

**Presentation paper for the Conference on  
Healthy Housing: promoting good health**

**19<sup>th</sup> – 21<sup>st</sup> March 2003**

**University of Warwick**

**Health and health perception in relation to  
housing and housing perception**

Matthias Braubach & Xavier Bonnefoy  
World Health Organization  
European Centre for Environment and Health, Bonn Office  
Görresstr. 15  
53113 Bonn  
Germany

## **I. Introduction: review of the existing situation**

### **I.1 Literature review: housing conditions and the impact on health**

Housing conditions play a major role in individual health status: a wide variety of housing features may influence both the physical and the mental well-being of occupants. Although the past decade has brought an increasing amount of research and numerous publications on the influence of living conditions on the health of occupants (e.g. Lowry 1991, Ranson 1991, Ineichen 1993, Burridge & Ormandy 1993, Raw & Hamilton 1995, Fiedler 1997, Dunn 2000, Fuller-Thomson et al. 2000), there is a lack of fundamental research on housing and health in the context of current urbanization trends, which have “...not been well understood in terms of both the positive and the negative impacts on health and well-being” (Lawrence 2000:1).

The relationship between housing and health is known to be very complex. This is true for both the medical dimension and the spatial or functional dimension. Medically, housing affects people through physical, mental and social pathways, touching on issues of well-being, identity, inequality and safety. Spatially and functionally, health impacts of housing can be divided into four categories (Fuller-Thomson et al. 2000): the house as the physical structure, the home in a psycho-social sense, the neighborhood as the immediate physical environment, and the community as the social framework. In the light of this complexity, and acknowledging the many levels of interaction between housing characteristics and health, Ranson (1991, preface) concluded that “*Housing and health is not and never will be an exact science.*”

Reviewing the recent literature on housing and health, it is clear that most studies are preoccupied with sectoral research, focusing on specific parameters of the diverse housing-health-relationship. The full health significance of the private dwelling is thus deconstructed, and any evidence restricted to specific circumstances that are only seldom found in the real housing environment. A recent review done in Canada concluded that many housing and health studies were too focused, unbalanced, or of low practical relevance (Fuller-Thomson et al. 2000); however, only a few scholars have so far called for an extended view of housing and health, integrating the mental and social aspects of housing as a fundamental setting for living (Dunn 2000). A more

holistic approach is needed, to understand the wide range of interactions between place and health (Williams 1998).

In modern societies, individuals spend most of the day in artificial settings, planned and constructed by mankind. Such artificially designed living environments are not necessarily the healthiest option for human beings, as their standards have usually been developed with economic, technological or political priorities paramount (Lawrence 1993). The human or socio-ecological perspective is usually undervalued. This is especially true for health aspects, which have so far not been well integrated into housing designs.

Based on the reviewed literature, a number of research fields are most prominent in the area of housing and health. The following box introduces the main fields of scientific work as identified so far, distinguishing between physical, mental and social effects.

It is not surprising that due to more readily-established cause-effect relationships and the opportunity of measurements, most research has focused on the physical health aspects. Mental and social effects have so far only been investigated in a few research fields, and have also proven to be difficult to work with: *“Attempting to measure the health impact of poor housing is difficult, particularly in cases of mental health.”* (Stewart 1999: 230).

<b>Housing and health research field</b>	<b>EFFECTS</b>		
	<b>Physical</b>	<b>Mental</b>	<b>Social</b>
<b>Asbestos</b>	<b>XXXXX</b>		
<b>Radon</b>	<b>XXXXX</b>		
<b>Lead / heavy metals</b>	<b>XXXXX</b>		
<b>Electromagnetic fields</b>	<b>XXXXX</b>		
<b>Dust / Particulate Matter</b>	<b>XXXXX</b>		
<b>Volatile Organic Compounds</b>	<b>XXXXX</b>		
<b>Indoor Air Quality, Humidity</b>	<b>XXXXX</b>		
<b>Moulds</b>	<b>XXXXX</b>		
<b>Temperatures</b>	<b>XXXXX</b>		
<b>Home safety / Accidents</b>	<b>XXXXX</b>		
<b>Sanitary installations</b>	<b>XXXXX</b>		
<b>Lighting / Illumination</b>	<b>XXXXX</b>	<b>XXXXX</b>	
<b>Pests and infestations</b>	<b>XXXXX</b>	<b>XXXXX</b>	
<b>High-rise buildings / Architecture</b>		<b>XXXXX</b>	<b>XXXXX</b>
<b>Isolation</b>		<b>XXXXX</b>	<b>XXXXX</b>
<b>Environmental Tobacco Smoke</b>	<b>XXXXX</b>	<b>XXXXX</b>	<b>XXXXX</b>
<b>Overcrowding</b>	<b>XXXXX</b>	<b>XXXXX</b>	<b>XXXXX</b>
<b>Noise</b>	<b>XXXXX</b>	<b>XXXXX</b>	<b>XXXXX</b>

Summarising the information on health risk factors and health effects, the following table gives an overview of the possible health effects that may be caused by various factors within the domestic setting. It is, however, far from exhaustive.

#### Possible health effects caused by residential health risk factors

<b>Causal factors</b>	<b>Possible health effects</b>
<b>Environmental tobacco smoke</b>	Respiratory symptoms in children; lung cancer; increased risk of cardiovascular effects; annoyance and discomfort
<b>Radon</b>	Lung cancer
<b>Asbestos</b>	Asbestosis; lung cancer; mesothelioma
<b>Lead</b>	Systemic poisoning; permanent brain damage in children; anaemia
<b>Particulate matter</b>	Eye, nose and throat irritation; respiratory infections and bronchitis
<b>VOCs</b>	Eye and respiratory tract irritation; headache; nausea; organ toxicity; cancer
<b>Classic Air pollutants</b>	Respiratory problems; headache; nausea; cardiovascular effects; increased risk of respiratory infections; CO poisoning
<b>Biological agents (moulds, viruses, bacteria, pests, pets)</b>	Eye / upper respiratory tract irritation; allergic reactions of skin and throat; asthma; respiratory infections; general infections and communicable diseases; food poisoning; toxicity; annoyance and insecurity
<b>Hygrothermal conditions</b>	Cooling; cardiovascular effects; hyper- and hypothermia; increased risk of throat infections; annoyance and irritation
<b>Lighting</b>	Hormonal changes; emotional changes; increased accident risk
<b>Noise</b>	Potential hearing loss; cardiovascular effects; annoyance; aggression; mental pressure; hormonal changes; sleep disturbance
<b>Overcrowding</b>	Increased risk of infections and respiratory disease; mental pressure; isolation; behaviour change and aggressions

This short review shows both the importance and the complexity of housing and health. It is nevertheless striking that in most countries, housing and health is not considered to be a public health issue (Roderick et al. 1991). Regular surveillance of housing conditions is not carried out in most European countries except the UK, where a large-scale house condition survey is undertaken every five years (and in the most recent, extended by an explicit health-based ranking approach to housing conditions (Raw 2000)). In France, a new observatory on indoor air quality was launched in 2000; however, these two countries seem to provide the only examples of large-scale governmental housing research and surveillance.

Still, only some aspects of the housing and health relationship in Europe can be described with existing statistics. Even at the beginning of the 21<sup>st</sup> century, many questions about mechanisms and cause-effect-relationships are unfortunately still unresolved. Thus, it needs to be kept in mind that the interaction of multiple factors and the complexity of the issues require more attention in future research. This will involve integrating physical and mental health effects and using an interdisciplinary approach.

## **I.2 Housing in CEE countries: the situation of prefabricated blocks**

Housing conditions are, above all, dependent on investment and maintenance. Without maintenance, housing slowly loses its contribution to physical, mental and social well-being and in the long run turns into a health risk. Many countries in Central and Eastern Europe (CEE) and the Commonwealth of Independent States (CIS) currently find themselves moving towards such situations. Large-scale privatisation of the housing sector in the past decade, the lack of governmental regulation and the general economic and social crisis have resulted in lack of repairs and maintenance to the existing stock, and a decline in new housing construction. Given such a societal framework, it is not surprising that the existing housing stock is starting to deteriorate.

In the CEE countries and in the Russian Federation, a total of 170 million people are housed in large housing estates, made up exclusively of prefabricated blocks of flats (European Academy of the Urban Environment 1998). More such buildings have been erected individually. These blocks have often been called a “legacy of the past” in these countries, being the architectural response to the socialistic desire to produce a new society (Herlyn / Hunger 1994). Using industrial techniques, prefabricated panels were used for the erection of large housing estates in the suburbs of existing towns. Any evaluation of the techniques was limited to their production efficiency and low-quality materials and inadequate construction methods were used, resulting in low-quality, anonymous and identical housing blocks. Many of them were already in need of substantial repairs by the time of the political changes (Vilnius Technical University 1998, Senat Berlin 1992).

The technical problems that are typical of prefabricated buildings are most often related to the constructional elements of the roof and external wall panels, to the heating and sanitation systems, and to the ventilation system (BMBau 1991). Three major reasons account for these technical and constructional shortcomings:

1) Inadequate or low-quality materials

2) Inadequate construction techniques

3) Faults due to lack of maintenance

Taking the current societal and economic developments into consideration, the housing conditions of CEE and CIS countries give substantial cause for concern. Without national rehabilitation programs, it is only a question of time until the first blocks become inhabitable; indeed, in the case of the new eastern states of Germany at least, a considerable proportion of these flats have already been labelled as inhabitable and removed from available housing stock. Data for CEE countries is hardly available, although in some countries, the physical stability of several building types has already been questioned by experts. This deterioration to the point where demolition is the only option needs to be countered. The sooner remedial action is taken the better – especially given housing's core role in each society, and that these prefabricated blocks house a large part of the population: in many countries, the percentage of the population living in these blocks is between 40 and 50% (European Academy of the Urban Environment 1998). It is clear that the problem at hand has the potential – if not taken care of in time – to result in widespread social problems.

### **I.3 Specific health threats in prefabricated blocks**

Given adequate maintenance levels, living conditions in prefabricated blocks are not much different from those in any other part of the housing stock – healthy living and a good quality of life is also possible in prefabricated housing (Fiedler 2000). However, there are several specific housing-related health threats that are typical of these kinds of flats. They are related to low standards of dwelling layout, installations, and the use of poor quality materials and building elements.

*1) Dwelling layout and size:* The existence of only a few types of layout results in small flats without functional flexibility. With average flat sizes of roughly 60m<sup>2</sup> and commonly three rooms, households with more than three people face the problem of shortage of space.

*2) Air quality:* Problems of humidity and air pollution arise especially in building types in which kitchens and bathrooms are located internally, i.e. without windows. Without this means of natural ventilation, high relative humidity and resulting mould growth can often be found in bathrooms while small kitchen compartments are likely to become places of elevated exposure to air pollutants.

3) Temperature: Flats on large housing estates are usually supplied with heat from a district heating scheme, but as radiators in the flats are often inefficient and not adjustable, problems with indoor temperatures are common with both under- and overheating, depending on the weather. Temperature problems are increased by the low insulation standards of the outer walls, not tight windows and the existence of temperature bridges such as parts of the weight-carrying steel skeleton.

4) Noise exposure: Noise is a traditional problem in blocks of flats. This seems particularly so for prefabricated blocks: the low noise insulation quality of external walls, as well as the thinness of walls inside and between flats and stairwells, make noise a widespread influence on quality of life.

5) Use of harmful building materials: Many potentially harmful materials such as asbestos or formaldehyde foams were used in the construction of these blocks. While renovation measures have removed some of these in the states of Eastern Germany, in many countries of the CEE region, the health threats of inadequate building materials are still a priority.

## **II. A WHO study on healthy housing**

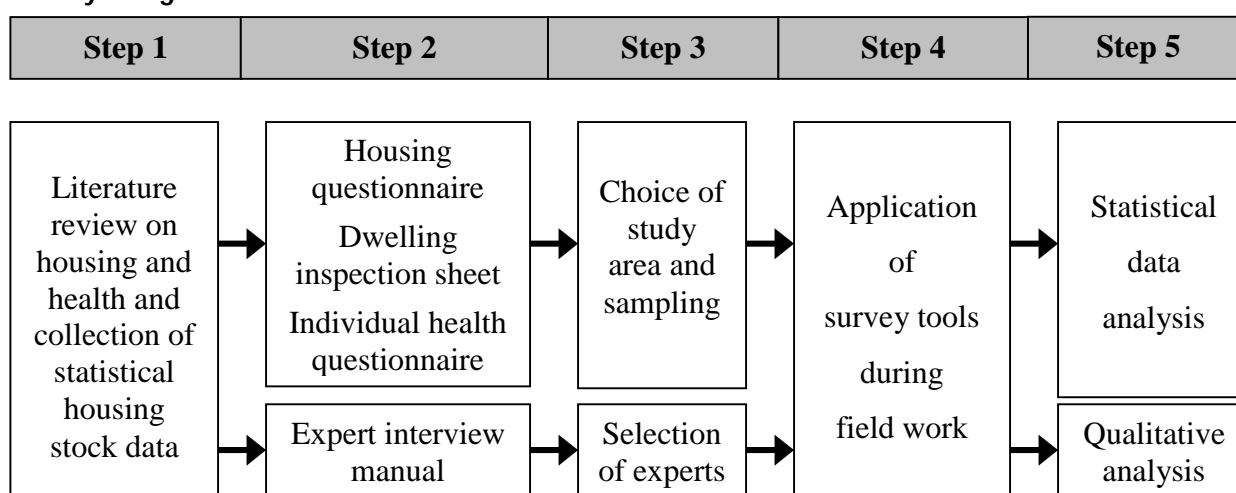
### **II.1 Reasons for the chosen approach to the survey**

The European Regional Office of WHO decided to launch a project on housing and health in 2000 for two reasons: to help fill the knowledge gap currently existing in the field of housing and health; and to promote the discussion of housing and health in the member states. The study topic was living conditions in prefabricated blocks of flats. As well as housing inadequacies being most likely in the housing stocks of the Eastern European and Central Asian countries, other, often more pragmatic reasons, lead to this decision: panel block buildings house for a large part of the Eastern European population, and their equipment and installations are often of a lower quality than required nowadays as a minimum standard. Since these are very basic problems, it might be expected that very easy and technically simple interventions (such as improved heating systems or tighter windows) should lead to significant improvement. The large quantity of such housing and the similar construction types, resulting in similar problems, should enable the development of “standardised” and thus cost-efficient renovation concepts that could be applied on a large-scale.

## II.2 Materials and methods

The chart below shows the basic structure, methods and work steps of the WHO housing and health study: as a first step, a review of housing and health literature and relevant housing data was carried out to identify the current status of housing and health research. The review results served as the basis for the second step, the development of survey tools (three in total: housing questionnaire, inspection sheet and an individual, self-administered health questionnaire). After the sampling (step 3), a field study was carried out as a fourth step. The results were then analysed and interpreted as the final work step.

### Study design



The next table indicates the various characteristics of the national samples:

### Profiles of the survey by city

City	Schwedt	Vilnius	Bratislava
<b>Number of chosen areas</b>	3	4	1
<b>Main distinction</b>	Renovation	Building type	Building type
<b>Number of chosen flats in total</b>	<b>180</b>	<b>160</b>	<b>200</b>
<b>Number of renovated flats</b>	90	---	---
<b>Number of unrenovated flats</b>	90	160	200

An average flat visit during the field work phase took from roughly 40 minutes to one hour, depending on flat and household size. In total, 48% of the selected households participated in the study, giving a total of 259 flats visited. The table below presents a breakdown of the participants in the individual countries:



### Survey result breakdown

	Schwedt	Vilnius	Bratislava	TOTAL
<b>Number of chosen flats</b>	180	160	200	<b>540</b>
<b>Successful flat inspections</b>	83	102	74	<b>259</b>
<b>Inhabitant health interviews</b>	172	219	210	<b>601</b>
<b>Health interviews per flat</b>	2.1	2.1	2.8	<b>2.3</b>

### **III. Results**

After data entry, a joint database for all three cities was developed, aiming at an international comparison of the surveyed housing stock in the three countries. However, for the following presentation, it was decided to still differentiate between the two building categories of renovated and unrenovated buildings in Schwedt in order to highlight the impact that renovation might have had on building quality and living conditions. The following charts illustrate the potential of renovation approaches and suggest that – due to the somewhat worse housing conditions in Bratislava and Vilnius – modernisation might produce even larger benefits in their housing stock.

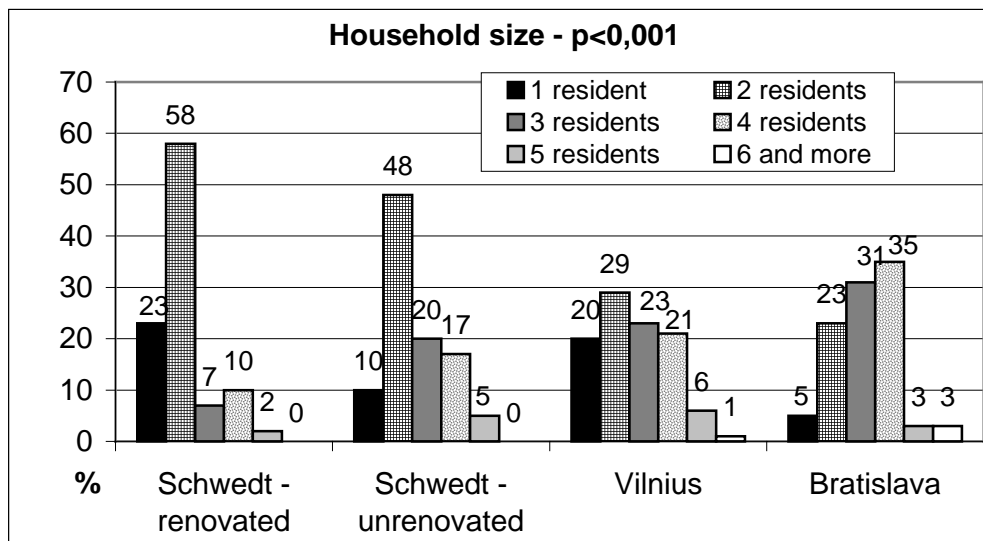
In interpreting statistical significance of data presented below, it is important to keep in mind that the p-values given are only valid for comparisons among the aggregated data for all three cities, while the data presented in the charts has been extended by a break-down for renovation status in Schwedt.

#### **1) Household size**

The largest household sizes can be found in Bratislava, where only 28% of all households have one or two residents and the largest incidence is found of three- and four-person households. The results for Vilnius show a different pattern, which resembles more the Schwedt situation: two-person households are the largest group, although they are not as dominant as in Schwedt (where half of all households are made up of three or more persons).

The trend towards smaller households is – typically for Western lifestyles – most strongly expressed in Schwedt, where two-person households are prevalent and account for 81% (renovated) and 58% (unrenovated) of all surveyed households. The difference is based on the fact that older households and pensioners are more often

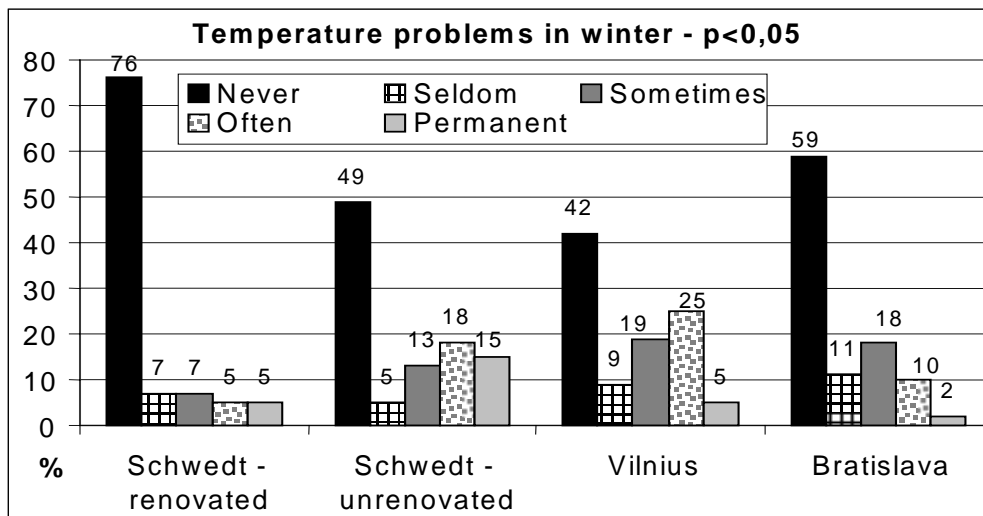
found in renovated flats, while young households with children tend to rent cheaper, unrenovated flats.



The conclusion can be drawn that – assuming the continuing adoption by CEE countries of more Western life styles, and with them the trend to smaller household sizes – in the near future a massive demand for new housing units will arise in many CEE countries. This will be based not on demographic growth, but on increased living space per person, as in the West.

## 2) Indoor temperature problems

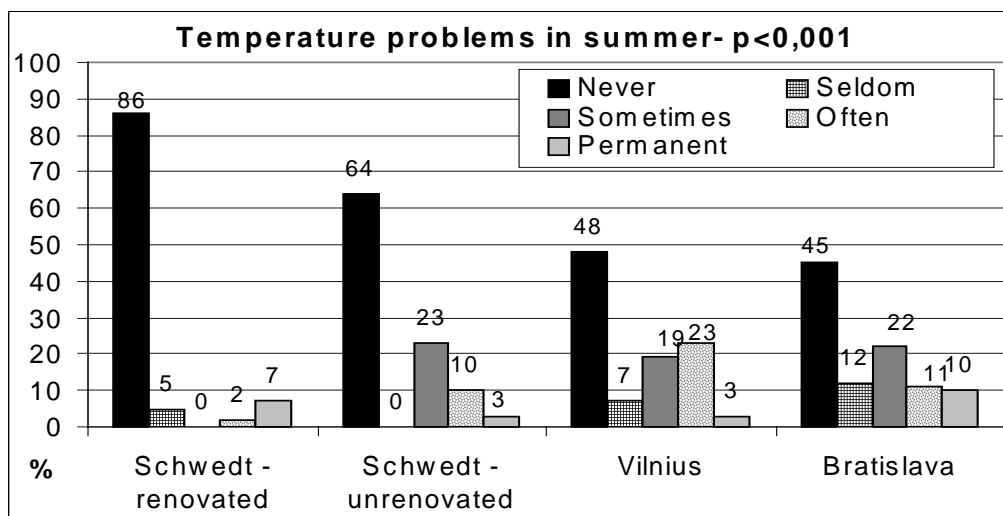
Looking at households which reported problems with indoor temperatures during winter time, it appears that there is very little difference between the unrenovated flats in all three surveys, while the renovated flats in Schwedt clearly offer an improved thermal environment.



The greatest problems are experienced by residents in Vilnius, where only 42% are free of winter temperature problems; severity is also most extreme in Vilnius, where 30% of all households report frequent or constant temperature problems.

The situation in Schwedt (unrenovated flats) is similar to that in Vilnius: only 7% more households report no problems (49% total), while 33% suffer frequently or permanently. Only when looking at the reported incidence of constant problems does the unrenovated housing stock in Schwedt turn out to be worst with 15% of all households being affected. By comparison, the results from Bratislava are more positive, with almost 60% of residents having no temperature problem during the winter. Among the remainder, the numbers affected decrease with increasing problem severity (only 12% for example, are frequently or constantly affected by inadequate winter indoor temperatures).

The situation is very different for summer temperatures. Unrenovated housing stock in Schwedt performs much better than the buildings in Vilnius and Bratislava, where more than half of all households have problems with indoor temperatures in summer. In the cases of Vilnius and Bratislava, the most striking result is the high number of households claiming to have frequent or constant problems (Vilnius 26%, Bratislava 21%). Consistency and persistence of problems is particularly remarkable in Bratislava: it is the only city in which all answer options were chosen by at least 10% of households. The housing stock in Schwedt is, in contrast, much better adapted to the summer climate. This is indicated by the large number of households without any problems and the clear decrease in the number of affected households with increasing problem severity in the case of unrenovated flats.

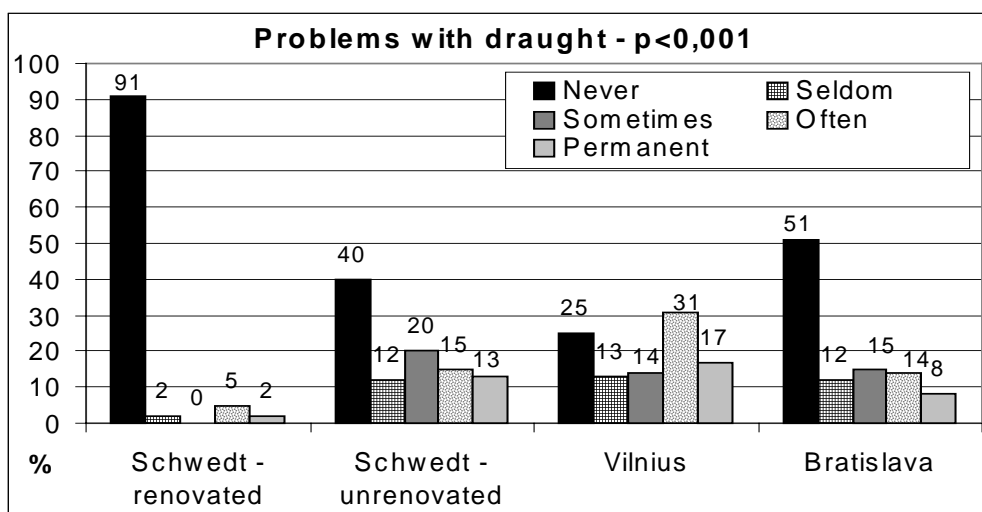


### 3) Draught and air quality

Looking at indoor air quality, the occurrence of draughts was found to be one of the major issues for residents. Although draughts may not have a direct bearing on health, they still have an impact on the thermoregulation of the body, and – which counts much more – strongly influence perceptions of thermal comfort. Frequent sensation of draught is a significant cause of discomfort to the people affected.

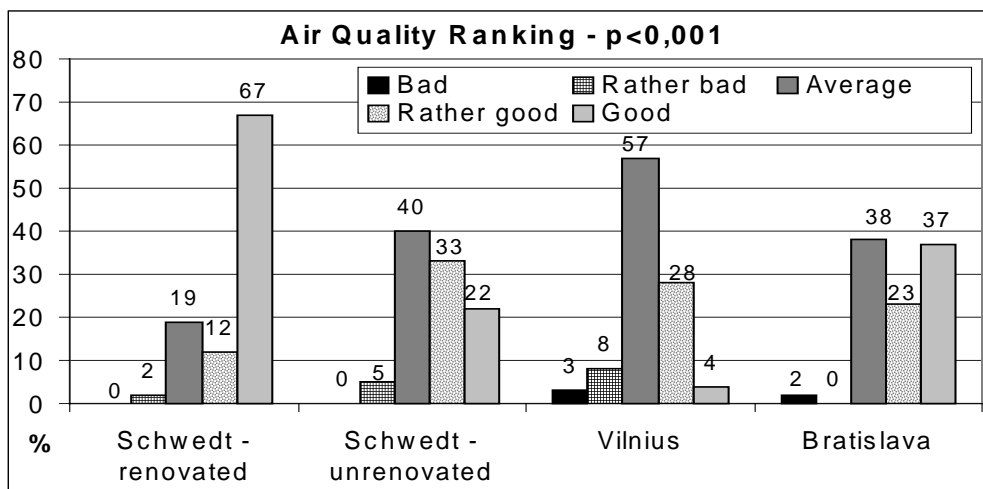
The occurrence of draught is most widespread in Vilnius, where only one quarter of households do not complain about insufficiently tight windows and draughts, 48% indicating that they suffer from draughts on a frequent or even constant basis. The problem is less severe in the unrenovated flats of Schwedt and slightly smaller still in Bratislava. These differences are apparent in the proportion of households reporting no problems (40% in Schwedt, 51% in Bratislava), and in the ratio of households most affected (28% in Schwedt, 22% in Bratislava).

The most remarkable result relating to draughts is the impact that renovation measures can have. Replacement of windows and window frames is one of the most frequent features of renovation schemes and the effect is dramatic: 91% of households living in renovated flats in Schwedt reported no problem with draughts at all.



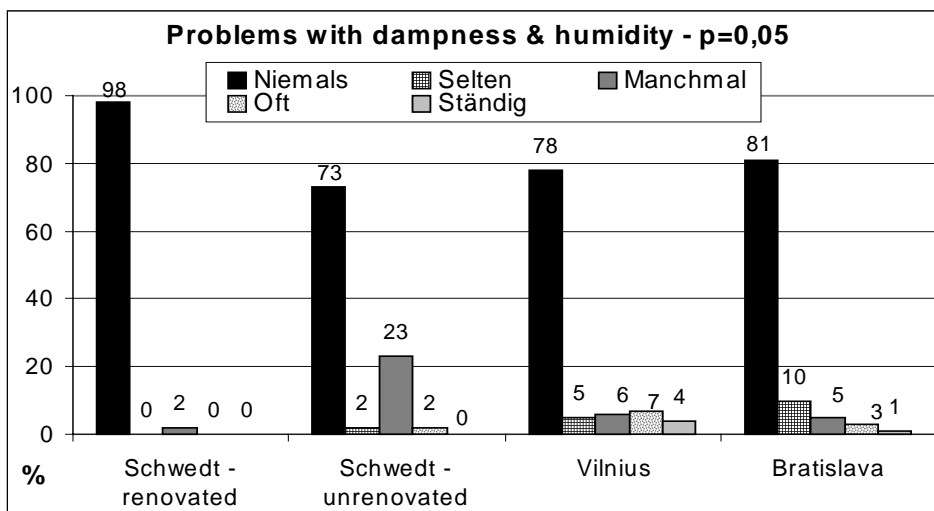
Assessment of air quality, undertaken on a five-point scale from “bad” to “good”, produced a picture similar to the one drawn above. Again, the residents of Vilnius are least satisfied with their indoor air quality, 57% of them rating it as only “average”. At 11%, Vilnius also received the highest number of “below average” ratings, and the most marked decline of households being increasingly satisfied. This decline is also

visible within the data from the households living in unrenovated Schwedt blocks: 40% assessed their indoor air quality as average, 33% as rather good and only 22% as good. However, the decline is less pronounced than in Vilnius, and only 5% gave a rating of “above average”. By contrast, residents in Bratislava assessed their air quality more positively: 60% in total rating it “rather good” or “good” and 38% as “average”.



However, even while standing out from Vilnius and the unrenovated Schwedt flats, Bratislava cannot match the results provided by the residents of renovated flats in Schwedt: two thirds of whom assess their air quality as good, indicating clearly the benefits of renovation.

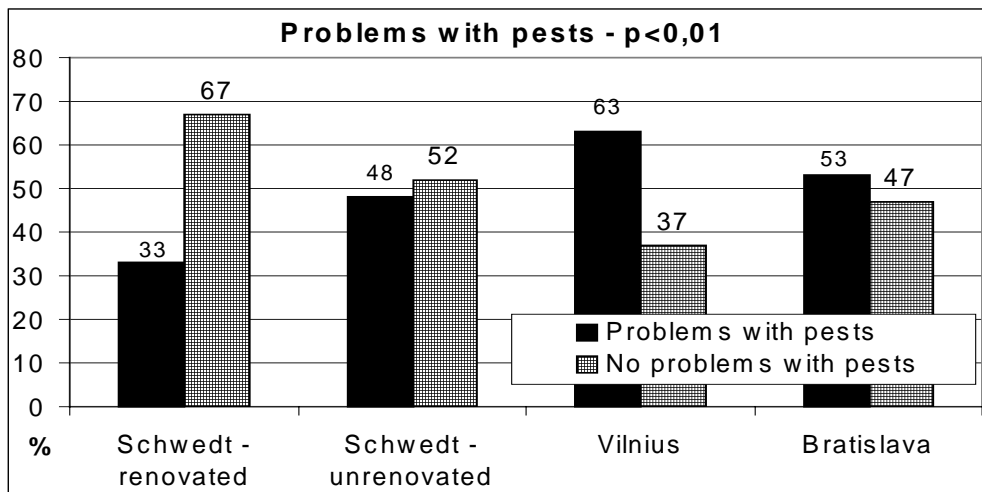
Perhaps surprisingly, problems of high humidity and dampness were only rarely reported. Notwithstanding, humidity problems were most often reported in unrenovated flats in Schwedt, while Vilnius and Bratislava reported lower frequencies.



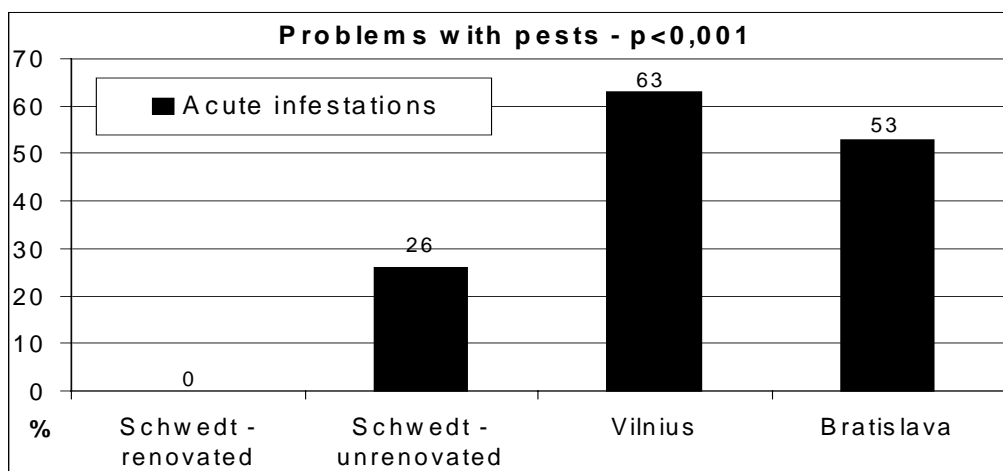
Frequency aside, it is clear that in Bratislava and Schwedt (unrenovated), the severity of the problem is less (4% and 2% of households respectively reported frequent or constant humidity problems) than in Vilnius, where 11% of all households claim to have problems on a frequent or constant basis. Again, the impact of renovation is indicated by the very positive evaluation of households of renovated flats, only one of which reported any continuing problem in this regard.

#### 4) Pests and infestations

Pests have been recognised as a major problem for multi-occupied buildings in general. Households were therefore asked whether they had ever experienced infestations in their flat or on their staircase. The chart below shows that Vilnius had the highest rate of households that had been affected at least once (63%), while Bratislava (53%) and Schwedt – unrenovated (48%) have rates of around half of all households. The impact of renovation in Schwedt is clear but less marked than it was, for example in the case of draughts or air quality: although the renovated flats had the lowest incidence (only one third of households there having experienced infestations before), the difference between these and the unrenovated flats was only 15%.



Following up on the initial question on pests, the households which indicated that they had had experience of pests in their building were asked about their current situation. Again, almost two thirds of the Vilnius households reported current infestations. In Bratislava, 53% of households had a problem at the time of the survey, while only one out of four households in unrenovated flats in Schwedt were experiencing infestations.

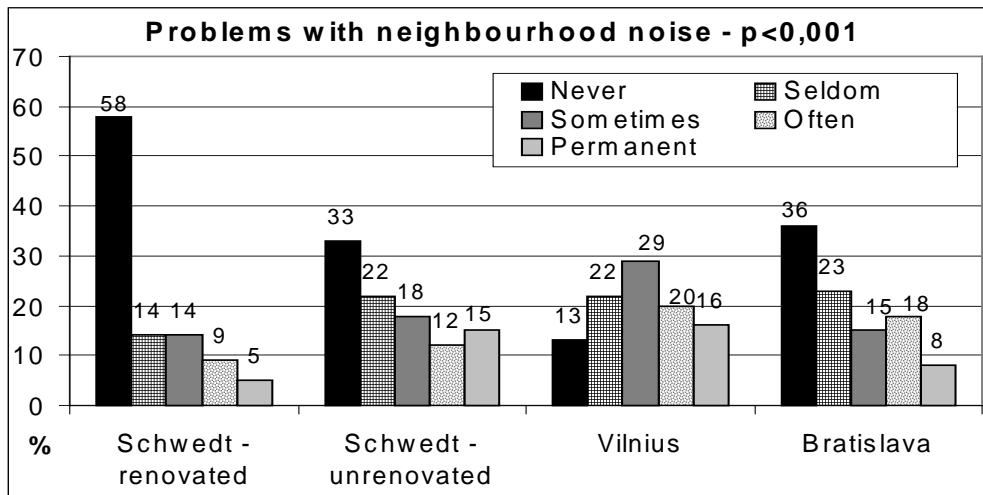


While it is therefore simple to conclude that infestations occur more frequently in Vilnius and Bratislava than in the unrenovated blocks in Schwedt, again, the results strongly illustrate the impact of the renovation. During the survey, none of the renovated households reported current infestations.

## 5) Noise

Due to the growing recognition of noise as a public health issue in recent years, both neighbour and neighbourhood noise were featured in the study. The results support the view that noise has a major influence on quality of life: the number of households without any noise problems is extremely low in comparison to other parameters. Questions on many such other parameters (see e.g. charts on draughts and temperature problems) resulted in satisfaction ratings ranging from 40% in Vilnius and Bratislava to above 90% in the renovated Schwedt flats. In the case of noise, the highest rating found – in renovated Schwedt flats – was only 58%.

In the case of noise exposure, the data is in line with other parameters: Vilnius had the biggest problems, while there was less difference between Bratislava and the unrenovated flats in Schwedt. Thus in Vilnius, only 13% of all households were free of noise disturbance in their neighbourhood and for the three last answer categories (sometimes – often – permanent), Vilnius always had the highest ratios, indicating that the problem is more severe than in the other cities. In total, more than one third of all households in the Vilnius sample were frequently or constantly exposed to neighbourhood noise.

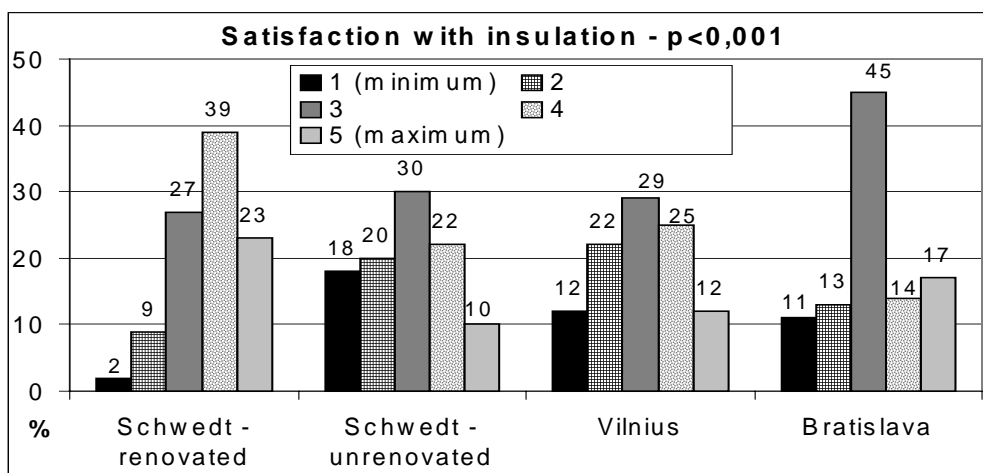


The proportions were lower in Bratislava and the unrenovated flats of Schwedt, where only 26% and 27% respectively claimed such a degree of exposure; while at least one third of all households in these two samples were free from external noise problems.

Compared to the unrenovated housing stock, the renovated flats in Schwedt were rated much better by their residents, again indicating the benefit of modernisation.

However, the fact that even here, only 58% of households do not suffer from noise problems, while 14% have problems on a regular basis, shows that the renovation is only able to soften the problem, not solve it completely. Noise must therefore remain an important topic for inquiry in housing and health studies.

A similar result is gained when the residents were questioned on their satisfaction with their insulation. Households in Vilnius and Schwedt (unrenovated flats) are least satisfied, while Bratislava residents show slightly higher satisfaction.

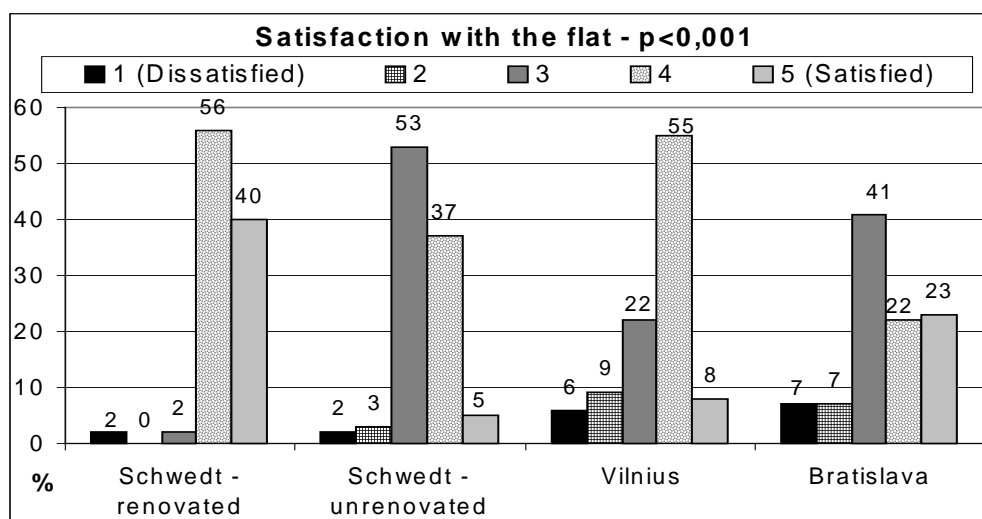




The result for renovated flats in Schwedt shows that satisfaction with the standard of insulation was improved significantly by modernisation, although the last chart showed that its effect on noise reduction was less marked. This could be explained by the fact that only the insulation of the outside walls was improved, providing no mitigation of indoor noise sources.

## 6) General flat satisfaction

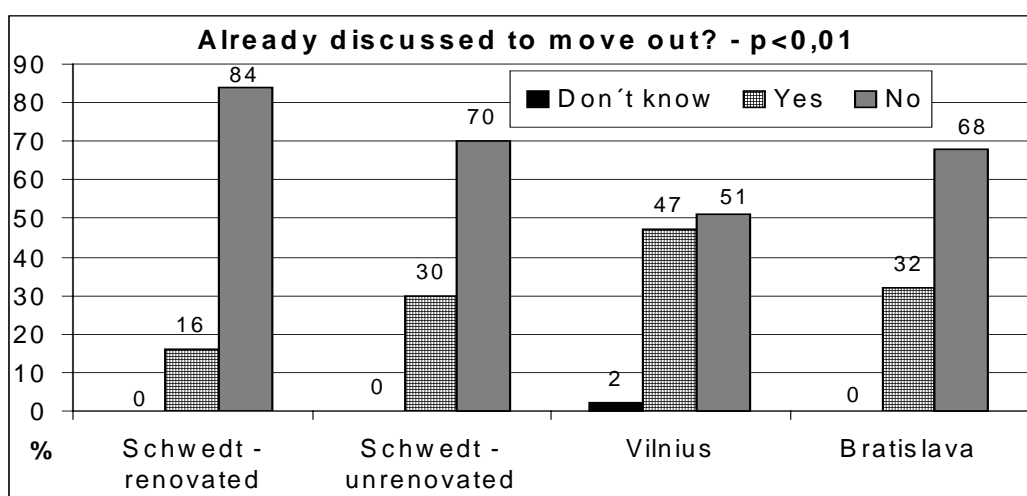
Concluding the questioning about health-related living conditions, households were asked about their general satisfaction with their dwelling. Collecting data on a scale from 1 (minimum) to 5 (maximum satisfaction), the results from the different samples are significantly different. Comparing the average values for each city, it is clear that the residents of renovated flats in Schwedt have by far the greatest satisfaction with their homes, with a mean value of 4.3. This is almost one full ranking scale value more than for the residents of unrenovated flats, who gave an average ranking value of 3.4. In Vilnius and Bratislava, residents' satisfaction with their flats is on a level of 3.5 for both cities. This is somewhat surprising in the case of Vilnius, since as the results discussed above showed, on many individual parameters the Vilnius stock was assessed as worse than Bratislava. On the other hand, the fact that Bratislava and the unrenovated Schwedt buildings were rated similarly is not surprising, as there were several similar assessments of individual housing quality parameters.



As the assessment of residential satisfaction reflects the views of the residents, it inevitably reflects their own housing experience and expectations. As these will be related to national standards and traditions, the context for such satisfaction ratings is

different in each country. In any case, results for the two building categories in Schwedt show that renovation does have a strong impact on the satisfaction of residents, which ties in with the results that have been discussed above.

Connected to the question on overall residential satisfaction, households were also asked whether they had ever considered moving out. This question reflects residential satisfaction (low satisfaction providing a stimulus to move) but also the reality of the housing market – low satisfaction not being enough to bring about a move if the alternative accommodation available is not better, or if better flats are simply not available for economic or practical reasons. This hypothesis is confirmed by comparison of the two Schwedt categories where there is only a fairly small difference between residents of renovated and unrenovated flats.



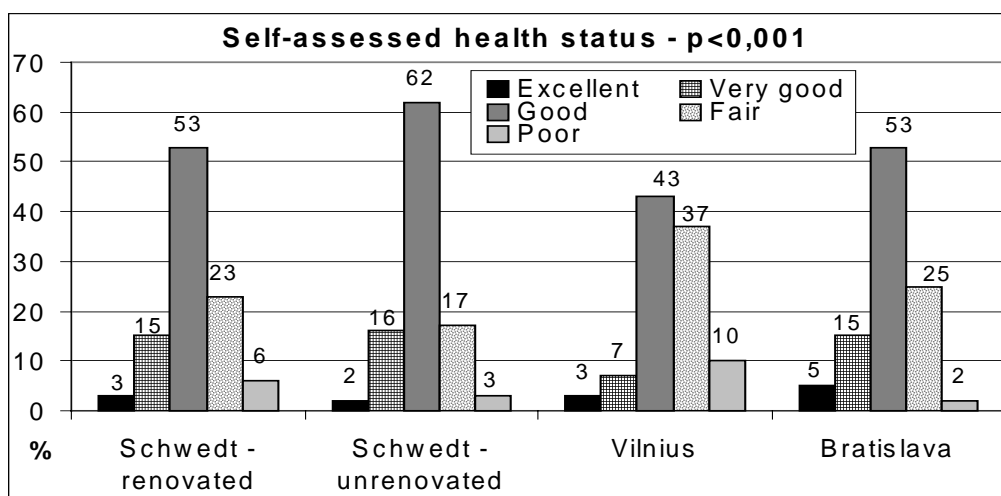
Although they assessed their overall living conditions lower, the residents of unrenovated flats showed only a slightly increased tendency to move out over the residents of unrenovated flats. Again, the results for Bratislava were very similar to the results for unrenovated flats in Schwedt; while the desire to move out among the residents of blocks in Vilnius were almost 50%. This indicated that residential mobility might turn out to be high once new housing types were made available to the public.

## 7) Health status

Moving away from housing parameters to health issues, the major question was whether the observed differences in housing conditions were reflected in the health status of residents. As discussed in the country sections, only in the case of Vilnius did the health self-assessment provide a significant result. At the same time, the

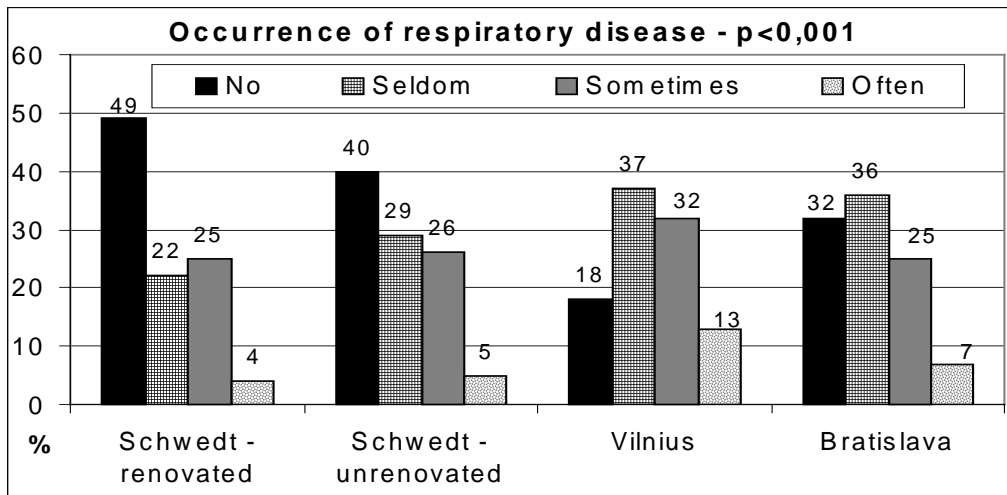
Vilnius study was the only one in which results of the health assessment were in line with the findings of the housing survey, linking better living conditions to significantly increased self-rated health status. In the cases of Schwedt and Bratislava, the results were not statistically significant.

Once more, nevertheless, the distribution of health status in Bratislava was similar to that in Schwedt (where the contrast between the renovated and unrenovated flats was marginal), while Vilnius residents assessed their health as much worse than the residents of other cities. This corresponds with the general results suggesting that the housing stock in Vilnius was a higher priority for intervention than in the other cities.



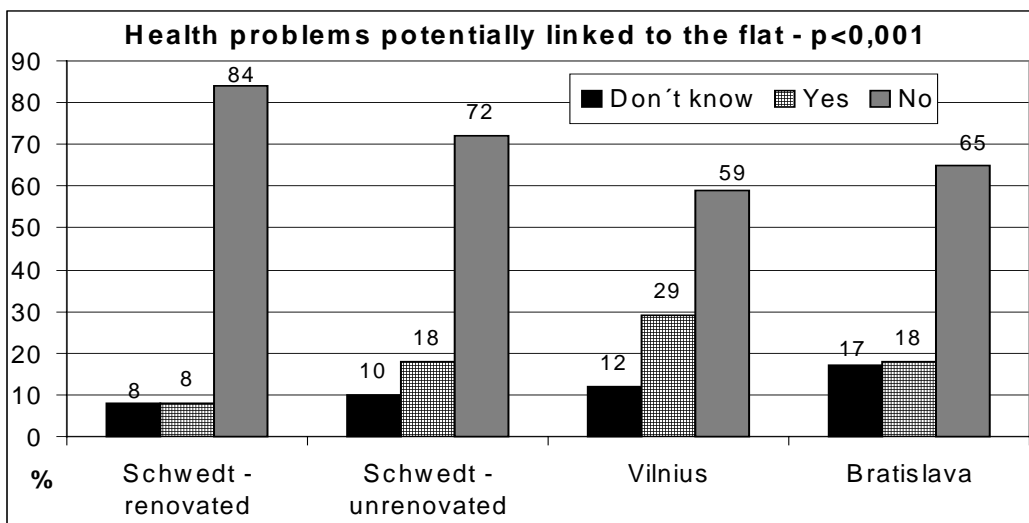
Interesting enough, the Vilnius results showed a need for action on both housing quality and health, reinforcing the recommendation to explore the Vilnius database further.

As an example for the various types of disease on which data was collected, the results of the question on acute respiratory disease are shown below. Although the comparison presented here is statistically significant, it must be noted that within the Schwedt housing stock, the differences are small (and are limited to the options “no” and “seldom”). The Bratislava results differ little from those of the unrenovated flat residents in Schwedt, apart from showing a slightly higher morbidity, while the results for Vilnius show a higher overall incidence of disease: the lowest rate for residents never having experienced respiratory disease, and the highest rate for frequent disease. Once again however, the differences are insignificant due to a variety of factors and the small sample sizes.



On being asked whether they believed their flats and related living conditions could play a role in the development of any disease or health problems, once more the occupants of blocks in Vilnius displayed the greatest suspicions about their dwellings: 41% of all residents suspected that their flats might play a causal role of some kind. Many Bratislava residents were less concerned, two-thirds believing their flats had no impact on their health – only 7% fewer than in the unrenovated flats in Schwedt. The difference between Bratislava and Schwedt was mainly in the increased use of the option “don’t know” in Bratislava.

From results within the Schwedt housing stock and despite the question on health status not resulting in a significant difference, it is still clear that renovation brought about an improvement. Further studies would be needed to isolate the reason for this, but it is possible that higher overall satisfaction played some part.



## **IV. Conclusions**

Findings of the survey indicate that several features of living conditions in these flats have some impact on health-related living conditions (e.g. air quality, temperature, pests, noise, space, air-tightness). These features have varying influence in the respective countries however, and it proved to be impossible to identify a dominant influence on health. Residential health is affected by many different aspects of the home and its environs and thus represents a complex construct.

Overall, the results suggest that the quality of the housing stock in Bratislava is not much different from that of the traditional housing stock in Schwedt before renovation and no clear links between its condition and health could be identified during the data analysis of the national databases. Housing conditions in Vilnius, by contrast, were often significantly below the level of unrenovated housing stock in Schwedt. Furthermore, the data set from Vilnius was the only one to provide some evidence that poor living conditions may be linked to lower health status.

The failure of the individual studies in Schwedt and Bratislava to identify any impact of their living conditions on health might have various reasons. The two most likely are that (a) the sample size was too small for detecting a direct impact of the living conditions on health, and (b) there simply were no health effects to be detected as living conditions may be above a critical level. Furthermore, in the case of Schwedt, it is also possible that any effects of the renovation works had simply not been expressed yet, the work having only finished in 1998.

As a general conclusion of the rehabilitation work done in Schwedt, in the light of the total results, it can be said that – next to the provision of healthier living conditions – renovated flats seem much more able to fulfil their function as private and safe shelter, although no specific health gains could be detected by this survey. Still, due to an insufficient sample size, this result is not solid enough to be understood as a fact, although it seems that the renovation impacts are mostly limited to aspects of comfort than health requirements.

As expected, renovation measures were strongly reflected in the assessment of individual living conditions and the general satisfaction with residents' flats. In this context, it seems only natural to consider housing as a force for health promotion and to ascribe at least a similar weight to living conditions as to physical fitness, adequate

nutrition or personal hygiene. This is especially true in the sense that in the case of the latter factors, the home provides the contextual framework: it is the place where activities such as washing or cooking take place. The quality of one's housing also provides a way to express socio-economic status and the residential environment; it thereby functions as a forum where many other housing-related health factors meet. Thus, good housing quality and adequate living conditions are a limiting factor for health risk and function as a kind of artificial immune system for the residents.

To summarise, the main conclusions from this study are as follows:

- Health and housing is a very complex construct that is not only based on the physical structure of the house and existing and measurable parameters, but also on the interaction between these elements and the residents.
- Healthy living is possible in prefabricated blocks if a minimum level of maintenance is carried out.
- Responsibility and identity are keywords for the maintenance of a good housing environment.
- Renovation and modernisation measures have a direct impact on living conditions.

Based on the study results, the following housing parameters are proposed as those factors which need most to be improved by modernisation or renovation measures in order to increase the health-related quality of life in these buildings:

Indoor air quality: The efficiency of ventilation systems is a major cause of problems with air quality and modernisation is required. Also, improved window tightness can increase satisfaction with indoor air, offering greater control over ventilation rates and reducing draughts.

Flat sizes and floor space: Increased flexibility of flat layout and the provision of a proportion of larger flats as a particular objective for building renovation could result in increased variety and better living conditions for larger households.

Heating systems: Dissatisfaction with indoor temperatures was found in all of the countries. The main cause was the lack of regulation of the heating devices, which could be easily changed by rehabilitation (as well as the thermal insulation quality).

Insulation quality: The insulation of flats must be improved against both heat loss and noise. In the case of noise, it is not only external but also internal insulation that is relevant. Double-glazed and tighter windows would improve both noise attenuation and energy consumption.

Pests: The occurrence of pests is linked to building quality and may also be related to the method of waste disposal and general maintenance / management. For eradicating pest problems, a clear allocation of management / cleaning responsibilities is required.

From a public health point of view, any improvement of the housing stock represents a welcome betterment of living conditions for residents. Without any doubt, renovation measures are a tool for the improvement of the population's health.

## **V. References**

Braubach, M. / Bonnefoy, X. (2001): Housing and health: The Eastern European challenge. In: Open House International 26 (2): Health, housing and urban environments. Pages 8-22.

BMBau: Bundesministerium für Raumordnung, Bauwesen und Städtebau (ed.)(1991): Vitalisierung von Großsiedlungen. Forschungsvorhaben des Experimentellen Wohnungs- und Städtebaus. Bonn.

Burridge, R. / Ormandy, D. (eds.)(1993): Unhealthy housing: Research, remedies and reform. (E & FN Spon) London.

Department of the Environment (ed.)(1997): Housing and health research: measuring the health benefits of housing improvements. Some research lessons and descriptive results from a pilot study. DoE. London.

Dunn, J.R. (2000): Housing and Health Inequalities: Review and prospects for research. In: Housing Studies 15 (3): 341-366.

Engel, E. (1980): Wohnungsnot und inhumaner Wohnungsbau. Reihe Stadt- und Regionalsoziologie, Band 4. (Ölschläger) München.

European Academy of the Urban Environment (ed.)(1998): A future for the large housing estates. European strategies for prefabricated housing estates in Central and Eastern Europe. EAUE, Berlin.

Fangohr, H. (1988): Großwohnsiedlungen in der Diskussion. In: Geographische Rundschau 40 (11): 26-32.

Fiedler, K. (1997): Alles über gesundes Wohnen. Wohnmedizin im Alltag. (Beck) München.

- Fiedler, K. (2000): *Gesundes Wohnen. Thesen zur Wohngesundheits – am Beispiel der Plattenbausanierung*. IBK-Plattenbausymposium “Nachhaltige Plattenbausanierung 2000: 10 Jahre Erfahrungen – Stand, Entwicklungen und Perspektiven”. Symposium-Handbuch.
- Fullilove, M.T. / Fullilove, R.E. (2000): *What’s housing got to do with it?* In: *American Journal of Public Health* 90 (2): 183-184.
- Gibbins, O. (1991): *Beseitigung von Baumängeln und –schäden*. In: Arbeitsgruppe KOOPERATION: Gesamtverband d. Wohnungswirtschaft, Bund Deutscher Architekten, Deutscher Städtetag (eds.): *Besser Wohnen in großen Siedlungen*. Bonn. Pages 39-45.
- Herlyn, U. / Hunger, B. (eds.)(1994): *Ostdeutsche Wohnmilieus im Wandel. Eine Untersuchung ausgewählter Stadtgebiete als sozialplanerischer Beitrag zur Stadterneuerung*. Stadtforschung aktuell, Band 47. Basel, Boston, Berlin.
- Hunger, B. (1994): *Die Bedeutung großer Neubaugebiete in der Wohnungs- und Städtebaupolitik der DDR - historischer Rückblick*. In: *Informationen zur Raumentwicklung* 9: 595-609.
- Ineichen, B. (1993): *Homes and health: how housing and health interact*. (E & FN Spon) London.
- Kearns, A. et al. (2000): *‘Beyond four walls’. The psycho-social benefits of home: evidence from West Central Scotland*. In: *Housing Studies* 15 (3): 387-410.
- Lawrence, R.J. (1993): *An ecological blueprint for healthy housing*. In: Burrige, R. / Ormandy, D. (eds.): *Unhealthy housing: Research, remedies and reform*. (E & FN Spon) London. Pages 338-360.
- Lawrence, R.J. (2000): *Urban Health: a new agenda?* In: *Reviews on Environmental Health* 15 (1-2): 1-12.
- Lowry, S. (1991): *Housing and health*. (British Medical Journal) London.
- Open House International (2000): *Towards the refurbishment and renovation of large prefabricated housing estates in East and Central Europe*. Special Issue: Dessau Conference report. *Open House International* 25 (1).
- Ranson, R. (1991): *Healthy housing – a practical guide*. Published by E & FN Spon on behalf of the WHO Regional Office for Europe. (Chapman & Hall) London.
- Rapoport, A. (1995): *A critical look at the concept ‘home’*. In: Benjamin, D.N. / Stea, D. / Saule, D. (eds.): *The home: Words, interpretations, meanings and environments*. Aldershot, Ashgate. Pages 25-52.
- Raw, G.J. / Hamilton, R.M. (1995): *Building regulation and health*. Building Research Establishment Report 289, BRE, Watford.
- Raw, G.J. et al. (2000): *A risk assessment procedure for health and safety in buildings*. Building Research Establishment Report 402. London.
- Roderick, P. / Victor, C. / Connelly, J. (1991): *Is housing a Public Health issue? A survey of directors of Public Health*. In: *British Medical Journal* 302: 157-160.
- Siegrist, J. (2000): *Place, social exchange and health: proposed sociological framework*. In: *Social Science & Medicine* 51 (9): 1283-1293.
- United Nations Economic Commission for Europe (ed.)(1976): *Human settlements in Europe. Post-war trends and policies*. UNECE, Geneva, New York.
- Vilnius Technical University (ed.)(1998): *Technical and economical ground for renovation of panel living houses built in 1971-1989*. Report to the Ministry of Environment. VTU, Vilnius.
- Yen, I.H. / Syme, S.L. (1999): *The social environment and health: a discussion of the epidemiologic literature*. In: *Annual Reviews of Public Health* 20 (1): 287-308.