Relating Housing Standards to Health Hazards

RAY RANSON, M.A., F.R.S.H., M.I.E.H.
Senior Environmental Health Officer — London Borough of Lambeth
Housing Hygiene Consultant — World Health Organisation

1. HOUSING AND HEALTH

1.1 Introduction

THROUGHOUT ALL recorded history mankind has been concerned with provision of adequate shelter against the elements and the development of a safe and comfortable physical environment in which to live. The level of provision achieved is reflected to some extent by the quality and numbers of housing provided both in terms of the individual shelter and the housing environment. This in turn is fashioned by prevailing socio-economic conditions, industrialisation and urbanisation, etc., which in many cases has had an adverse effect on housing conditions. The resultant homelessness, slum and poor quality housing produced by these changes are often thought to affect 'health' or contribute to illness in some way. For instance, in mediaeval times it was known that disease, accidents and fires were more prevalent in overcrowded slum areas and today, for example, there is concern about the contribution made by 'modern' slum housing on psychological and social well-being.

Thus, improvement of poor housing conditions through slum clearance, rehabilitation, medical rehousing or other intervention measures are generally thought to be justifiable for improving physical, mental and social well-being. In some cases housing standards have institutionalised these goals, but any housing hygiene concept assumes the existence of a linear dose — response relationship between housing conditions and state of health which can be crudely expressed as:

BETTER HOUSING = BETTER HEALTH
POORER HOUSING = POORER HEALTH

However, there are a number of other non-health reasons for improving poor housing and planners now rarely articulate 'improvement in health' as a reason for slum clearance or rehabilitation. Similarly modern housing standards rarely reflect housing hygiene considerations aimed at eradicating health hazards. Indeed there is currently a general move away from standardisation, regulation and control of housing conditions in terms of policy and legislation.

The sanitary housing model which was drawn up to deal with 19th century conditions still hangs on in outdated Public Health and Housing Legislation, but there has been little recent attempt by governments to revise this to take account of 20th century problems and knowledge — despite the invaluable contribution these measures have made to improving housing in the past. However, the question of whether housing standards can or should relate to obviating health hazards is complex. This paper describes some of the problems which would need to be resolved if health objectives are to be expressed in terms of housing standards.

Based on a lecture given at a Conference of the Royal Society of Health and the Greater London Centre of the Institution of Environmental Health Officers, and a Conference on Unhealthy Housing — a Diagnosis held at Warwick University.

1.2 Empirical Evaluation

The empirical evaluation of the effects of housing improvement in bettering health has proved difficult because of the following reasons:

(i) Housing and health studies have usually failed to separate or take into account the multi-factoral non-housing variables which affect health, e.g. poverty, ignorance, poor nutrition and lack of medical care. It is even less clear whether these various factors are equally important or not and how they should be evaluated in a research programme.

(ii) The direction of a cause-and-effect relationship appertaining to housing and health variables is also unclear. Thus, if a particular housing factor is shown to be associated with a disease, the question arises whether or not the disease has given rise to the factor or whether a third set of determinants is responsible.

(iii) Indices for measuring 'health' and the hygienic quality of housing are often too insensitive, inappropriate and/or lack universal acceptability. This is a particular problem when assessing the intangible or aesthetic effects of housing on 'social well-being', in determined comfort levels, measuring qualitative aspects such as 'quality of life', or assessing individual health housing needs.

(iv) In many cases NO epidemiological studies into the effects of particular housing factors on health have been conducted. As a result the causal factors of potential housing-related illnessess are often unknown or insufficiently corroborated.

1.3 Collection of Data

In determining a better understanding of the aetiology of housing and health it is necessary to gain as much knowledge as possible about the relationship between housing hygiene and its effects on health. Up to now there has been a piecemeal approach towards data collection and epidemiology. One reason for this has been poor co-ordination of housing/health information between the various agencies and professions involved (e.g., architects, doctors,. ehos, sanitarians, social workers, police and research bodies). Better co-ordination of research and exchange of information would prove invaluable to epidemiologists, health statisticians, planners and policy-makers in understanding the aetiology of housing related diseases. Ideally though this information needs to be fed into a common framework for collecting and analysing data.

For example, the recommended protocol of the European study of public health aspects of the Indoor Environment of Human Habitations describes epidemiological methods to identify and evaluate health hazards, with the objective of ascertaining the relationship between various elements and component parts of human habitations on the health of occupants[9].

The study requires an inter-disciplinary approach using various health scientists and others to design, plan, implement and monitor the research programme and to analyse results. This is in line with recommendations of a WHO Expert Committee on Housing and Health in 1974 who proposed that multi-disciplinary teams be set up to examine the aetiology of housing and health[10]. In my opinion there is an urgent need for these teams to be set up in the UK which is considerably behind many other European countries in establishing local and national teams.

1.4 General Inter-Relationships between Housing and Specific Diseases and Pathological Conditions

1.4.1 Interaction of housing conditions and diseases

In determining the inter-relationship between housing conditions and specific diseases, account should be taken of the interaction of three factors on which the hazard potential for causing toxic, traumatic or pathogenic effects on humans is dependent, viz:

(i) The DOSE of the causative agent as measured by the intensity, frequency and/or duration separately or in combination with other agents and factors.
(ii) The susceptibility of the HOST to the causative agent.
(iii) The ENVIRONMENT in which the interaction between host and agent takes place which may serve to increase or decrease the toxicity, injury potential or pathogenicity of the potentially harmful chemical, physical and biological agent[9].

The major diseases which may be related to poor housing environment can be crudely divided into two broad categories — *communicable* diseases and *non-communicable* diseases. All of these have a greater or lesser effect on physical health, mental health and social well-being.

1.4.2 Housing and health studies

Up to now most housing health studies have dealt specifically with the effects of housing on physical health and only a few with psychological or social illness. For example, by 1962, of 14 selected European studies dealing with some aspects of physical health, eight investigated solely the relationship between housing and tuberculosis, five analysed general morbidity rates, death rates, birth rates, infant mortality caused by respiratory diseases and one on the height of pre-school children. By contrast, of 24 selected American studies, 10 dealt with physical disease and studies of general morbidity whilst the remaining 14 studies dealt with social and psychological matters with a marked interest in a single topic. Seven of the fourteen studies deal solely with juvenile delinquency.

Most of the findings showed a marked positive association between housing and health: poor housing correlating with poor health, better housing with better health. There were some mixed, ambiguous, or null findings and a very small number of actual negative findings. Of the 24 studies reviewed (14 European and 10 American) involving physical morbidity, 15 showed positive findings, seven seemed ambiguous or showed no relationship between housing and health and two arrived at negative results. Of the 16 studies dealing with some aspects of social adjustment, 11 found a positive relationship to housing, four gave ambiguous or null results and one as negative*.

The difficulties involved in establishing a relationship (if any) between housing and *mental* health or psycho-social disorders lie in the subjective nature of the symptoms and the indeterminate influence of other factors. As a result clear cause-and-effect relationships based on positive facts are difficult to elicit.

At the moment there are considerable gaps in research-based knowledge on Housing and Health, e.g: more information and research is needed into the efficiency of heating and ventilation systems and insulation and housing design as they affect indoor microclimates; the potential carcinogenic or other health effects due to use of certain construction materials, the role of ergonomic housing design on 'comfort and well-being' and also detailed epidemiological studies into the causes of home accidents. Similarly little research has been carried out into the effects of *indoor* air quality on health (although considerable information is available on the chronic effects of *outdoor* air pollution on respiratory diseases such as bronchitis and lung cancer). Various research programmes into these problems is currently being undertaken by the WHO Regional Office for Europe, United Nations and a number of other research agencies. It is hoped that information from these sources and from individual member states can be distributed and exchanged to everybody's advantage and in particular to avoid costly mistakes caused by poor planning and housing design in the future.

2. PARAMETERS OF HEALTH

BEFORE ANY analysis can be made of housing hygiene requirements, it is necessary to clarify the meaning of the term 'health' which is capable of many different interpretations. The World Health Organisation defines health as "not merely the absence of disease and infirmity, but a state of complete physical, mental and social well-being"[2].

'Health' has also been described as 'an absolute condition of well-being' or alternatively 'an optimum capacity of effective performance of value tasks'. These different views of 'health' have an important bearing on health models and subsequent health care services, policies and housing hygiene standards. In general terms 'health' is normally assessed by reference to deviant behavioural indicators such as physical, mental or social pathologies. However, these are often difficult to apply to 'well-being' as many doctors fail to recognise them or treat them symptomatically and are unwilling or unable to remedy the underlying cause.

Examination of current health models confirms the limitation of diagnostic and prognostic methods in catering for physical, mental and social health needs. At the present time developing countries are mainly concerned with bio-medical illnesses such as communicable diseases, nutritional diseases and acute medical conditions, while in the developed countries (such as the UK) bio-psycho-social models of ill-health are fashionable. The main reasons for this are changing patterns of disease and consumer expectations; developed countries have largely eradicated infectious, nutritional and other acute diseases through preventive and remedial action, but are left with the problem of dealing with unabated degenerative, chronic and psycho-social diseases which have a much more complex aetiology.

Current UK housing standards under-represent psycho-social health considerations and are still predominantly concerned with bio-medical illnesses. In any case, information about epidemiology and identi-

*An invaluable reference guide to the aetiology of housing and health is contained in the WHO publication *Housing, the Housing Environment and Health: An annotated Bibliography*[4].

fication of casual factors is rarely equated with a wider understanding of health to include bio-medical, psychosomatic and social pathologies. As a result the possible contribution made by housing in causing stress diseases such as hypertension, migraine, depression, neurosis, alcoholism and social diseases manifested by pathologically derived anti-social behaviour, e.g., crime, violence, street mugging, vandalism, child abuse and mental or sexual ailments is totally ignored. Without detailed cause-and-effect studies it is impossible to be precise about remedial action either and it is likely that symptomatic medical treatment will be the only course of action available to sufferers of bad housing. However, this analysis takes no account of intuitive or pragmatic considerations which often guide patients, doctors and others in coming to certain decisions about the causation of particular illnesses. Thus in many cases patients ascribe their state of ill-health partly or wholly to the state of their housing, e.g., common colds and chest-conditions are often blamed on housing dampness. Despite this, intuitive considerations alone are suspect as there are usually concomitant ill-health factors which patients may be unaware of or unwilling to accept. Conversely patients, doctors and health officials may be unaware of the aetiology of a particular housing related illness.

2.1 General Health Housing Needs

It is estimated that humans spend about two-thirds of their lives within the home and immediate areas of the home. The health of each occupant is potentially at risk from insanitary or otherwise unhealthy housing environments. However, the groups who spend most time in the home are children, mothers with young children, the elderly, disabled persons, the chronically sick and unemployed persons. These groups (which make up two-thirds of the population) can be expected to be disproportionately affected by poor housing conditions and also often have special health needs. Thus, housing which is suitable for general needs may be quite unsuitable for these groups. This is a problem for 'standards' which are rarely flexible enough to take account of individual differences in health-housing needs, and are usually expressed in terms of general or average requirements.

Nevertheless there are a number of common human health requirements which CAN be identified in relation to housing hygiene which could usefully be included into standards. These are generally described in terms of the negative, deleterious effects of the residential environment on health rather than defining the positive effects of 'good' housing in maintaining and promoting *good* health.

Thus poor housing may affect *Physical Health* in one of three ways:

(i) It may facilitate the transmission of communicable diseases.
(ii) It may interfere with physiological needs.
(iii) The design or construction may cause injury to health or safety.

Maintenance and promotion of mental health and social well-being is more difficult to define, but since housing provides the scenario for family life, recreation, rest, sleep and social interaction, it follows that many aspects of poor housing such as overcrowding, noise, air pollution, bad smells or dampness give rise to considerable dissatisfaction and annoyance, perhaps contributing to poor health but certainly causing discomfort. Conversely, comfortable, pleasant surroundings aid satisfaction and facilitates the maintenance of friendly interpersonal relationships.

Healthful housing must, therefore, do more than merely limit the occurrence and spread of physical diseases and infections. It must permit individuals of all ages to conduct useful household activities without undue fatigue and without putting an excessive burden upon any organ of the body. The housing environment should also be comfortably pleasant and provide a social setting for active and passive recreation, rest and exercise[3].

3. THE ROLE OF HOUSING HYGIENE STANDARDS

THERE ARE several different ways of expressing the quantitative and qualitative aspects of housing provision by housing standards, but implicit to all standards is an assumption that housing variables can be measured by empirical assessment and comparison on a numerical scale. However, although it is often easy to measure quantitative housing entities such as number of rooms, housing density or provision of amenities it is more difficult to assess qualitative aspects such as the effect of housing on mental and social well-being. As a result quality is often ignored altogether in housing standards or at least treated with scant regard.†

In addition the functional basis of housing standards is largely determined by a number of diverse and often incompatible factors as is shown in Figure 1.

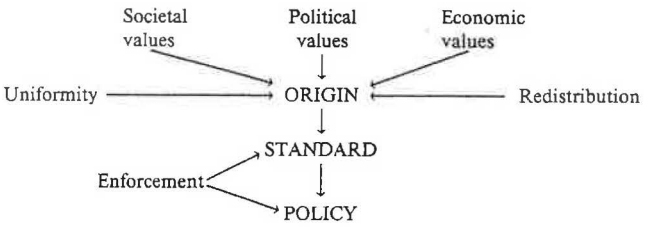

Figure 1: Functional basis of housing standards.

Inputs into housing standards

Key

Societal values	— What society believes ought to be provided or will accept.
Political values	— The value which politicians and government places on housing provision.
Economic values	— The value society is able or prepared to pay for housing.
Uniformity	— The need or desire to standardise housing conditions.
Redistribution	— The role of standards in redistributing wealth.

All of these inputs depend on the value ascribed to them and in a society where values are constantly changing a situation could easily arise where the functional basis for the standard may disappear and, therefore, the standard becomes unnecessary, obsolete or unacceptable to the consumer. This is already the case with many UK housing standards. However a distinction could arguably be made between housing standards which are largely determined by the free market e.g., owner occupied housing and housing standards

† See Robert Persig's description and analysis of 'Quality': 'If quality were dropped out rationality would remain unchanged . . . the World can function without it, but life would be so dull as to be hardly worth living. In fact, it would not be worth living at all . . . life would be living without any values or purpose at all'[11].

applicable to public and privately rented housing. In the latter case standards are often treated as sacrosanct, they seem to exist more or less indefinitely—long after the *raison d'etre* and rationale has been lost and forgotten. The World Health Organisation Expert Committee on the Public Health Aspects of Housing suggested that:

> 'Housing standards are not of this order: they are means to the ends of public health—the physical, mental and social well-being of man. They should be examined and periodically re-examined to determine whether or not they are fulfilling their objective'[3].

This is particularly important when designing *new* housing which is a capital intensive asset in providing suitable accommodation for a large number of years. It is also especially important in the public housing sector where the state arguably has a duty of care in protecting the health and safety of its tenants and where the state has to decide what needs to be provided in terms of standards: council tenants are less able to change standards through the normal forces of supply and demand which apply in the free market, and do not have the benefits of enforcement machinery enjoyed by private tenants.

3.1 The Role of Housing Standards in Social Policy

Housing standards play a very important role in many countries' housing policies and a summary of their principal applications is, therefore, included in this paper. However, considerable international variation exists in the content and applications of standards and thus their value in housing policy. Many standards in use are 'performance standards' which, while stating objectives, do not in all cases provide criteria for measurement and enforcement by field observation and inspection. It is therefore necessary to reduce the basic objectives to specific criteria that can be measured and observed. In many cases this basis for comparison will be a rule, code or official guide suitable for the country and region in which it is applied as the minimum requirements for new housing/new residential areas or as an intervention point for existing housing.

Despite the general inherent drawbacks of 'standards', it is recommended that policymakers establish and enforce housing standards by reference to healthful housing criteria. These will not be universal since building regulations or techniques cannot be transferred from one country to another without adapting them to geographic and climatic conditions. Consideration must also be given to epidemiological and economic factors when drawing up housing standards. Cultural and social factors are also important although health education can be used to encourage people to adapt their life-style to meet health norms rather than through rigid adoption of standards. Health Education tends to follow rather than proceed social change and history has shown that mankind quickly adapts behaviour and life-style in response to changes in the environment.

3.2 Basic or Absolute Housing Standards

The terms 'basic' or 'absolute' in relation to housing standards means the minimum level of housing provision which will fulfil physical, mental and social health needs. This definition is based on the assumption that housing needs can be expressed on a continuum with zero housing provision (e.g. homelessness) at one end (Point A—Figure 2) and infinity (Point E—Figure 2) at the other.

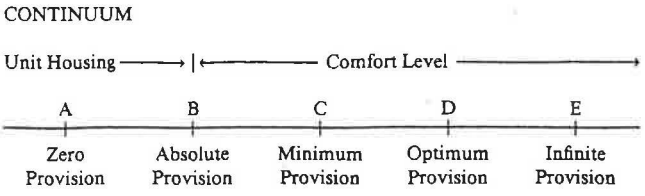

Figure 2: Housing Standards as a Continuum of Housing Need.

If this is accepted it follows that somewhere along the continuum there is a point where healthful housing needs are satisfied. This is shown as Point B on Figure 2, and is the reference point at which absolute or basic housing standards are derived. Existing housing which falls below this position on the continuum (i.e., A-B) is by definition unfit for human habitation and should be dealt with accordingly, but housing hygiene criteria are also applicable when planning and designing *new* human settlements if new unfit housing is to be avoided.

3.3 Determining Basic or Absolute Housing Needs

In theory it should be possible to define human health needs in terms of housing standards. In practice this is difficult, because although a number of fundamental human requirements with respect to housing standards have been identified, these are by no means universal and vary considerably depending on differences in climate, ways of life, cultural and social traditions, resistance to disease, economic conditions or other factors. Even within the same society or culture, fundamental differences in health needs will be observed amongst individuals and sub-groups. For example the elderly, children and handicapped persons all have different health needs compared with other members of the community and anyway, each can be expected to have variable individual health needs, e.g. susceptibility to allergens, or home accidents etc.

Wide individual tolerances to disease means that standards are at best a compromise in meeting varying health needs. This is borne out by the ability to survive in squalid, unhygienic, polluted or unsafe housing conditions (e.g., nomadic housing, cave-dwellings, hutments and primitive shanty town housing). However, this is not a yardstick of basic hygiene standards as many people do NOT survive in these conditions or become ill as a result of them.

In addition to the intangible problem of defining individual health-housing needs it is usually also impossible to define 'sub-standard' housing (A-B — Figure 2) without detailed epidemiological information which is often unavailable. The necessity for general housing standards based on epidemiologically determined health needs has been recognised by the World Health Organisation for many years. For instance in 1974 a World Health Organisation Expert Committee on housing and health recommended that:

> "In view of the large scale investment needs for the construction of basic minimum housing and the crucial nature of decisions concerning certain alternatives, that the assessment and monitoring of effects of health should be part of every large scale housing programme and that criteria and procedures for such assessment and monitoring should be developed and supported by the World Health Organisation in collaboration with other United Nations agencies and various sources of funds"[10].

To date there has been little progress in the UK in realising this objective and at the present time it is

thus not possible for planners to impose rigid housing/health norms in terms of standards. However, certain human requirements with respect to healthful housing *can* be identified and these have a high degree of generality. These requirements are physiological, psychological and social. Some of them may be stated precisely; others pending further research must be put in less exact terms based on the best information available in keeping with healthful housing criteria, which in themselves are relatively stable indicators of human health needs. (See 4).

3.4 Minimum Housing Standards

There is often considerable confusion between 'basic' or 'absolute' housing standards and so called 'minimum' housing standards. The main difference is that absolute housing standards are based on unchanging fundamental health needs and are therefore at a *fixed* position on a continuum as shown in Figure 2, whereas a minimum standard (Point C — Figure 2) can be placed *anywhere* on the continuum depending on the level at which the standard has been set. Minimum standards may or may not meet absolute housing needs and or varying levels of comfort provision. In practice minimum standards are often determined in a very arbitrary or haphazard way and are not necessarily based on health needs at all. Many conflicting political, economic, social and cultural factors affect the development of minimum housing standards which may weaken their status and application.

In some countries minimum housing standards are incomplete or do not exist at all (i.e. Point A and C (Figure 2) are the same) or in other cases minimum standards exist, but there are no policies for implementing or enforcing them. Thus a distinction should be made between *stated* minimum standards and those that are actually *applied,* otherwise it is the latter standards which become regarded as the status quo. If minimum housing standards satisfy absolute health/housing/needs then Points C and B (Figure 2) would be at the same position on the continuum. This objective should be regarded as a first priority for policy action, if healthful housing is to be achieved. It is also recommended that policy makers carry out an urgent review of their minimum housing standards (including planning control, urban development, design, construction and fitness standards) in order to check compliance with healthful housing criteria. (See Appendix I.)

3.5 Optimum Housing Standards

The theory behind optimum or desired housing standards is that there is a hypothetical level of housing which will satisfy not only *healthful housing* needs but an acceptable level of *comfort* needs as well. However, it is always difficult, in dealing with housing hygiene, to distinguish factors affecting morbidity from those affecting 'comfort' which anyway is a highly individual and somewhat subjective variable[5].

An optimum housing standard is often used in new housing schemes as a second stage target standard, following slum clearance or for rehabilitation schemes or improvement grants. The degree of comfort incorporated into the standard is nearly always determined by construction costs and the ability to pay running costs (maintenance, heating costs, etc.). Also optimum housing standards are subject to the same criteria and constraints as minimum standards and are highly dependent upon consumer expectations and values.

For this reason optimum standards are difficult to define since consumer expectations are highly subjective and constantly evolving during the life of the building which is usually a minimum of 60 years. It should also be observed that satisfaction with housing is a *relative* factor and highly dependent on standards existing in the community as a whole. The idea that deprivation is relative may explain why deprivation is not necessarily perceived by communities living in appalling conditions, but whose members neither know nor aspire to anything better whereas others are dissatisfied with much better housing conditions‡.

Therefore a given level of comfort is unlikely to 'satisfy all the people all the time', and optimum standards must be flexible enough to reflect prevailing economic, cultural and social conditions and the ability or willingness of consumers to pay for it if they are to be accepted§.

To overcome disparities between housing need and consumer expectations more equally distributed 'basic' housing with less comfort provisions needs to be provided with the proviso that these can be reassessed at a later date when economic conditions or building capacity improves. This policy would not only minimise relative deprivation and social injustice but would also be more responsive to 'troughs and peaks' in economic performance.

3.6 Example of Housing Standards in Health/Housing Policies

3.6.1 The Housing Micro-Environment

The WHO scientific group on the development of environmental health criteria for urban planning identified two major environmental health/housing goals in relation to urban planning. One was correction—the elimination or modification of present hazards of the environment which affect the health and social well-being of urban residents. Here standards are concerned with correcting errors made in the past due to no planning, poor planning, planning that utilised inadequate criteria or planning that ignored criteria altogether.

The other goal was prevention—the efficient management of environmental resources of an urban area in such a manner as to promote or enhance health and well-being and avoidance of hazards[6]. The scientific group identified a number of possible areas where urban planning standards could be used to provide favourable conditions of life for urban populations. These include land use zoning standards, air resources conservation, water pollution control standards and environmental noise standards.

3.6.2 Building Control and Design Standards

Building standards are intended to control the construction of new housing developments for the health, safety and well-being of the occupants. These standards are often incorporated into building codes and prescribed in legislation at national or local levels.

These codes or regulations usually apply to both private or public-owned housing and control methods of construction, materials, thermal insulation, space norms, means of escape in case of fire, seismic stability, foundations, lighting and ventilation, drainage and water supply requirements etc. Codes may include

‡See R.C. Runciman *Relative Deprivation and Social Justice*[12].
§John Rawls makes the point that the test of standards is whether they can be justified to the losers and for the winners to be able to do this they must be prepared in principle to change places[13].

either 'performance standards' which simply describe the objective of the regulation such as ability to withstand a certain floor load, wind velocity or earthquake force etc., or alternatively a 'specifications standard' might be incorporated to specify the required thickness of a wall, drainage dimensions, spacing of roof timbers etc.

Building control standards are most commonly used for new buildings but are also used as intervention standards for existing buildings, and may place legal obligations on owners to remedy a particular situation, e.g.—when a building becomes unsafe because of structural damage, or where drains become defective or blocked up so posing a threat to public health.

Building design standards are minimum housing design requirements for new housing developments provided at public expense (e.g. as was once the role of Parker Morris Standards in the public sector). In developed countries these standards are widely applied to cover all aspects of internal design, space requirements, home safety, heating and thermal insulation, refuse disposal, play space, car parking and environmental amenities. It is often a condition of financial assistance that these design standards are met and cost yardsticks applied for budgetary control purposes.

In privately-owned housing, building design standards are applied on a much more restricted basis, e.g., Housing and Public Health Legislation may require that certain minimum design requirements are provided, e.g., provision of amenities such as bathroom, kitchen, inside toilet, hot water etc., and internal design requirements.

Recommended housing design standards are also used by Government agencies, architects, builders and professional bodies when planning private housing. In all cases design standards must reflect prevailing socio-economic conditions if they are to be acceptable. In many cases this simply is not done, e.g., in providing heating systems for tenants who cannot afford to pay running costs. Building control and design standards are currently being threatened by Government proposals to de-regulate even basic health and safety requirements (see Government White Paper *Lifting the Burden*).

3.6.3 *Housing Fitness Standards*

Another use of standards is defining an intervention point for slum clearance of dilapidated, derelict or 'unhealthful' housing. These minimum standards are often incorporated into legislation and are either specific or non-specific about particular conditions which make a habitation unfit for human habitation. An example of specific criteria to determine whether a house is unfit for human habitation is used in the United Kingdom[7] viz: a local authority must have regard to the criteria specified in the Housing Acts. That is to say (a) repair (b) stability (c) freedom from damp (d) internal arrangement (e) natural lighting (f) ventilation (g) water supply (h) drainage and sanitary conveniences (i) facilities for preparation or cooking of food and disposal of waste water. No powers exist to vary or waive any of the provisions, but in practice a local council has considerable scope in interpreting the criteria depending on the values of the authority and the inspecting officer. It is not a 'standard' in the sense of being quantifiable, comparable or in providing a degree of uniformity. Its origins also appear not to have any 'health' basis and indeed they seem to be pragmatic representations of what was thought to be acceptable at conception. They have little relevance as an expression of healthful housing norms and are widely regarded as being archaic and meaningless by enforcing authorities.

By contrast, the American Public Health Association utilises an appraisal method for evaluating 10 *specific* basic deficiencies. These relate to items of sanitation such as water supply, toilet facilities, provision of bath and other amenities. Each item is then evaluated in terms of its importance to health, safety or basic need plus the difficulty or expense of correction. Penalty points are awarded for deviations from the predetermined set of minimum conditions. The sum of all penalty points provides an indication of the degree of substandardness of a particular housing area. The system is not applied for assessing the habitability of *individual* dwellings. Nevertheless, the advantage of a scoring system is that it is likely to produce reasonably consistent conclusions, and results will probably agree closely with the overall judgement of experts and policy-makers. It also does not rely so much on professional judgement integral to the UK method. The disadvantage is that the minimum standards are arbitrarily and empirically established. Also it may not have been used in enough situations to have acquired local acceptance.

Both specific and non-specific fitness standards have advantages and disadvantages as a measure of assessing fitness for human habitation. In either case the type of remedial action required to obviate the situation will depend on a number of factors: the cost and practicality of bringing housing up to an acceptable standard are the two most important considerations.

The uses of minimum criteria for assessing housing conditions has important applications in a housing hygiene policy, but fitness standards must reflect basic health needs if they are to be effective and there must be a genuine political will to provide adequate finances and enforcement machinery for implementation.

4. A UNIVERSAL HOUSING HYGIENE CODE

THE ADOPTION of a housing code which states the minimum health objectives is a prerequisite of any absolute ('bottom line') housing standards which are aimed at satisfying minimal general health requirements. As long ago as 1939 the American Public Health Association organised a Committee on Housing Hygiene to formulate the basic health needs which housing should subserve. These basic principles were adopted as reference methods of attainment for new housing construction and the appraisal of older housing. They were widely adopted by many other countries as housing appraisal criteria.

The author is in the process of finalising Housing Hygiene Guidelines for the World Health Organisation (Euro) and is assisting WHO in updating housing hygiene requirements to take account of contemporary knowledge about Housing and Health[8]. These requirements (Appendix I) are intended to be used by policy-makers, architects, environmental health officers and others as a benchmark in which housing hygiene objectives, standards, policies and parameters can be assessed and applied. It is hoped that the World Health Organisation will urge member countries to adopt housing hygiene principles (which should have *universal* application) as the basis of housing policies towards the year 2000.

The acceptance of such a code would enable a much more comprehensive and flexible approach towards housing and health than is the case at the present time. By contrast housing hygiene standards are extremely

difficult to define in many cases, e.g., when assessing fitness for human habitation although they have obvious applications in building control and other policies. However, until a much stronger research base is established in the UK we are currently only partly able to relate health hazards to housing standards. It would thus be inappropriate to put too much faith in either existing or revised standards without the benefit of epidemiological findings.

5. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

5.1 The dose of the causative agent, susceptibility of the host and the environment are the primary factors determining the inter-relationship between housing conditions and specific diseases.

5.2 Poor housing can affect physical health by aiding the transmission of communicable diseases, interfering with physiological needs, or causing injury. It may also adversely affect mental health and social well-being.

5.3 A healthful housing environment should not put an excessive burden upon the body and should provide a social setting for recreation, rest, exercise and family activity.

5.4 Poor housing disproportionately affects people who are home-bound viz; mothers and young children, the elderly, disabled, sick and long-term unemployed people. Those groups often have special healthful housing needs.

5.5 A good hygienic environment is especially important to children, as it directly or indirectly influences physical, psychological and social development.

5.6 Basic housing needs are defined as the minimum standard of housing provision which will fulfil physical, mental and social health needs.

5.7 Health/housing needs are not universally the same—fundamental differences can be expected between individuals and sub-groups within a community. Housing standards and adjudgement of conditions should take account of varying health needs wherever possible.

5.8 Housing hygiene standards should ideally be based on epidemiologically determined health parameters.

5.9 Housing standards need to be reviewed at regular intervals to see whether or not they are fulfilling health objectives.

5.10 Healthful housing criteria are relatively stable indicators of human health needs and can assist policy-makers to establish housing hygiene standards.

5.11 It is recommended that minimum housing standards should satisfy fundamental healthful housing needs and that policy-makers urgently review standards to check compliance with healthful housing criteria.

5.12 It is probable that housing deprivation is a relative variable and highly dependent on consumer expectations and conditions shared by a particular community group.

5.13 Optimal second stage 'target' standards should reflect a given level of comfort provision preferably in line with economic viability, consumer expectations, cultural needs and social conditions.

5.14 It is recommended that policy-makers provide basic healthful housing for all as a first stage priority with provision to improve comfort levels at incremental stages.

5.15 Policy makers should beware of copying standards *'per se'* from other countries, but should adopt standards appropriate to their own climate, culture and social infrastructure.

5.16 Housing standards have important uses in urban planning, land use zoning, environmental pollution control and evaluating fitness for human habitation.

5.17 Although housing hygiene standards have some important applications, it would be inappropriate to put too much faith in either existing or revised health standards without further epidemiological findings. Where adopted, housing standards should satisfy basic human health requirements.

CAVEAT

The views expressed in this paper are those of the author and do not necessarily represent the decisions or the stated policy of the London Borough of Lambeth or the World Health Organisation.

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APPENDIX I
DRAFT HOUSING HYGIENE CODE

A. General requirements

- Provision of shelter against external elements.
- Provision of housing of suitable height, size, location and design including space between building blocks, privacy arrangements, view, orientation, dwelling size mix and residential housing density.
- Provision of opportunity for achieving aesthetic satisfaction in the home and its surroundings.
- Provision of facilities for normal community and social life.
- Provision of opportunities for normal family life.
- Provision of special housing adapted to meet the requirements of disabled persons, the elderly, children and others with special needs.

B. Indoor space requirements

- Provision of sufficient usable floor area, number of rooms and volume of enclosed space to satisfy human requirements for health, safety, family life, privacy, rest and domestic, recreational and social activities.

- Provision of facilities which are designed to optimise performance of household tasks without causing undue physical or mental fatigue.

C. Sanitation requirements

- Provision of clean wholesome water supply, reasonably accessible to the dwelling.
- Protection of the water supply against pollution from within the dwelling.
- Provision of toilet facilities of such a character as to minimise the danger of transmitting disease.
- Provision of sanitary means of disposing of sewage and waste water.
- Provision of sanitary personal and domestic washing facilities.
- Provision of hygienic facilities for the storage, preparation and cooking of food.
- Provision of sanitary facilities for the storage, collection and disposal of household refuse.
- Exclusion from the dwelling of vermin, pests and unwanted animals.
- Provision of separate sanitary arrangements for housing of pets and domestic animals.

D. Indoor air quality requirements

- Provision of an indoor atmosphere which is free from toxic and/or noxious odours, chemicals, pathogens and other air contaminants or pollutants including radioactive emissions.
- Provision of sufficient ventilation so that air quality and hygrothermal requirements maintain health and comfort conditions.
- Protection against excessive noise from both within and outside the dwelling.

E. Indoor climate

- Maintenance of a thermal environment which will not impose any significant strain on the thermoregulatory mechanisms of the body, i.e., prevent undue heating or cooling of body temperature and enable physiological functions to proceed at a level most favourable to rest and psychological comfort.
- Provision of adequate operative air temperature, mean radiant temperature, relative humidity and air velocity in all parts of habitable rooms during both cold and warm periods of the year.
- Provision of adequate daylight and artificial illumination and avoidance of glare.
- Provision of admission of direct sunlight.

F. Home safety requirements

- Protection against natural hazards through preventive design and construction measures.
- Design of the micro-environment so as to minimise human assault.
- Avoidance of unsafe conditions in outbuildings and in the vicinity of the dwelling.
- Protection against the risks and effects of falls.
- Control and removal of conditions likely to cause or promote the spread of fire.
- Provision of adequate facilities for enabling means of escape in case of fire.
- Protection against gas poisoning from faulty appliances, supply pipes or fittings.
- Protection against electrical shocks from defective appliances, wiring or electrical points.
- Protection against lead poisoning and intoxication.
- Protection against poisoning from dangerous drugs, medicines or household chemicals.
- Protection against injuries or poisoning from dangerous animals, reptiles, insects and poisonous plants.
- Provision of security measures against intrusion by humans or dangerous animals.
- Protection against burns, lacerations and asphyxiation.

Micro-computers in Interactive Health Education

VALERIE INGLIS, B.Sc., Ph.D., DAVID BLACK, Dip.Prim.Ed., Dip.H.Ed., HOWARD McNULTY, M.P.S., B.Pharm., Ph.D. and GILL GIBSON, B.Sc.
Health Education Department, Greater Glasgow Health Board, 223 Hope Street, Glasgow G2 2UR

INTRODUCTION

THERE IS growing interest in promoting learning through simulations, games and interactive teaching tools.[1 2 3] As a fresh approach which complements traditional methods it is particularly relevant in health education as a means of attracting initial interest and client participation. With some groups and in some situations these methods may offer positive advantages, e.g. in helping mentally handicapped young people acquire basic health knowledge[4] or develop social skills.[5]

Quizboards have been found useful in generating interest and allowing people to check their knowledge on a variety of health topics.[6] A range of models has been developed in Glasgow and used widely, at health fairs, exhibitions and in group learning situations such as workshops. Details and specifications have been given elsewhere[6]. Recent developments in micro-computer technology, however, offer many advantages over quizboards in terms of versatility and cost. Moreover, micro-computer hardware now is widely available in schools and relatively available in the community so that it is often enough to provide programs rather than have to lend equipment with the complications of 'booking' and transporting. Already there is considerable experience of using micro-computers in education[7 8] and their potential for health education is great. They can be used:

— to present information in a simple way
— in multiple choice quizzes
— in learning-games
— to prescribe health and related lifestyle changes tailored to the individual

A range of computer software for health education already exists. The Scottish Community Education Microelectronics Programme, a community computing project in Scotland, has been involved in producing some such programs (see Appendix). Although these have been widely accepted and are popular there has been little systematic study of their effectiveness in health education.[9] Consequently programs have tended to evolve in an opportunistic and haphazard way.

Having already produced two programs and with the wide experience of developing and using quizboards we decided to address this issue by preparing further programs one-by-one and evaluating each in use. Findings would be applied to make minor modifications (*viz* within the constraints of the program structure) but would have a more fundamental effect on succeeding work.

MICROCOMPUTER HARDWARE

THE SCOTTISH Microcomputer Development Programme advised that the computer most widely distributed in secondary schools both in Strathclyde and in Scotland as a whole was the BBC model B used with a disk drive and Epson SX-80 printer. Programs therefore would be produced for this system.

PROGRAM SUBJECT

THE CORRECT use of medicines by elderly people was selected as a suitable subject. It is important for several reasons. Older people take more medicines than any other group, often as multiple prescriptions, and moreover their numbers are increasing. With advancing age body functions slow down and become more sensitive to drug action so that side effects are more likely to occur. Confusion in an elderly patient about which medicine to take or when to take it may lead to doses being missed or duplicate doses taken. Older people and those who care for them need to know how to handle drugs correctly.

TARGET USERS OF THE PROGRAM—CARERS OF THE ELDERLY

THE PACKAGE was designed for those who look after the elderly rather than old people themselves and the prime targets were carers in the community. It is suitable for use in basic and in-service training of carers employed by the statutory services, e.g. nurses, social workers, home helps and others; for use with relatives and voluntary workers and in pre-retirement classes.

THE PROGRAM

THE PROGRAM was written in BBC basic and the content is shown in Figure 1.

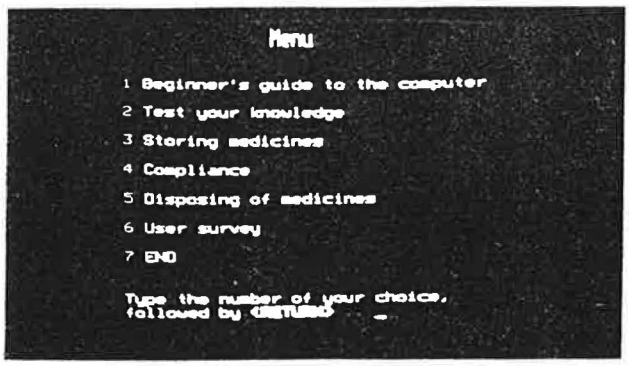

Figure 1. Contents of the Program.

An optional first item was a brief introduction to using the computer, thereafter the user could choose all or part of the program and repeat sections of particular interest. The program was varied. There was simple presentation of information, multiple choice questions, opportunities to manipulate the cursor to select targets and attractive graphics throughout. Two leaflets were provided for each user; one to reinforce the main points

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