ischemic Heart Disease (410-414)* | |
| | | | 410 Acute myocardial infarction |
| | | | 411 Other acute and subacute forms of ischemic heart disease |
| | | | 414 Other forms of chronic ischemic heart disease |
| | | *Diseases of Pulmonary Circulation (415-417)* | |
| | ❑ | ***Other Forms of Heart Disease (420-429)*** | |
| * | | ❑ | **427 Cardiac dysrhythmias** |
| | | ❑ | **428 Heart failure** |
| | | *Cerebrovascular Disease (430-438)* | |
| | | *Diseases of Arteries, Arterioles, & Capillaries (440-449)* | |
| | | *Diseases of Veins & Lymphatics, & Other Diseases of Circulatory System (451-459)* | |
| * | | ❑ | **453 Other venous embolism and thrombosis** |
| | | | 455 Hemorrhoids |
| ❑ | ***8. DISEASES OF THE RESPIRATORY SYSTEM (460-519)*** | | |
| | | *Acute Respiratory Infections (460-466)* | |
| | | | 459 Other disorders of circulatory system |
| | | | 462 Acute pharyngitis |
| | | | 465 Acute upper respiratory infections of multiple or unspecified sites |
| | | | 466 Acute bronchitis and bronchiolitis |
| | | *Other Diseases of the Upper Respiratory Tract (470-478)* | |
| | | | 473 Chronic sinusitis |
| | | *Pneumonia & Influenza (480-488)* | |
| | | | 486 Pneumonia, organism unspecified |
| | | *Chronic Obstructive Pulmonary Disease & Allied Conditions (490-496)* | |
| | | | 490 Bronchitis, not specified as acute or chronic |
| | | | 491 Chronic bronchitis |
| | | ❑ | **493 Asthma** |
| | | *Pneumoconioses & Other Lung Diseases Due to External Agents (500-508)* | |
| | | *Other Diseases of Respiratory System (510-519)* | |
| | | | 511 Pleurisy |
| ❑ | ***9. DISEASES OF THE DIGESTIVE SYSTEM (520-579)*** | | |
| | | *Diseases of Oral Cavity, Salivary Glands, & Jaws (520-529)* | |
| | | | 521 Diseases of hard tissues of teeth |
| | | | 522 Diseases of pulp and periapical tissues |
| | | | 525 Other diseases and conditions of the teeth and supporting structures |
| | | | 526 Diseases of the jaws |

| ☑ | Group | Sub-Group | ICD-9-CM Code and Name of Principal Diagnosis |
|---|---|---|---|
| | | | 528 Diseases of the oral soft tissues, excluding lesions specific for gingiva and to |
| | | | *Diseases of Esophagus, Stomach, & Duodenum (530-538)* |
| | | | 530 Diseases of esophagus |
| | | | 535 Gastritis and duodenitis |
| | | | 536 Disorders of function of stomach |
| | | | *Appendicitis (540-543)* |
| | | | *Hernia of Abdominal Cavity (550-553)* |
| | | | 550 Inguinal hernia |
| | | | 553 Other hernia of abdominal cavity without mention of obstruction or gangrene |
| | | | *Noninfectious Enteritis & Colitis (555-558)* |
| | | | 558 Other and unspecified noninfectious gastroenteritis and colitis |
| | | | *Other Diseases of Intestines & Peritoneum (560-569)* |
| | | | 560 Intestinal obstruction without mention of hernia |
| | | | 564 Functional digestive disorders, not elsewhere classified |
| | | | 569 Other disorders of intestine |
| | | | *Other Diseases of Digestive System (570-579)* |
| * | | | ❑ 571 Chronic liver disease and cirrhosis |
| | | | 574 Cholelithiasis |
| * | | | ❑ 577 Diseases of pancreas |
| | | | 578 Gastrointestinal hemorrhage |
| ❑ | ***10. DISEASES OF THE GENITOURINARY SYSTEM (580-629)*** | | |
| | | | *Other Diseases of Urinary System (590-599)* |
| | | | 590 Infections of kidney |
| | | | 592 Calculus of kidney and ureter |
| | | | 597 Urethritis, not sexually transmitted, and urethral syndrome |
| | | | 599 Other disorders of urethra and urinary tract |
| ❑ | ***13. DISEASES OF THE MUSCULOSKELETAL SYSTEM AND CONNECTIVE TISSUE (710-739)*** | | |
| | | | *Arthropathies & Related Disorders (710-719)* |
| | | | 715 Osteoarthrosis and allied disorders |
| | | | 716 Other and unspecified arthropathies |
| | | | 717 Internal derangement of knee |
| | | | 718 Other derangement of joint |
| | | | 719 Other and unspecified disorders of joint |
| | | | *Dorsopathies (720-724)* |
| | | | 721 Spondylosis and allied disorders |
| | | | 723 Other disorders of cervical region |
| | | | 724 Other and unspecified disorders of back |
| | | | *Rheumatism, Excluding the Back (725-729)* |
| | | | 726 Peripheral enthesopathies and allied syndromes |
| | | | 727 Other disorders of synovium, tendon, and bursa |
| | | | 728 Disorders of muscle, ligament, and fascia |
| | | | 729 Other disorders of soft tissues |
| | | | *Osteopathies, Chondropathies, & Acquird Musculoskel. Deformities (730-739)* |
| | | | 730 Osteomyelitis, periostitis, and other infections involving bone |
| | | | 733 Other disorders of bone and cartilage |

*

☑ **Group Sub-Group ICD-9-CM Code and Name of Principal Diagnosis**

***17. INJURY AND POISONING (800-999)***

❑ **970 Poisoning by central nervous system stimulants**

***Is this patient expected to recover and live independently without continuing nursing care?***

❑ Yes ❑ No ❑ Don't Know

***Will this patient need short-term respite care?*** ❑ Yes ❑ No ❑ Don't Know

**IN THE PAST 2 YEARS:**

*This section on past health care and jail use in the past two-year's history is extremely important. Please look up this information in patient records.*

Outpatient Clinic (#visits) _____ (all clinics)

Emergency Room (#visits) _____ (all hospitals)

Hospital inpatient (#admissions) _____ (all hospitals) (#days) _____

In jail or prison? ❑ Yes ❑ No ❑ Don't Know

Individuals are screened for five issues as part of the background check for permanent supportive housing. Please check (☑)any of the following attributes that are known to apply to this patient: _____ (1) undocumented immigrant; _____ (2) on parole for a violent crime; or convicted of _____ (3) arson, _____ (4) operating a methamphetamine lab, or _____ (5) an offense that requires registering as a sex offender.

# Interview Questionnaire

*ALL RESPONSES ARE CONFIDENTIAL*

Name _____ Date _____ Location _____

## *Background*

1-3 1 In what year were you born? 19____ Where were you born? _____

2 Did you serve on active duty in the U.S. Armed Forces? ❑ Yes ❑ No

3 Which of the following categories best describes your ethnicity or race?

❑ African American ❑ Latino ❑ White ❑ Asian or Pacific Islander ❑ Other

### *Disabilities*

*Do you have any of the following long-lasting conditions?*

4 4 ❑ Blindness, deafness, or a severe vision or hearing impairment?

4 5 ❑ A condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying?

*Do you have a physical, mental, or emotional condition lasting 6 months or more, that makes it difficult for you to do any of the following activities:*

4 6 ❑ Learn, remember or concentrate?

4 7 ❑ Dress, bathe, or get around indoors?

4 8 ❑ Go outside alone to shop or visit a doctor's office?

4 9 ❑ Work at a job or business?

### *Medical Conditions*

*Have you been diagnosed by a doctor as having any of the following medical conditions:*

16 10 ❑ Circulatory system disorder: heart attack, cardiac dysrhythmia or reduced blood supply to the heart (390-459)

6 11 ☐ High blood pressure (hypertension 391-405)

12 12 ❑ Respiratory disease such as pneumonia or respiratory inflammation (460-519)

13 13 ☐ Asthma (493)

11 14 ❑ Urinary tract infections or kidney stones (590-599)

18 15 ❑ Muscle or joint disorder: arthritis or a back disorder (musculo-skeletal system 710-739)

17 16 ❑ Digestive disorder: ulcer, gastritis, inguinal hernia, cirrhosis of liver, or dental disease (520-579)

17 ❑ Human immunodeficiency virus [HIV] disease (042)

15 18 ❑ Nervous system disorder such as epilepsy or eye or ear disorders (320-389)

5/14 19 ❑ Mental disorder (290-313)

5/10 20 ☐ Depression, substance abuse or extreme anxiety (personality disorder 290, 293-294, 300-319)

21 ☐ Alcohol or drug dependency (303-304)

5/ 9 22 ☐ Long-term mental effects from alcohol use (alcohol-induced mental illness 291)

5/ 7 23 ☐ Long-term mental effects from drug use (drug-induced mental illness 292)

5/ 8 24 ☐ Psychoses (loss of contact with reality, e.g., bipolar, schizophrenic, delusional 295-299)

Now we want to ask about your experiences during three specific years, 2008, 2009, and 2010.

- The first year is 2008, that was the year of the political campaign in which Obama was elected president over McCain.
- The second year is 2009, which was the first year of Obama's presidency.
- The third year is 2010, last year.

***Employment history***

In which of the following years did you earn money from a job?

25 ❑ 2008 ❑ 2009 ❑ 2010

***Outpatient history***

How many times did you visit a medical clinic or doctor's office in each of the past two years?

21 26 | | |
2009 2010

***Emergency room history***

How many times did you visit a hospital emergency room in each of the past two years?

22 27 | | |
2009 2010

28 Any hospitals other than here? ❑ Yes ❑ No *(names)* _____

***Hospital inpatient history***

How many times were you admitted to a hospital as an inpatient in each of the following two years?

23 29 | | |
2009 2010

How many days did you spend in hospitals as an inpatient in each of the following two years?

24 30 | | |
2009 2010

## *Justice system history*

19 31 Have you been on probation or parole in the past 3 years? ❑ Yes ❑ No

19,27 32 How many days were you jail or prison in each of the past two years? | | |
2009 2010

33 Anywhere other than LA County jail? ❑ Yes ❑ No *(names)* _____

34 Was any of this time spent in a jail or prison medical facility? ❑ Yes ❑ No

26 35 If *"YES"*, how many days were spent each year in the medical facility? | | |
2009 2010

36 Was any of this time spent in a jail or prison mental health facility? ❑ Yes ❑ No

20,25 37 If *"YES"*, how many days were spent each year in the mental health facility?

| | |
|---|---|
| 2009 | 2010 |

*Background* checks are conducted before people go into permanent supportive housing. Five issues can prevent people from getting housing:

1. Undocumented immigration
2. Being on parole for a violent crime
3. Conviction for arson
4. Conviction for operating a methamphetamine lab
5. An offense that requires registering as a sex offender

Could any of these issues come up in your background check? If "Yes," which one(s)?

_____

*Thank you for answering these questions. Your information will remain confidential.*

# Statistical Appendix

The triage tool for identifying high-need, high-cost homeless residents has been substantially revised since the first version of the model was released in June 2010. This is a description of how the revised model has been developed and of the statistics behind the model for the triage tool.

*Narrowing the Population*

Individuals in the highest cost decile can be partially differentiated from other homeless residents based on having been an inpatient in a hospital (852 percent more frequent) or a visitor to an emergency room (216 percent more frequent). In addition, nearly all individuals in the highest cost decile are between the ages of 18 and 64, and do not have a recent work history.

Because the model is being used as a triage instrument for identifying the highest cost individuals and prioritizing them for supportive housing, it makes sense to use the tool in hospitals and jails, where these individuals are most likely to be found, and where case records may provide some of the data needed for the screening. To develop the revised tool, the population of 9,186 individuals in the Adult Linkage Project who experienced an interval of homelessness and were used to develop the first version of the calculating tool was reduced to a population of 2,907 individuals who were 18 to 64 years of age, had not worked in the past three years, and had been an inpatient or emergency room patient at a county hospital. This means that medical diagnostic and county health facility usage data was available for everyone in the sample that was used to develop the revised model.

*Using New Decile Structure Based on Costs in All Months*

Examining the health problems and institutional encounters of specific individuals in the 10th cost decile led us to reconsider our method for assigning decile designations to cases based on costs in the months they were homeless. What we saw was that health problems often were chronic and acute, and that much of these individuals' time was spent in institutional care. Their lives were marked by continuing problems, crises and the need for care.

The difficulty of ascertaining whether individuals were homeless or housed at a particular time is complicated by the long intervals of institutional care that these individuals received. Labeling them homeless or housed during these intervals often turns out to be arbitrary.

Differentiating homeless vs. housed intervals is even more problematic when screening patients because hospital and jail records and the memories of persons with mental impairments are unlikely to be able to provide this information. This made it pragmatically important to use a decile structure that is consistent with the types of information that can be obtained for identifying high-need homeless individuals.

Average monthly costs for the new decile groups presented in this paper are based on costs in all months, not just homeless months, as was the case with the decile structure in the earlier paper. Because this new decile structure more accurately reflects data that can be obtained when using the triage tool to screen homeless adults, the new model is much more accurate than the previously model.

*Adding More Diagnostic and Health Service Variables*

A wide range of medical and jail variables were recoded in the reduced Adult Linkage Project data set for use in developing the revised model. These variables include:

1. Presence or absence of a chronic medical condition
2. Presence or absence of diseases and disorders affecting each of the 18 body systems
3. Presence or absence of specific diseases and disorders that are widely diagnosed among people in the highest cost decile, including asthma, cellulitis, diabetes, essential hypertension, heart failure, pneumonia, and psychoses
4. Number of inpatient admissions and days as an inpatient over one, two, three and four years
5. Number of emergency room visits over one, two, three and four years
6. Number of days of incarcerated in jail mental health facilities
7. Number of days incarcerated in jail medical facilities

*Partitions and Specification of Variables*

To improve the accuracy of the model, various options for partitioning the dataset were investigated. These options (with numbers of partitions in parentheses) included:

1. Ever-jailed (2)
2. Mental illness (2)
3. Disabled (2)
4. Gender (2)
5. Age-groups (3)
6. Born in other state (2)
7. Use of emergency room in past 3 years (2)

Separate logistical regression analyses were performed for each partition in the respective options. The resulting true-positives, false-negatives, and false-positives were tabulated, using probability >=0.5 as the inclusion rule. The models generally had 7-15 variables, selected without prior judgment (using stepwise regression rules) from among all the variables in the dataset. All the partition models performed better than the original model released in June 2010.

The models were created using what amounts to manual reverse stepwise regression. That is, the first iteration began by specifying almost all the variables in the dataset except for some that are statistically redundant and a few that we specifically decided to omit because they appear unreliable (these include veteran and chronic homeless status). After the initial regression was run, the variables that gave coefficients with the highest p-values were removed. This process was repeated multiple times until the remaining variables had individual p-values of 0.15 or less. Then, the joint significance of variable groups that might have an interactive effect was tested. These groups included:

1. Substance abuse, alcohol-induced mental illness, and drug-induced mental illness
2. Mental illness, drug-induced mental illness, and psychoses
3. HIV and infectious and parasitic diseases
4. Incarceration in jail medical facility and number of days incarcerated in medical facility

5. Incarceration in jail mental health facility and number of days incarcerated in mental health facility
6. Hospital inpatient at any time in the past 3 years, number of inpatient admissions in the past 3 years, and total days of inpatient hospitalization in the past 3 years
7. Any emergency room use in the past 3 years and number of emergency room visits in the past three years

If the joint p-value for a group was very small, a higher p-value was tolerated for the individual variables. The model was culled until all remaining variables had individual or joint p-values less than 0.12. Permitting p=.12 might seem inordinately loose for modeling, but the intent here was to foster a diverse variable set that would help keep the model robust over time.

Additional model results were then produced using the three most promising partition options: one option using Age Group, and two options using Born in Other State and Age Group in different ways. Burden and shortfall were analyzed for each partition for a range of potential cutoff values. The three partitioned options performed nearly the same.

The models were also examined using goodness-of-fit tests and some joint testing of specific variable sets. Filtering was then used to identify specific cases in the sample that had a disproportionate influence on model results. This included assigning 32 especially costly cases to the 10th decile with certainty.

The dataset includes demographic and medical diagnosis variables, and variables that measure service use. The latter group has a much stronger effect on model results than the first two groups. The fact that a particular diagnosis has high prevalence in the 10th decile population doesn't necessarily mean that it strongly affects the level of a person's total cost.

*Current Version of Model*

The current version of the triage tool incorporates separate models for three age group partitions. There is one model for persons 18 to 29 years of age, a second for 30-45 years of age, and a third for 46 years of age or older. At an operational level, this means that when information for a case is entered into the triage tool, the data are routed to the model developed for the age group into which the case falls.

The models have the following form: *Pr[case is in 10th decile] = e^z/(1+e^z)*, where z = B+SUM[BiXi], B is a constant, and the Bi are coefficients for the respective independent variables.

For each age group partition model, the initial list of candidate variables was governed by judgment informed by the model development process. Final selection depended on the strength of their regression coefficients, as measured by the respective p-values. Note that some variables appear twice, both squared and not-squared, in order to model curved logarithmic effects.

Statistics that are shown in the following tables for overall model include: pseudo R2 that measures goodness-of-fit; p-value for chi-square test that the model provides no information; percent of sample correctly identified as 10th decile or not, using Pr = 0.5 as criterion.

Statistics that are shown in the following tables for individual variables include: odds ratio, which measures the proportional change in odds for a positive result (i.e., decile=10th) for each unit change in the respective variable; estimated logistic regression coefficient; 95%

confidence interval for the coefficient; p-value that results from testing whether coefficient = 0.0 (or equivalently, whether odds ratio = 1.0). For example, the last two variables share joint p-values of .016, but individual p-values are .030 and .371

Some variables that produced intolerably high p-values were found to produce tolerable p-values when tested for joint effect with one or two related variables; these joint p-values are shown in a separate column.

Note that the listing order of Health Status variables shown in the tables below differs from the Triage Tool to facilitate presentation of joint p-values.

*Model for Persons 18 to 29 Years of Age*

| | | | | | | |
|---|---|---|---|---|---|---|
| **Age Group** | **18-29** | | | | | |
| **% correctly classified, for cutoff-Pr=0.5** | **90.61** | | | | | |
| **P>chi2** | **0.0000** | | | | | |
| **pseudo R2** | **0.4928** | | | | | |
| **CURRENT HEALTH STATUS:** | **odds ratio** | **coefficient** | **[.95% conf. interval]** | | **p-value** | **joint p-value** |
| **Disability** | | | | | | |
| **Mental illness** | | | | | | |
| **Alcohol induced Mental Illness** | | | | | | |
| **Drug induced Mental Illness** | | | | | | |
| **Psychoses** | | | | | | |
| **Personality disorder** | | | | | | |
| **Disease of nervous system** | | | | | | |
| **Hypertension** | | | | | | |
| **Urinary disease** | 0.23 | -1.46918 | -2.93527 | -0.00308 | 0.045 | |
| **Respiratory disease** | | | | | | |
| **Asthma** | | | | | | |
| **Mental disorder** | | | | | | |
| **Disease of circulatory system** | | | | | | |
| **Disease of digestive system** | | | | | | |
| **Disease of musculo-skeletal system** | | | | | | |
| **IN PAST 3 YEARS:** | | | | | | |
| **Jail or probation record in past 3 years** | | | | | | |
| **Inmate in jail mental health facility in past 3 yrs** | 6.52 | 1.87456 | 1.06756 | 2.68156 | 0.000 | |
| **IN PAST 2 YEARS:** | | | | | | |
| **Outpatient clinic (#admissions in past 2 yrs)** | 0.66 | -0.42036 | -0.66740 | -0.17331 | 0.001 | |
| **Outpatient clinic (#admissions squared)** | 1.0148 | 0.01473 | 0.00123 | 0.02822 | 0.029 | |
| **Emergency Room (#admissions in past 2 years)** | | | | | | |
| **Emergency Room (#admissions squared)** | | | | | | |
| **Hospital inpatient (#admissions in past 2 yrs)** | | | | | | |
| **Hospital inpatient (#admissions squared)** | | | | | | |
| **Hospital inpatient (#days in past 2 yrs)** | 1.61 | 0.47675 | 0.30424 | 0.64925 | 0.000 | |
| **Hospital inpatient (#days squared)** | 0.9927 | -0.00734 | -0.01402 | -0.00067 | 0.028 | |
| **Jail, mental health facility (#days in past 2 yrs)** | 1.07 | 0.06949 | 0.03494 | 0.10403 | 0.000 | |
| **Jail, mental health facility (#days squared)** | 0.9995 | -0.00046 | -0.00070 | -0.00021 | 0.000 | |
| **Jail, medical facility (#days in past 2 years)** | 1.07 | 0.07129 | 0.02815 | 0.11443 | 0.001 | |
| **Jail, medical facility (#days squared)** | 0.9998 | -0.00019 | -0.00057 | 0.00019 | 0.324 | 0.000 |

| *Model for persons 18 to 29 years of age continued* | | | | | | |
|---|---|---|---|---|---|---|
| **Jail, not medical or mental (#days in past 2 yrs)** | 1.01 | 0.00977 | 0.00075 | 0.01878 | 0.030 | |
| **Jail, not med or mental facility (#days squared)** | 1.0000 | -0.00001 | -0.00003 | 0.00001 | 0.371 | 0.016 |
| | | | | | | |
| **Constant** | | -4.51604 | -5.30953 | -3.72254 | 0.000 | |

## *Model for Persons 30 to 45 Years of Age*

| **Age Group** | **30-45** | | | | | |
|---|---|---|---|---|---|---|
| **% correctly classified, for cutoff-Pr=0.5** | **90.67** | | | | | |
| **P>chi2** | **0.0000** | | | | | |
| **pseudo R2** | **0.5580** | | | | | |
| **CURRENT HEALTH STATUS:** | **odds ratio** | **coefficient** | **[.95% conf. interval]** | | **p-value** | **joint p-value** |
| **Disability** | 1.49 | 0.39900 | -0.08651 | 0.88451 | 0.100 | |
| **Mental illness** | | | | | | |
| **Alcohol induced Mental Illness** | | | | | | |
| **Drug induced Mental Illness** | | | | | | |
| **Psychoses** | | | | | | |
| **Personality disorder** | | | | | | |
| **Disease of nervous system** | | | | | | |
| **Hypertension** | | | | | | |
| **Urinary disease** | | | | | | |
| **Respiratory disease** | | | | | | |
| **Asthma** | 0.06 | -2.82636 | -4.92222 | -0.73049 | 0.007 | |
| **Mental disorder** | 1.80 | 0.58592 | 0.03675 | 1.13509 | 0.033 | |
| **Disease of circulatory system** | | | | | | |
| **Disease of digestive system** | | | | | | |
| **Disease of musculo-skeletal system** | 0.61 | -0.50191 | -1.11915 | 0.11533 | 0.104 | |
| **IN PAST 3 YEARS:** | | | | | | |
| **Jail or probation record in past 3 years** | 3.64 | 1.29097 | 0.36870 | 2.21323 | 0.005 | |
| **Inmate in jail mental health facility in past 3 yrs** | | | | | | |
| **IN PAST 2 YEARS:** | | | | | | |
| **Outpatient clinic (#admissions in past 2 yrs)** | 0.74 | -0.30522 | -0.48323 | -0.12721 | 0.001 | |
| **Outpatient clinic (#admissions squared)** | 0.9983 | -0.00167 | -0.00808 | 0.00474 | 0.602 | 0.000 |
| **Emergency Room (#admissions in past 2 years)** | 1.15 | 0.14345 | -0.26472 | 0.55162 | 0.482 | |
| **Emergency Room (#admissions squared)** | 0.9579 | -0.04302 | -0.09338 | 0.00734 | 0.088 | 0.067 |
| **Hospital inpatient (#admissions in past 2 yrs)** | 1.82 | 0.59878 | -1.00907 | 2.20663 | 0.456 | |
| **Hospital inpatient (#admissions squared)** | 1.4493 | 0.37109 | -0.73840 | 1.48057 | 0.504 | 0.014 |
| **Hospital inpatient (#days in past 2 yrs)** | 1.39 | 0.32727 | 0.15013 | 0.50442 | 0.000 | |
| **Hospital inpatient (#days squared)** | 1.0031 | 0.00306 | -0.00288 | 0.00900 | 0.303 | 0.000 |
| **Jail, mental health facility (#days in past 2 yrs)** | 1.09 | 0.08985 | 0.06092 | 0.11878 | 0.000 | |
| **Jail, mental health facility (#days squared)** | 0.9996 | -0.00036 | -0.00065 | -0.00007 | 0.012 | |
| **Jail, medical facility (#days in past 2 years)** | 1.20 | 0.18127 | 0.14003 | 0.22251 | 0.000 | |
| **Jail, medical facility (#days squared)** | 0.9983 | -0.00169 | -0.00222 | -0.00116 | 0.000 | |
| **Jail, not medical or mental (#days in past 2 yrs)** | 1.01 | 0.01200 | 0.00527 | 0.01872 | 0.000 | |
| **Jail, not med or mental facility (#days squared)** | 1.0000 | -0.00001 | -0.00003 | 0.00000 | 0.037 | |
| | | | | | | |
| **Constant** | | -6.02772 | -7.12788 | -4.92757 | 0.000 | |

*Model for Persons 46 Years of Age or Older*

| | | | | | | |
|---|---|---|---|---|---|---|
| **Age Group** | **46+** | | | | | |
| **% correctly classified, for cutoff-Pr=0.5** | **91.13** | | | | | |
| **P>chi2** | **0.0000** | | | | | |
| **pseudo R2** | **0.5933** | | | | | |
| **CURRENT HEALTH STATUS:** | **odds ratio** | **coefficient** | **[.95% conf. interval]** | | **p-value** | **joint p-value** |
| **Disability** | | | | | | |
| **Mental illness** | 2.15 | 0.76459 | 0.15873 | 1.37046 | 0.012 | |
| **Alcohol induced Mental Illness** | 0.37 | -0.99983 | -2.70498 | 0.70532 | 0.242 | |
| **Drug induced Mental Illness** | 2.41 | 0.87778 | -0.47032 | 2.22588 | 0.193 | 0.0198 |
| **Psychoses** | 0.69 | -0.37339 | -1.20914 | 0.46235 | 0.372 | |
| **Personality disorder** | 0.43 | -0.83296 | -1.69950 | 0.03358 | 0.055 | |
| **Disease of nervous system** | 1.39 | 0.32855 | -0.35665 | 1.01376 | 0.338 | 0.1076 |
| **Hypertension** | 2.33 | 0.84434 | -0.23167 | 1.92034 | 0.117 | |
| **Urinary disease** | | | | | | |
| **Respiratory disease** | 1.78 | 0.57661 | -0.03006 | 1.18328 | 0.057 | |
| **Asthma** | | | | | | |
| **Mental disorder** | | | | | | |
| **Disease of circulatory system** | 0.38 | -0.95656 | -1.90049 | -0.01264 | 0.043 | |
| **Disease of digestive system** | 1.57 | 0.45089 | -0.10603 | 1.00781 | 0.105 | |
| **Disease of musculo-skeletal system** | 0.54 | -0.61131 | -1.18585 | -0.03677 | 0.033 | |
| **IN PAST 3 YEARS:** | | | | | | |
| **Jail or probation record in past 3 years** | | | | | | |
| **Inmate in jail mental health facility in past 3 yrs** | | | | | | |
| **IN PAST 2 YEARS:** | | | | | | |
| **Outpatient clinic (#admissions in past 2 yrs)** | 0.75 | -0.28767 | -0.47051 | -0.10484 | 0.002 | |
| **Outpatient clinic (#admissions squared)** | 0.9952 | -0.00485 | -0.01166 | 0.00195 | 0.154 | 0.0000 |
| **Emergency Room (#admissions in past 2 years)** | 1.24 | 0.21393 | -0.15177 | 0.57963 | 0.242 | |
| **Emergency Room (#admissions squared)** | 0.9480 | -0.05341 | -0.08841 | -0.01840 | 0.002 | 0.0003 |
| **Hospital inpatient (#admissions in past 2 yrs)** | 1.92 | 0.65448 | -0.01383 | 1.32279 | 0.050 | |
| **Hospital inpatient (#admissions squared)** | | | | | | |
| **Hospital inpatient (#days in past 2 yrs)** | 1.46 | 0.37767 | 0.20127 | 0.55407 | 0.000 | |
| **Hospital inpatient (#days squared)** | 1.0028 | 0.00283 | -0.00253 | 0.00819 | 0.291 | 0.0000 |
| **Jail, mental health facility (#days in past 2 yrs)** | 1.13 | 0.12129 | 0.07730 | 0.16528 | 0.000 | |
| **Jail, mental health facility (#days squared)** | 0.9996 | -0.00044 | -0.00086 | -0.00002 | 0.034 | 0.0000 |
| **Jail, medical facility (#days in past 2 years)** | 1.17 | 0.15282 | 0.10278 | 0.20286 | 0.000 | |
| **Jail, medical facility (#days squared)** | 0.9990 | -0.00096 | -0.00148 | -0.00044 | 0.000 | |
| **Jail, not medical or mental (#days in past 2 yrs)** | 1.03 | 0.02778 | 0.01903 | 0.03653 | 0.000 | |
| **Jail, not med or mental facility (#days squared)** | 0.9990 | -0.00004 | -0.00005 | -0.00002 | 0.000 | |
| | | | | | | |
| **Constant** | | -5.41464 | -6.31262 | -4.51667 | 0.000 | |

# *END NOTES*

[1] Economic Roundtable (2009), *Where We Sleep: The Costs of Housing and Homelessness in Los Angeles,* pp. 17-18.

[2] Economic Roundtable (2009), *Where We Sleep: The Costs of Housing and Homelessness in Los Angeles;* and (2010), *Tools for Identifying High-Cost, High-Need Homeless Persons*, www.economicrt.org.

[3] The complex task of linking client records was carried out by the Service Integration Branch of Los Angeles County's Chief Executive Office through its Adult Linkages Project (ALP), now known as the known as Enterprise Linkages Project (ELP). The study population was made up of 13,176 indigent adults who entered Los Angeles County's General Relief Program over a 6-month period, creating a representative sample of this overall population. This project linked administrative records across eight departments to provide information on client needs, service gaps, service costs, and utilization patterns. The ALP used an anonymous record linkage method that addressed the legal obstacles involved in sharing confidential information by de-identifying personal information.

Seventeen types of costs could be determined for all persons based on data provided by county departments and other agencies:

1. Los Angeles County Department of Health Services hospitals-inpatient
2. Los Angeles County Department of Health Services outpatient clinics
3. Los Angeles County Department of Health Services emergency rooms
4. Private hospitals-inpatient (The estimated use of private hospital facilities is based on 61.95 percent of homeless inpatients or emergency room patients at county hospitals. This is based on hospital discharge records from the California Office of Statewide Health Planning and Development, in which there is a flag for patients who were homeless. OSHPD records were extracted for inpatient hospitalizations of homeless patients from 2005 through 2007 treated at hospitals in downtown Los Angeles.
5. Private hospitals-emergency room (see above explanation of how private hospital costs were estimated)
6. Emergency Medical Transportation
7. Los Angeles County Department of Mental Health
8. Los Angeles County Department of Public Health
9. Los Angeles County Department of Public Social Services Food Stamps
10. Los Angeles County Department of public Social Services General Relief
11. Los Angeles County Department of Public Social Services GR Housing Vouchers
12. Los Angeles Homeless Services Authority services
13. Los Angeles County Probation Department
14. Los Angeles County Sheriff's Department general jail facilities and services
15. Los Angeles County Sheriff's Department medical jail facilities and services
16. Los Angeles County Sheriff's Department mental health jail facilities and services
17. Supportive housing costs of the Skid Row Housing Trust

Twelve types of costs could not be determined:

1. Homeless services not in shown in the Los Angeles Consortium of Care Homeless Management Information System (HMIS) and not directly funded by LAHSA. These missing costs include a significant number of agencies funded by LAHSA, matching costs by all LAHSA service providers, and all nonprofit service providers not funded by LAHSA, including faith-based missions and food pantries.
2. Non-county outpatient clinics such as JWCH Institute or Homeless Health Care Los Angeles
3. Non-county substance abuse facilities
4. Non-county mental health facilities
5. Veteran's Administrations services
6. State incarceration and parole
7. Federal incarceration
8. City of Los Angeles Police Department
9. Courts
10. Business environment impacts
11. Los Angeles City Business Improvement Districts
12. Costs outside of Los Angeles County

These twelve types of costs were unavailable for both housed and homeless individuals in this study, so the absence of this data did not create any asymmetry in cost comparisons. However, this missing data results in understating the amount of public costs for homeless residents, and where there are cost savings from housing homeless individuals, to understate the amount of those savings.

[4] The estimated subsidy includes $750 per month in capital costs, which is derived from amortizing an estimated development and construction cost of $270,000 over 30 years without any interest. This money is typically paid at the time of construction, without long-term interest costs. The subsidized operating costs are comprised of $268 per month if the resident is receiving SSI or $463 per month if the resident receives only General Relief income from the county. For additional information about costs see, *Where We Sleep*, pages 34-35 and 59-61.

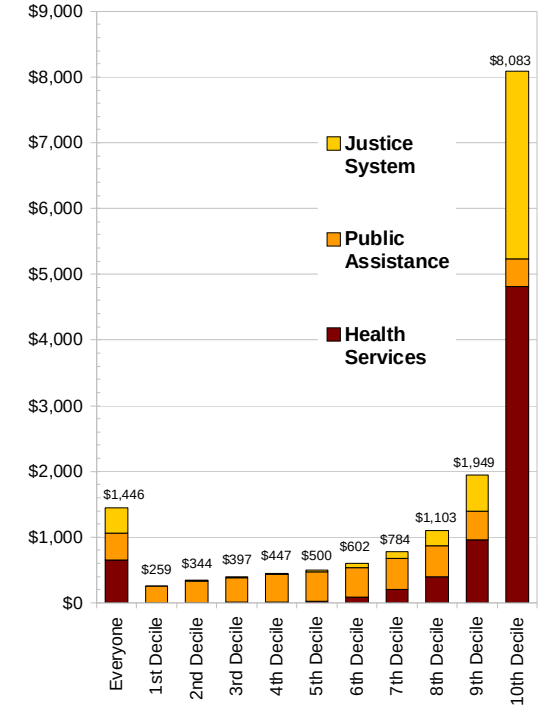
[5] The homeless study population is generally representative of Los Angeles County's population of homeless single adults who are U.S. citizens or legal immigrants. The sample does not include unauthorized immigrants or residents of other counties.

[6] Supportive housing is permanent, affordable housing with on-site or readily available case management and additional services such as health, mental health and substance abuse rehabilitation.

[7] Economic Roundtable (2010), *Tools for Identifying High-Cost, High-Need Homeless Persons*.

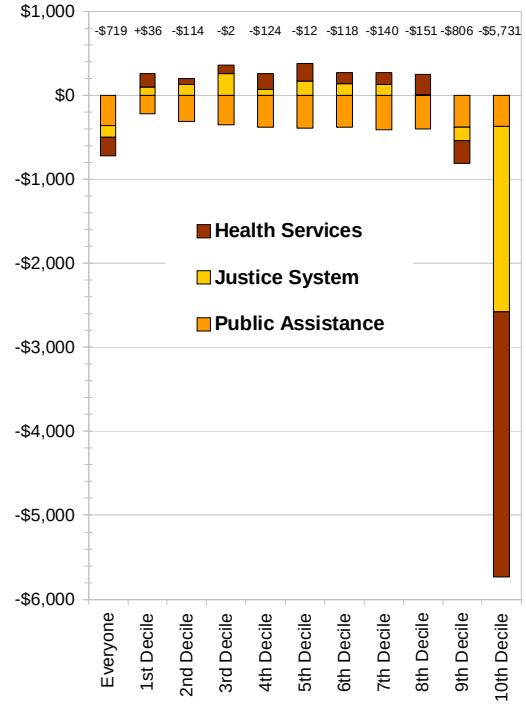
[8] Of the 13,176 General Relief recipients in the study sample, 9,186 or 70 percent had an episode of homeless during the 22- month data window. The total homeless population was homeless an average 46 percent of the months in this data window. The previous decile breakout was based on costs during homeless months. Average monthly public costs for individuals in the 10th decile, using this old breakout, averaged over $8,000 per month during homeless spells, as shown in Figure A. Supporting data for Figure A is provided at the end of this endnote.

Figure A
Average Monthly Public Costs for Homeless Single Adults Using *Outdated* Decile Structure based on Costs in Months when Homeless




*Source: 9,186 homeless General Relief recipients in Los Angeles County. Costs in 2008 dollars. Costs are for months when homeless.*

Figure B
Monthly Change in Cost by Decile for Single Adults when Not Homeless Using *Outdated* Decile Structure based on Homeless Months




*Source: 9,186 homeless General Relief recipients in Los Angeles County. Costs in 2008 dollars. Deciles are based on costs in months when homeless.*

Using this old decile breakout based on homeless months to compare public costs in months when homeless to costs when housed, public costs for individuals in the 10th decile decline by over $5,700 per month when they are housed, as shown in Figure B. The cost saving shown in Figure B are for individuals in any type of housing; in most cases this was temporary housing rather than permanent supportive housing. The exceptionally high cost savings for 10th decile individuals continues to be shown by the new decile structure introduced in this paper.

Supporting data for Figure A, average monthly public costs by decile for homeless single adults; costs and cost deciles based on months when homeless:

| | Health Services | Public Assistance | Justice System |
|---|---|---|---|
| Everyone | $651 | $407 | $387 |
| 1st Decile | $3 | $253 | $3 |
| 2nd Decile | $5 | $330 | $9 |
| 3rd Decile | $10 | $374 | $14 |
| 4th Decile | $15 | $415 | $18 |
| 5th Decile | $31 | $442 | $28 |
| 6th Decile | $94 | $445 | $64 |
| 7th Decile | $199 | $474 | $111 |
| 8th Decile | $393 | $473 | $237 |
| 9th Decile | $958 | $442 | $549 |
| 10th Decile | $4,811 | $428 | $2,844 |

Supporting data for Figure B, monthly change in cost by decile for single adults when not homeless; costs and cost deciles based on months when homeless:

| | Health Services | Public Assistance | Justice System |
|---|---|---|---|
| Everyone | -221 | -361 | -136 |
| 1st Decile | 164 | -225 | 98 |
| 2nd Decile | 63 | -310 | 132 |
| 3rd Decile | 94 | -356 | 260 |
| 4th Decile | 190 | -385 | 71 |
| 5th Decile | 211 | -391 | 168 |
| 6th Decile | 127 | -385 | 140 |
| 7th Decile | 135 | -408 | 133 |
| 8th Decile | 239 | -402 | 12 |
| 9th Decile | -270 | -378 | -159 |
| 10th Decile | -3,153 | -367 | -2,212 |

[9] The pragmatic assessment of the authors is that when chronically homeless individuals move into and out of jails and hospitals, it is largely arbitrary to label these intervals as homeless or housed. When screening to identify individuals in the 10th decile, this problem is complicated by the memory limitations of many individuals with mental impairments and the general absence from jail and hospital records of information mapping homeless and housed intervals. This makes it pragmatically important to use a decile structure that fits the types of information that can be obtained for identifying high-need homeless persons. However, HUD does apply definitions to these intervals, which affect individuals' access to federally subsidized housing and services.

- HUD's Emergency Shelter Grant Program currently defines a person as being homeless if they have spent up to 30 consecutive days in a hospital or other institution after residing in a place not meant for human habitation, an emergency shelter, or transitional or supportive housing for homeless persons; or if a person is being discharged within a week from an institution in which the person has been a resident for more than 30 consecutive days and no subsequent residence has been identified and the person lacks the resources and support networks needed to obtain housing. (http://www.hudhre.info/index.cfm?do=viewEsgDeskguideSec4)
- HUD specifies that an individual is not homeless while they are imprisoned or detained pursuant to an Act of the Congress or a State law. (http://portal.hud.gov/hudportal/HUD?src=/topics/homelessness/definition)

[10] People who had worked in the past three years were excluded because they were less than half as likely to be in the tenth decile as people who had not worked.

[11] 2,907 individuals in the Adult Linkage database were ***inpatients or emergency room users at county hospitals, 18 to 64 years of age, and unemployed for the past three years.*** This population had medical diagnostic codes,

providing key information for identifying individuals in the tenth cost decile. Using the same decile assignments given the total homeless population in the matrix shown above, this smaller population of county hospital users is again broken out by the two types of cost deciles in the matrix below – the old decile breakout based on *costs in HOMELESS months on the left axis*, and the new decile breakout based on *costs in ALL months on the top axis*. This smaller population included a higher share of individuals with health problems and with data about costs for their health services, so the distribution is skewed toward persons in higher cost deciles. Cells with the same persons in both decile breakouts are highlighted with **bold** font and **black** cell outline. Seventy-one percent (443 out of 627) of individuals in the 10th decile in the old breakout are also in the 10th decile in the new breakout.

| | | Breakout of *Hospital* Population by Deciles based on Average Monthly Cost in ***ALL Months*** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1st Decile | 2nd Decile | 3rd Decile | 4th Decile | 5th Decile | 6th Decile | 7th Decile | 8th Decile | 9th Decile | 10th Decile | TOTAL |
| Breakout of *Hospital* Population by Deciles based on Average Monthly Cost in ***Months when Homeless*** | 1st Decile | **18** | 22 | 27 | 12 | 7 | 9 | 6 | 7 | 8 | 2 | 118 |
| | 2nd Decile | 13 | **24** | 25 | 24 | 12 | 5 | 9 | 5 | 6 | 7 | 130 |
| | 3rd Decile | 9 | 16 | **16** | 20 | 18 | 17 | 8 | 5 | 3 | 8 | 120 |
| | 4th Decile | 6 | 12 | 13 | **24** | 32 | 30 | 9 | 9 | 9 | 6 | 150 |
| | 5th Decile | 11 | 7 | 11 | 28 | **44** | 57 | 20 | 18 | 6 | 16 | 218 |
| | 6th Decile | 1 | 9 | 10 | 28 | 33 | **62** | 83 | 19 | 19 | 12 | 276 |
| | 7th Decile | 2 | 6 | 14 | 29 | 40 | 38 | **86** | 89 | 21 | 23 | 348 |
| | 8th Decile | 0 | 3 | 15 | 14 | 20 | 34 | 61 | **136** | 75 | 45 | 403 |
| | 9th Decile | 0 | 2 | 1 | 8 | 11 | 20 | 50 | 75 | **246** | 104 | 517 |
| | 10th Decile | 0 | 0 | 0 | 1 | 2 | 5 | 19 | 30 | 127 | **443** | 627 |
| | TOTAL | 60 | 101 | 132 | 188 | 219 | 277 | 351 | 393 | 520 | 666 | 2,907 |

[12] Supporting data for Figure 2, average monthly public costs for homeless single adults treated at hospitals in the past two years; costs and cost deciles are based on for all months, whether homeless or non-homeless:

| | 1st Decile | 2nd Decile | 3rd Decile | 4th Decile | 5th Decile | 6th Decile | 7th Decile | 8th Decile | 9th Decile | 10th Decile | Every -one |
|---|---|---|---|---|---|---|---|---|---|---|---|
| County hospital-inpatient | 0 | 0 | 0 | 0 | 2 | 2 | 12 | 49 | 205 | 2,125 | 532 |
| Priv. hospital-inpatient | 0 | 0 | 0 | 0 | 8 | 10 | 33 | 113 | 291 | 995 | 301 |
| County clinic | 0 | 7 | 9 | 18 | 20 | 35 | 53 | 82 | 123 | 188 | 89 |
| County Health Srv - ER | 1 | 6 | 21 | 24 | 36 | 33 | 61 | 65 | 108 | 203 | 90 |
| Private hospital-ER | 1 | 5 | 15 | 17 | 26 | 23 | 39 | 45 | 71 | 129 | 59 |
| Mental Health | 0 | 4 | 2 | 8 | 8 | 14 | 22 | 47 | 88 | 211 | 76 |
| Public Health | 0 | 0 | 3 | 2 | 17 | 20 | 41 | 95 | 161 | 119 | 77 |
| Paramedics | 1 | 9 | 27 | 32 | 48 | 42 | 75 | 90 | 151 | 306 | 130 |
| Food Stamps | 26 | 49 | 58 | 75 | 87 | 110 | 112 | 120 | 115 | 114 | 103 |
| General Relief | 29 | 48 | 63 | 73 | 100 | 134 | 134 | 145 | 130 | 136 | 120 |
| GR Housing Vouchers | 6 | 6 | 9 | 11 | 13 | 12 | 16 | 18 | 23 | 18 | 16 |
| Homeless services-LAHSA | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 3 | 3 | 2 |
| General jail | 4 | 3 | 9 | 22 | 29 | 59 | 84 | 132 | 226 | 266 | 139 |
| Medical jail | 0 | 0 | 1 | 0 | 0 | 3 | 5 | 27 | 55 | 671 | 168 |
| Mental health jail | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 9 | 77 | 1,032 | 252 |
| Probation | 0 | 3 | 3 | 8 | 4 | 8 | 10 | 13 | 16 | 13 | 11 |
| MONTHLY TOTAL | 68 | 140 | 220 | 291 | 399 | 506 | 700 | 1,052 | 1,843 | 6,529 | 2,165 |

[13] For a detailed explanation of how costs were calculated and what costs are not included, see Economic Roundtable (2009), *Where We Sleep: The Costs of Housing and Homelessness in Los Angeles*, www.economicrt.org.

[14] A portion of the hospital costs for homeless patients are offset by federal insurance programs and county coverage. The breakout of payment sources for homeless hospital patients in California is as follows: Medi-Cal 42 percent, Self Pay 14 percent, Medicare 13 percent, County Indigent Programs 13 percent, Other Government 6 percent, Other Indigent 6 percent, Private Coverage 3 percent, Other Payer 3 percent. Source: State of California Office of Statewide Health Planning and Development, Patient Discharge Data for 36,367 homeless inpatient admissions in 2008-2009.

[15] Deciles 1 to 4 are not shown because there were too few persons in these lower cost deciles residing in permanent supportive housing to provide reliable data. Most residents in permanent supportive housing are chronically

homeless individuals with disabilities who had significant needs for public services before being housed, which placed them in higher cost deciles. Supporting cost data for Figure 3, change in monthly costs when living in permanent supportive housing, using costs and cost deciles based on all months, is as follows:

| | Monthly cost when living in permanent supportive housing – 2008 dollars | | | | | | Change in costs from before living in permanent supportive housing – 2008 dollars | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Decile** | **5th** | **6th** | **7th** | **8th** | **9th** | **10th** | **5th** | **6th** | **7th** | **8th** | **9th** | **10th** |
| County hospital-inpatient | 63 | 68 | 86 | 98 | 112 | 131 | 61 | 66 | 74 | 49 | -93 | -1,994 |
| Priv. hospital-inpatient | 7 | 18 | 53 | 13 | 177 | 254 | -1 | 8 | 20 | -99 | -114 | -741 |
| County clinic | 8 | 14 | 5 | 25 | 36 | 27 | -12 | -21 | -48 | -57 | -87 | -161 |
| County Health Srv - ER | 4 | 7 | 6 | 2 | 25 | 27 | -32 | -27 | -54 | -62 | -83 | -176 |
| Private hospital-ER | 3 | 4 | 5 | 2 | 18 | 18 | -22 | -19 | -34 | -43 | -53 | -111 |
| Mental Health | 48 | 40 | 37 | 60 | 50 | 81 | 40 | 26 | 16 | 13 | -37 | -131 |
| Public Health | 16 | 12 | 4 | 17 | 12 | 17 | -2 | -8 | -37 | -77 | -148 | -102 |
| Paramedics | 7 | 8 | 13 | 5 | 46 | 51 | -41 | -34 | -62 | -85 | -106 | -256 |
| Food Stamps | 46 | 53 | 51 | 75 | 69 | 63 | -41 | -57 | -60 | -45 | -46 | -51 |
| General Relief | 72 | 84 | 72 | 113 | 102 | 100 | -28 | -50 | -62 | -32 | -29 | -35 |
| GR Housing Vouchers | 0 | 0 | 0 | 0 | 0 | 0 | -13 | -12 | -16 | -18 | -23 | -18 |
| Homeless services-LAHSA | 0 | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -1 | -2 | -3 | -3 |
| General jail | 9 | 3 | 1 | 10 | 7 | 6 | -21 | -56 | -83 | -122 | -219 | -259 |
| Medical jail | 25 | 3 | 0 | 48 | 0 | 4 | 25 | 1 | -5 | 21 | -55 | -667 |
| Mental health jail | 3 | 0 | 0 | 114 | 18 | 42 | 3 | 0 | -2 | 105 | -59 | -990 |
| Probation | 5 | 2 | 2 | 6 | 7 | 7 | 0 | -6 | -7 | -7 | -9 | -6 |
| Average monthly cost/change | $256 | $258 | $286 | $506 | $716 | $922 | -$143 | -$246 | -$414 | -$544 | -$1,128 | -$5,606 |

Note: the cost data for people in permanent supportive housing is not limited to records with Los Angeles County Department of Health Services (DHS) data; it includes all matched-pair records in the data set. This means that there is a data inconsistency between records for housed persons and records for the 2,907 homeless persons with DHS data that are used to calculate changes in costs compared to homeless persons. It is likely that the records for housed persons capture a slightly smaller share of overall health costs than records for persons not in permanent supportive housing. This may result in slightly overstating the saving in health costs for persons in permanent supportive housing.

[16] Matching on propensities is a powerful statistical technique that incorporates all of the descriptive data that reliably defines people in a group and reduces it to a single score – this score is the propensity of individuals to be in that group. Some members are highly typical of a group and they will have high propensity scores. Other members have few of the traits that characterize a group and they will have low propensity scores. After propensity scores are calculated for each member of a group, for example, formerly homeless people living in supportive housing, the same fields of descriptive data that were used to calculate propensity scores for the group are used again to calculate the propensity scores of candidates for a comparison group. In this example, the comparison group candidates are homeless General Relief recipients. The final step in creating the comparison group is to create matched pairs with similar propensity scores. In this example the pairs are made up of one person in housing and a second similar homeless person who becomes part of the comparison group. This is an unbiased and statistically reliable tool for comparing costs of housed individuals with their homeless counterparts. Propensity score methodology is explained further in Appendix 1 of *Where We Sleep*, www.economicrt.org.

[17] These savings do not take into account the cost of permanent supportive housing, which we estimate to be $750 a month for the capital cost of developing supportive housing and $268 a month for the rent subsidy if the resident is an SSI recipient. These savings are greater than those shown in earlier Economic Roundtable reports that compared the overall population in supportive housing, not broken out by decile, to their homeless matched pair counterparts, and for the same individuals, comparing months when housed in any manner to months when homeless.

[18] See *Where We Sleep* for an analysis of the further reductions in public costs that result from higher levels of on-site services in permanent supportive housing.

[19] Supporting data for Figure 5, factors used in triage tool to identify homeless adults in the tenth decile:

| | % of Homeless Encounters where Attribute is Present | % of Persons with Attribute in 10th Decile | Number of Persons in 10th Decile with Attribute |
|---|---|---|---|
| Circulatory disease | 15% | 36% | 153 |
| Digestive disease | 25% | 25% | 183 |
| Disability | 51% | 30% | 452 |
| ER user past 2 years | 55% | 28% | 446 |
| Genitourinary disease | 13% | 26% | 97 |
| Infectious disease | 11% | 34% | 112 |
| Hospital inpatient past 2 years | 17% | 46% | 225 |
| Jail mental health past 3 years | 20% | 49% | 287 |
| Jail or probation past 3 years | 69% | 27% | 540 |
| Mental disorder | 25% | 36% | 264 |
| Musculoskeletal disease | 25% | 28% | 201 |
| Nervous disease | 15% | 31% | 131 |
| Personality disorder | 12% | 37% | 124 |
| Psychosis | 16% | 41% | 187 |
| Respiratory disease | 18% | 30% | 154 |
| 18-29 years | 22% | 17% | 110 |
| 30-45 years | 42% | 21% | 256 |
| 46+ years | 36% | 29% | 300 |

[20] The number of emergency room visits is also a factor in the tool, but it has far significance for identifying individuals in the 10th decile than either number of inpatient admissions or number of inpatient days, except for people 46 years of age or older. For that group, the significance of this factor approaches that of number of inpatient admissions.

[21] The frequency of the 17 medical conditions among homeless hospital emergency room patients and inpatients, both by number of encounters and number of unduplicated persons, and whether the condition is a factor in the triage tool are shown below.

| | | | | | Number of Unduplicated Patients | | |
|---|---|---|---|---|---|---|---|
| ICD-9-CM Code and Name of Principal Diagnosis | % of ER Patients with Condition | % of Inpatients with Condition | Discrete Category in Triage tool | In rolled-up Category in Triage tool | Emergency Room | Hospital Inpatient | Unduplicated Total |
| 042 Human immunodeficiency virus [HIV] disease | 0.1% | 0.7% | No | No | 7 | 10 | 12 |
| 250 Diabetes mellitus | 1.7% | 3.4% | No | No | 86 | 37 | 93 |
| 292 Drug-induced mental disorders | 1.1% | 1.2% | Yes | Yes | 81 | 19 | 89 |
| 295 Schizophrenic disorders | 0.8% | 1.4% | No | Yes | 58 | 26 | 71 |
| 298 Other nonorganic psychoses | 5.4% | 1.6% | Yes | Yes | 276 | 28 | 278 |
| 311 Depressive disorder, not elsewhere classified | 1.3% | 0.6% | No | Yes | 95 | 10 | 97 |
| 410 Acute myocardial infarction | 0.1% | 0.9% | No | Yes | 11 | 16 | 16 |
| 411 Other acute and subacute forms of ischemic heart disease | 0.2% | 0.5% | No | Yes | 19 | 9 | 28 |
| 427 Cardiac dysrhythmias | 0.1% | 0.7% | No | Yes | 9 | 9 | 15 |
| 428 Heart failure | 0.7% | 3.2% | No | Yes | 29 | 35 | 38 |
| 453 Other venous embolism and thrombosis | 0.1% | 0.8% | No | Yes | 11 | 11 | 15 |
| 493 Asthma | 1.9% | 2.0% | Yes | Yes | 68 | 24 | 73 |
| 571 Chronic liver disease and cirrhosis | 0.2% | 0.9% | No | Yes | 14 | 12 | 18 |
| 577 Diseases of pancreas | 0.2% | 0.9% | No | Yes | 9 | 10 | 14 |
| 590 Infections of kidney | 0.2% | 0.5% | No | Yes | 14 | 7 | 14 |
| 599 Other disorders of urethra and urinary tract | 0.6% | 0.5% | No | Yes | 57 | 8 | 57 |
| 730 Osteomyelitis, periostitis, & other infections involving bone | 0.1% | 1.1% | No | Yes | 10 | 15 | 18 |

[22] Stephen W. Hwang et al., "Risk Factors for Death in Homeless Adults in Boston," *Archives of Internal Medicine* 158 (1998): 1454-1460.

[23] Information about the origins of the vulnerability index is from an interview with Becky Kanis and Beth Sandor from Community Solutions' 100,000 Homes Campaign on August 5, 2011, and from an article by James J.

O'Connell (2005), "Premature Mortality in Homeless Populations: A Review of the Literature,"National Health Care for the Homeless Council, Inc., Nashville, www.nhchc.org/PrematureMortalityFinal.pdf.

[24] County of Los Angeles Chief Executive Office (May 27, 2008), Ninety-Day Report Regarding the Implementation of Project 50, p. 4.

[25] The decile distribution of the 44 participants in Project 50, based solely on County costs, was: 1st Decile 30 percent, 2nd Decile 9 percent, 3rd Decile 2 percent, 4th Decile 11 percent, 5th Decile 7 percent, 6th Decile 11 percent, 7th Decile 5 percent, 8th Decile 2 percent, 9th Decile 2 percent, 10th Decile 20 percent. This decile breakout does not include costs for health care provided by private hospitals. Patient discharge data covering 2005 through 2007 for Los Angeles County from California's Office of Statewide Health Planning and Development (OSHPD) shows that homeless individuals received 38 percent of their hospital care from private hospitals. Given that nine of these 44 individuals were both emergency room patients and hospital inpatients at county hospitals before entering Project 50, and that seven of these nine individuals were in the 10th decile, we can estimate that costs incurred at private hospitals might have put another four to six individuals in the 10th decile, in addition to the nine individuals identified as being in the 10th decile based on county cost data. This would mean that as many as 34 percent of Project 50 participants may have been in the 10th decile.

[26] When screening the county ELP database using vulnerability index factors, modified criteria were substituted for usage of hospitals in order to take account of likely use of private hospitals, which is not shown in the ELP database. Two or more hospital inpatient admissions in the past year was substituted for the vulnerability index criteria of more than three admissions, and two or more emergency room visits in the past six months was substituted for more than three visits in the past three months.

[27] Stephen W. Hwang et al., "Risk Factors for Death in Homeless Adults in Boston," *Archives of Internal Medicine* 158 (1998): 1454-1460.

[28] California Office of Statewide Health Planning and Development, Public Patient Discharge Data for 2008 and 2009.

[29] Several of the fields of information in the form for collecting hospital diagnostic and service use data are not used in the triage tool, but are used to identifying patients who have unusual and very serious medical conditions that are likely to place them in the 10th decile:

- Pulmonary Tuberculosis (011)
- Human Immunodeficiency Virus (HIV) Infection (042)
- Diabetes mellitus (250)
- Cardiac dysrhythmias (427)
- Other venous embolism and thrombosis (453)
- Chronic liver disease and cirrhosis (571)
- Diseases of pancreas (577)

[30] Several of the fields of information in the interview questionnaire are not used in the triage tool, but are used to provide information needed for propensity score matches that will link the patient with similar individuals for whom complete cost information is available, either when they were homeless or after they entered permanent supportive housing. This information can be used to estimate cost savings for patients after they enter supportive housing. Some of the fields of information for propensity score matches is also used in the triage tool, the additional fields collected solely for enabling the matches are: veteran status, ethnicity, gender, alcohol or drug dependency.

[31] Two options for addressing the problem of relying on patients to provide information include: 1) Remove factors from the model for which it is difficult to obtain data (for example, it is difficult to obtain jail data when screening in hospitals) and modifying the remaining coefficients to incorporate statistical associations with the factors that have been removed. This might make the model slightly less accurate, but possibly more useable. 2) Another alternative

is for Los Angeles County to carry out data linkages that bring together all of the needed information to identify high-need individuals.

[32] Housing First together with a harm reduction approach entail providing housing as quickly as possible regardless of the challenges the homeless individual is experiencing. These challenges may well include addiction and mental illness. A range of services are immediately offered to help the individual achieve stability, remain housed, and enhance their overall well-being. Housing is not contingent upon participation in services. Through a variety of early engagement and community-building activities, coupled with a safe, supportive environment, easy access to services, no predetermined sequence or set of services, and a highly client-driven approach to developing a services plan, staff engages the individual in services designed meet his or her specific needs.

[33] Economic Roundtable (2010), "*Tools for Identifying High-Cost, High-Need Homeless Persons*," www.economicrt.org. Using a 0.40 cut-off value for the estimated probability of being in the 10th decile, the old screening tool had a shortfall rate of 1.0 and a burden rate of 0.96. The new triage tool has a shortfall rate of 0.22 and a burden rate of 0.27, using a 0.35 cut-off value.

[34] Supporting data for Figure 10, "Burden and Shortfall from Using the Triage Tool," is as follows:

| Cut-off Value (Estimated Probability) for 10th Decile | 10th Decile Shortfall | 10th Decile Burden | 9th & 10th Decile Burden |
|---|---|---|---|
| 0.00 | 0.00 | 3.36 | 1.45 |
| 0.05 | 0.02 | 1.05 | 0.31 |
| 0.10 | 0.05 | 0.71 | 0.20 |
| 0.15 | 0.09 | 0.55 | 0.16 |
| 0.20 | 0.12 | 0.46 | 0.13 |
| 0.25 | 0.15 | 0.37 | 0.10 |
| 0.30 | 0.19 | 0.32 | 0.10 |
| **0.35** | **0.22** | **0.27** | **0.08** |
| 0.40 | 0.26 | 0.23 | 0.07 |
| 0.45 | 0.30 | 0.19 | 0.06 |
| 0.50 | 0.35 | 0.18 | 0.06 |
| 0.55 | 0.41 | 0.15 | 0.05 |
| 0.60 | 0.48 | 0.13 | 0.05 |
| 0.65 | 0.54 | 0.11 | 0.03 |
| 0.70 | 0.60 | 0.08 | 0.02 |
| 0.75 | 0.70 | 0.08 | 0.02 |
| 0.80 | 0.82 | 0.07 | 0.02 |
| 0.85 | 0.98 | 0.06 | 0.02 |
| 0.90 | 1.11 | 0.05 | 0.02 |
| 0.95 | 1.43 | 0.03 | 0.01 |
| 1.00 | 6.84 | 0.00 | 0.00 |