
A Review of the Worst Case Housing Needs Measure

Virginia Tech Center for Housing Research

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Introduction

From the reform efforts of the Progressive Era to current concerns about housing affordability, public policy in the United States has had an on going, albeit evolving, interest in housing needs. Over the past hundred years public policy has addressed various aspects of housing needs, including physical adequacy, sufficient supply, health problems, affordability, slums and neighborhood quality. In the Housing Act of 1949, Congress set a housing goal for the nation in establishing that the general welfare and security of the Nation “require housing production and related community development sufficient to remedy the serious housing shortage, the elimination of substandard and other inadequate housing through the clearance of slums and blighted areas, and the realization as soon as feasible of the goal of a decent home and suitable living environment for every American family.”

Since then at least four national commissions have addressed the nation’s progress in meeting housing needs. In the aftermath of urban riots, The National Commission on Urban Problems commissioned a 1968 report assessing progress in meeting housing needs and projecting future needs (Kristof 1968). The Kristof report documented “steady and unremitting progress” in meeting the nation’s housing needs and recommended a ten-year production of 600,000 publicly assisted housing units targeted directly to “housing-deficit families—particularly those in the poverty and near-poverty groups.” The President previously endorsed that goal in his 1968 State of the Union address and proposed a “national goal of producing 26 million units over a 10-year period, including six million for replacement of substandard housing” (Milgram 1993). Subsequently, Congress concluded, “that the Nation’s supply of housing is not increasing rapidly enough to meet the national housing goal” and adopted the national housing goals proposed by the president. Existing subsidy programs were expanded and several new programs were introduced.

A national goal for housing production proved to be of little use in monitoring private production. There were 17.7 million privately owned housing starts from 1970 to 1979 and the total housing inventory increased by 18 million units between 1970 and 1980 (US Census Bureau 2003). In addition, the goal for publicly assisted production was similarly elusive. In the four years following the Housing and Urban Development Act of 1968, federal housing assistance was expanded to an additional 1.6 million families. By 1973 the efficacy, efficiency and costs of meeting the goal for assisted housing production prompted the President to suspend several programs and initiate another national review (National Housing Policy Review 1974). The 1974 review focused largely on critiquing housing policy and evaluating housing programs more so than quantifying housing needs. It stressed that many of the existing programs were not reaching the most needy households and were too costly compared with either private sector production or existing housing. Over the next twenty years, housing policy focused increasingly on targeting assistance to “worst case” needs, assisting private rather than public production of assisted housing, and making more use of the existing housing stock through consumer subsidies rather than subsidizing new construction.

In the early 1980s the nation was faced with the challenges of double-digit inflation and unprecedented interest rates, a prolonged recession, and a housing finance system undergoing rapid and often chaotic changes. Once again a Presidential Commission was appointed to review federal housing policies and national housing needs. The Commission's description of the "current plight of housing" reflected the increased importance of affordability and housing costs, as well as the diminished importance of physical inadequacy (President's Commission on Housing 1982, xvii):

"Young couples who cannot find a first home they can afford to buy; empty nesters who cannot find purchasers for their houses; newcomers to the city confronting a short supply of rental units; low-income families compelled to spend an unconscionable portion of their income for an adequate place to live; thrift institutions hobbled as a source of funds for homebuilders or homebuyers; builders facing bankruptcy as interest charges swallow the potential profit on unsold inventory; construction workers unemployed in substantial numbers; and suppliers of building materials cut to the bone and into by the bone by the sharp decline in demand for their products."

Most recently in 1999, Congress established the Millennial Housing Commission to "conduct a study that examines, analyzes, and explores—

1. the importance of housing, particularly affordable housing which includes housing for the elderly, to the infrastructure of the United States;
2. the various possible methods for increasing the role of the private sector in providing affordable housing in the United States, including the effectiveness and efficiency of such methods; and
3. whether the existing programs of the Department of Housing and Urban Development work in conjunction with one another to provide better housing opportunities for families, neighborhoods, and communities, and how such programs can be improved with respect to such purpose."

Each of these efforts has struggled with defining "housing needs," as well as how to measure those needs. Until the development of the American Housing Survey in 1973, efforts at quantifying housing needs were largely dependent on the decennial census. Since then, the American Housing Survey has been the preferred source of data on housing needs.

Starting in 1991, the US Department of Housing and Urban Development has reported to Congress on "worst case housing needs" in response to a request by the Senate Appropriations Committee. HUD commissioned this report to review the worst-case housing needs measure and to make recommendations for improving the measure and possibly expanding its coverage. This report first reviews the broader concept of "housing need" and then reviews HUD's worst case housing measure. We then present three separate categories of potential adjustments in the measure: priority adjustments in

measure; potentially desirable adjustments that need further study; and, potentially undesirable adjustments.

Recommendations

Our recommended priority adjustments are those for which the case for consideration is more clearly established and the adjustments are more readily addressable with existing data, particularly the American Housing Survey (AHS). Although the AHS does not measure homelessness, the obvious importance of homelessness in any determination of severe housing needs argues for including it in some fashion. Despite the risk of some double-counting of households in an independent measure of homelessness and a Worst Case Needs measure derived from the AHS, we recommend homelessness be added to the WCHN measure.

Households receiving housing assistance are currently excluded from the WCHN measure, as are households with zero or negative incomes. We recommend that both be included in the WCHN measure after screening for possible misclassification.

The current household size adjustments to the very low-income threshold favor small households and disfavor larger households. We recommend changes in the adjustments for household size that better reflect the impacts of size on housing expenditures.

Last, we recommend that households who can afford a Fair Market Rent at 30% of income be excluded from classification as having Worst Case Housing Needs, even if they otherwise meet the WCHN criteria.

The second group of potential adjustments requires further refinement and research before being considered for implementation in the Worst Case Needs report. These include expansion of the WCHN measure to very low-income homeowners; adopting a sliding scale for excessive housing cost burdens; including non-cash (Food Stamps) and tax benefits (the Earned Income Tax Credit) as income in determining housing needs; including neighborhood quality as a WCHN criterion; using median household income rather than median family income in establishing the very low-income eligibility threshold; and, use of constant dollars rather than nominal dollars in evaluating household incomes. These changes could potentially improve the WCHN measure, but present higher risks of classification errors without further research and documentation.

The third group includes two changes that could be potentially undesirable. Using the poverty threshold rather than the current very low-income threshold would result in serious underestimation of worst case needs. We recommend against including overcrowding as a criterion for worst case needs except in the most extreme cases, as there is no clear rationale or evidence that most instances of overcrowding represent a severe housing problem.

The report presents the impact of these adjustments on the worst case housing needs measure. The Urban Institute (Burt et al 2001) estimated 3.5 million people

(approximately 2.7 million households) receiving homeless assistance at some time during 1996. On a daily basis, 800,000 people or approximately 637,000 households were homeless. The latter would increase worst case housing needs by 13%.

Among the other recommended priority adjustments, including households receiving housing assistance would increase worst case housing needs by 31%. Including zero and negative income households would increase WCHN by 15%. Adopting the alternative household size adjustments centered on a median family size of three persons would reduce the measure by 4%. Excluding households who can afford a fair market rent at 30 percent or less of income has a negligible impact.

We recommend caution in considering any changes that expand the measure to include incomes or criteria with significant risks of misclassification. The inclusion of very low-income homeowners in the worst case needs calculation should have the highest priority for further research. Without additional adjustments, considering very low-income owners doubles worst case housing needs. Many of these owners occupy houses valued over \$100,000. But including an imputed income from house equity and excluding very low-income owners who can afford a fair market rent at 30% or less of income reduces the number of WCHN owners by only 2%.

Adopting a more restrictive income threshold (such as the poverty threshold) would exclude numerous households with equally severe housing conditions. Including food stamps or the Earned Income Tax Credit in household income requires more research on the accuracy of proposed methods to estimate the income received from these programs. Including neighborhood quality as a criterion is very sensitive to the definition of neighborhood quality. Given the potential for significant misclassification, that definition should be sufficiently restrictive to include only the worst neighborhoods. The impact of neighborhood quality on quality of life needs to be more thoroughly documented to identify the measures of neighborhood quality that should be used and the threshold appropriate for inclusion as a worst case housing need.

The Concept of Housing Need

After the Great Depression and World War II, many countries faced severe housing shortages. Consequently, a prime component in the definition of housing need was the quantity of units required to house the current population and to replace physically inadequate units. Several countries established national housing goals to reduce their post-war shortages, a practice continued later by setting goals for producing enough housing for population growth and replacement of older stock. In the United States, housing shortages existed as an aftermath of the Great Depression and low-levels of production during WWII, but were not as severe as in countries where significant amounts of housing were destroyed during the war. Annual production goals received less attention here, where the emphasis was on private housing production. In addition, private production assumedly contributed to upgrading through the filtering of units from higher income to lower income occupants (Downs 1981).

Although most housing shortages have been addressed in developed countries, the availability of shelter continues as a problem in the form of homelessness. The causes of homelessness are varied and include personal, family and community characteristics. Among the latter, research has pointed to the supply and cost of permanent housing, along with the supply of temporary and transitional housing (Burt et al. 2001; Shlay and Rossi 1992; Wright, et al. 1998; Shinn and Gillespie 1994; Rossi 1994).

Counting the homeless has proven to be an on-going challenge. Initial estimates by advocacy groups proved to be exaggerated (Rossi 1991; Cordray and Pion 1992). But subsequent efforts to enumerate the homeless have also been controversial. The 1990 shelter and street night count conducted by the Bureau of the Census was criticized as “fatally flawed” by the National Coalition for the Homeless (1991), charging that the effort provided inadequate coverage and excluded several categories of homelessness. Concerns about the inability of any single-night, “snapshot” approach to accurately estimate the number of people who are homeless over a longer period are matched by the opposite concern that including episodic homelessness in annual estimates overstates the case by counting people who are no longer homeless (Kondratas 1994). Kuhn and Culhane (1998) divide the homeless into three categories: chronically homeless (few but long episodes), episodically homeless (multiple, short episodes), and transitionally homeless (few, short episodes). The new federal policy to end chronic homelessness in ten years underscores the importance of more detailed classification of homelessness.

Various aspects of housing quality have been used to identify housing needs. Numerous units built to house burgeoning urban populations in the nineteenth and early twentieth centuries lacked indoor plumbing (or only had cold water) and central heating, not to mention that in the absence of building codes some units were of extremely poor construction quality. These units have been largely replaced in the United States, but other physical inadequacies continue. There is no standard measure of inadequate housing that is widely accepted. Efforts to classify housing quality in the decennial census were abandoned after enumerators’ classifications in the 1960 Census proved to be unreliable. There are several undesirable housing conditions (e.g. leaking roofs, plumbing and heating system breakdowns, broken windows, and holes in walls) which can be used to identify units needing improvement, but the combination of these conditions into a single measure is largely a matter of judgment. In addition, the combination of several individual measures into any composite measure of housing quality (or inadequacy) must make conceptual sense and be based on a metric that allows equivalent categories to be combined (Innis 1994: 221).

Transmittal of infectious diseases and exposure to bacteria related to unsanitary conditions were associated with housing at a time when indoor plumbing and sanitary water supplies were scarce. Under those conditions, overcrowding and density contributed to poor health conditions and the spread of infectious diseases. Today, the impacts of housing on health are more limited. Lead paint poisoning is probably the most serious health threat associated with housing in the United States, particularly for children. Lead was banned from paint in 1978, but prior to then it was commonly used on

both interiors and exteriors. The federal government has promoted the removal of lead paint through several programs and the Uniform Real Estate Disclosure Act now requires sellers to identify if lead paint is present in the home.

As with indoor plumbing, the problems associated with cold and damp housing have largely diminished with time in the United States. Contemporary research on housing and health has been more a more frequent topic in the United Kingdom (Dunn 2000; Whitehead 2000) than in the US (see Sandel et al. 2000 for one of the few discussions of housing and health in the US). Recently, however, there has been increased concern with moisture and mold problems associated with newly built units that are improperly ventilated or allow moisture to build inside wall and floor cavities. But the problems of moisture and mold are not limited to newer housing. Increased incidence of asthma might be related to moisture and mold problems in older housing as well. The relationship of asthma and other respiratory problems (except those related to Radon) has not been definitively established and the available research is limited by methodological problems. Similarly, little research has been conducted on the problems of indoor air quality in residential dwellings aside from Radon. The latter is a known health risk, but there is debate about threshold levels for increased risk. Additionally Radon, which migrates from the ground into the house, is only a problem in certain locations. Radon could become a factor in measurements of housing need in those locations even if it is not sufficiently prevalent to be a national issue (Siniscalchi, et al. 1996).

Dunn (2000) points out that persons who are already unhealthy might also have a higher incidence of poor housing conditions probably as a result of diminished incomes. The homeless have a higher incidence of health problems and greater exposure to health risks, further justifying their inclusion in measures of housing need. Smith et al. (1993) suggest that substandard housing contributes independently to psychological distress and Marsha et al. (2000) concluded that the existing evidence “points to the conclusion that the impact of housing deprivation upon the risk of ill health is indicative of a causal relationship.” Both of these studies were conducted in the UK. Evans et al. (2002) suggest that multi-family buildings and residential crowding contribute to psychological distress among younger children, but the relationship was not clearly established. Anecdotal evidence and common sense point to a relationship between living conditions and mental health, but the exact pathways are unclear and neighborhood conditions might be more important than individual housing conditions. In any event, the potential relationships between housing and health have been largely ignored in the United States and more research is warranted.

Overcrowding was once a primary measure of housing conditions, particularly when it was more clearly associated with health outcomes. But over the past century, overcrowding diminished to very low levels in the US (Meyers et al. 1996; Clark, et al. 2000) and the relationship between overcrowding and social problems has been cloudy, at best. As consumption of housing increased, standards for overcrowding fell. Recent increases in overcrowding in some metropolitan areas with higher levels of immigration have prompted more concern about overcrowding as a potentially negative housing condition. Meyers et al. argue that many immigrant groups have a cultural preference or

tolerance for crowding and that overcrowding is independent of the amount of housing available. This suggests that overcrowding could be unresponsive to housing policy and might only be reduced by “diminishing racial/ethnic diversity and restricting immigration.” They conclude that overcrowding should be dropped as a measure of housing need in the United States.

Overcrowding related to doubling-up of families could identify a serious housing problem. Doubling-up can be considered both a problem and a solution (Koebel and Murray 1999). Doubling-up often reflects sharing of resources among family members during times of crisis, such as when a younger family moves in with their parents due to unemployment or other setbacks. In such instances doubling-up could prevent homelessness or severe cost-burden for the younger family. If the host family has sufficient resources and housing, doubling-up is clearly a solution to a potential housing problem. Doubling-up can also reflect personal choices independent of potential housing problems and should not be counted as a need for housing. However, when doubling-up occurs with a low-income host family that has little space or financial resources to share, it could indicate a high-risk of homelessness and a serious housing need (Ringheim 1990; Wright, et al. 1998).

Beyond the necessity of shelter and public health standards, the concept of housing need is predominately normative. Relationships between housing conditions and physiological needs are difficult to establish, but housing clearly has an impact on quality of life, be that measured in economic or psychological terms. Housing conditions and neighborhood characteristics are highly interrelated, as recognized by Congress as early as 1949 in its declaration of a national housing goal of “a decent home and a suitable living environment for every American Family”. Research on concentrated poverty and on the impact of neighborhood conditions on life opportunities (Galster 1998) suggest that our conceptualization of housing needs might be broadened to include characteristics of the surrounding neighborhood. Thus, persons in otherwise adequate quality housing might be considered to be inadequately housed if their neighborhoods were of insufficient quality. Since the “affordable” housing supply for many poor households is likely to be located in poorer quality neighborhoods, these “adequately” housed families might be exposed to more serious risks than their counterparts living in somewhat better neighborhoods at the expense of a high cost burden. The later would typically be counted as having a housing need due to their cost burden, while the former would be classified as adequately housed.

Research on neighborhood conditions and on resident satisfaction suggests that exposure to crime and higher risk of victimization contribute to lower levels of satisfaction and possibly to higher levels of psychological distress. The research, however, has not established the thresholds of neighborhood problems or the combination of problems that are critical to an occupant’s well being.

The most frequent factor cited in the United States and in many other developed countries in determining housing needs is affordability, which is generally measured by the percentage of household income devoted to gross housing costs. Initially the 25% threshold was used as a rule of thumb to identify a problematic level, based on a widely

held perception dating back to the 1800s that workers should spend no more than one week's wages for housing (Feins and Lane 1981). This level was codified into US housing policy in reaction to reports of households paying greater proportions of income for rent in public housing. The 1969 Brooke amendment to the 1939 Housing Act stipulated public housing tenants would pay no more than 25% of their adjusted income for gross rent. Congress later adjusted this to 30% in part due to fiscal considerations.

The threshold of cost burden associated with undesired consequences has never been established empirically. Indeed, the effects of affordability on households continue to be assumed rather than documented for the most part. High cost burdens have been associated with an increased risk of homelessness (Ringheim 1990; Dolbeare, et al. 1991; Leonard 1992), but this literature has not been reviewed for the purpose of establishing unacceptable levels of cost burden. Higher shares of income going to housing undoubtedly crowd out other expenditures, but there has been surprisingly little research on this or on its effects on person's lives. Harkness and Newman (2001) examined the impact of housing assistance and food stamps on food expenditures by poor families. The effect of housing assistance on disposable income for food stamp recipients is complicated by the deduction of shelter expenses in determining the food stamp benefit. Most households receiving rental assistance under the public housing or Section 8 programs also received food stamps. Households moving into public housing or into privately-owned assisted housing did not increase their out-of-pocket food spending, contrary to expectations. However, Harkness and Newman also reported that they "did not find any reliable evidence that the receipt of housing assistance significantly reduced housing costs", although housing assistance under most federal programs results in significantly lower cost burdens for assisted than for poor, unassisted households (Koebel 1997).

The old rule of thumb of 25% of income for housing costs was never clearly established as an upper threshold to determine affordability, even within mortgage underwriting. Mortgage underwriters and landlords have always used costs relative to income as a factor in decisions to lend or to lease. Currently, mortgage underwriters accept levels higher than 30% under certain conditions. Ironically, cost burdens above 30% and sometimes above 40% are promoted in programs promoting homeownership for lower-income purchasers and in environmental programs to promote energy efficiency, while higher cost burdens are otherwise considered to be objectionable.

Research on the probability of delinquency and default in meeting mortgage payments has addressed cost burden (Vandell 1993) but there has not been a systematic review of this literature for the purpose of addressing affordability thresholds. Similar research might be available relative to delinquency and default on rent payment. Until research on these and other consequences of housing cost burdens clarifies the threshold (or thresholds) that should be considered undesirable, only a standard significantly above 30% would be plausibly "safe".

Definitions of housing costs for owners typically include the mortgage payment (which normally includes principal, interest, taxes and home insurance) and utilities. Principal

payments build the home purchaser's wealth, but the principal payment is rarely deducted from the measurement of housing costs. Interest payments and property taxes are deductible for homeowners who itemize their deduction on federal and state income taxes. However, these tax benefits are typically ignored in calculations of housing costs for owners. For tenants, rent and utilities ("gross rent") are typically included in housing costs. Although renters often pay for insurance on household belongings, this is not typically included in housing cost measures.

Housing costs and transportation costs are often inversely related, but this relationship has gotten more complicated with the geographic dispersion of employment and retail trade. A trade-off between housing costs and transportation costs have been recognized in research on metropolitan housing markets for a long time (DiPasquale and Wheaton 1996, pp. 42-46). Less expensive land for housing can be found on the periphery of the metropolitan area but purchasers are required to have longer commutes and higher transportation costs. On the other hand, some locations provide more efficient access via public transportation and thereby reduce the household's cost for private transportation. This in turn can enable the household to have a higher housing cost burden than otherwise acceptable, a factor recognized in the underwriting standards for location efficient mortgages (Natural Resources Defense Council 2003). Nelson et al. (2002) have argued that this trade-off should be recognized in the measurement of housing affordability, but methods and data for calculating transportation costs have not been established.

Housing costs are, of course, dependent on the amount and quality of housing consumed, while the amount needed is related to household size. Households might choose more or better space at a higher cost burden. This raises the challenge of determining the amount of housing that is appropriate for a given household size (Lerman and Reeder 1987). It also points out the risk of misclassifying households as cost burdened (false positives) when they could afford suitable housing, assuming the latter is in sufficient supply.

Several authors (Baer 1976; Lane 1977; Stone 1993; Hulchanski 1995; Chaplin and Freeman 1999; Thalmann 1999) criticize the use of affordability ratios to define housing needs, to predict ability to pay housing costs, or as selection criteria in either leasing or lending decisions. These criticisms typically focus on the arbitrariness of the threshold of affordability, the use of single standards of affordability without any adjustment for household characteristics (such as size), changes in prices of other household expenditures, the lack of standards for appropriate consumption, regional variations in housing costs, and the definition of income used (e.g. current rather than permanent income).

Feins and Lane (1981) and Stone (1990) argue that thresholds for cost burdens depend on the household's income and age, as well as size. Any housing expense for very poor households could crowd out other needed consumption. Both Feins and Lane (1981) and Stone (1990) used household budgets once calculated by the Bureau of Labor Statistics to establish affordability standards based on income level, household type, age and size. Stone determined if income net of housing costs was sufficient to cover the prescribed

budget for non-housing expenses, implying that housing subsidies should address the entire income problems of the poor. Feins and Lane, however, adopted the ratio of rent to income prescribed in the BLS lower-income household budgets. The BLS budgets prescribed much lower rent-to-income ratios for low-income families than for the elderly, suggesting a family of four devote slightly less than 20% of income to rent while a retired couple could pay as much as 36% of income for rent. But the BLS stopped calculating the budgets in the 1970s after they determined they were unreliable and no other source has been identified.

Chaplin and Freeman (1999) proposed an alternative measure, the Foster, Greer, Thorbecke statistic (or FGT), which measures the degree to which households exceed the affordability threshold. The FGT statistic for unaffordability is based on the household's absolute difference between the affordability standard (e.g. 30%) and its affordability ratio (e.g. 35%) taken as a ratio to the affordability standard (e.g. 5%/30%), summed for all households exceeding the standard and divided by the total number of households in the community. The difference ratio is increased by an exponent reflecting the degree of sensitivity to larger differences above the affordability standard. The FTG measure does reflect the severity of affordability problems, whereas the binary designation of households as either violating or not violating the standard does not. For example, two communities where one-fifth of the households of each exceed an affordability standard set at 30% of income cannot be distinguished from each based on the distribution around that standard. The FGT measure would identify one of these communities as having a more severe affordability problem if its households exceeded the threshold by a larger degree than the other community. The FGT measure, however, is not likely to replace the standard affordability measure since it does not provide a "headcount" of households in need and requires an additional judgment about the weight to apply to the degree of variation from the affordability standard. It would be a potentially useful complement to the standard affordability measure, particularly for comparing communities where the threshold is set at relatively lower levels (e.g. 25% or 30% versus 50%).

Thalmann (1999) identifies different categories of households that could be misclassified using conventional approaches to analyzing housing affordability due to over or under consumption of housing relative to a prescribed level. "Overconsumers" have high cost burdens but could afford adequate housing. Standard measures of affordability misclassify these households as cost burdened (false positives). To avoid this misclassification, Thalmann recommends adopting a threshold for "appropriate" housing based on hedonic price indices of housing quality and average market rents. Whether housing is appropriate for a given household is determined by the match between the size of the unit and the number of people in the household and that the unit is of "sufficient physical quality". Both the size match and quality determination require additional calibration that involves quantitative and normative decisions. In addition, merely establishing a cost threshold for appropriate housing does not guarantee that such housing is in sufficient supply to allow "overconsumers" to adjust their housing consumption (Lazere 1995). Occupancy by higher income households complicates any assessment of the available supply of affordable housing for lower-income households (Nelson 1994; Stone 1994;).

Some “underconsumers” reduce their rent burdens by occupying less housing than suggested by their incomes, but since they can afford “appropriate” housing they are of little concern. More problematic are low-income households who obtain low rent burdens by consuming too little housing, poor quality housing, or poor quality neighborhoods. These underconsuming households (false negatives) cannot find adequate quality elsewhere without violating the affordability standard. Those living in seriously inadequate housing could be identified through housing quality standards but otherwise would be misclassified (false negatives) as having adequate housing on the basis of affordability. Those in adequate housing (but perhaps inadequate neighborhoods) would be similarly misclassified in that they cannot afford adequate quality elsewhere. This problem is further complicated by the receipt of housing assistance (or other forms of non-cash assistance that might not be reflected in the income measure) that subsidizes the household’s housing consumption.

The risk of misclassification of housing needs based on cost burden is influenced by the income level of the household. As income increases, the likelihood of being able to afford appropriate housing increases and thus the opportunity for misclassification based solely on cost burden also increases. Consequently measures of affordability are highly sensitive to income and cost-burden thresholds, as well as the treatment of homeowners. The latter impose additional challenges due to the potential (but typically uncounted) income related to the asset-value of the house and their potential ability to afford housing in the rental market. Elderly homeowners would have a greater likelihood of misclassification due to lower post-retirement incomes. Inclusion of homeowners and “moderate-income” households in both Stegman et al. (2000) and Millennial Housing Commission (2002) approximately double the number of households classified as having critical housing needs relative to HUD’s Worst Case Housing Needs measure that is limited to very-low income renters. Although the incidence of classified housing needs declines markedly with increases in income, the size of the “moderate” income population that is included in these more expansive measures accounts for the large impact on the classification of housing needs. Consequently, concern about the potential for misclassification should be greatest for households that are included due to these shifts at the margin of the classification criteria.

Point in time estimates of housing needs also are prone to misinterpretation because the duration of the incidences of need. A household can exit the condition of housing need through various ways, depending on the definition and calculation of need. For example, an overcrowded household could exit that status through a change in the number of people in the household (children grow up and move out) or through a move to a larger unit. Similarly, a cost-burdened household could exit that status with an increase in income or a reduction in cost.

Little research has been conducted on the duration of housing needs. Adams (1989) used the Panel Study of Income Dynamics to examine entry into and exit from high cost burden (50% of income for rent and utilities) among poor renters (a condition he referred to as “poor high-rent” status). For the nineteen-year study period (1967 through 1985),

“entry rates appear to have increased at least three times as fast as exit rates.” Adams concluded “over time many households experience poor high-rent status, but that it is a relatively short-term phenomenon for most of those who do experience it.” On average, the duration was approximately 2.2 years. Adams reported that among all households that ever experienced poor high-rent status, they experienced the status in 15.7% of those years. Since the mean time in the data set was 13.7 years, the average duration ($15.7\% \times 13.7$ years) would be 2.2 years. The median time in the data set was 17.9 years, which would indicate a median duration of 2.8 years. However, these are not necessarily continuous periods, so average durations of individual spells would be lower.

There are several reasons to suspect that this research underestimates the duration of poor high-rent status. First, the income threshold used was only slightly higher than the poverty threshold, so households could exit the poor high-rent category due to becoming “non-poor” with relatively modest shifts in income, which were mainly due to changes in employment status. Modest shifts in income might not affect the household’s housing cost burden significantly. Someone shifting from a cost burden of 50% to 49% would be reclassified out of the cost-burden category. Some of the exits could be due to housing assistance, rather than an unassisted exit. Finally, the households most likely to leave the panel would be those most susceptible to severe housing problems. Additionally research is needed to establish current durations of high-rent burden as well as the contributing factors to entry to and exit from this status.

Numerous other studies of housing affordability rely on aggregate measures (e.g. median incomes and median prices). These measures are mainly useful as community-level indices and cannot be used to classify households without serious risk of error. Even as community-level indices, measures that adopt an income standard without any regard to geographic variations in household incomes (such as the index published periodically by the National Low Income Housing Coalition using the minimum wage) simply reflect the place-to-place variation in median costs and provide limited insight into actual affordability levels.

Certain population groups are more at risk of experiencing housing needs or might have higher public priority than others. Consequently attention must be paid to the target populations to be featured in any housing needs analysis. Feins and Lane (1981) showed that rent-to-income ratios drop dramatically between the first and second quartile of incomes. Since income is probably the most important correlate of housing needs, most studies focus on some designation of low-income, be that poverty or some other threshold. Housing tenure (owner or renter) is also highly correlated with income and with measures of housing need, with renters more at risk of experiencing various categories of housing need. Depending on the location, race and ethnicity often suggest important target populations. Other population groups that have been the focus of attention include the physically disabled, the mentally ill, persons with HIV or AIDs, recovering substance abusers, victims of domestic violence, single parents, youth, frail elderly, and persons being released from prisons or other institutions. Some of these groups have highly specialized needs, requiring housing and social service approaches tailored to those needs. For the most part, however, it is sufficient to identify the target

population in the tabulation of housing needs without modifying the way those needs are measured.

The Worst Case Housing Needs Measure

At the time the Worst Case Housing Needs measure was developed, both Congress and HUD were placing a high priority on targeting scarce federal resources for housing on those households with the greatest needs. HUD released the first Worst Case Needs Report to Congress in 1991 (Office of Policy Development and Research 1991) in response to a directive from the Senate Appropriations Committee (Senate Report 101-474 accompanying the FY91 appropriations bill) to prepare an annual report estimating the number of households with incomes below 50% of the area's median income and who either pay 50% or more of their monthly income for rent or live in substandard housing. In 1979 and 1983 Congress had established federal priorities for admission to assisted housing programs, targeting families who pay more than half of their income for housing, live in substandard housing, or had been involuntarily displaced from their housing. (Federal preferences for tenant selection have since been changed to allow greater local flexibility.) As explained in the 1991 report, "the concept of worst case needs developed in the early 1980s from discussions among Senate appropriations staff, HUD, and OMB, after the staff director of the housing subcommittee asked HUD to produce estimates of renter households with the most severe housing needs and a model projecting how combinations of turnover and incremental units could meet worst case needs."

Tensions within housing policy often exist between various levels of housing need. The most severe needs are also the most costly to address. Programs based on less costly subsidies or requiring higher incomes for participation reach households with less pressing housing needs (Nelson and Khadduri 1992; Nelson 1994). The WCHN measure and report have been used to identify the severity of need and to help policy makers target those with the most severe needs, typically very or extremely low income renters.

The Annual Housing Survey (now titled the American Housing Survey) started by the Bureau of the Census in 1974 greatly facilitated the development of the WCHN measure. It was important to have a regular data source of sufficient reliability to establish the credibility of any measurement of housing needs. The use of the AHS to measure WCHN was enhanced by the Census Bureau's reputation as an objective source for high quality in sampling design and data collection, the detail of data collected, national and regional coverage, and samples of major metropolitan areas. Measures of housing quality in the decennial census are extremely limited and its periodicity hampers its use for more regular reporting. Other national surveys have similar shortcomings for use in measuring housing needs.

Following the Congressional directive, HUD defined worst case housing needs as households in severely inadequate housing or rent burdens exceeding 50 percent of reported income and tabulated worst case needs for very-low-income renters with incomes below 50% of the area median family income. Statutory guidelines for several

housing programs stipulate the use of median family income (rather than household income) to determine eligibility (Nelson 1994). So as to not penalize poor communities, the median family income for non-metropolitan areas of each state is used as a default minimum. Additional adjustments have been prescribed. Consequently, 50% of area median family income does not necessarily apply to all communities. HUD’s income limits for 50% of area median family income are used directly for the 141 MSAs (or in some instances CMSAs) identified in the AHS data. For other locations, the income limit was estimated for the combination of six climate zones, four census regions, and metropolitan status (metropolitan, non-metropolitan) and applied to households in each of these locations. (Although the combination of six zones, four regions, and two metropolitan status categories is a maximum of 48 location categories, some of the region-climate zone combinations are empty.) Income limits are adjusted for different household sizes by assuming a median size of 4 persons and adjusting 50% of the area median by the household size factors shown in Table 1, which are used in determining income eligibility for a variety of HUD programs.

Table 1. HUD WCHN Adjustments to AMFI for Household Size

	Persons									
	1	2	3	4	5	6	7	8	9	10+
Adj	0.7	0.8	0.9	1.0	1.08	1.16	1.24	1.32	1.40	1.48

Severely inadequate housing is defined as the unit having any of the following five problems:

- Lacking hot piped water or a flush toilet, or lacking both bathtub and shower, all for the exclusive use of the unit.
- Having been uncomfortably cold last winter for 24 hours or more because the heating equipment broke down, and that equipment broke down at least 3 times last winter for at least 6 hours each time.
- Having any five of the following six maintenance problems: leaks from outdoors; leaks from indoors; holes in the floor; holes or open cracks in the walls or ceilings; more than a square foot of peeling paint or plaster; or rats in the last 90 days.
- Having all of the following four problems in public areas: no working light fixtures; loose or missing steps; loose or missing railings; and no elevator.
- Having no electricity, or all of the following three electric problems: exposed wiring; a room with no working wall outlet; and three blown fuses or tripped circuit breakers in the last 90 days.

The WCH classification excludes several categories of households that might otherwise be included as having worst case housing needs. The homeless are not included since the AHS is a survey of housing units. Households receiving federal housing assistance¹ are excluded from WCH on the basis that their rent should be constrained to 30% of their income.

¹ Answering yes to “Is the building owned by a public housing authority?”, “Does the federal government pay some of the cost of the unit?”, or, “Do the people living here have to report the household’s income to someone every year so they can set the rent?”

Households with zero or negative income are excluded unless they live in severely inadequate housing. It is mathematically impossible to calculate the rent-to-income ratio for households with zero income and the ratio would be negative (and thus impossible to interpret) for those with negative incomes. Household income in the AHS is the sum of incomes reported for all household members for the 12 months prior to the interview (consequently the 12-months covered varies between households.) Separate questions cover income received from wages and salaries, self-employment, Social Security or railroad retirement income, public assistance or welfare payments, and all other money income. The amounts reported are supposed to be prior to any deductions for taxes or other purposes. Interpreting zero and negative incomes is a challenge, since most of these same households are paying rent. Since income is self-reported and unverified, some households might report it erroneously. Some higher income households might have exceptional business losses or other losses during a year. Since the AHS does not report income for other years, a multi-year average cannot be calculated. In addition, the incomes reported in the AHS are lower than incomes measured in other surveys covering approximately the same periods. Low-income households apparently underreport their incomes in surveys, particularly when compared with levels of expenditures reported. Since low-income households are likely to rely more on irregular sources of income, annual amounts might be underestimated or intentionally underreported.

The WCHN income measure does not include non-cash support received from public programs, such as food stamps, or the Earned Income Tax Credit, which can increase gross income for some households. These benefits could shift households out of the worst case needs designation if their adjusted incomes exceed the income threshold (50% of AMFI) or reduce cost burden below the affordability threshold.

The WCHN measure is one of several social indicators calculated by the federal government to track social problems and that prescribes thresholds or standards to determine acceptable conditions. Many of these are done as dichotomies that identify whether a person, household or some other unit has the identified condition or does not. For example, unemployment and poverty are typically treated as simple dichotomies, even though this might mask important aspects of severity, periodicity, and other characteristics that might provide more complete understanding of the phenomenon. While social scientists are drawn to the underlying complexity that surrounds most any social problem, policy makers, administrators and the general public want to know whether a particular condition exists and how often.

It is easy to criticize almost any measure of social problems, particularly single, dichotomous measures; however, these criticisms often miss the point. For a variety of purposes, it is important to know how many people have a particular problem, whether certain groups are more affected than others, and whether the problem is increasing or decreasing. This is not to say that these measures are the full extent of what we need to know about the problem. Public policy and program planning require more detailed knowledge beyond single measures. However, it is critically important that these measures meet certain standards and do not provide false or misleading readings of the prevalence or direction of the problem measured.

In reviewing social indicators, several criteria can be applied. First there are the basic criteria used for scientific measurement, namely validity and reliability. Any measure is an instrumentation of a broader, more general concept, which often goes undefined (like “housing need”). Valid and reliable measurement, however, requires a precision that allows all similarly situated cases to be classified the same. The validity of the measure is the degree to which it measures the right thing. Validity is difficult to establish clearly and mainly reflects the degree to which knowledgeable persons think that the measure sounds intuitively reasonable and whether it behaves in ways consistent with theory and with other measures of the same or related phenomena. The reliability of the measure is the degree to which the same results are obtained whenever the same conditions are encountered.

The reliability of the worst case housing measure is without question. The AHS is conducted with extreme care and the sample design and size produce stable results. The AHS data set provides some limitations (such as underreported income), but its extensive coverage of housing quality cannot be found elsewhere.

The validity of the worst case housing needs measure depends on one’s expectations. In terms of the initial charge by Congress, the measure is clearly valid. Congress asked for a measure of worst case housing needs relative to extant housing assistance programs, which mainly focused on rental assistance. In the meantime, federal housing policy and programs have changed. Tenant selection preferences are now more flexible and higher priority is placed on creating better quality assisted housing properties and neighborhoods that appeal to a broader range of incomes. Changes in housing assistance programs have made it increasingly difficult to assume that assisted households should be automatically excluded from the worst case needs measure. Although homeownership has always been a priority in US housing policy, low interest rates have created greater opportunities for ownership among lower income households. These are legitimate concerns (among others) about the current coverage of the worst case housing needs measure (Dolbeare 2001).

While changes in housing policy and programs raise some concerns about the coverage of the worst case needs measure, the audience of the WCHN report has also changed. Initially intended as a report to Congress on the number of priority households eligible for federal rental assistance, the report has a much wider audience today and has become a primary record of housing needs for the country. If the report is to serve as a report to the nation on housing needs, it must become more comprehensive. There are also important implications in following eligibility guidelines for federal housing assistance. Some of those guidelines give implicit priority of certain households over others, particularly preferring small households (and thus the elderly) over families. Eligibility standards also reflect statutory subtleties that might not be consistent with clear interpretation of the measure.

Several of these concerns are addressed here in terms of potential adjustments to the worst case needs measure. These potential adjustments are presented in three groups. The

first group, priority adjustments, includes adjustments for which the case for consideration is more clearly established and the adjustments are more readily addressable with existing data, particularly the AHS. The second group requires further refinement and research before being considered for implementation in the Worst Case Needs report. And the third group includes those adjustments that are much more speculative and warrant more fundamental research, as well as those that do not clearly reflect a housing need and should not be considered further.

Our baseline recreation of HUD's official WCHN measure for 1999 closely approximates the HUD estimate: 4,812,910 compared to 4,856,000. An unpublished HUD calculation² of WCHN using a revised computer program (SAS replacing Fortran) yielded 4,809,504 households with WCHN, a difference of only 3,406 households (less than 0.1%). Similarly, our baseline estimate of very low-income (VLI) renters (14,756,051) is virtually identical to the HUD estimate (14,803,000).

PRIORITY ADJUSTMENTS IN THE WORST CASE HOUSING NEEDS MEASURE

Including the Homeless Population

Including the homeless population in worst case needs is warranted on the grounds of both federal housing policy and achieving a more accurate reflection of the broader concept of housing need. Nonetheless, there are several problems in doing so, some of which could be difficult to resolve. First, a reliable, national estimate of the homeless population is not routinely available. The 2000 Census estimated 170,706 persons in emergency and transitional shelters. A more inclusive estimate based on homeless populations served on two different days in 1996 reported as many as 3.5 million people (approximately 2.7 million households) as homeless at any time during the year and about 800,000 on any given day (Burt et al. 2001).

Despite the difficulty in estimating homelessness, its importance in any definition of housing need argues for using the most recently available objective estimate such as provided in Burt et al. 2001. Secondly, estimates of homelessness are most often for people rather than households. The concept of housing needs relies on the definitional equivalence between households and housing units. Achieving a household equivalent homeless estimate could prove to be difficult if the original data source does not identify household or family units among the homeless. Additionally, there is some potential for double counting whenever different data sets are used. Adding a homeless estimate to an AHS derived worst case housing measure could double-count AHS households who become homeless at some other time during the year. This problem would be lessened by using a single point-in-time estimate for the homeless rather than a 12-month estimate, as many short-term spells of homelessness would likely include the population already represented by the AHS worst case need households. The two single day estimates of homeless households from the 1996 data (Burt et al. 2001) were 346,000 (October) and

² Email from HUD economist, David Vandenbroucke, 10/22/02.

637,000 (February). Depending on the estimate used, worst case housing needs increase by either 7.2% or 13.2%. Research addressing the double-counting problem between the AHS measure and a national estimate of homeless households should be considered. These problems notwithstanding, the worst case housing needs measure should include the best estimate of homeless households currently available.

Households Receiving Housing Assistance

The current procedure for calculating WCHN excludes households living in public housing or receiving other forms of rental assistance. Excluding households who receive housing assistance assumes that their rent payment is less than 50 percent of their income and that the housing does not violate the other standards for WCHN. Both of these assumptions are subject to error. Although most households receiving rental assistance pay 30% or less of their gross income for rent, there are numerous exceptions that might be increasing due to greater flexibility in tenant selection rules. Also the quality of public housing units and similar units subsidized under various “site-based” programs cannot be assumed to exceed the WCHN standards. Consequently, households receiving rental assistance should be considered to have WCHN if their rent-to-income ratios and housing quality dictate.

By including assisted renters meeting the criteria for worst case housing, WCHN increases by 1.5 million households or 31.1 percent (Table 2). The assumption that the housing needs of assisted households are already met by that assistance is clearly unwarranted in terms of the definition of worst case needs. Many of these households are paying very high proportions of their income for rent (>50%) or are in severely inadequate housing.

Table 2. Including Housing Assisted Households

	Total very low income	Total WCHN	% change in WCHN	% of VLI	% all renter households	Earn < 30% AMFI	30-50% AMFI
Current standard	14,756,051	4,812,910	N/A	32.6%	14.2%	2,822,916	1,109,584
Housing Assisted Incl.	14,756,051	6,311,674	31.1%	42.8%	18.6%	22.9%Δ	18.5%Δ

It is possible that some of these households do not receive federal rental assistance, either because they have annual income verification under a state or local housing program or due to errors in reporting (Shroder 2002; Shroder and Martin 1996). Residents of public housing were fairly accurate in identifying their assisted housing status. Those in privately owned units with federal rental assistance (either project based or certificates-vouchers) often misidentified their units as public housing and about 15% misidentified themselves as not having housing assistance. From 15% to 20% of very low-income renters without housing assistance from HUD identified themselves as receiving such assistance. Since the total number of VLI renters is fairly large, these “false positives” can account for a significant proportion of households identified as receiving federal housing assistance in the AHS and other surveys. Some of these households could have been missing from HUD records or could have received rental assistance from the Department of Agriculture. Since income verification is also required under the Low

Income Housing Tax Credit, these households would be incorrectly identified as “false positives” in this research.

Although the misreporting of housing assistance is troublesome, this further supports including these households in the calculation of worst case needs. It is also possible that households receiving federal rental assistance could underreport their income in the AHS or error in reporting their assistance status. The extent of these errors and their impact on estimating worst case needs could be investigated in future research that would allow additional refinements in the WCHN calculation. But the measure should include assisted households who continue to have worst case housing needs.

Households with Zero and Negative Incomes

The current treatment of zero and negative incomes in the WCHN calculation has an even greater, but opposite, impact. The Millennial Housing Commission (2002) reported that the AHS includes an “unusually high proportion of households [that] report no or negative incomes, compared to other surveys.” In the 1999 AHS 2.4 percent of total households reported no or negative income. Currently, the WCHN measure excludes households that report zero or negative total household income. The assumption apparently is that these households are not actually poor but are reporting unusual losses from investments or business income.

The Millennial Housing Commission assumed that households reporting zero and negative income were actually middle-income if their housing costs were greater than or equal to FMR, but were extremely low-income if their housing costs were less than the FMR (Millennial Housing Commission 2001 104), following HUD’s calculation of very low income renters in the WCHN report. In contrast, the poverty measure treats households that report zero and negative incomes as poor because their total household income is lower than the poverty threshold.³

An alternative approach is to use earned income to test income eligibility and rent burden for households that reported zero or negative total household income. Although earned income is not completely representative of a household’s economic status, it should be more constant than total income if losses in investment income are generally the cause of zero or negative income reporting. Therefore, evaluating rent burden based on earned income provides a better sense of overall cost burden for these households.

In measuring worst case housing needs, the treatment of zero and negative incomes is further complicated by the calculation of the rent-to-income ratio, given the difficulties of dividing by an income of zero or a negative number. If these households are indeed poor, any rent payment should be considered a severe cost burden. Computationally this can be accomplished by truncating all zero and negative incomes to a default value of 1 in calculating the rent-to-income ratio.

After applying earned income to test income eligibility and rent burden for households with zero and negative total income, there were still a significant number of households

³ Email for Census Bureau demographer, Catherine Short, 10/02/02.

classified as missing due to income criteria. Using several discrete variables that address a household’s investment and savings income, these households were further classified based on wealth. Specifically, if the household answered that they had investment income of more than \$20,000 (the only category available in the AHS) or income from savings, interest, dividends, or property, they were classified as above the WCHN income threshold. The remainder was classified below the threshold. All of the latter households were “assigned” an income of \$1 and were thus automatically considered to have a severe rent burden unless they paid no rent.

This approach to households with zero and negative incomes increases the number of VLI renters by 320,000 and WCHN households by 710,000 (14.8 percent) to 5,532,006 (Tables 3a and 3b). The impact on VLI renters is lower than the impact on WCHN because most of these households were already classified as VLI. The impact on WCHN is much more substantial because under the baseline most of these households are classified as not having worst case housing needs, whereas under this alternative nearly all VLI renters with zero or negative incomes are classified as having worst case housing needs. Including zero and negative incomes increases WCHN among all groups, with higher gains among small households (17.5%) and extremely low-income households (19.2%). The disparate impact on smaller households further suggests that those with zero and negative incomes are not misclassified higher income families, but poor, single individuals and couples. It bears noting that poor, non-elderly individuals and poor couples without children are typically ineligible for public assistance.

Table 3a. Zero and Negative Incomes Included

	Total very low income	Total WCHN	% change in WCHN	% of VLI	% all renter households	Earn	< 30% AMFI	30-50% AMFI
Current standard	14,756,051	4,812,910	N/A	32.6%	14.2%	2,822,916	3,703,327	1,109,584
Zero and neg. income	15,075,875	5,523,631	14.8%	36.6%	16.2%	0.2%Δ	19.2%Δ	0%Δ

Table 3b. Percent Change in Household Demographics with Zero and Negative Incomes Included

	Household Size			Children		Disabled	Minority
	1 and 2 person households	3 and 4 person households	5+ person hholds	Children under 5 yrs	Children under 18 yrs		
Current standard	3,198,380	1,193,613	420,918	775,310	1,630,036	847,008	2,303,100
Zero and neg. income	17.5%Δ	9.4%Δ	9.4%Δ	11.8%Δ	9.5%Δ	0.7%Δ	15.0%Δ

Household Size Adjustments

In calculating income eligibility, the current WCHN standard assumes that the median family income is for a household of four persons. This median household size was approximately accurate in the 1970s when the approach of adjusting income thresholds for household size was adopted. However, based on the 2000 Census, the median family size is 3.14 persons and the median household size is 2.59 persons. Since the income threshold for other household sizes is adjusted downward for smaller households and

upward for larger households, the effect is to underestimate the income threshold for each household size by approximately 11.1%.

The household size adjustments for AMFI under the current WCH measure are shown in Table 4. The four-person household is assumed to be the average family size. The AMFI for smaller households is adjusted downward by a factor of 10 percentage points (equivalent to an 11 percent reduction). The AMFI for larger households is increased by 8 percent for each additional person. The HUD household size adjustments underestimate the income required for larger families and overestimate the income required for smaller families, particularly for single individuals.

Table 4. HUD WCHN Adjustments to AMFI and Experimental Poverty Adjustments for Household Size

	Persons									
	1	2	3	4	5	6	7	8	9	10+
HUD Adj	0.7	0.8	0.9	1.0	1.08	1.16	1.24	1.32	1.40	1.48
Xpov Adj	0.475	0.693	0.876	1.0	1.118	1.231	1.339	1.444	1.545	1.644

HUD’s household size adjustment scale varies much less by family size than other equivalence scales (Ruggles 1992). Other equivalence scales indicate that increases in household size require more additional income than the HUD standard suggests, although they acknowledge economies of scale for certain costs, such as housing (Short, et al. 1999; Citro and Michael 1995). The experimental poverty measure (XPOV) appears to more accurately account for differences in income requirements across household sizes than the HUD scale. To convert the XPOV household size adjustments to the HUD scale with a four-person median, the one-adult and two-adult household size adjustment for the XPOV were averaged and centered on a four-person household. This adjustment is also shown in Table 4. Under the XPOV adjustment, a household of four requires more than twice the income of a one-person household, rather than the 43 percent increase in the HUD adjustment. For larger households, each additional person requires household income to increase on a sliding scale from 12 percentage points to 10 percentage points, rather than the fixed 8 point increase in the HUD scale. Adopting the XPOV scale reduces the AMFI threshold for smaller households and increases it for larger households.

Shifting to a 3-person median family size (shown in Table 5a) increases the number of income eligible households by 1,717,093 (11.3%), however the number of WCHN households increases by only 110,286 (2.3%). The larger increase in the number of income eligible households decreases the incidence of WCHN among VLI renters to 29.9 percent. Shifting to the experimental poverty (XPOV) adjustment scale has a more dramatic opposite effect, reducing VLI renters by -14.9% and WCHN by -8.3%. The entire latter decline is concentrated among households with 30-50% of AMFI, which drops sharply by -36.0%. Combining the two adjustments results in a -3.6% reduction in WCHN compared to the current standard. The combined 3-person median and XPOV scale decreases WCHN households with earned income by -3.7 percent, all in the 30-50% AMFI category, where WCHN decreases -17.2%.

Table 5a. Changes in WCHN compared with current HUD standard for Household Size

	Total very low-income	Total WCHN	% change in WCHN	% of VLI	% all renter households	Earn	< 30% AMFI	30-50% AMFI
Current standard	14,756,051	4,812,910	N/A	32.6%	14.2%	2,822,916	3,703,327	1,109,584
3-person median HH	16,473,144	4,923,196	2.3%Δ	29.9%	14.5%	3.0%Δ	0%Δ	9.9%Δ
XPov Adj HH Size	12,502,369	4,413,590	-8.3%Δ	35.3%	13.0%	-9.0%Δ	0%Δ	-36.0%Δ
3-p median and XPov scale	14,057,055	4,639,766	-3.6%Δ	33.0%	13.6%	-3.7%Δ	0%Δ	-17.2%Δ

Table 5b provides the incremental percent changes in WCHN for the specified groups. Smaller households are affected more than larger households and the 3-person median family size adjustment has little impact on households with children, which was expected since HUD’s household size adjustments favor small households. The XPOV scale reduces income eligibility among wage earners by -9%, also entirely concentrated in the 30-50% AMFI category. It has, as anticipated, a disproportionate effect on small households and only a minor effect on families with children. There is less impact on minorities than on whites. The combined effect (overall reduction of -3.6%) is also higher for small households, but results in an increase for larger households, particularly those with 5+ persons, and households with children.

Table 5b. Percent Change in WCHN with adjusted HH size standard by Population Group

	Household Size			Children		Disabled	Minority
	1 and 2 person households	3 and 4 person households	5+ person hholds	Children under 5 yrs	Children under 18 yrs		
Current standard	3,198,380	1,193,613	420,918	775,310	1,630,036	847,008	2,303,100
3-person median	2.8%Δ	1.3%Δ	1.3%Δ	0.5%Δ	0.9%Δ	0%Δ	1.2%Δ
Xpov Adj	-12.5%Δ	0%Δ	0%Δ	-0.3%Δ	-1.0%Δ	-0.9%Δ	-5.6%Δ
3-person & Xpov	-6.0%Δ	0.9%Δ	1.8%Δ	0.5%Δ	0.9%Δ	-0.1%Δ	-2.0%Δ

Ability to Afford a Fair Market Rent

The current WCHN standard counts every VLI household with an excessive rent burden or in severely inadequate housing. This potentially includes households that could afford standard quality housing without being rent burdened, who could be interpreted as consuming excess housing by choice (although this depends on the actual housing opportunities available at the time of their housing search). These potentially “false-positive” WCHN households can be estimated by excluding VLI renters from the WCHN classification if 30 percent of household income is less than the annualized FMR for the area. Doing this has a negligible impact on WCHN, reducing it by only 16,990 cases (-0.4%). Most VLI renters clearly cannot afford a fair market rent even at 30% of income. However, if a higher income standard is used (e.g. 80% of AMFI), there would probably be a larger number of households who can afford a fair market rent, making this test more important. Despite the minor impact under the VLI income threshold, excluding households who can afford a fair market rent at 30% of income should be adopted in the WCHN criteria.

Table 6. Excluding VLI Renters Who Can Afford FMR

	Total very low-income	Total WCHN	% change in WCHN	% of VLI	% all renter households	Earn	< 30% AMFI	30-50% AMFI
Current standard	14,756,051	4,812,910	N/A	32.6%	14.2%	2,822,916	3,703,327	1,109,584
Exclude if afford FMR	14,756,051	4,795,920	-0.4%	32.5%	14.1%	-0.4%Δ	0%Δ	-1.5%Δ

Potentially Desirable Adjustments that Need Further Study

Very Low Income Homeowners

Another source of misclassification (due to “false negatives”) involves the exclusion of very low-income homeowners in the current WCHN measure. Some of these homeowners could occupy deficient housing or have severe cost burdens, which should qualify them as having a worst case housing need. Both federal housing policy (which strongly promotes homeownership) and the broader concept of housing need provide justification for including homeowners.

Including VLI homeowners in the WCHN calculation using the same eligibility criteria for renter households approximately doubles the VLI estimate and the WCHN estimate. The number of VLI owner households is 13,923,480. Of these households, 32.7 percent have WCHN, virtually the same incidence as for VLI renters. The number of total households with WCHN including renters and owners is 9.1 percent.

Table 7a. Including Very Low Income Homeowners

	Total very low-income	Total WCHN	% change in WCHN	% of VLI	% all renter households	Earn	< 30% AMFI	30-50% AMFI
Current standard	14,756,051	4,812,910	N/A	32.6%	14.2%	2,822,916	3,703,327	1,109,584
Incl owners	28,679,531	9,366,019	94.6%Δ	32.7%	9.1%	52.8%Δ	88.5%Δ	115.0%Δ

Table 7b. Percent Change in Household Demographics with VLI Homeowners Included

	Household Size			Children		Disabled	Minority
	1 and 2 person households	3 and 4 person households	5+ person hholds	Children under 5 yrs	Children under 18 yrs		
Current standard	3,198,380	1,193,613	420,918	775,310	1,630,036	847,008	2,303,100
Incl owners	101.8%Δ	81.9%Δ	76.2%Δ	44.8%Δ	65.6%Δ	44.2%Δ	51.7%Δ

Including eligible owners to the measure increases the number of WCHN households dramatically. Most notably, very low-income households (30-50%AMFI) had a 115% increase in WCHN and small households had a 102% increase in WCHN, whereas including homeowners has less impact (but still sizeable) on poorer and larger households, and particularly those with children.

Including owners in the WCHN measure presents some additional challenges to avoid misclassifying those with sufficient wealth so as not to need assistance in addressing their

housing needs. We have identified two approaches to this problem. VLI owners with house values above a certain level could be excluded from classification as WCHN. As can be seen in Table 8, a large percentage of VLI owners (46% of owners below the age of 60 and 50% of owners aged 60 and over) have house values in excess of \$100,000. This jumps to 69% for owners with incomes between 50-80% of AMFI. This approach requires setting an appropriate threshold for the value of housing above which households would not be considered for the worse case housing needs classification. While conceptually appealing, establishing a credible threshold (one that recognizes metropolitan and regional variations in housing prices) might prove to be difficult.

Table 8. House Value for VLI and LI Owners

House Value	Income and Age			
	< 50%AMFI		50-80%AMFI	
	<60	≥60	<60	≥60
<25K	13.2%	7.3%	5.3%	3.7%
25-50K	13.6%	11.6%	2.8%	5.3%
50-75K	13.3%	15.9%	9.9%	9.5%
75-100K	13.8%	15.3%	12.6%	12.2%
100+K	46.1%	49.9%	69.3%	69.2%

An alternative would be to attribute as income a percent of the equity in owner-occupied housing. This is consistent with HUD policy and past efforts to analyze the housing needs of low-income homeowners. Calculating the owner's equity from the AHS data can be done based on the reported house value and the original mortgage amount (i.e. principal), remaining term in years, interest, and mortgage payment (adjusted to obtain principal and interest) for first and second mortgages. The owner's equity is the cumulated principal plus the house value less the original mortgage amount. The income equivalent of this equity can be estimated by applying the annual interest rate available during the year on a short-term deposit (about 5% in 2000).

Including imputed income from equity reduces worst case housing needs for very low-income owners by only 2%, from 4,553,109 to 4,457,608. Further research should be done to confirm that the AHS data can be used to accurately estimate equity. But from our calculations, the impact of imputed income from equity is very small.

In addition to estimating the income equivalent of the owner's equity, the same procedure for identifying over-consuming renters can be applied to owners. Thus, VLI owners who could afford the FMR at 30% of income would not be classified as WCHN. Excluding owners who could afford a fair market rent at 30% or less of household income reduces worst case needs among very low income owners from 4,457,608 to 4,453,144, a reduction of only 0.1%. Although the fair market rent test is logically appealing, it has virtually no impact on worst case housing needs for either owners or renters. In practice, the threshold level for classification as very low income is below the income required to afford a fair market rent using the 30% rent-to-income standard except for only a few households.

Sliding-Scale for Excessive Cost Burden

Feins and Lane (1981) and Stone (1993) suggested that a single, fixed standard to determine rent burden does not reflect differences in non-housing costs due to the age of the householder and other household characteristics. Stone's approach determined if income net of housing costs was sufficient to meet the Bureau of Labor Statistics lower family budget for non-housing items for given household characteristics. The implication is that housing consumption crowds out consumption of other necessary goods. Even if the household's income was sufficient to "afford" housing, there was insufficient income left for other goods. This creates potential anomalies, such as households paying no or very little rent classified as having a housing affordability problem when the real problem is their inability to afford health care, energy, or other non-housing items. Since BLS stopped estimating a low-income budget in 1981 because of reliability problems, a current standard is unavailable.

An alternative procedure for determining excessive rent burden relies on the standards used in the Food Stamp program. The food stamp eligibility level could be used to establish a non-shelter budget requirement for households by size by subtracting 50% of income for housing costs. To illustrate, the 1999 eligibility level for a one-person household was \$10,500. Allocating a maximum of 50% of this for rent leaves a non-housing budget of \$5,250. If gross income net of gross rent is less than this non-housing budget, the household would be classified as having a severe rent burden qualifying for WCHN. For one-person households, any incomes below \$5,250 would be classified as WCHN regardless of housing costs or housing quality.

The measure would very likely include a significant portion of households who receive housing assistance regardless of rent or housing quality. We have not calculated this measure because of the potential for misclassifying households as WCHN. Before a sliding-scale cost-burden standard can be recommended for use in establishing worst case housing needs, more research is needed on alternative approaches to identifying excessive rent burden levels.

Non-cash Sources of Income

The inclusion of non-cash sources of income and tax credits is conceptually sound but difficult to model accurately with current data resources. Nationally, government assistance constituted only five percent of total household income in 1996 but was 44 percent of total household income among poverty households. Although most of this assistance is through cash transfers, 18 percent of total household income was from non-cash assistance (Golan and Nord 1998, 5). These subsidies have a marked impact on the incomes of households in poverty, even if insufficient to raise them above the poverty line (Golan and Nord 1998).

A few data sets include details on non-cash sources (e.g. SIPP), but unfortunately they provide very limited data on housing expenditures and characteristics. The AHS does not specifically identify receipt of non-cash sources of income other than food stamps. For the latter, the amount received is not identified. Consequently, the amount of non-cash sources of income must be estimated based on eligibility standards rather than reported

amounts. Koebel and Krishnaswamy (1993) estimated the impact of non-cash transfer payments on rental affordability using cash equivalents and the probability of poverty households receiving specific benefits. This introduces the potential for unknown errors, first in the estimation of participation and second in the estimation of the amount received. Public assistance programs can also have complicated interactions between programs. Receipt of public housing has been found to increase food stamp participation, as well as decrease the amount received. Additionally, for some programs there might not be a dollar value clearly associated with the assistance received. For example, assigning a value for publicly provided health care and then imputing that value as income makes numerous assumptions that might not be valid.

We review two programs that could significantly affect the estimation of worst case housing needs: Food Stamps and the Earned Income Tax Credit (EITC). The Food Stamp program provides government script (food stamps) to eligible households that only can be exchanged for food items. The script works much the same as money but is restricted to food purchases. The EITC is a tax credit program that increases after-tax disposable income for eligible households. The EITC was initially considered a rebate of FICA taxes for the working poor, particularly families with children.

Food Stamps

The USDA reports significantly more food stamp recipients than reflected in the AHS data. There are several possible reasons for this difference. First, the USDA defines an eligible household as “individuals who live in a residential unit and purchase and prepare food together” (Rosso and Fowler 2000, 3). Under the USDA guidelines, there could be more than one food stamp recipient within a housing unit. Second, the AHS is known to undercount households with food stamps by only asking the primary individual or household questions pertaining to public assistance. This information is not collected for subfamilies. By adding subfamily counts to the AHS counts of food stamp recipients, we can account for a large proportion of the gap between the USDA and the AHS. Last, the USDA counts food stamp program participants on a monthly basis. There are ambiguities in how these monthly counts can be annualized that also may contribute to the discrepancy in participant counts.

For households specified in the AHS as receiving food stamps, we estimate their value by applying the USDA guidelines governing the amount eligible households receive. Adding the estimated value of food stamps to household income affects both the number of VLI renters included in the WCHN calculation and the number of WCHN households. Initially it appears reasonable to expect that including food stamps as income would push some households over the VLI threshold. However, counting food stamps as income increases the number of VLI households from 14,756,051 to 15,149,444 (Table 9a).

Table 9a. Including Food Stamps as Income

	Total very low income	Total WCHN	% change in WCHN	% of VLI	% all renter households	Earn	< 30% AMFI	30-50% AMFI
Current standard	14,756,051	4,812,910	N/A	32.6%	14.2%	2,822,916	3,703,327	1,109,584
Include food stamps	15,149,444	4,586,776	-4.7%	30.3%	13.5%	-3.7%Δ	-5.7%Δ	-1.7%Δ

This small net increase reflects counterbalancing shifts. Some households could be lifted above the VLI threshold by counting food stamps as income. But since the eligibility standards for food stamps are well below the VLI threshold, this effect would be minimal. Offsetting any households lifted above the VLI threshold would be the shift of households from zero or negative incomes (currently excluded in HUD’s calculation of VLI and WCHN) to positive incomes. The net effect of VLI households increasing when food stamps are counted as income gives further support to including households with zero or negative incomes in the WCHN calculation.

Although food stamps increase the number of VLI households, their value decreases the number of WCHN households by -4.7%. The number of WCHN households declined for all groups examined. Larger households, households with children, and households with disabled persons experienced the most significant reductions (Table 9b). Most notably, WCHN declined for 5+ person households by -21.5%. Similarly, WCHN among households with young children (less than 5 years) decreased by -13.1% and by -11.6% for households with dependent children (less than 18 years). WCHN declined by -18.4% for households with disabled persons.

Table 9b. Percent Change in Household Demographics with Food Stamps Included as Income

	Household Size			Children		Disabled	Minority
	1 and 2 person households	3 and 4 person households	5+ person hholds	Children under 5 yrs	Children under 18 yrs		
Current standard	3,198,380	1,193,613	420,918	775,310	1,630,036	847,008	2,303,100
Include food stamps	-1.0%Δ	-8.6%Δ	-21.5%Δ	-13.1%Δ	-11.6%Δ	-18.4%Δ	-6.4%Δ

The disparate effect of food stamps on larger WCHN households reflects both the importance of food stamps to these households and the bias of the current household size adjustment in favor of smaller households. Including food stamps as income without also changing the household size adjustment would significantly shift the composition of WCHN toward smaller households and compound the bias of the current WCHN measure toward those households.

Although including the value of food stamps as income in calculating worse case housing needs definitely warrants further consideration, a few issues should be addressed. Given that the AHS only identifies whether the household receives food stamps and not the amount received, that amount has to be allocated based on an algorithm modeling the amount received based on household characteristics. It is thus critical that someone with expertise in the administration of the food stamp program examine the allocation algorithm. It might also be necessary to verify the algorithm using a data set that includes the dollar amount of food stamps received by the household.

An additional concern is that food stamps cannot be used for housing or for consumption of other non-food items. Consequently, adding their value to income could distort the worst case housing measure to the extent that it is not fungible with housing

consumption. For extremely low-income households, the impact of this is probably immaterial since the amounts would not likely change a household's worst case housing classification. For households closer to the income threshold (where including food stamps does have an important effect on the WCH classification), it is important to establish the impact of food stamps on other consumption beyond the research of Harkness and Newman (2001), which suggests that food stamps do not affect housing.

The Earned Income Tax Credit

The Millenium Housing Commission (2002) and Stegman, et al. (2003) have recently estimated the impact of the EITC on WCHN by modeling IRS rules to identify EITC eligible households and estimating the appropriate tax credit for these households. Stegman, et al. (2002) have developed a model for determining the impact of the EITC using 1999 IRS data on EITC filers and the 1999 AHS dataset. There are numerous potential errors in modeling EITC, which requires assumptions about the standard (or itemized) deduction, the number of tax units in a household, and filing status.

The Stegman model contains two flaws. First, the model does not estimate and deduct tax liability from the EITC estimate. Second, the EITC is not applied to total household income prior to the income eligibility test (whether total household income is less than 50% HAMFI). The authors only apply the credit to total household income for the RTIR test. Even a small credit could potentially shift a household's income above the VLI threshold. If the EITC is treated inconsistently when establishing VLI status versus WCHN status, the number of VLI households will be over-estimated.

Modeling the EITC is problematic using only the AHS dataset for several reasons. First, the AHS does not measure after-tax disposable income. Adding the estimated EITC to gross income overstates gross income, since the EITC is largely a return of withheld taxes. Although the EITC amount definitely increases after-tax disposable income, it would only increase gross household income if it exceeds the household's total tax withholdings, including FICA taxes. In order to model EITC correctly, it is necessary to estimate total tax liability as well as the EITC. By adding the EITC to gross household income, the existing research overstates the impact of the EITC on both VLI households and WCHN households.

Second, the AHS includes a question about "other income" that does not delineate between a variety of income sources that include fixed income payments and investment earnings. Also, in the AHS instructions "other income" does not explicitly exclude EITC, which could result in some respondents reporting the EITC as income. In such cases, imputing the EITC would result in counting it twice.

Last, there is no way to conclusively identify qualifying children (a key test for the EITC) using the AHS, specifically for older dependent children. The complexities of modeling the EITC reflect the complexity of the EITC itself, which has caused concern over errors in both eligibility and the size of benefit claimed.

With these cautions in mind, the Stegman EITC model can be considered to estimate the EITC's maximum potential impact on WCHN. At full participation, the model shows that including the EITC in household income reduces WCHN by 8 percent or 393,000 households (Stegman et al 2002, 9) and decreases the percentage of total renter households with WCHN from 14.2 percent to 13 percent. For households with children (the primary beneficiaries of the credit), the EITC reduces WCHN by 29 percent.

Given the uncertainties involved with modeling the EITC and the potentially large impact on the number of families with children who are classified with worst case housing needs, the accuracy of an EITC algorithm should be firmly established before incorporating it into the worst case housing needs measure.

Neighborhood Quality

The current WCHN measure does not include neighborhood quality or concentrated poverty. Mounting empirical research confirms that neighborhood environment influences future outcomes in the lives of both children and adults (see Ellen and Turner 1997 for a synthesis of this research). Among this research is evidence that residents of poor, inner-city neighborhoods are less likely to complete high school and pursue college, more likely to be involved in crime, more likely to be teenage parents, and less likely to have decent paying jobs (Ellen and Turner 1997, 843), all of which increase the likelihood of these individuals to have lower incomes and higher housing cost burdens.

Within metropolitan areas, renters had a higher incidence of living in distressed neighborhoods than the overall population with 10.6 percent of renters living in mildly distressed neighborhoods and 1.9 percent of renters living in severely distressed neighborhoods in 1998 (Pendall 2000, 892 and Table 3). More significant, poor renters (households earning less than \$10,000 in 1989) had the highest rate of living in distressed neighborhoods with 22.6 percent and 4.5 percent living in mildly and severely distressed neighborhoods respectively. Poor, unassisted renter households are less likely to live in neighborhoods considered safe and healthy, which can affect their life chances.

There is no way to determine whether a household is living in an area of concentrated poverty using AHS data because the survey does not include the poverty rate for the block or census tract (although census tract characteristics can be added to the original AHS file). The dataset does provide a series of variables that address neighborhood quality, including a variable that allows households to rate their neighborhood as a place to live on a ten-point (1 through 10), worst-to-best scale.

Using the AHS neighborhood variables, Nelson and Redburn (1994) created a proxy indicator for "worst" neighborhoods and tested the impact of including households living in these neighborhoods in the WCHN measure. Unassisted, very low-income renter households were included as WCHN if one of the following applied:

- Rated their neighborhood 1-3 on the 10-point scale and reported at least one of the following serious problems of crime, poor schools, abandoned buildings, or major trash accumulation, or
- Rated their neighborhood 4-5 with two or more of the serious problems.

This modification increased the number of WCH households by 8.3 percent in 1991.

We add neighborhood quality to the priority problems criteria of the WCHN measure based on a more strict definition of worst neighborhood. Our first neighborhood quality adjusted WCH measure includes households who rate their neighborhood 1 or 2 on the 10-point scale or report both crime AND poor schools as serious problems. Our second neighborhood quality adjusted WCH measure includes households who rate their neighborhood 1 or 2 or report crime OR poor schools as serious problems.

Our first (more restrictive) neighborhood quality measure increases the number of households with WCHN by 208,682 (4.3%) and increases the incidence of WCHN among VLI renters to 33.2 percent (Table 10a). Our less restrictive neighborhood quality measure adds more than twice as many WCHN households (499,610 or 10.4%).

Including neighborhood quality in WCHN disproportionately increases WCHN for large households, households with children, and very low-income households (Table 10b).

Table 10a. Including Neighborhood Quality

	Total VLI	Total WCHN	% change in WCHN	% of VLI	% all renter households	Earn	< 30% AMFI	30-50% AMFI
Current standard	14,756,051	4,812,910	N/A	32.6%	14.2%	2,822,916	3,703,327	1,109,584
Include neigh. quality 1	14,756,051	5,021,592	4.3%	34.0%	14.8%	6.1%Δ	1.3%Δ	14.3%Δ
Include neigh. quality 2	14,756,051	5,312,520	10.4%	36.0%	15.6%	15.0%Δ	3.1%Δ	34.8%Δ

Table 10b. Percent Change in Household Demographics with Neighborhood Quality Included

	1 and 2 person households	3 and 4 person households	5+ person hholds	Children under 5 yrs	Children under 18 yrs	Disabled	Minority
Current standard	3,198,380	1,193,613	420,918	775,310	1,630,036	847,008	2,303,100
Include neigh. quality 1	2.5%Δ	7.1%Δ	10.4%Δ	9.3%Δ	7.3%Δ	3.7%Δ	5.2%Δ
Include neigh. quality 2	6.7%Δ	15.4%Δ	24.0%Δ	22.1%Δ	18.1%Δ	8.9%Δ	13.2%Δ

Additional research is needed before neighborhood quality should be included in the worst case housing measure. The impact of this adjustment is highly sensitive to the definition of neighborhood quality. Given the potential for significant misclassification, that definition should be sufficiently restrictive to include only the worst neighborhoods. The impact of neighborhood quality on quality of life needs to be more thoroughly documented to identify the measures of neighborhood quality that should be used and the threshold appropriate for inclusion as a worst case housing need. Households with sufficient income to afford a fair market rent should probably be excluded from the worst case needs designation based solely on neighborhood, as they should be able to find housing in other neighborhoods.

Including neighborhood quality as a factor in establishing housing needs complicates the interpretation of the measure, particularly in terms of the appropriate public response. The problem, per se, is not the quality or even the cost of the housing, but its location. Unless the only acceptable solution to neighborhood problems is relocation, the correct response might not involve housing at all. Until more research documents the effects of neighborhood quality, its inclusion in determinations of housing needs should be considered exploratory and should be separately identified within such measures.

Use of Median Household Income

The use of median family income rather than median household income introduces an upward bias in the income threshold as MFI is significantly higher than MHI, primarily because of the exclusion of non-family households from the MFI calculation. Location specific biases could also be introduced if the proportion of non-family households varies significantly between areas.

Since many housing programs have statutorily mandated income requirements based on MFI, the WCHN definition should continue to use MFI if its purpose is to estimate eligibility for housing assistance programs. However, to the extent the HUD WCHN is used for broader purposes, it is beneficial to know the degree to which using MHI instead of MFI would affect the number of WCHN households. This modification decreased the number of income eligible households from 15,131,922 to 12,952,617 (-14.4%) and WCHN households by 268,390 (-5.6%). The incidence of WCHN increased to 35.1 percent.

Since the median income measure, whether it be MFI or MHI, is used to estimate the income standard for a given household size, the MFI comes closest to the median income for a three-person household. Although the median income for a three-person family could be calculated for use in the WCHN estimation, this complicates HUD's calculation of income thresholds for assisted housing programs, which currently rely on estimates of MFI for localities. The more important issue is to match the income measure with the appropriate household size and to make adjustments for fewer or more people in the household based on estimates of the consumption needs of households of varying size. The three-person median and the XPOV size adjustments come closest to accomplishing this end.

Use of Constant Rather than Nominal Dollar Thresholds

The current income standard uses nominal rather than constant dollar incomes. Real improvements in median incomes would result in the income threshold for WCHN to increase in consumption power over time. Using a 50%AMFI standard assumes that increases in the MFI and the cost of living are equal. However, if MFI increases faster than consumer prices (i.e. real gains in income), the actual purchasing power increases for the 50%AMFI standard. The effect is to include incomes as very low-income (VLI) that in constant dollars were previously classified above VLI. Consequently, the standard for WCHN, across periods of real increases in median incomes, would include some households that previously would not have been included as having WCHN. Conversely, real declines in median incomes would result in shifting households out of consideration

for WCHN without any real increase in their purchasing power. This would distort the overall estimate of WCHN and particularly period-to-period changes of WCHN for those incomes near the income threshold.

Table 11a shows that using a constant dollar AMFI decreases the number of income eligible households in 1999 by 1,156,424 households (-7.6%). The number of WCHN households declines by 138,767 (-2.9%). Households with earned income and those with five or more persons (Table 11b) are disproportionately affected, although in general those with children are impacted less than the average.

Table 11a. Constant Dollar Income Threshold

	Total very low income	Total WCHN	% change in WCHN	% of VLI	% all renter households	Earn	< 30% AMFI	30-50% AMFI
Current standard	14,756,051	4,812,910	N/A	32.6%	14.2%	2,822,916	3,703,327	1,109,584
Constant dollar threshold	13,599,627	4,674,143	-2.9%	34.4%	13.7%	-4.1%Δ	0%Δ	-12.5%Δ

Table 11b. Percent Change in Household Demographics for Constant Dollar Income Threshold

	Household Size			Children		Disabled	Minority
	1 and 2 person households	3 and 4 person households	5+ person hholds	Children under 5 yrs	Children under 18 yrs		
Current standard	3,198,380	1,193,613	420,918	775,310	1,630,036	847,008	2,303,100
Constant dollar threshold	-3.1%Δ	-2.1%Δ	-3.7%Δ	-1.3%Δ	-2.3%Δ	-0.2%Δ	-2.5%Δ

The impact of using a nominal rather than constant dollar threshold could seriously distort the interpretation of changes in the measure over time. The increased eligibility threshold pulls in more households at the margin of 50%AMFI, particularly wage earners. This could erroneously be interpreted as an increase in housing affordability problems for working families, when the change might be largely due to the real dollar increase in the threshold. However, adjustments to determine real increases in incomes, particular relative to housing costs, require accurate measurement of changes in constant quality housing prices and rents (separately) for metropolitan areas. While hedonic price indices could track such changes for the metropolitan areas covered with sufficient sample sizes in the AHS, no such indices are available regularly from a standard source. Until accurate adjustments to determine real increases in income relative to housing costs are available, analysis of changes in worst case housing needs for households close to the income threshold should be done with due caution.

Potentially Undesirable Adjustments

Using the Poverty Threshold Adjusted for Regional Housing Costs

The poverty standard is estimated based on consumer costs for a minimum bundle of goods (shelter, food, clothing, etc.). However, the poverty standard does not reflect regional and local variations in prices. Work on alternative poverty thresholds has used HUD’s Fair Markets Rents (FMR) to adjust for local price variation. Additionally, the household size adjustments in the poverty standard reflect research on budget requirements for households of different sizes, as described earlier.

The poverty standard, even adjusted for variations in cost-of-living, is not without its own problems as an income threshold to determine WCHN. The poverty standard is roughly equivalent to 30% AMFI, so it is a much more restrictive threshold than the 50% AMFI standard. Thus using the poverty standard to calculate WCHN would exclude numerous households that are eligible for housing assistance and have a high probability of worst case housing needs, defeating one of the primary purposes of the WCHN measure.

The poverty standard was initially developed in the 1960s. It was last revised in 1981 and since has been adjusted using the consumer price index. A recently developed experimental poverty threshold (Short, et al. 1999) provides an updated threshold based on current consumer costs and consumption patterns, but it has not been official adopted and remains “experimental.” Nonetheless, it is instructive to examine the impact on calculating WCHN using this threshold.

Using an income threshold for determining WCHN based on the experimental poverty threshold adjusted for area-to-area variation in FMR reduces the number of income eligible households substantially from 14,756,051 to 8,645,950 (-41.4%). The number of WCHN households declines by -25%, so the incidence of WCHN increases to 41.7% percent (Table 12a). The number of total renter households with WCHN declines to 10.6%.

Table 12a. Experimental Poverty Threshold Adjusted by FMRs

	Total very low income	Total WCHN	% change in WCHN	% of VLI	% all renter households	Earn	< 30% AMFI	30-50% AMFI
Current standard	14,756,051	4,812,910	N/A	32.6%	14.2%	2,822,916	3,703,327	1,109,584
FMR adjusted XPov thresh	8,645,950	3,608,299	-25.0%	41.7%	10.6%	-26.6%Δ	-8.6%Δ	-79.7%Δ
COLA adjusted XPov thresh	8,281,528	3,487,611	-27.5%	42.1%	10.3%	-30.0%Δ	-11.3%Δ	-81.8%Δ

Table 12b. Percent Change in Household Demographics with Experimental Poverty Threshold Adjusted by FMRs

	Household Size			Children		Disabled	Minority
	1 and 2 person households	3 and 4 person households	5+ person hholds	Children under 5 yrs	Children under 18 yrs		
Current standard	3,198,380	1,193,613	420,918	775,310	1,630,036	847,008	2,303,100
FMR adjusted XPov thresh	-31.8%Δ	-12.6%Δ	-9.3%Δ	-9.7%Δ	-12.7%Δ	-4.9%Δ	-18.9%Δ
COLA adjusted XPov thresh	-34.4%Δ	-15.2%Δ	-10.5%Δ	-12.1%Δ	-15.4%Δ	-6.4%Δ	-20.0%Δ

The Consumer Price Index for 141 major metropolitan areas and four census regions can serve as an alternative to FMRs as a cost of living adjustment. Using a CPI adjusted experimental poverty threshold reduces the number of income eligible households to 8,281,528 (-43.9%). The number of WCHN households declines by -27.5% increasing the incidence of WCHN to 42.1%. These are very similar to the changes in the FMR adjusted experimental poverty threshold. From this it appears that Fair Market Rents accurately reflect local variations in cost-of-living as measured by the CPI.

These modifications drastically reduce WCHN households among all groups (Table 12b), particularly for the 30-50%AMFI category, which declines by about 80% and confirms that the poverty threshold roughly reflects the 30% of AMFI level. WCHN households with earnings as their main source of income decline by about 30% and WCHN minority households decline by about 20%. Thus using the experimental poverty threshold to determine WCHN would disproportionately affect households in the 30-50%AMFI category, those with workers, and non-minority households.

The adoption of the poverty threshold (or of 30%AMFI) excludes a substantial number of households with worst case housing needs in the 30-50%AMFI income category. The selection of an income threshold should be at a significant inflection point in the incidence of worst case housing needs, which is closer to 150% of the poverty threshold (or 50%AMFI) than 100% of the poverty threshold (or 30%AMFI). Adopting a more stringent income threshold would result in a substantial misclassification of households who have worst case housing needs and who are eligible for many assisted housing programs. On both grounds, a more stringent income threshold cannot be recommended.

Overcrowding

The current classification of “severe physical problems” for WCHN does not include overcrowding or households with subfamilies. While both of these conditions reflect occupant-unit mismatch problems rather than problems of the physical quality of the unit, doubling-up or overcrowded units might reflect a housing affordability issue (Myers, Baer, and Choi 1996).

Involuntary doubling-up is at least as common in the U.S. as actual homelessness, particularly in urban areas (Wright, Caspi, Moffitt, and Silva 1998). In fact, involuntary doubling-up often precedes actual homelessness (Wright, Caspi, Moffitt, and Silva 1998, 94). It is impossible to differentiate between voluntary and involuntary doubling up using national survey data such as the AHS or Census. These surveys only inquire about sub-families or the number of persons per room without any follow-up to determine the cause of overcrowded or doubled-up housing units.

In this section we include overcrowding and households with subfamilies to the priority problems sequence of the WCHN measure. Including overcrowded households (>1.0 persons per room and households with subfamilies) increases the number of households with WCHN by 584,937 (12.2%), as shown in Table 13a. The incidence of WCHN increases to 36.6% among VLI renters and to 15.9% among total renters. The number of income eligible households remains the same since the VLI income threshold is

unchanged. Using a more restrictive standard of overcrowding (>1.5 persons per room or doubled-up) significantly decreases the impact on WCHN, which only increases by 139,205 (2.9%) and there is less than a one percentage point shift in the percent of VLI renters with WCHN.

Table 13a. WCHN Including Overcrowded

	Total VLI	Total WCHN	% change in WCHN	% of VLI	% all renter households	Earn	< 30% AMFI	30-50% AMFI
Alternative model specs								
Current standard	14,756,051	4,812,910	N/A	32.6%	14.2%	2,822,916	3,703,327	1,109,584
Incl. crowded (> 1.0ppr)*	14,756,051	5,397,847	12.2%	36.6%	15.9%	19.3%Δ	5.5%Δ	34.2%Δ
Incl. crowded (> 1.5ppr)*	14,756,051	4,952,115	2.9%	33.6%	14.6%	4.5%Δ	1.6%Δ	7.3%Δ
Incl. subfamily + crwd	14,756,051	4,815,757	0.1%	32.6%	14.2%	0.1%	0.0%Δ	0.1%Δ

* Includes households with subfamilies.

Including overcrowded households disproportionately increases WCHN among large households, households with children, very low-income households, and minority (primarily Hispanic) households (Table 13b). WCHN increases considerably among households with 5+ persons, more than doubling when using 1.0 person per room as the standard and increasing by a quarter using 1.5 persons per room. Also, households with dependent children had a 33.0% increase in WCHN and households with children under the age of 5 increase even more (45.6%) using the 1.0 person per room standard, but substantially less using 1.5 persons per room.

Table 13b. Percent Change in Household Demographics with Overcrowded Households Included

	1 and 2 person households	3 and 4 person households	5+ person hholds	Children under 5 yrs	Children under 18 yrs	Disabled	Minority
Current standard	3,198,380	1,193,613	420,918	775,310	1,630,036	847,008	2,303,100
Incl. crowded (> 1.0ppr)*	0.2%Δ	12.0%Δ	103.8%Δ	45.6%Δ	33.0%Δ	11.5%Δ	21.3%Δ
Incl. crowded (> 1.5ppr)*	0.2%Δ	2.2%Δ	25.9%Δ	10.9%Δ	7.1%Δ	3.6%Δ	5.6%Δ
Incl. subfamily + crwd	0%Δ	0%Δ	0.7%Δ	0.2%Δ	0.1%Δ	0%Δ	0.1%Δ

* Includes households with subfamilies.

WCHN among minority households increases by 21.3% when overcrowding at 1.0 person per room is included. This is largely associated with Hispanic-headed households, where WCHN increases by 42.9%. Myers, Baer, and Choi (1996, 81) suggest that among Hispanic and Asian households overcrowding is voluntary or tolerated since the incidence of overcrowding was found to be unrelated to place of birth (native or foreign) or income.

Since it is highly uncertain if overcrowding is really a housing problem at relatively low levels of people per room, including overcrowding as a worst case housing need cannot be recommended. There might be better justification for including households with subfamilies, particularly if these units are also overcrowded (which might suggest involuntary doubling-up). However, this is so infrequent that it only increases worst case

needs by 3,642 households (Table 13a). It also potentially confuses a problem (potential homelessness) with a solution (resource sharing among families). If the worst case measure is adjusted to include the homeless, any additional consideration of subfamilies in the measure should address the potential for double-counting of these households in the AHS and an independent estimate of the homeless population.

Review of WCHN Modifications

Some potentially desirable changes in the WCHN measure have opposite effects (Table 14). Among the priority adjustments the recommended changes in the household size scale and the fair market rent test would reduce the WCHN measure. Including households living in assisted housing would increase WCHN by 31%, and including zero or negative incomes and the homeless would increase WCHN by 7% to 15% respectively.

A significant number of households receiving rental assistance qualify as WCHN based on rent burden or severely inadequate housing. It appears illogical to exclude them simply because they receive assistance which is insufficient to correct their housing problems. At one time most housing assistance programs provided deep subsidies controlled the recipient's rent burden to 30% of adjusted income. It was easier to assume that these households could not be rent burdened. Today this is no longer the case. Several contemporary housing programs (federal, state and local) allow the recipient's rent burden to exceed 30%. In addition, some of the older assisted housing stock could violate the WCHN quality standards. Without evidence that including assisted households would generate an exceptional proportion of false-positive WCHN classifications, including assisted renters in the WCHN calculation should be seriously considered.

Including zero or negative incomes also has a dramatic impact on WCHN, increasing it by 14.8%. Obviously this change has to be considered carefully. To avoid misclassification, we incorporated an earned income and wealth test. The available data suggests that households reporting zero or negative incomes should be considered as having WCHN unless they report earned income or wealth that indicates to the contrary, or they have zero gross rent.

Although the number of very low-income renters with worst case housing needs who can afford a fair market rent is almost negligible, we recommend excluding households who can afford the FMR in order to avoid potential misclassification. Further analysis should be conducted to confirm that there is a sufficient supply of adequate quality units at or below the FMR, a condition that would likely vary between market areas.

Table 14. Impact of Modifications on VLI and WCHN

Priority Adjustments	VLI	WCHN
Incl. Homeless	na	7.2 to 13.2%
Incl. Housing assisted	0.0%	31.1%
Incl. zero and neg. income	2.2%	14.8%
3-p median and XPov scale	-4.7%	-3.6%
Exclude if afford FMR	0.0%	-0.4%
Adjustments Recommended for Further Study		
Incl owners	94.6%	94.4%
Sliding cost burden scale	na	na
Include food stamps	2.7%	-4.7%
Include EITC	na	na
Include neigh. quality 1	0.0%	4.3%
MHI for threshold	-14.8%	-5.6%
Constant dollar threshold	-7.8%	-2.9%
Incl subfamilies + crowded	0.0%	0.1%
Unrecommended Adjustments		
Use poverty level	-41.4%	-25.0%
Incl. crowded (> 1.0ppr)*	0.0%	12.2%
Incl. crowded (> 1.5ppr)*	0.0%	2.9%

*Includes households with subfamilies

Including VLI owners has potentially the largest effect on the WCHN count. However, the potential for misclassification due to over-consumption relative to current income is a serious problem if owners are included. Consequently, imposing an asset test based on house value and the FMR affordability test should be considered if owners are included in the WCHN calculation.

Including food stamps and modifying the household size adjustments have somewhat similar effects on the whole but impact smaller and larger households quite differently. The current WCHN household size adjustments are biased against larger households and clearly favor small households, particularly one-person households. Adding food stamps to the current calculation without changing the household size adjustments would compound this bias. In addition, adjusting income for food stamps (or the EITC) requires more research to certify the accuracy of the adjustment.

Our less restrictive measure of neighborhood quality would increase WCHN by 10.4%. Although the research on the negative effects of neighborhood quality argues for its inclusion as a criterion for WCHN, there is an unknown potential for misclassification. First, the measure is based on the respondents' perceptions rather than independent assessments. Second, it is very sensitive to the measures included. Our neighborhood quality measure was reduced by more than half when we used crime and schools as serious problems versus crime or schools. (Both measures included households rating their neighborhoods as 1 or 2 on a 10-point scale.) Neighborhood quality should not be considered in worst case housing needs without additional research and an analysis of potential misclassification problems.

Shifting to a median household income threshold in place of median family income would reduce the VLI estimate by 14.8% and WCHN by 5.6%. However, most of the statutes governing housing programs reference median family income. In addition, it is much more important to adopt better household size adjustments of income, which would reduce the impact of also adopting a median household income. Given the statutory mandates using median family income and the greater importance of correcting the current household size adjustments, the WCHN measure should continue using median family income with the recommended household size adjustments.

Adopting a constant dollar threshold reduces WCHN by -2.9% and provides a more accurate assessment of changes over time. This change warrants further investigation, particularly using the CPI-U for housing costs. Since the CPI-U is available for larger metropolitan areas, it can reflect local variations in price trends.

Few households are severely overcrowded. The research on crowding does not establish a clear rationale for its inclusion as a criterion for WCHN. The presence of subfamilies in overcrowded households among VLI renters can be more readily justified for inclusion in WCHN as an indicator of the hidden homeless. However, this adds very few households to worst case housing needs.

Conclusion

Among the numerous modifications in the WCHN measure examined here, five are recommended for immediate consideration in order to develop a more inclusive and accurate measure. The recommended modifications are to include as worst case housing needs: the homeless population (albeit as a separate estimate from an independent source); households receiving housing assistance who qualify as having worst case needs; and households with zero or negative incomes. In order to improve the accuracy of the measure, the household size adjustments should be modified to reflect a median family size of 3 persons and household size adjustments developed for the experimental poverty measure. Also to improve the accuracy of the measure, households who can afford a fair market rent at 30% of their income should be classified as not having a worst case housing need.

We have also identified six modifications that are potentially desirable but require further study before they can be implemented in the worst case housing needs measure. Very low-income homeowners should be included if the risk of false-positive misclassifications can be reduced. This can potentially be done through an asset test (either based on house value or an imputed income from equity) and by excluding owners who can afford a fair market rent at 30% of income. A sliding-scale for cost-burden is logically appealing if it does not confuse housing and non-housing costs, and can be reasonably made operational.

Including food stamps and Earned Income Tax Credits as income would provide a more accurate measure of gross income, if these amounts can be accurately estimated with

AHS data. Further research is needed to confirm the accuracy of proposed estimation algorithms.

The relationship between neighborhood quality and severe housing needs also warrants further research, both to establish that neighborhood quality is indeed a feature of housing need and to develop an appropriate threshold. Given the sensitivity of worst case housing needs to the neighborhood quality standard used, there is significant risk of false-positive classifications of worst case housing needs by including neighborhood quality without additional substantiating research.

Shifting to median household income (from median family income) is conceptually desirable in determining the housing needs of all households. The frequent (and often statutory) use of median family income in determining income thresholds for housing programs argues for continuation of that measure. In addition, a new series of median household income estimates similar to HUD's median family income estimates would be required to enable a shift to median household income. Since the recommended household size adjustments would substantially accomplish this while continuing to use median family income, this appears to be the more practical solution.

Using constant rather than nominal dollar thresholds to establish income eligibility for worst case housing needs would avoid potential misinterpretations of changes in the measure between time periods. However, this requires an accurate estimation of inflation in housing costs for the metropolitan areas covered by the AHS. A constant dollar threshold also complicates the measure and should probably be included as an analytical clarification rather than as a substitute for using nominal dollar thresholds.

We also find the case for two other modifications not compelling. Shifting to a more restrictive income threshold such as the poverty level would result in serious misclassification of low-income households with worst case housing needs. Adopting a multiple of the poverty level that more closely approximates the 50%HAMFI level would also require adjusting that measure for geographic differences in housing costs. Less complicated improvements in the current standard would be more appropriate and consistent with the use of the WCHN measure in housing policy than shifting to some variant of the poverty threshold.

The case for including overcrowding as an element of worst case housing needs is also not compelling. Research has failed to show a clear link between crowding and social problems. Doubling-up might be included as a component of worst case housing needs, if the evidence indicates that doubling-up is involuntary, but the impact on the WCHN measure would be negligible as most of these households are classified as having WCHN based on other criteria.

Decisions about the definition of worst case housing needs and expansion of the measure to include more criteria can have serious implications in the future allocation of federal housing resources. To the extent that the worst case needs measure is meant to reflect current housing policies, it could expand and contract based on the groups targeted by

those policies. However, such changes could significantly reduce the measure's utility as an objective quantification of need if groups with only marginal levels of need are included on equal par with those with more severe levels of need. Potential misclassification of households with low levels of need (or arguably with no need for public assistance in their housing consumption) is most likely at the margins of the current very low-income threshold. The number of households increases rapidly above that threshold, so it is particularly important to assure that changes in the worst case needs measure affecting households at that margin are indeed comparable to the severity of housing needs captured in the current measure.

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