

Issue 2

Rural Health Research Report Series

A Review of the Literature: Access and Service Models in Rural Health



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Pat Davies

Rural Health Research Series

1. A review of the literature: measurement issues in rural health
2. A review of the literature: access and service models in rural health
3. A review of the literature: social inclusion and rural health
4. Rural Health Intelligence Programme: main findings and recommendations
5. The state of rural health and well-being in Wales
6. Rural health policy review
7. The use of health impact assessment in rural Wales
8. Contemporary rural health issues: intelligence from Wales and beyond

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Contents

Acknowledgements	2
Executive Summary	3
1. Introduction and background to the Rural Health Intelligence Programme	4
1.1 The Rural Health Intelligence Programme (RHIP)	4
1.2 The rural health and well-being literature reviews	5
2. Methods	6
2.1 Applying the Health Evidence Bulletins Wales approach	6
2.2 Systematic search of the literature	8
2.3 Selection criteria and appraisal of papers	9
3. Appraisal of research papers	10
3.1 What factors influence access to services?	10
3.2 Bringing health services to rural people	12
3.3 Bringing the patient to health services	18
4. Discussion	21
4.1 Methodological considerations	21
4.2 Emerging themes	21
References	23
Appendices	
Appendix 1 Membership of the All Wales Rural Health Intelligence Group	24
Appendix 2 Appraisal team at the Workshop on 16th April 2002	25
Appendix 3 List of papers reviewed	26
Appendix 4 Critical Appraisal Proforma: rural health services	28

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Executive summary

Introduction

Access and service models in rural health is the second in a series of three literature reviews conducted as part of the Rural Health Intelligence Programme (RHIP). The RHIP was commissioned by the Welsh Assembly Government to facilitate the development and implementation of evidence-based policies and programmes on health and well-being in rural Wales.

Methods

A systematic search of the literature was undertaken utilising the Health Evidence Bulletin Wales Guidelines and using the key words: *rural* and *health services* and *accessibility* plus the following in turn: *primary health care, community services, community hospitals, acute services, mental health services, learning disorders, outpatients, inpatients, community nursing, emergency, pregnancy, child health, paediatrics, maternity, elderly, geriatric* or *aged*. The search was limited to UK English language papers published between 1999 and 2002. In addition, members of the All Wales Rural Health Intelligence Group (AWRHIG) were contacted to ascertain if there were any relevant research papers and grey literature in their sphere of expertise.

Each paper was independently reviewed by a minimum of two people and was excluded or included on the basis of screening through a standardised proforma and through discussion of differences of opinion. The initial search yielded 84 papers, of which 20 were included in the review.

The STOX methodology was used to classify studies in the review, as this approach recognises the contribution of high quality controlled observational studies and cites evidence to support this view. It also recognises the contribution of surveys and case studies in generating hypotheses and informing research programmes which is a primary aim of the RHIP.

Emerging findings

The review process identified that there is a lack of robust research evidence to inform access and service model issues in rural health. Most papers reported on small local projects and the evidence took the form of case studies and/or expert opinion. The research findings reinforce the presence of physical and non-physical barriers to access in rural areas and provide pointers to potential rural solutions. Many of the papers allude to the need for more robust evidence to inform the reorientation of health services to ensure safe and effective specialist diagnosis and treatment for acute and chronic disease in rural patients. Despite the limitations of the available evidence, some themes do emerge, including: evidence of a decline in access to services associated with increasing distance from medical care and poorer health outcomes; rural patients are positive about initiatives that are local and reduce travelling time; innovative 'remote' technologies have potential but need widespread support; and the voluntary sector has a key role to play.

Issues for future investigation could include: attempting to disentangle potential confounding variables operating in distance decay which are associated with poorer health outcomes; focusing on sustaining voluntary sector support for rural health initiatives; and assessing patient/practitioner satisfaction and outcomes associated with alternative service models and the accompanying costs/benefits.

1. Introduction and background to the Rural Health Intelligence Programme

1.1 The Rural Health Intelligence Programme (RHIP)

The Welsh Assembly Government commissioned the Institute of Rural Health (IRH) to undertake the RHIP to facilitate the development and implementation of evidence-based policies and programmes on health and well-being in rural Wales. As one third of the population of Wales live in rural areas there is a clear need for a robust evidence base to inform decision making and to target health and well-being issues in rural Wales in an effective manner¹. The research was carried out between November 2001 and March 2003.

The main objectives of the RHIP were as follows:

- To provide a rural perspective to the Welsh Assembly Government on health and well-being issues;
- To provide intelligence on UK and wider European developments on rural health and well-being issues and their implications for Wales;
- To further develop research capacity in Wales on rural health and well-being issues, and advise on future research direction.

The RHIP comprised an innovative and multi-faceted approach to gathering health intelligence.

The methods used included:

- Systematic search of published literature on mortality, morbidity, deprivation and social determinants of health in rural Wales;
- Search of grey and unpublished literature;
- Review of mortality and morbidity datasets;
- Review of datasets on social issues that act as determinants of health;
- Appraisal of a range of health and well-being policies in a rural context;
- Case studies;
- Surveys of rural health experts within Wales, elsewhere in the UK and in Europe.

There were six requirements to the RHIP:

- Requirement 1: to examine and analyse available data on health and well-being in rural Wales;
- Requirement 2: to examine the evidence on how policies which can impact upon health and well-being are operating in rural areas of Wales;
- Requirement 3: to produce a report on the development of Health Impact Assessment in respect of specific issues facing rural communities;
- Requirement 4: to network with relevant organisations and individuals to identify models of good practice that address health and well-being issues in Wales;
- Requirement 5: to identify three key rural health and well-being issues and conduct brief reviews of recent UK and European literature in each of the three areas;
- Requirement 6: to organise and host a workshop with participation from Welsh Assembly Government and connected bodies, the National Health Service and the All Wales Research Health Intelligence Group (AWRHIG) members.

An important component of the RHIP was the setting up of AWRHIG, an expert group on rural health issues in Wales to guide and contribute to the intelligence gathering exercise. The group was comprised of individuals drawn from the spectrum of backgrounds that affect health directly and indirectly and included policy makers, academics, public health specialists, local government officers and representatives from the voluntary sector (see Appendix 1).

1.2 The rural health and well-being literature reviews

This report is the second in a series of three rural health and well-being literature reviews conducted as a part of the RHIP. The views of the AWRHIG were sought as to the key issues in rural health research in Wales and the following topics were identified:

- Measurement issues in rural health;
- Access and service models in rural health;
- Social inclusion in rural areas.

Access difficulties cut across the many domains that determine health and well-being. In an assessment of the functioning of current health and well-being policies in rural Wales, access to health and medical services in rural areas emerged as an ongoing and substantial challenge to service users and providers (Rural health policy review, Rural Health Research Series 6). For this reason, this literature review focuses on the narrow perspective of access and service models in the delivery of health and medical services in the United Kingdom. The broader issues of access are considered in the third review in this series, which addresses social inclusion in rural areas (A review of the literature: Social inclusion and rural health, Rural Health Research Series 3).

¹ Definition of rurality

For the purposes of this study the Organisation for Economic Co-operation and Development (OECD) definition of rurality (1994) was adopted (fewer than 150 persons per square km). Based on the population density of the 22 unitary authorities, nine were classified as rural with a combined population around a third of the population in Wales (National Assembly for Wales, 2001): Anglesey, Carmarthenshire, Ceredigion, Conwy, Denbighshire, Gwynedd, Monmouthshire, Pembrokeshire and Powys.

2. Methods

2.1 Applying the Health Evidence Bulletins approach

2.1.1 Applying the Health Evidence Bulletins Wales approach to rural health research

The methodology used in producing the Health Evidence Bulletins Wales (HEBW) i.e. systematic searching of literature, critical appraisal, grading of evidence and assigning evidence to statements, coupled with internal and external review (Weightman et al, 2001), provides a rigorous approach to literature reviewing. It was agreed by AWRHIG to pursue this approach for rural health reviews.

However, there were concerns about time constraints within the RHIP to produce a more rigorous review of evidence that went beyond the initial requirements for the programme. An appraisal group was established to explore the application of the HEBW approach and to assist the appraisal process. It consisted of AWRHIG members with interest and experience in reviewing research papers and external researchers recruited through AWRHIG members' personal networks. Training was held on the HEBW methodology, with a subsequent workshop. For a list of participants see Appendix 2.

During the review it became apparent that papers were predominantly type IV (observational studies) or type V (expert opinion) (see Table 1) and that the HEBW proforma appeared to be inappropriate. Therefore, an additional in-house critical appraisal form was used to assist in the appraisal process of the mainly qualitative studies (Appendix 4).

Table 1. Health Evidence Bulletin Wales: classification of evidence

Type of evidence	Example
Type I evidence	At least one good systematic review including at least one randomised controlled trial
Type II evidence	At least one good randomised control trial
Type III evidence	A well designed interventional study without randomisation
Type IV evidence	A well designed observational study
Type V evidence	Expert opinion/influential reports and studies

(Source: Weaver et al, 2002)

2.1.2 Barriers to Health Evidence Bulletins Wales approach

The application of the HEBW methodology to rural health research was previously untested. The workshop and the process of paper appraisal and development of summary statements revealed a number of unforeseen difficulties. A key issue emerging from the discussion with the AWRHIG and in the training workshop was the appropriateness of the application to rural health research of an evidence hierarchy such as that used in the HEBW approach.

It was suggested that the literature search may have missed key references relating to access issues in rural health. This view is supported by the Health Technology Unit (Murphy et al, 1998) in their review of qualitative research methodology in health technology assessment. They concluded that the tools often used for systematic reviews would not be appropriate for their topic due to the incomplete coverage by many of the databases leading to potential selection bias in the papers included for review.

The appraisal group confirmed the inappropriateness of the HEBW critical appraisal proformas for the type of evidence presented in the rural research papers. Furthermore, the hierarchy of evidence itself was questioned, particularly when applied to predominantly qualitative research papers. The majority of papers present observational evidence and expressions of opinion, which in a traditional hierarchy of evidence, are not deemed to carry significant weight. The application of such a hierarchy could give a misleading impression of the range of evidence available for rural health research.

2.1.3 STOX system

Recently published research into the development of a cross disciplinary methodology for systematic reviews for all types of research (Weaver et al, 2002) presented a methodology that could more appropriately be applied to the rural health reviews, in particular the use of an expanded classification system (STOX) to categorise research evidence.

Table 2. The STOX Classification System

Evidence Type	STOX classification	HEBW Classification	Description
Systematic reviews	S1	I	Comprehensive systematic review containing at least one randomised controlled trial
	S2	IV	Comprehensive systematic review
Trials	T1	I	Randomised controlled trial
	T2	III	Non randomised controlled trial
	T3	IV	Before and after intervention trial

Continued over leaf

Evidence Type	STOX classification	HEBW Classification	Description
Observational Studies	O1	IV	Cohort study
	O2	IV	Case control study
	O3	IV	Cross sectional/longitudinal study including statistical data
	O4	IV	Study using qualitative methods only
	O5	IV	Case study
EXpressions of opinion	X	V	Formal consensus or other professional opinion (including literature review where there is no indication of a systematic approach and models based on reviews of the literature)

(Source: Weaver et al, 2002)

The STOX classification remains within the HEBW hierarchy of evidence but recognises the contribution of high quality controlled observational studies and cites evidence to support this view. The authors also recognise the contribution of surveys and case studies in generating hypotheses and informing research programmes which is a primary aim of the RHIP. STOX greatly expands the HEBW Type IV evidence into a range of more specific types of study allowing far more detailed categorisation of papers.

Following discussions with the AWRHIG members it was agreed to progress with the rural health reviews using a 'middle way'. This involves a three-stage process:

1. Selection of key papers based on critical appraisal;
2. Classifying the evidence using both STOX and HEBW systems;
3. Summarising the findings of the paper in relation to themes in a rural context.

2.2 Systematic search of the literature

The key search words identified for this review were *rural* and *health services* and *accessibility* combined with *primary health care, community services, community hospitals, acute services, mental health services, learning disorders, outpatients, in-patients, community nursing, emergency, pregnancy, child health, paediatrics, maternity, elderly, geriatric, or aged*. The search was limited to UK English language papers from 1999 to 2002. Searches were made on a range of electronic databases as listed in Box 1. In addition, AWRHIG members were requested to send in key references in their field of expertise.

Box 1. Core sources

ASSIA, CINAHL, EMBASE, HealthStar, HMIC, MEDLINE, SIGLE, Cochrane Library, NRR, Best Evidence, Clinical Evidence, NICE, HTA Programme, NHS Centre for Reviews and Dissemination Systematic Reviews, SIGN guidelines, Eguidelines, TRIP, OMNI, AMED and ISI Web of Science databases.

The findings of the systematic search were then circulated to AWRHIG members with a further request for additional relevant research studies.

2.3 Selection criteria and appraisal of papers

Literature was included if the prime focus was on problems of accessing health services and practices aimed at improving access in rural areas of the UK.

The initial search yielded 84 citations, of which 20 are included in the review and listed in Appendix 3. Closer inspection of the abstracts of the 84 papers resulted in the exclusion of 37 that did not deal directly with models of delivery of medical or health services in rural areas. A further 27 papers were excluded as the authors did not focus on a rural dimension, the research did not relate specifically to accessibility issues, or the research related to access to information rather than access to services. Where a series of papers describe the findings of the same project by the same team of authors in a variety of journals, the most comprehensive research paper was included.

Preliminary scrutiny of the 20 papers resulted in the identification of three sub-themes on access issues:

- Factors influencing access to health care in rural areas;
- Taking health services out to rural people;
- Bringing rural people into health services.

Each paper was allocated to a sub theme and independently reviewed by a minimum of two people. Findings were then compared and where differences were identified agreement was reached.

3. Appraisal of research papers

3.1 What factors influence access to services?

1. Campbell N, Elliot A, Sharp L, Ritchie L, Cassidy J, Little J

Rural and urban differences in stage at diagnosis of colorectal and lung cancers
British Journal of Cancer 2001; 84(7): 910-914

This study set out to investigate whether outlying patients had more advanced cancer at diagnosis than patients living closer to cancer centres. Case notes of 1,323 patients who were diagnosed with lung or colorectal cancer in north and north-east Scotland in 1995 or 1996 were reviewed retrospectively. Information was abstracted from the notes identifying the nature of the cancer, the stage of dissemination at diagnosis and whether there was a need for emergency treatment. Data were also collected on a number of independent variables including distance from cancer centre, smoking behaviour, deprivation quintile, health board of residence, sex and age. The relationship between stage of diagnosis at presentation and independent variables was analysed statistically using chi square test and logistic regression to adjust for additional variables. The findings identified a trend for distance from a cancer centre to be associated with more advanced disease at diagnosis. When the data from both cancers was amalgamated the trend was found to be statistically significant (p value= 0.031). Despite the difference in stage at diagnosis, no differences were detected in the proportion of patients requiring emergency admission to hospital or emergency surgery.

The authors conclude that their study lends further support to the theory that remote and rural patients are disadvantaged in the early diagnosis of cancer and comment that the poor survival observed in outlying patients in a previous study is in part explained by more advanced disease at diagnosis which is particularly evident in patients living more than 58km from a cancer treatment centre (up to 10 per cent of the population). The reasons for this are not clear and more research is required.

STOX - O3

HEBW - IV (cross-sectional)

2. Nuttall N, Steed M, Donachie M

Referral for secondary restorative dental care in rural and urban areas of Scotland: findings from the Highlands & Islands Teledentistry Project
British Dental Journal 2002; 192(4): 224-228

The aim of this study was to compare the reported level of use of secondary care services for restorative dental care in rural and urban areas of Scotland. A questionnaire to determine referral practice was sent to 300 urban and rural dentists with approximately equal numbers of urban and rural dentists participating. The survey had a 62 per cent response rate. The study reports that 85 per cent of urban dentists believed that they had good access to a secondary referral service. By contrast 26 per cent of rural dentists felt that they had no access to a secondary referral service, compared to 3 per cent of urban practitioners. A further 53 per cent of rural dentists felt that access to secondary services was difficult, leaving about 20 per cent feeling that access was good.

The conclusions of this study suggest that many dental patients in rural and remote areas in Scotland would benefit from improved access to secondary restorative dental care that could include teledentistry.

STOX -O3 HEBW - IV (cross-sectional)

3. Bain N, Campbell N

Treating patients with colorectal cancer in rural and urban areas: a qualitative study of the patients' perspective

Family Practice 2000; 17(6): 475-479

The aim of this qualitative study was to explore the differences in perceptions, attitude and experiences of patients with colorectal cancer living in urban, rural and remote areas of north east Scotland. (Urban was defined as within the city boundary, rural within 1 hours drive from the main cancer centre and remote greater than one hours drive). Data were obtained from focus groups, which were held with a total of 22 patients and 10 of their relatives. Analysis of the findings revealed the following five themes:

- All three types of participants voiced concern about the speed of referral and treatment;
- Communication, especially delivery of bad news, access to test results and withholding of information gave greatest concern for both urban and rural patients;
- Collaboration between primary and secondary care was seen to have its tensions, where GPs and hospital doctors were not seen to be working together;
- Differences in expectations were apparent between urban and rural dwellers with rural participants having lower expectations from services than urban participants;
- Transportation was a greater issue for rural and remote participants than those from urban areas.

The authors conclude that in rural areas GPs are pivotal in managing those with cancer. They reinforce the need for good communication, well co-ordinated care, rapid referral and smooth progress to counterbalance lower expectation and problems with transport.

STOX - O5 HEBW - IV

4. O' Reilly D, Stevenson M, McCay C, Jamison J

General Practice out-of-hours service, variations in use and equality in access to a doctor: a cross-sectional study

British Journal of General Practice 2001; 51: 625-629

This research was undertaken within a rural health board of Northern Ireland. The aim was to examine geographical variation in the rates of GP out-of-hour calls to assess if there was any systematic variation in the response of the out-of-hours co-operative to calls. The co-operative comprises 230 GPs and covers a population of around 394,000. The data analysis was based on 110,357 calls made during 1998; the second year of the GP co-operative.

The results showed that older patients were more likely to be seen by the GP while females over the age of 15 years were more likely to receive telephone advice only. Additionally each kilometre from the centre reduced the likelihood of seeing a GP ($p < 0.001$). Even after controlling for potential confounding variables,

a large difference remained in the manner in which centres responded to calls from females and from remote locations.

The authors conclude that there are variations in the delivery of service but that the study was not designed to ascertain the reasons for this variation. They comment that it would be unwise to conclude that there is an inequity of access to women and to patients remote from the centre without further information.

STOX - O3

HEBW - IV

5. Jones A, Bentham G, Horwell C

Health service accessibility and deaths from asthma

International Journal of Epidemiology 1999; 28: 101-105

This study aimed to examine the relationship between asthma mortality and access to hospital and primary care services in East Anglia. It builds upon a previous study that demonstrated an elevated level of asthma mortality in English local authority districts with poor access to acute medical services.

Data from the Regional Deaths System for the period 1985 to 1995 were used to undertake a retrospective analysis of asthma mortality. For each electoral ward, asthma deaths were correlated with estimated mean travelling time to GP surgery and large hospital using GIS analysis. Regression analysis was used to examine the relationship between health service accessibility and mortality from asthma. After controlling for confounding variables there was a significant tendency for asthma mortality to increase with travel time to hospital with a relative risk of 1.07 for each 10 minute increase in journey time ($p < 0.04$).

The authors conclude that this research supports prior studies showing that inaccessibility to hospital may increase the risk of asthma mortality and suggest that the provision of good access to acute hospitals in rural areas may be one factor in reducing the burden of avoidable deaths from asthma.

STOX - O3

HEBW - IV (cross-sectional)

3.2 Bringing health services to rural people

6. Le Mesurier N, Duncan G

Over the hills and far away: Providing accessible day care services for older people in rural areas

Managing Community Care 2000; 8(4): 33-37

This paper describes the provision of mobile day care services to older people in North Herefordshire, which aims to reduce social isolation for those who live too far away to access static day-care facilities.

The service visits 13 local venues, such as village halls, sheltered housing schemes and school halls, with two mini buses bringing in clients who live within a five mile radius. The authors estimate the unit costs of the provision to be £16.67, which compares favourably with the £19.00 unit cost of local authority day provision. The authors suggest that the principles underpinning the success of the service are:

- Knowledge of each locality by local people;
- Use of existing networks to consult local opinion and meet local need;
- Integration of new services into local facilities;
- Empowering local volunteers to use their skills;
- An opportunistic approach to funding from local and national sources.

In conclusion, this paper provides an overview of a mobile day-care service that appears to provide a cost effective model of care for older residents in remote and rural areas. However there is need for a more detailed evaluation of the service model before it can be confidently applied in other areas.

STOX - X

HEBW - V

7. McCavana P

Delivering chemotherapy in rural areas: can it work?

Nursing Times 2000; 96(35): 35-36

The author describes how people living in rural areas diagnosed with cancer, often have to travel long distances to obtain chemotherapy. It is suggested that because of long travelling times and waiting times in clinics, remote rural patients will experience more physical discomfort and fatigue, with a consequent deterioration in their quality of life. In response to these issues and in line with Royal College of Nursing Guidelines, a chemotherapy unit was created in the District General Hospital in Oban, Scotland. The authors document the better emotional support available to cancer patients arising from the practitioners' rapport with patients, as well as the benefits derived from a reduction in travel time.

While a local service clearly has benefits to remote and rural patients more research is needed to establish a sound evidence base in respect of clinical outcomes.

STOX - X

HEBW - V

8. Rawles J, Sinclair C, Jennings K, Ritchie L, Waugh N

Call to needle times after acute myocardial infarction in urban and rural areas in northeast Scotland: prospective observational study

British Medical Journal 1998; 317: 576-578

The aim of this study was to measure call to needle times and consider how best to provide thrombolytic treatment for patients with acute myocardial infarction within the recommended time of 90 minutes. The study was set in the Grampian region and Aberdeen City and involved 1046 subjects, 544 from rural practices and 502 from city or suburban areas.

The findings indicate that the median journey time to hospital for rural patients was 47 minutes. GPs were the first medical contact in 97 per cent of cases for rural patients and for 68 per cent of urban patients. When an opiate was given by the GP, the median call to opiate time was 30 minutes in all areas. Call to opiate time for 999 calls was 60 minutes in city and suburban areas.

One third of rural patients received thrombolytic treatment from GPs with a median time of 45 minutes between call and thrombolysis. When treatment was not given by GPs, only five per cent of patients received treatment within 90 minutes. In city areas no thrombolytic treatment was given outside hospital and only a minority (46 per cent) received treatment within 90 minutes.

The authors emphasise the importance of patients receiving thrombolytic treatment before transportation to hospital and within the British Heart Foundation guidelines of 90 minutes. The role of GPs in rural areas is therefore vital, given the possible lengthy journeys to hospital.

STOX - O3 HEBW - IV (Cross-sectional)

9. Heard-Dimyan J

Issue of emergency hormonal contraception through a casualty department in a community hospital

The British Journal of Family Planning 1999; 25: 105-109

This paper describes a pilot project in which nurse practitioners working in the casualty unit of a rural community hospital in Wales issued emergency hormonal contraception (PC4) to patients attending the casualty unit. The nurses were trained in delivering PC4, using protocols identified in the paper. Medical support was available to the nurses and all under 16 year-olds were referred to a doctor.

Over a two-year period, 51 people used the service, the majority of whom were aged under 20 years (70 per cent of total). Analysis of data provided by the local surgery indicates that in the same time period 164 people attended the GP practice seeking PC4, the majority of whom were in the 20-39 age category with only 30 per cent being under 20 years of age.

The author argues that casualty departments in rural areas, staffed by nurse practitioners are well positioned to give confidential emergency hormonal contraception that does not require medical support. This is particularly convenient for those under 20 years of age where privacy and confidentiality can be compromised in rural areas.

STOX - O5 HEBW - IV

10. Readhead C., Henderson G., Hughes G., Nickless J

Accredited accommodation: an alternative to in-patient care in rural North Powys

Psychiatric Bulletin 2002; 26: 264-265

This article describes an accredited accommodation scheme for a targeted group of patients with enduring forms of mental illness, as an alternative to in-patient care. The initial six month pilot study started in 1999, motivated by the realisation that 12 per cent of all hospital admissions in north Powys did not require 24-hour specialist care. The project became permanent as soon as the pilot project finished as it was seen to offer a good alternative to hospital admission. There were 25 patients enrolled on the scheme and four selected providers of accommodation, all offering short term adult fostering in a nurturing and homely environment. The authors believe that this is a good, cost-effective alternative scheme to hospital admission. It depends on ordinary housing stock with no need for new buildings. Patients find the scheme

less stigmatising than the traditional route to care.

This local scheme operating in a large rural area, offers accessible support for those who would otherwise travel a long distance for hospital admission.

STOX - X HEBW - V

11. Walsh, M., Howkins D **Lessons from a farmers' health service** **Nursing Standard 2002; 16(16): 33-40**

The evaluation of a nurse-led mobile health service targeted at the farming community in rural north Lancashire is described in this paper. The service visited local auction markets on a regular basis, undertook health promotion work at agricultural shows and meetings of the farming community. The evaluation was informed by data gathered from three sources:

- Telephone interviews with patients after they had used the service;
- Detailed audit of anonymised case notes;
- Personal, subjective experiences of the four staff that ran the project.

Over a 12 month period 211 patients were seen, with a further 330 follow-up consultations recorded. A total of 116 users were interviewed and the main findings were that all stated that the service was useful and 92 per cent could not think of any way of improving it. The audit revealed that 85 per cent of patients were males. A total of 126 patients attended the service and 'just wanted a check-up' whilst the rest specified a particular problem. Of those who had a check-up, 70 were found to have a significant health problem, usually related to mental health problems and cardiovascular disorders.

This paper highlights, that there is a significant amount of ill health in the farming community that is untreated. Patients responded well to the service because all the staff had farming backgrounds. The authors suggest that innovative projects like this are required to improve the health of rural and farming communities.

STOX - O5 HEBW - IV

12. Pitt K **Pre-hospital selection of patients for thrombolysis by paramedics** **Emergency Medical Journal 2002; 19: 260-263**

This prospective study assessed the effectiveness of paramedic decision making, in relation to the accurate selection of patients suitable for thrombolysis and the notional reduction in call to treatment time associated with pre-hospital treatment.

Twenty four paramedics working in rural Powys volunteered to take part in the study, amounting to 60 per cent of the workforce. The paramedics were trained using criteria that had been established for this purpose by the joint Royal Colleges Ambulance Liaison Committee. All of them made an independent decision regarding the eligibility of the patients for thrombolysis before hospital admission, noting the time

that they could have administered the drug. The results show that a total of 96 patients with a possible myocardial infarction were identified. No errors were made by the paramedics in case selection and there was a potential reduction in 'call to needle time' of 41.2 minutes.

The study findings indicate that having received appropriate training, paramedics were able to accurately select those patients eligible for thrombolysis according to current criteria. This resulted in a significant reduction in the notional time between 'call and needle time'. However, the authors highlight the small numbers involved and limited generalisability of the study.

STOX O5 HEBW IV

13. Haynes R., Gale S., Mugford M., Davies P

Cataract surgery in a community hospital outreach clinic: patients' costs and satisfaction **Social Science and Medicine 2001; 53: 1631-1640**

The aim of this study was to compare the cost and benefits to patients of cataract surgery within an urban District General Hospital (DGH) and rural community hospital (outreach clinic) both within Norfolk. The authors hypothesised that the cataract surgery undertaken in the outreach clinic would:

- Treat patients with similar health status as the DGH;
- Produce similar short-term outcomes as the DGH;
- Involve similar health service usage as the DGH;
- Reduce costs to patients;
- Increase patient satisfaction.

Two groups of patients, closely matched but not identical, received treatment at two different hospitals; 201 patients attended the DGH and 198 patients attended the outreach clinic. Patients were interviewed and completed questionnaires to establish their general health prior to cataract surgery, their arrangements to get to hospital and their satisfaction with the clinic and the care they received. The results showed that the journey to hospital was quicker, more convenient and less costly for the outreach clinic patients than the DGH patients. Satisfaction with administrative matters, facilities and care received was high for both clinics.

The authors argue that an outreach clinic in a small rural community can provide cataract day surgery under local anaesthesia as effectively as a DGH, at a reduced social cost and with positive social benefits.

STOX - O5 HEBW - IV

14. Campbell N, Ritchie L, Cassidy J, Little J

Systematic review of cancer treatment programmes in remote and rural areas **British Journal of Cancer 1999; 80(8): 1275-1280**

This study reviewed papers and published evidence relating to the delivery of cancer care in remote and rural areas. Papers were identified from searches of MEDLINE, EMBASE, CINAHL and HEALTHSTAR databases for the period 1978-1999. The inclusion criteria for the review were if papers:

- Described a programme providing cancer treatment in rural areas;

- Reported a study which aimed to evaluate the programme's effectiveness or identify problems;
- Came from industrialised countries.

Of the 2697 papers identified, 105 were scrutinised and of the 51 papers that described cancer programmes only 15 fulfilled the criteria of describing treatment programmes and also reporting on results from evaluations.

Appraisal of these 15 papers revealed three main themes:

1. Rural hospital initiatives (four cross-sectional studies found);
2. Shared care with central clinic (two non-randomised controlled studies found);
3. Shared care with outreach clinics (six papers using various methods found).

The authors comment on the methodological limitations of the research papers available and highlight general criticisms of the studies that used small numbers, were open to bias, had made incomplete adjustment for confounding factors or were without the power to compare the outcome of the innovative programme with a centralised model. Only one paper described a UK based programme, the remainder were from the US and Australia.

The authors conclude that the evidence in this review is at best suggestive and should be viewed as a platform for more methodologically robust research, rather than the basis for changes in clinical practice.

STOX - S2

HEBW - IV

15. Macloed C, Jenkins J, Kennedy F, Kerr K, Lim J, McElroy G, O'Loan D

Ambulatory Paediatrics: Does it work?

Irish Medical Journal 2002; 95(2): 1-5

This paper evaluated the development of an ambulatory paediatric service in Northern Ireland. The service was introduced following a decision by the Royal College of Paediatrics and Child Health to cease accreditation of a small district general hospital paediatric unit for training purposes and had the dual purpose of protecting from closure the small DGH and lowering the paediatric admission rate to the larger Antrim Hospital.

The service was evaluated using survey data from all GPs in the catchment area (n=57) and parents of children treated (n=50) and hospital admission data. Analysis of these data revealed that 37 GPs (65 per cent) responded to the survey, of whom 84 per cent found the new service beneficial. Thirty-one GPs had referred a patient to the service and almost all (97 per cent) reported that the service was easy to access with a prompt response to requests for consultation. Feedback from parents showed that most were either very satisfied (76 per cent) or satisfied (22 per cent) with the service. Eighty two percent reported that their child had benefited by not being admitted into hospital. Finally the admission data revealed a gradual reduction since the introduction of the service in 1996. By the third year of the project (1998/1999) a 47 per cent reduction in admissions was recorded.

The authors argue that this project enabled a largely rural service to flourish while meeting the needs of children, their families and GPs and reduced the number of paediatric admissions.

STOX - O5

HEBW - IV

16. Cook L**Triple integration nursing****Nursing Standard 2000; 14(52): 33-34**

This paper describes the key features of 'triple integration nursing' undertaken in Dunoon, situated on a rural peninsula on the west coast of Scotland. The project aimed to promote integrated multidisciplinary working between community, general practice and hospital settings through action research.

Throughout the year data derived from field notes, critical incident reports, reflective diaries, audiotaped interviews and completed questionnaires were collected and collated. The author identified the main outcomes of the project as:

- The raised awareness of roles and responsibilities within one multidisciplinary team;
- Improved communication and teamwork between professionals and across the three settings;
- A range of stroke management initiatives;
- Adoption of a heart manual for post-myocardial infarction follow-up and rehabilitation.

The author believes that the triple integration project has shown it is possible to work across community, general practice and hospital settings and enhance patient care.

STOX - X

HEBW - V

3.3 Bringing the patient to health services**17. Sherwood K, Lewis G****Accessing health care in a rural area: an evaluation of a voluntary medical support scheme in the English Midlands****Health & Place 2000; 6: 337-350**

The aim of the paper is to contextualise the establishment of voluntary medical rural transport programmes and to evaluate the function and sustainability of one such programme in order to draw lessons from it.

The 'rural wheels' project has operated in a small area of west Northamptonshire since 1990 and was originally set up for those living in Woodford Halse who needed to attend the medical centre but who had no access to transport. Service delivery information was complemented by a survey of users. It was found that about half the journeys now go to destinations other than the medical centre, with the annual number of journeys increasing from 195 in 1990 to 1,545 in 1998. Three-quarters of the total users of the service were over 60 years of age, and 85 per cent of these were female. The scheme was found to be popular because it offered a door-to-door service, a familiar driver who would escort the users to a clinic and wait for them, and was reliable, flexible and independent.

The authors conclude that in rural areas this type of transport offers people a lifeline but express concerns about the sustainability of a service that is dependent upon a relatively static pool of ageing volunteers. The authors call for central government to commit more seriously to self-help and voluntary schemes.

STOX - O5

HEBW - IV

18. Wootton R**Telemedicine and isolated communities: a UK perspective****Journal of Telemedicine and Telecare 1999; 5(supplement 2): 27-34**

This paper reviews current knowledge on the use of telemedicine in isolated communities and assesses the implications for its use in the UK. Examples are presented where telemedicine has been beneficial, including dermatology, minor injuries, ultrasound for GPs, cardiology and home physiological monitoring. Telemedicine was also successful in aiding diagnosis in radiology, orthopaedics, psychiatry, and paediatric echocardiography and for educational purposes.

The author highlights the advantages of telemedicine, such as easier access to specialist services, educational issues and a lower cost in some circumstances. However, it is concluded that it is not as 'good as the real thing' and can alter the doctor-patient relationship.

STOX - X

HEBW - V

19. Macduff C, West B, Harvey S**Telemedicine in rural care. Part 2: assessing the wider issues****Nursing Standard 2001; 15(33): 33-37**

This study aimed to review the wider implications of nurse-led teleconsultation in rural areas that arose from an evaluation of a project based in the village of Hamlet in northeast Scotland six miles from the nearest GP surgery.

In this small project, appropriately trained nurses link with a single GP practice to undertake teleconsultation. The nurses act as mediators between the GP and the patient and deal with minor ailments and prescriptions, resulting in a decrease in GP workload and the need for the patient to travel. Patients were generally satisfied with the service, although some reported that it was not as good as seeing the doctor in person. The strength of the scheme was its convenience for both patients and doctors with consultation time with travel time and costs being reduced.

The authors acknowledge the potential benefits for vulnerable people living in remote rural areas but comment on the need for the nursing role to be developed systematically at a strategic level. They note, however, that increased usage may not necessarily indicate appropriate usage.

STOX - X

HEBW - V

20. Craig J, Chua R, Wootton R, Patterson V

A pilot study of telemedicine for new neurological outpatient referrals

Journal of Telemedicine and Telecare 2000; 6: 225-228

The aim of this study was to examine whether it is feasible and safe for neurologists using telemedicine to assess neurological outpatients at a distance.

A video-link was set up between a rural location, Erne Hospital, and the neurology department of the Royal Victoria Hospital in Belfast, 140 km away. Eleven male and fourteen female patients took part in the study that involved them having two consultations with different doctors: one using traditional face-to-face meeting and the other using the video link. The diagnoses of the two consultants were compared in respect of three outcome measures: diagnostic category; actions taken after consultation; disposal method (for example, admitted to hospital).

The results showed that only in one case was there a difference in diagnosis. There were 'minor' differences in the actions taken by the neurologists; different investigations were ordered in seven cases and disposal method was the same in 21 cases. The authors suggest that the differences in diagnoses could be accounted for by variability between the two neurologists involved rather than the two consultation methods employed.

In conclusion, the authors suggest teleconsultation may provide a feasible and safe alternative to face-to-face consultations for patients from remote and rural areas and recommend that a larger randomised controlled trial be carried out.

STOX - O5

HEBW - IV

4. Discussion

4.1 Methodological considerations

The STOX Classification system proved to be a useful adjunct to the HEBW hierarchy in appraising the quality of rural health research papers on access and service model issues, allowing a more detailed review of observational studies (Type IV evidence in the HEBW classification). However, there are still concerns relating to the effectiveness of the HEBW approach in dealing with the cross-disciplinary nature of rural health research. There is also the need to balance the rigour of the systematic appraisal process with the potential selection bias of excluding work not reported in peer-reviewed journals.

The STOX system revealed that nineteen of the papers reviewed were cross-sectional studies, case studies or based on expert opinion. Only one paper, the Systematic Review of Oncology Services for remote and rural areas, (Campbell et al, 1999) could be considered as higher-level evidence within the STOX Classification (S2). However, as it did not contain a randomised controlled trial, it could only be considered as level IV evidence in the HEBW hierarchy and the authors conclude that the evidence is at best suggestive and should be used as a platform for further research, rather than changes in clinical practice.

Nevertheless, a number of relevant issues have been highlighted in this review, particularly through qualitative studies supported by service delivery data. The review has identified a number of small innovative models of service of comparatively recent origin. By their nature and location they tend to involve small numbers of individuals. Where evaluations have been undertaken, they tend to utilise indicators such as patient or clinician satisfaction or reduction in travelling time and costs for the patient. While these are clearly important parameters of any service, there is a need to tailor the methods used to the issue under investigation. For example, where patients are treated for serious and potentially fatal conditions in new accessible models of service, clinical effectiveness is also a critical outcome. Studies to assess clinical outcomes will require significantly enhanced power and larger numbers to assess the risks and benefits. This will present substantial methodological challenges to achieve robust evidence.

4.2 Emerging themes

Despite the limitations of the available evidence, there is a consistency in the themes emerging from the recently published studies reviewed here, providing guidance for future action on access to health services, particularly in the most remote rural areas.

- There is evidence of a decline in access to services associated with increasing distance from medical care and poorer health outcomes of remote rural residents. Rural patients have to overcome more barriers to access services than urban residents (e.g. transport) and have lower expectations of services.
- The studies do not reveal the reasons for distance decay and poorer health outcomes. It is likely that a number of confounding variables operate among residents of remote rural areas.
- Rural patients are positive about programmes that provide more local specialist services and reduce travelling time.

- Improvement of access to health services is generally mediated through the extension of the roles of rural practitioners. Telemedicine and other 'remote' technologies appear to have been successful in improving access, although such developments tend to be initiated and supported by clusters of enthusiastic professionals rather than being widely available.
- The case studies highlight the substantial role played by the voluntary sector to improve access to health services in rural areas and report concerns about the sustainability of programmes that rely upon a predominantly retired population.

These findings highlight the difficulties associated with access to medical services in rural areas and suggest that innovative service models will be required to resolve these difficulties. The findings also highlight the lack of available evidence in this important area of policy. Important issues for future investigation could include:

- The need to disentangle the confounding variables operating in distance decay which are associated with poorer health outcomes. This could inform the design of effective interventions to minimise avoidable mortality and morbidity;
- The sustainability of voluntary sector support to rural health initiatives;
- An analysis of patient and practitioner satisfaction and clinical outcomes associated with different models of service delivery, with an accompanying analysis of costs/benefits.

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Appendix 1

Membership of the All Wales Rural Health Intelligence Group (AWRHIG) as of July 2002

Mrs Trish Buchan	Institute of Rural Health
Mr Gareth Davies	National Public Health Service
Dr Jenny Deaville	Institute of Rural Health
Ms Jacqueline Dix	Age Concern Cymru
Dr David Fone	National Public Health Service
Ms Lindsay Foyster	Mind Cymru
Ms Catriona Graham	Powys County Council
Professor Mark Goodwin	University of Wales, Aberystwyth
Ms Marie Grannell	Society of Health Education and Health Promotion Specialists
Ms Margaret Hands	Ceredigion Social Services
Dr Barry Hounsome	University of Wales, Bangor
Ms Helen Howson	Welsh Assembly Government, Health and Social Care Department
Y Parch Roger Ellis Humphreys	Wales Rural Forum
Professor Joyce Kenkre	University of Glamorgan
Mr Edward H Lewis	Local Government Boundary Commission for Wales
Ms Catherine Mullin	Welsh Assembly Government, Transport Directorate
Ms Kaori Onoda	Welsh Assembly Government, Health Promotion Division
Mrs Grace Lewis Parry	Gwynedd Local Health Group
Ms Cath Roberts	Welsh Assembly Government, Statistical Directorate
Mr Chris Roberts	Welsh Assembly Government, Health Promotion Division
Mr Jasper Roberts	Welsh Assembly Government, Rural Policy Division
Miss Daisy Seabourne	Wales Council for Voluntary Action
Mr David Seal	Wales Centre for Health
Dr Paul Walker	National Public Health Service
Professor Clare Wenger	University of Wales, Bangor
Ms Simant Westley	National Public Health Service
Professor John G Williams	University of Wales, Swansea
Dr John Wynn-Jones	Institute of Rural Health

Appendix 2

Appraisal team at workshop on 16 April 2002

Ms Dawn Armstrong Esther	University of Wales, Aberystwyth
Ms Glynis Bennett	University of Glamorgan
Mrs Trish Buchan	Institute of Rural Health
Ms Rebecca Cannings	Local Government Data Unit
Ms Caroline Davies	Rural Stress Information Network
Mr Gareth Davies	National Public Health Service
Dr Jenny Deaville	Institute of Rural Health
Prof. Mark Goodwin	University of Wales, Aberystwyth
Ms Marie Grannell	Society of Health Education/Promotion
Ms Roswyn Hakesley Brown	University of Glamorgan
Mr Barry Hounesome	University of Wales, Bangor
Ms Lesley Jones	Institute of Rural Health
Prof. Joyce Kenkre	University of Glamorgan
Ms Allyson Lipp	University of Glamorgan
Mr Iain Mansall	University of Glamorgan
Ms Kate Mitchison	Institute of Rural Health
Ms Kaori Onoda	Welsh Assembly Government, Health Promotion Division
Ms Delyth Owens	Citizens' Advice Bureau
Mr Nick Read	Agricultural Chaplain
Ms Cath Roberts	Welsh Assembly Government, Health Statistics & Analysis Unit
Dr Yvonne Tommis	University of Wales, Bangor
Prof. Clare Wenger	University of Wales, Bangor
Ms Louise Wilson	Institute of Rural Health

Appendix 3

List of papers reviewed

- Bain N, Campbell N. (2000) Treating patients with colorectal cancer in rural and urban areas: a qualitative study of patient's perspectives. *Family Practice*; 28(6): 475-479.
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- Craig J, Chua R, Wootton R, Patterson V. (2000) A pilot study of telemedicine referrals for new neurological outpatient referrals. *Journal of telemedicine and telecare*; 6: 225-228.
- Cook L. (2000) Triple integration nursing. *Nursing Standard*; 14(52): 33-34.
- Haynes R, Gale S, Mugford M, Davies P. (2001) Cataract surgery in a community hospital outreach clinic patients' costs and satisfaction. *Social Science and Medicine*; 53: 1631-1640.
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Sherwood KB, Lewis GJ. (2000) Accessing health care in a rural area: an evaluation of a voluntary medical transport scheme in the English Midlands. *Health and Place*; 6: 337-350.

Walsh M, Howkins D. (2002) Lessons from a farmers health service. *Nursing Standard*; 16 (16): 33-40.

Wootton R. (1999) Telemedicine and isolated communities a UK perspective. *Journal of telemedicine and telecare*; 5 (Supplement 2): 27-34.



Appendix 4

Critical Appraisal Proforma: Rural Health Services

Name of Reviewer

Details of Publication

Please circle one of the following types of publication and give the details required for each type, using the space below.

- 1. Journal Article Author/s, Article title, Journal title, Date/Volume/Issue/ Pages
- 2. Report/Book Author/s, Title, Pages, Date/Place/Publisher
- 3. Book Chapter Author/s, Chapter title, Chapter pages, Editor/s of the book, Book title, Date/ Edition/Place/Publisher
- 4. Thesis/Dissertation Author, Thesis/Dissertation title, Degree/Institution, Date

A: Aims and Objectives of the Study

What are the aims and objectives of the study?

.....
.....

B: Rural health access issue

What is the problem/key issue considered in the study?

Please use keywords listed in the paper, if any.

.....
.....

C: Definitions of Rurality (or substitute terms e.g. isolated or remote etc.)

Is 'Rurality' clearly defined in the study?

Yes No

If yes what is it?

.....
.....

D: Study Methods

Research Methods (Please highlight all those apply)

Health Evidence Bulletin Criteria
 Systematic review or meta-analysis (Type I)
 Randomised Controlled Trial (Type II)
 Interventional study (e.g. before and after design) (Type III)
 Observational study (e.g. cohort, cross sectional) (Type IV)
 Expert opinion (Type V)

STOX Criteria

Systematic review: Comprehensive with at least one RCT (S1)
 Systematic review: Comprehensive (S2)
 Trials: Randomised control trial (T1)
 Trials: Non-randomised control trial (T2)
 Trials: Before and after intervention trial (T3)
 Observational: Cohort (O1)
 Observational: Case control study (O2)
 Observational: Cross sectional/longitudinal study including statistical data (O3)
 Observational: Study using qualitative methods only (O4)
 Observational: Case study (O5)
 Expressions of opinion: Formal consensus or other professional opinion (including literature review where there is no indication of a systematic approach and models based on a review of the literature) (X)

Setting rural rural-urban
 (or substitute terms e.g. remote etc.) (or substitute terms e.g. remote etc.)

Target population (if appropriate)

.....

.....

E: Brief Description of the Intervention (in the case of evaluative studies)

Please give a brief description of the intervention including its objectives, target groups and methods.

.....

.....



F: Study Findings

What are the key outcomes/messages of the study?
Please do not go into a detailed description of the results.

.....

.....

Does the paper include any discussion of applications of the study findings, future research needs, or policy implications, especially regarding access to rural health?

Yes No

If yes, what are they?

.....

.....

G: Quality of the paper

(Please highlight your answers)

- Are the aims and objectives clearly described? Yes / No
- Do the authors refer to appropriate literature? Yes / No
- Are the study methods clearly described? Yes / No
- Is the response rate reported? Yes / No / NA
- Is there any discussion of possible bias? Yes / No
- Are statistical methods clearly described? Yes / No / NA
- If a qualitative study, is the method of analysis clearly described? Yes / No / NA
- Are the study methods appropriate for the objectives? Yes / No
- Was sample selection justified? Yes / No / NA
- Are statistical methods appropriate? Yes / No / NA
- Are the conclusions justified by the results? Yes / No
- Other comments on the quality of the study?

.....

.....

H: Reviewer's assessment

Strength of evidence
(please circle a number)

1	2	3	4

very convincing	convincing	not very convincing	not at all convincing

I: Reviewer's comments

.....

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