



**Liverpool
Public Health
Observatory**

The Public Health contribution to capacity planning and demand management in Merseyside, Phases 1 & 2: Circulatory diseases, respiratory diseases, older people (aged 75 and over), alcohol problems and musculoskeletal disorders

Nigel Fleeman

Observatory Report Series No. 53

PROVIDING INTELLIGENCE FOR THE PUBLIC HEALTH

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**Liverpool Public Health Observatory
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Executive Summary

Aim and objectives

The aim was to identify key evidence-based public health interventions that can be provided by the NHS, that will contribute significantly to demand management, and should therefore be included in the PCT 3-year capacity plans (2003-2006). The topic areas were pre-selected resulting in the following objectives:

1. To review the evidence of effectiveness of (pre-defined) interventions relating to circulatory and respiratory disease and people aged 75+ which contribute to reducing emergency hospital admissions.
2. To review the evidence of effectiveness of interventions relating to alcohol problems which contribute to reducing elective and emergency hospital admissions.
3. To review the evidence on the best settings for the management of musculoskeletal disorders.
4. To quantify the potential impact of these interventions on reducing hospital admissions e.g. impact of interventions on bed day usage and number of admissions.
5. To identify the timeframe within which the intervention might be expected to have an impact i.e. short, medium or long term.

Method

Evidence was found by literature searches and informal suggestions and contacts.

Findings

A large amount of evidence for effective public health interventions was found and for most areas of interest, there were systematic reviews available, although very few studies use hospital admissions as an outcome measure. The evidence is summarised in the Appendix to this executive summary (*Tables 1-5*).

Attempts have been made to quantify the impact of interventions on hospital admissions although great caution must be taken in generalising these findings, especially when the findings are from single studies.

It is important to note that in the timescale available, some evidence that either supports or contradicts that presented here and/or quantifies impacts on hospital admissions may have been overlooked.

Discussion

This study was limited to specific preventive interventions that could be employed by the NHS. Many broader population and community based interventions have achieved equally impressive results but were outside the remit of this study.

The quality of evidence varied from topic to topic. For example, the evidence relating to smoking cessation is well established but the evidence for pneumococcol vaccinations is very mixed.

Furthermore, in some areas there is apparently strong evidence for the rationale of interventions, but in the practical setting, evidence is often lacking. For example, the benefits of physical activity on health are well established but the means of promoting this (at least in the NHS) seem less so.

There is also the added problem of the duration of interventions and of evaluations. By their nature, chronic diseases are of long duration, yet interventions are typically short in duration, and are often only evaluated over a matter of weeks or months.

Finally, it is important to note that not all effective interventions will have immediate impacts on hospital admissions.

Conclusions

This report should be seen as the start of a process of presenting evidence that may reduce demand for hospital admissions. More evidence will become available, and the potential (greater) impacts of “upstream” interventions (particularly in preventing smoking and alcohol related problems) should not be neglected.

Following a meeting of the Cheshire and Merseyside Directors of Public Health on 3rd March 2003, it was decided to examine the following three interventions in more detail in order to develop a model approach and to calculate the likely impact on admissions:

1. Managing heart failure.
2. Pulmonary Rehabilitation.
3. Preventing falls in older people.

The findings from this exercise will be available later this year.

Appendix to the Executive Summary

Table 1: Summary of the effectiveness of interventions to reduce emergency admissions due to circulatory disease

	Proposed intervention	Evidence of effectiveness	Intervention outcome	Estimated impact on emergency admissions
Primary prevention				
Reducing smoking.	Brief advice from a GP (3 mins). Brief advice and Nicotine Replacement Therapy (NRT). Intensive support.	Systematic reviews.	2.5% reduction in smoking prevalence after 6 months with advice. 5% reduction in smoking prevalence after 6 months with NRT. 8% reduction in smoking prevalence after 6 months with intensive support.	In two years time, if abstinence is maintained, around 1.25% of emergency admissions for MI and Stroke amongst smokers may be averted with just brief advice, rising to 2.5% when NRT is added. Intensive support may reduce emergency admissions for MI by 4%.
Healthy Eating.	Dietary advice based on a theory of behavioural change and nurse administered health checks. (This intervention is probably best aimed at those at high risk)	Systematic reviews.	Long-term interventions reduced dietary fat by about 1% to 4%. Blood total cholesterol reduced by 3% in the least intensive dietary interventions and by 7.6% in the most intensive. This would translate to a reduction in CHD risk of between 3%-18%.	Based on the evidence found, the impact on emergency hospital admissions cannot be estimated.
Physical activity.	Moderate activity for 30 minutes daily.	Systematic reviews.	A systematic review concluded that expectations of programme success should be realistic. Major changes in large numbers of participants are unlikely to happen. There is insufficient evidence that the NHS can increase physical activity.	Based on the evidence found, the impact on emergency hospital admissions cannot be estimated.
Secondary prevention				
Aspirin prescribing.	Aspirin for people at high risk.	Systematic review.	Absolute risk reductions in having a serious vascular event.	Based on the evidence found, the impact on emergency hospital admissions may result in a decrease of 36-38 per thousand patients treated for MI.
Cholesterol management.	Screening for people at risk. Low fat diet for people at risk. Prescribing statins for people at risk.	Systematic reviews.	Insufficient evidence for effectiveness for screening people at risk. Insufficient evidence for effectiveness of low fat diets. Reduction in CHD risk by 25% with prescribed statins.	Based on the evidence found, the impact on emergency hospital admissions cannot be estimated.
Managing heart failure.	Specialised disease management eg nurse-mediated.	RCT and systematic reviews.	The RCT found admission risk for worsening heart failure reduced by 62%. While the Review found risk of hospitalisation reduced by 13%.	Using the figure found from the systematic review, the reduction in emergency admissions may be 13%.
Managing atrial fibrillation.	Use of Warfarin.	RCT and systematic review.	A systematic review has shown that Warfarin reduced stroke by 60%.	Based on the evidence found, the impact on emergency hospital admissions cannot be estimated.
Tertiary prevention				
Cardiac rehabilitation.	Rehabilitation including exercise.	Systematic review.	Up to 31% reduction in mortality but no impact on Myocardial Infarctions.	Based on the evidence found, the impact on emergency hospital admissions cannot be estimated.

NB – Please see the full text of this report for a full explanation of assumptions, caveats etc in applying the findings to hospital admissions

Table 2: Summary of the effectiveness of interventions to reduce emergency admissions due to respiratory diseases

	Proposed intervention	Evidence of effectiveness	Intervention outcome	Estimated impact on emergency admissions
Primary prevention				
Reducing smoking.	Brief advice from a GP (3 mins). Brief advice and Nicotine Replacement Therapy (NRT). Intensive support.	Systematic reviews.	2.5% reduction in smoking prevalence after 6 months with advice. 5% reduction in smoking prevalence after 6 months with NRT. 8% reduction in smoking prevalence after 6 months with intensive support.	Given it is estimated there are 200 emergency admissions per 100,000 for COPD patients and that 80% of COPD deaths are smokers, 2% (or 4 per 100,000 emergency hospital admissions) of COPD admissions may be averted with brief advice alone. This may be doubled to 4% (or 8 per 100,000 emergency hospital admissions) when NRT is added to the intervention. More intensive interventions may reduce COPD emergency admissions by 12-13 per 100,000 emergency hospital admissions (or 6%-6.5%).
Secondary prevention				
Influenza vaccination.	Annual vaccination for those at risk.	Systematic reviews.	Insufficient evidence for cost-effectiveness in the general population.	Significant reductions in the population of older adults.
Pneumococcal vaccination.	Vaccination every five years for those at risk.	Systematic reviews.	Insufficient evidence for effectiveness.	N/A
Access to specialist support.	Specialist nurses for patients following admission for asthma or COPD.	Individual studies including RCTs.	Asthmatics increased use of rescue medication. COPD patients' average length of hospital stay reduced. In children with asthma, an RCT found re-admissions were significantly reduced from 25% to 8%.	Based on the evidence found, the impact on emergency hospital admissions cannot be estimated but there may be a reduction in acute asthma attacks leading to admission. The nurse led service for children with asthma may result in one less child being readmitted for every six seen.
Tertiary prevention				
Pulmonary rehabilitation.	Specialised care.	Individual studies including RCTs.	Some studies suggest a better quality of life and reduced hospital admission rates.	One study suggests 67% of COPD patients will spend less time in the hospital during the 12 months after program completion compared with the 12 months before.

NB – Please see the full text of this report for a full explanation of assumptions, caveats etc in applying the findings to hospital admissions

Table 3: Summary of the effectiveness of interventions to reduce emergency admissions by elderly people (>75 years)

	Proposed intervention	Evidence of effectiveness	Intervention outcome	Estimated impact on emergency admissions
Primary prevention				
Reducing smoking.	Brief advice from a GP (3 mins).		2.5% reduction after 6 months with advice.	Based on the evidence found, the impact on emergency hospital admissions cannot be estimated as the impact of comorbidities is unclear.
Healthy Eating.	Brief advice and Nicotine Replacement Therapy (NRT). Intensive support. Dietary advice.	Systematic reviews.	5% reduction after 6 months with NRT. 8% reduction after 6 months with intensive support. Conflicting evidence.	Based on the evidence found, the impact on emergency hospital admissions cannot be estimated. See falls prevention.
Physical activity.	Moderate activity of 30 minutes daily.	Systematic reviews.	Physical activity can be beneficial for falls prevention.	
Falls prevention.	Multi-factorial screening and intervention. Muscle strengthening.	Systematic reviews. Systematic reviews.	Multi-factorial screening and intervention reduces falls by 27%. Muscle strengthening reduces falls by 20%.	Based on the evidence found, the reduction in admissions could be between 20%-27%.
Secondary prevention				
Influenza immunisation.	Annual vaccination for those at risk.	Systematic reviews.	Significant reduction in hospital admissions for the over 65s.	Over half of the patients admitted for influenza are aged over 65 – a reduction in the number of these admitted can be expected of between 50% -56%.
Blood pressure management.	Control by diet – fish supplements. Control by medication.	Systematic reviews. Systematic review and RCT.	Eating oily fish - rich in omega-3 fatty acids - and taking fish supplements are more beneficial for people with hypertension than those without. Possibly 35%-40% reduction in stroke, 50% in heart failure, 16% in coronary events and a 10%-15% reduction in mortality.	If blood pressure is well managed and well controlled, there could be a substantial reduction in admissions.
Tertiary prevention				
Stroke rehabilitation.	Hospital based stroke unit.	Systematic reviews.	There is strong evidence from that people who have a stroke are more likely both to survive and to recover more function if admitted promptly to a hospital based stroke unit.	Based on the evidence found, the impact on emergency hospital admissions cannot be estimated.

NB – Please see the full text of this report for a full explanation of assumptions, caveats etc in applying the findings to hospital admissions

Table 4: Summary of the effectiveness of interventions to reduce hospital admissions due to alcohol problems

	Proposed intervention	Evidence of effectiveness	Intervention outcome	Estimated impact on hospital admissions
Primary prevention				
Reducing patterns of problem drinking.	Screening (in primary care). Brief advice (in primary care).	Systematic reviews. Systematic reviews.	Up to 20% of patients presenting to primary care may be hazardous drinkers and these could thus be identified by screening. The AUDIT questionnaire was most effective in identifying subjects with at-risk, hazardous, or harmful while the CAGE questionnaire proved superior for detecting alcohol abuse and dependence. Brief interventions can result in a 24% (18%-31%) reduction in alcohol consumption.	Based on the evidence found, the impact on hospital admissions cannot be estimated.
Secondary prevention				
Preventing alcohol related injuries.	Screening (in hospital settings). Brief advice (in hospital settings).	Validation study and systematic review. Systematic review and individual studies.	LAST may be more effective than AUDIT in hospital settings and MAST may be most effective in psychiatric settings. Those receiving brief advice were twice as likely as controls to change their behaviour.	It has been suggested that reduced levels of drinking following a brief intervention can be maintained for four years, resulting in less than half the number of hospital days in the following 12 months among the treatment group than the control group.
Services for people with co-existing psychiatric or psychological disorders.	Assertive treatment (ACT).	Systematic review.	Integrated services are effective in reducing alcohol problems and problems associated with comorbid psychiatric or psychological disorders. ACT appears to be particularly promising.	For all patients with a psychiatric disorder (i.e. including those without an alcohol problem) people allocated to ACT were 41% less likely to be admitted to (psychiatric) hospital than those receiving standard community care and 80% less likely than those receiving hospital-based rehabilitation. They also spent less time in hospital than both those receiving standard community care or hospital-based rehabilitation.
Alcohol detoxification.	Home and outpatient detoxification.	Individual studies.	Home and outpatient detoxification appears to be as effective as inpatient detoxification for most patients, although inpatient detoxification is still required for patients likely to suffer from complications during withdrawal.	In one study, outpatient detoxification has been found to save at least 74 inpatient detoxification weeks a year (assuming an average stay of ten days).
Tertiary prevention				
Alcohol "treatment" and "aftercare".	Relapse prevention (psychosocial and pharmacological interventions).	Individual studies.	Interventions have proved to be effective in preventing relapse and hospital admissions.	Based on the evidence found, the impact on hospital admissions cannot be estimated but relapse rates may be reduced by half.

NB – Please see the full text of this report for a full explanation of assumptions, caveats etc in applying the findings to hospital admissions

Table 5: Summary of the effectiveness of different treatment settings to reduce hospital admissions for musculoskeletal disorders

	Proposed intervention	Evidence of effectiveness	Intervention outcome	Estimated impact on hospital admissions
Pre-admission initiatives.	Increasing responsibility of primary care staff. Pre-admission clinics.	Individual studies.	Physiotherapist outreach in primary care has reduced inappropriate referrals to orthopaedic surgeons. Pre-admission clinics have reduced the number of cancelled operations and the average length of hospital stay.	For patients with total knee replacement, the average length of stay for those who attended the pre-admission clinic after it had become compulsory, compared with before, was 3.8 days shorter. For total hip replacement patients, the reduction was 1.1 days.
Diagnostic and treatment centres (DTCs).	Day surgery.	Evaluation (of the ACAD centre in Middlesex) and US data.	Day surgery would appear to be as effective as inpatient surgery but there is a lack of conclusive evidence as to the effect of DTCs due to a lack of evaluative studies.	It has been suggested that DTCs can deal with at least 90% of the traditionally non-emergency workload traditionally undertaken in district general hospital. In March 2000, at the ACAD centre in Middlesex, 40 NHS patients were being operated upon weekly, with 16 of these being orthopaedic patients.
Ambulatory pain management / rehabilitation.	Outpatient rehabilitation. "Partial hospitalisation".	Individual studies.	"Partial hospitalisation" appears to be an effective means of providing pain management / rehabilitation. German studies show outpatient rehabilitation to be as effective as other modes but the few UK studies do not reach the same conclusion.	Based on the evidence found, the impact on hospital admissions cannot be estimated.
Hospital at home schemes (for orthopaedic patients only).	Early discharge schemes. Admission avoidance schemes.	Individual studies (as the systematic review includes non-orthopaedic patients).	Early discharge schemes (such as PACC and Allied BONE) can be just as effective as inpatient care although may not reduce the length of episode of care. Admission avoidance schemes significantly reduced the number of bed days.	For general orthopaedic patients, PACC reduced the length of stay from 12.3 to 7.7 days and Allied BONE reduced the average length of stay by 24%. 4.6 bed days per trauma patient could be saved by admission avoidance schemes.

NB – Please see the full text of this report for a full explanation of assumptions, caveats etc in applying the findings to hospital admissions

Background

The main reasons for emergency admissions/readmissions to Aintree and the Royal Liverpool and Broadgreen University Hospital NHS Trust for the period 1998-2001 were identified from a report produced for the North Mersey Future Healthcare Project (Gandy, 2002).

The North Mersey Future Healthcare Project report identified the three main reasons for emergency medical admissions to Aintree and the Royal Liverpool and Broadgreen United Hospitals Trusts in 2000/2001 as: diseases of the circulatory system, diseases of the respiratory system and “symptoms, signs and abnormal clinical and laboratory findings” (Table 6). In addition to this, the report concluded that the group most likely to be readmitted to hospital were elderly patients over the age of 75. Elderly patients were also found to be the biggest users of beds.

Table 6: Reasons for emergency medical re-admissions to Aintree and the Royal Liverpool and Broadgreen United Hospitals Trusts in 2000/2001

Reason for admission	% of emergency medical admissions	% of associated bed days
Diseases of the circulatory system	18	23
Diseases of the respiratory system	16	17
“Symptoms, signs and abnormal clinical and laboratory findings”	23	17
All of the above combined	57	57

Primary, secondary and tertiary public health interventions that would impact upon those admissions were determined with specific reference to recommendations made in the National Service Frameworks.

Because the group of patients admitted for “Symptoms, signs and abnormal clinical and laboratory findings” were a diverse group, including a high proportion related to circulatory and respiratory symptoms, it was recommended that public health interventions to reduce emergency hospital admissions should focus on the following:

1. Diseases of the circulatory system (primarily Coronary Heart Disease).
2. Diseases of the respiratory system.
3. Reducing emergency admissions in the elderly (aged >75 years).

Interim reports were produced on 15th November 2002 and 10th December 2002. New topic areas of interest were then identified as follows:

4. Alcohol problems.
5. Musculoskeletal disorders.

Aim

To identify key evidence-based public health interventions that can be provided by the NHS, that will contribute significantly to demand management, and should therefore be included in the PCT 3-year capacity plans (2003-2006).

Objectives

1. To review the evidence of effectiveness of (pre-defined) interventions relating to circulatory and respiratory disease and people aged 75+ which contribute to reducing emergency hospital admissions.
2. To review the evidence of effectiveness of interventions relating to alcohol problems which contribute to reducing elective and emergency hospital admissions.
3. To review the evidence on the best settings for musculoskeletal disorders.
4. To quantify the potential impact of these interventions on reducing hospital admissions i.e. impact of intervention on bed day usage, number of admissions.
5. To identify the timeframe within which we would expect the intervention to have an impact i.e. short, medium or long term.

Method

Because of the short timescale available , the review consisted of the following searches:

1. The Internet for relevant sites and sources of information (e.g. the Health Development Agency Evidence Base, The Cochrane Library etc).
2. MEDLINE for systematic reviews and other studies examining the effectiveness of interventions and settings in the relevant areas (i.e. circulatory diseases, respiratory diseases, older adults, alcohol problems and musculoskeletal disorders) and CINAHL and PsycINFO (for musculoskeletal and alcohol problems respectively).

This was supplemented by a search of:

3. Information and evidence available from already known literature (e.g. Department of Health, US Preventive Task Force, etc).
4. Information and references provided from health academics and practitioners via public health and health economics email discussion lists.

Expected outcomes

Identification of evidence based public health interventions that the NHS should be providing to reduce emergency admissions to hospital.

Ideally all interventions should be quantified with regard to their impact on hospital admissions.

Findings: Interventions to reduce emergency admissions due to circulatory diseases

Introduction

Circulatory diseases contain Coronary Heart Disease (CHD) which is the single commonest cause of premature death in the UK and is thus seen as a “major priority” by the Government.

As is common with most diseases, circulatory diseases are not distributed equally within society, the less well off experiencing higher rates of morbidity and mortality.

The principal risk factors for developing circulatory diseases include smoking, poor diet, high blood pressure, high total blood cholesterol and physical inactivity.

Over the last 20 years, CHD incidence and mortality rates have halved in the UK but CHD admissions have doubled. Thus quantifying impacts on hospital admissions is difficult. However, it is felt that some quantification may be possible in relation to Myocardial Infarctions (MI). A reduction in MI should result in a reduction in demand for admissions (Personal communication with Prof Simon Capewell, 17th October 2002).

Primary prevention

Smoking cessation

Rationale for smoking cessation

While a third of all people in the UK smoke, 70% of these want to give up (Royal College of Physicians, 2000).

The relative risk for peripheral arterial disease is about 9 for those smoking more than 15 cigarettes a day (Anon, 1996). Smoking cessation before middle age returns the CHD risk to that of a non-smoker within 10 years (Doll *et al*, 1994) and reduces the risk of MI or stroke by around half after two years (Lightwood and Glantz, 1997).

According to the Scottish Executive (2001): “Smoking cessation is the most important non-pharmacological intervention in the prevention of coronary heart disease.”

A number of smoking cessation interventions exist. Weekly follow up for the first four weeks is advised, although alternative support like a telephone helpline/counselling may also suffice (Department of Health, 2000; Milner and Bates, 2002).

Evidence of effectiveness of smoking cessation interventions

Brief advice from a GP of about 3 minutes has been shown to be effective from a systematic review (Silagy and Stead, 2002), even more so with Nicotine Replacement Therapy (NRT) (Silagy *et al*, 2002).

It has been shown that the success of attempts to quit is increased by intensive support and follow up (USDHHS, 2000). This may be particularly needed for heavily dependent

smokers, disproportionately found in the lowest income groups who are unable to give up smoking with brief interventions alone (WHO Europe Partnership Project and SmokeFree London, 2001). Advice and counselling offered by nurses has "reasonable evidence" to support their effectiveness (Rice and Stead, 2002).

According to the General Household Survey of 1994 (OPCS, 1996), over 80% of the population visit their GP at least once a year, emphasising the wide-reaching impact GP advice can have.

Data available on people using smoking cessation services shows that around 60% are exempt from NHS prescription charges, suggesting that some inequalities are being reduced (Raw *et al*, 2001). These cessation schemes usually offer intensive support.

Not only are smoking cessation interventions effective, they are also extremely cost-effective. The Wanless Report (2001) noted how the cost per quality adjusted life year (QALY) was between £212 and £873 compared to between £4,000 and £8,000 for statins. Regarding the risk threshold for cardiovascular disease, 80% of patients prescribed statins would no longer need them if they were to stop smoking (Muir *et al*, 1999).

Quantifying the impact of smoking cessation interventions

Based on a systematic review of clinical trials, after six months brief advice can reduce the level of smoking by 2.5% compared to no intervention (Silagy and Stead, 2002).

NRT would appear to double the chance of success (Silagy *et al*, 2002).

Evidence from systematic reviews also shows more intensive interventions (such as one to one counselling, smokers' clinics etc) can reduce the level of smoking by 8% compared to no treatment (Raw *et al*, 1998).

After two years of cessation, the risk of an ex-smoker suffering a MI or stroke is halved.

Thus in two years time, if abstinence is maintained, around 1.25% of emergency admissions for MI and Stroke amongst smokers may be averted with just brief advice, rising to 2.5% when NRT is added. Intensive support may reduce emergency admissions for MI by 4%.

Raw *et al* (1998) have calculated that if GPs increased the number of brief interventions by half and recommended NRT, 18 people per five-person practice would stop smoking.

Among patients with CHD, one study found that smoking cessation advice has been shown to increase quit rates by 45% compared with usual care (van Berkel *et al*, 1999).

Healthy eating

Rationale for healthy eating

Low fat diets can result in a reduction in cholesterol levels (Clarke *et al*, 1997) and eating more fresh fruit and vegetables is associated with a lower risk of coronary heart disease (Ness and Powles, 1997).

Reduction in saturated dietary fat is associated with reduction in cardiovascular events if sustained for at least two years (Hooper *et al*, 2002).

The average person is likely to benefit from dietary practices and physical activity that keep caloric intake commensurate with daily energy expenditures (USPSTF, 2002).

Evidence of effectiveness of healthy eating

There is insufficient evidence that nutritional counselling by physicians as opposed to more specialist counselling is effective in changing behaviour (USPSTF, 2002).

A systematic review (Roe *et al*, 1997) found weak evidence for primary care based healthy eating interventions in reducing blood cholesterol. Nurse-administered health checks may be effective.

A systematic review by Tang *et al* (1998) also only found modest results. More intensive diets tended to produce better results. A lack of compliance with the prescribed diet was given as a possible explanation.

Another systematic review concluded that healthy eating initiatives are best aimed at those at high risk (Ebrahim and Davey Smith, 1996). The most effective interventions were based on a theory of behavioural change.

Quantifying the impact of healthy eating

According to the Department of Health, a 10% reduction in saturated fat intake by the UK population would reduce CHD mortality by between 20%-30% (Department of Health, 2002a).

Long-term interventions in the systematic study only reduced dietary fat by about 1%- 4% (Roe *et al*, 1997).

Tang *et al*, (1998) state that a 1% reduction in blood cholesterol would reduce CHD risk by 2%-3%. They found dietary interventions reduced blood total cholesterol by 3% (95% CI: 1.8%- 4.1%) in the least intensive dietary interventions and by 7.6% (95% CI: 6.2%-9%) in the most intensive. This would translate to a reduction in CHD risk of between 3%-18%.

There is insufficient evidence to quantify the impact on admissions.

Physical activity

Rationale for physical activity

Evidence from epidemiological studies clearly indicates that morbidity and mortality from a range of chronic diseases are lower in physically active groups compared to sedentary groups. Half an hour a day of physical activity, of at least a moderate intensity, helps to prevent and reduce the risk of CHD, stroke, high blood pressure and obesity (amongst other diseases) (Riddoch *et al*, 1998). But more intensive activity may also be beneficial (Tanasescu *et al*, 2002).

The Department of Health (2002a) have stated that half of all coronary heart disease could be avoided if regular activity was undertaken by the population while the Scottish Executive have stated (2001) have stated that a third of all CHD and a quarter of all strokes could be avoided if regular activity was undertaken by the population.

The average person is likely to benefit from dietary practices and physical activity that keep caloric intake commensurate with daily energy expenditures (USPSTF, 2002).

Evidence of effectiveness of physical activity

“Moderate physical activities have higher compliance rates than vigorous exercise activities, mesh better with daily lifestyle, and are well maintained over time” (USPSTF, 2002). But exercise cannot be carried out only occasionally or seasonally to protect against CHD.

A systematic review concluded that expectations of programme success should be realistic. Despite there being an apparent dose-response relationship between physical activity and health (except for vigorous levels of intensity of more than 3,000 kcal/week), more modest levels of activity are more feasible amongst those who are currently sedentary and therefore at greatest CHD risk. Thus, major changes in large numbers of participants are unlikely to happen (Riddoch *et al*, 1998).

A systematic review has found interventions are more likely to be effective in increasing physical activity if they are based on the principles of behaviour modification, and have regular follow-ups/reminders (Hillsdon and Thorogood, 1996). But there is insufficient evidence that primary care personnel can motivate patients to take more physical activity.

Nevertheless, the Department of Health (2002a) exemplified an initiative set up by a GP Practice in Sonning, Oxfordshire as a model of good practice. This set up a series of short walks around Sonning Common, varying in length from 1-4 miles.

A cohort study of US men followed over a 12-year period suggested that "while moderate exercise like brisk walking is associated with reduced risk [of CHD], greater risk reduction can be obtained with more intense exercise". Interestingly, swimming and cycling were not associated with reduced risk. However with regard to these two factors, "findings were limited by their low range of exposure" (Tanasescu *et al*, 2002).

As well as benefits to health, increasing physical activities can bring potential harm such as injury, osteoarthritis, MI and even sudden death in admittedly rare cases. Whilst there is an apparent relationship between the risk of injury and frequency of an activity such as running, the risk of sudden death is greatest in sedentary individuals who carry out vigorous activity. The risk of sudden death appears to decline in those who are habitually active (USPSTF, 2002).

Therefore, the USPSTF recommend that consistent moderate-level activities should be promoted, based on the grounds that physical activity has "proven benefits" even if there is insufficient evidence for the promotion of physical activity by clinicians.

Quantifying the impact of physical activity

The Department of Health (2002a) note 20% of people who took part in the Sonning experiment reported weight loss.

A relative risk of death from CHD of 1.9 (95% CI: 1.6-2.2) was calculated for sedentary people compared to the physically active in one meta analysis reported by the USPSTF (2002).

The risk reductions for CHD found in Tanasescu *et al*'s study for intense activity (when compared with men who did not undertake the activity) were 42% for running an hour or more weekly, 23% for training with weights for half hour or more weekly, 18% for rowing for an hour or more weekly and 18% for brisk walking for half or more daily.

Cohort studies suggest that physically inactive persons have a 32%-52% greater risk of developing hypertension than those who exercise (USPSTF, 2002).

There is insufficient evidence to quantify the impact on admissions.

Secondary prevention

Prescribing Aspirin

Rationale for prescribing Aspirin

Aspirin has been shown to be effective in reducing the risk of many conditions, including circulatory diseases. But only half of patients with a history of MI, angina or peripheral arterial disease receive antiplatelets (which includes Aspirin) (Antithrombotic Trialists' Collaboration, 2002).

Evidence of effectiveness of prescribing Aspirin

A large amount of evidence exists for the effectiveness of Aspirin, particularly in secondary prevention. Most recently a systematic review found oral antiplatelets to be protective against MI, stroke and death for most patients at high risk of occlusive vascular events (Antithrombotic Trialists' Collaboration, 2002). The dose need only be 75mg daily.

Quantifying the impact of prescribing Aspirin

Absolute risk reductions of having a serious vascular event found by the Antithrombotic Trialists' Collaboration (2002) were:

- 36 per 1000 treated for two years among patients with previous MI;
- 38 per 1000 patients treated for one month among patients with acute MI;
- 36 per 1000 treated for two years among those with previous stroke or transient ischaemic attack;
- 9 per 1000 treated for three weeks among those with acute stroke;
- 22 per 1000 treated for two years among other high risk patients (with separately significant results for those with stable angina, peripheral arterial disease, and atrial fibrillation).

The impact on emergency hospital admissions may result in a decrease of 36-38 per thousand patients treated for MI.

Cholesterol management

Rationale for cholesterol management

Lowering serum cholesterol concentration reduces the incidence of CHD. But it is a poor predictor of who will go on to have CHD. Therapy should therefore be aimed at people with a high risk of CHD rather than be based upon cholesterol levels (NHS Centre for Dissemination and Reviews, 1998).

Evidence of effectiveness of cholesterol management

A systematic review by the NHS Centre for Dissemination and Reviews (1998) found no evidence for the effectiveness for the screening for cholesterol, nor low fat diets for reducing levels. The US Preventive Services Task Force (2002) also failed to find strong evidence for the effectiveness of dietary treatment alone but do believe there is strong evidence for screening.

The use of statins has been found to be effective at managing cholesterol levels and reducing CHD mortality and morbidity (but some anti-hypertensives, aspirin and beta-blockers were found to be more cost-effective than statins regarding CHD).

Combining data on statin usage in British Columbia, Canada with a systematic review, Savoie and Kazanjian (2002) argued that statin use was widely inappropriate, it being justified on men with risk of CHD but there being insufficient evidence for their use in women nor those aged 70 and over who they found made up 60.5% of the prescriptions for statins. They noted how statins are drugs with side-effects in a substantial proportion of users.

These findings reflect a systematic review carried out by van der Weijden *et al* (1998) which found cholesterol lowering intervention is more cost effective in men compared with women and in patients with CHD compared with persons without CHD.

The USPSTF (2002) however strongly recommends that all men aged 35 and over and all women aged 45 and over be screened for lipid disorders. The primary evidence to support this is the ability of cholesterol-lowering interventions to reduce the risk of CHD in patients with high cholesterol, and it is these groups of people who are at highest risk.

As noted above (under smoking cessation), regarding the risk threshold for cardiovascular disease, 80% of patients prescribed statins would no longer need them if they were to stop smoking (Muir *et al*, 1999).

Indeed as the USPSTF (2002) note, lipid-lowering treatments should be accompanied by interventions addressing all modifiable risk factors for heart disease including smoking cessation, treatment of blood pressure, diet and physical activity.

Quantifying the impact of cholesterol management

Each 1% reduction in serum cholesterol yields a 2%-3% reduction in total CHD for both diet and drug interventions (USPSTF, 2002).

The NHS Centre for Dissemination and Reviews (1998) found statins to reduce CHD mortality by 25%.

Based on four large trials, the USPSTF (2002) note drug treatment for 5-7 years reduces CHD risks by around 30% in people with high total cholesterol or average cholesterol and low high-density lipoprotein cholesterol.

The USPSTF (2002) state that in a population with a 1% risk of CHD per year, drug treatment of 67 people over 5 years is required to prevent one CHD event.

There is insufficient evidence to quantify the impact on admissions.

Managing heart failure

Rationale for managing heart failure

Heart failure is a disease that is on the increase and which predominantly affects older people with “short lives remaining of extremely poor quality, punctuated by frequent admissions to hospital” (Murray, 2002).

The advent of angiotensin-converting enzyme inhibitors, beta-blockers, and spironolactone has revolutionized the management of heart failure, reducing morbidity and mortality (Ahmen, 2002).

Over the last 50 years, new cases of heart failure are falling in women but not in men. This has been attributed to the fact that most women get heart failure from hypertension, but with better management of blood pressure, the incidence is falling, whilst men are more likely to develop heart failure as a result of MI (Gottlieb, 2002).

Evidence of effectiveness of managing heart failure

A qualitative study found that too often patients with heart failure have scant insight into their condition, and are thus unable to manage it as well as other chronic diseases, particularly cancer. This is not helped by the fact that predicting the illness trajectory is much harder in severe heart disease than in cancer (Murray, 2002).

An RCT has found extremely beneficial results on hospital admission, readmission and mortality from a specialist nurse-mediated, post-discharge management service for heart failure within a whole population when compared to usual care offered by the admitting physician and subsequently, GP (Blue *et al*, 2001). The nurse intervention essentially consisted of planned home visits of decreasing frequency supplemented by telephone contact as needed.

Such a service will not only improve quality of life and reduce readmissions in patients with congestive heart failure, but also reduce costs and improve the efficiency of the health care system in doing so (Stewart *et al*, 2002).

A systematic review has backed up the evidence for specialized heart-failure disease management (Ahmed, 2002).

A systematic review examining exercise training found positive effects for physical performance and quality of life (Lloyd-Williams *et al*, 2002). Only one of the 31 studies reviewed found a reduction in hospital admission.

Alcohol was found to be an independent predictor of heart failure hospital readmissions in a study by Evangelista (2000). Noncompliance rates for alcohol were found to be 69.5%. However, up to two drinks a day should not be harmful (Cooper *et al*, 2000).

Quantifying the impact of managing heart failure

In the Blue *et al* (2001) study, death or readmission from all causes was reduced by 28% and the risk of readmission to hospital for worsening heart failure by 62%.

Ahmed (2002) found the risk of hospitalisation was reduced by 13% (RR=0.87; 95% CI: 0.79-0.96).

A significant reduction in emergency hospital admissions can be achieved by specialised disease management programmes for heart failure - this may be as high as 62% but a more conservative estimate is 13%.

Managing atrial fibrillation

Rationale for managing atrial fibrillation

Atrial fibrillation is a form of irregular heartbeat. The incidence of atrial fibrillation increases markedly with advancing age.

The incidence of atrial fibrillation has been estimated to be 1.7 per 1,000 person years – it is nearly twice this in people aged over 60 and continues to increase markedly with age, being 8 times as high in those aged 80 and over (Ruigomez, 2002).

Having atrial fibrillation increases the risk of having a stroke by 3-7 times. Of people who have a stroke, 13% are in atrial fibrillation (Department of Health, 2001). Atrial fibrillation also increases the risk of thromboembolism (Chatap, 2002).

Evidence of effectiveness of managing atrial fibrillation

Screening may be effective for elderly people at risk. A randomised controlled trial found more patients had their pulse assessed through nurse-led systematic screening by invitation than through opportunistic case finding (Morgan and Mant, 2002).

A randomised controlled trial has shown that Warfarin is the best means of treating atrial fibrillation. Where Warfarin is inappropriate, Aspirin or another anti-platelet agent should be taken (Stroke Prevention in Atrial Fibrillation Investigators, 1994). The evidence has been supported by systematic review with Aspirin being a less-effective substitute (Lip *et al*, 2002).

Based on a study of 26 GP practices in Northumberland, echocardiography would be useful to assess the need for Warfarin in patients younger than 75 years with no contraindications to treatment and no clinical risk factors for stroke (Sudlow *et al*, 1998).

Estimated impact on admissions

A systematic review has shown that Warfarin reduced stroke by 60% with annual risk reductions of 3% in primary prevention and 8% in secondary prevention; by comparison,

Aspirin reduced stroke by 20% with annual risk reductions of 1.5% in primary prevention and 2.5% in secondary prevention (Lip *et al*, 2002).

Similarly, Sudlow *et al* (1998) estimated that for patients aged 65 and over: 61% over and above those receiving Warfarin would have benefited from receiving it.

There is insufficient evidence to quantify the impact on admissions but the impact on admissions for stroke could be significant.

Tertiary prevention

Cardiac rehabilitation

Rationale for cardiac rehabilitation

Cardiac rehabilitation aims to restore patients with heart disease to health. It is a multidisciplinary approach to improve short-term recovery and promote long-term changes in lifestyle which help to correct adverse risk factors.

Cardiac rehabilitation services usually include exercise training, risk factor modification, education and counselling (Thompson, 1994).

Only a fifth of patients with acute MI receive thrombolytics (Mayor, 2002).

Effectiveness of interventions for cardiac rehabilitation

It is widely regarded that cardiac rehabilitation is effective. For men and women of all ages who have had myocardial infarction, coronary artery bypass graft or percutaneous transluminal coronary angioplasty, or who have angina pectoris or coronary artery disease defined by angiography, a recent systematic review has shown exercise interventions are effective at prolonging life but had no impact on MI. It is not clear whether an exercise only based programme or a more comprehensive programme is more beneficial (Jolliffe *et al*, 2002).

A systematic review found that patients with acute ischaemic stroke who are given thrombolytic therapy within the first six hours are less likely to suffer death or dependency than those given placebo (Wardlow *et al*, 2002).

There is not enough evidence to conclude whether lower doses of thrombolytic agents might be safer or more effective than higher doses in acute ischaemic stroke (Liu and Wardlow, 2002) or which groups of patients benefit most (Wardlow *et al*, 2002).

Quantifying the impact of cardiac rehabilitation

Comprehensive cardiac rehabilitation reduced mortality by 26% (OR=0.74; 95% CI: 0.57-0.96)

Exercise rehabilitation reduced mortality by 31% (OR=0.69; 95% CI: 0.51-0.94).

Thrombolytics administered within three hours after ischaemic stroke reduced death or dependency by 42% (OR=0.58; 95% CI: 0.46-0.74).

Thrombolytics administered up to six hours after ischaemic stroke reduced death or dependency by 17% (OR=0.83; 95% CI: 0.73-0.94).

There is insufficient evidence to quantify the impact on admission but the impact could be significant.

Findings: Interventions to reduce emergency admissions due to respiratory diseases

Introduction

Respiratory diseases are one of the most common forms of ill health. They are also a leading cause of hospitalisation and death. Diseases include pneumonia, asthma and chronic obstructive pulmonary disease (including chronic bronchitis and emphysema. COPD is a progressively disabling disease, which reduces health status as it destroys the lung, resulting in discomfort, inability to work, increasing dependence, hospital admission and death.

Accurate prevalence figures for respiratory disease are hard to come by, but it is thought that this is about 10% for COPD in the UK and at least 12% of emergency admissions are thought to be attributable to COPD; or 200 emergency admissions for a primary care organisation with a population of 100,000, taking up 1.7 bed days per patient (Anon, 2002; Guest 1999).

Smoking is a major cause of all respiratory diseases. Not only is pneumonia more common amongst smokers, it is more likely to be fatal. At least 80% of COPD deaths can be attributed to smoking (Health Education Authority, 1998; Royal College of Physicians, 2000). Stopping smoking can slow down the speed of decline in health status but after diagnosis, the 10-year survival rate is approximately 50% with more than a third of patients dying due to respiratory insufficiency (Anon, 2002).

Primary prevention

Smoking cessation

Rationale for smoking cessation

While a third of all people in the UK smoke, 70% of these want to give up (Royal College of Physicians, 2000).

Age-related lung function declines more rapidly in smokers, but cessation before middle age results in this returning to that of a non-smoker (Doll *et al*, 1994).

A number of smoking cessation interventions exist. Weekly follow up for the first four weeks is advised, although alternative support like a telephone helpline/counselling may also suffice (Department of Health, 2000; Milner and Bates, 2002).

Evidence of effectiveness of smoking cessation interventions

Brief advice from a GP of about 3 minutes has been shown to be effective from a systematic review (Silagy and Stead, 2002), even more so with Nicotine Replacement Therapy (NRT) (Silagy *et al*, 2002).

It has been shown that the success of attempts to quit is increased by intensive support and follow up (USDHHS, 2000). This may be particularly needed for heavily dependent

smokers, disproportionately found in the lowest income groups who are unable to give up smoking with brief interventions alone (WHO Europe Partnership Project and SmokeFree London, 2001). Advice and counselling offered by nurses has "reasonable evidence" to support their effectiveness (Rice and Stead, 2002).

According to the General Household Survey of 1994 (OPCS, 1996), over 80% of the population visit their GP at least once a year, emphasising the wide-reaching impact GP advice can have.

Data available on people using smoking cessation services shows that around 60% are exempt from NHS prescription charges, suggesting that some inequalities are being reduced (Raw *et al*, 2001). These cessation schemes usually offer intensive support.

Not only are smoking cessation interventions effective, they are also extremely cost-effective. The Wanless Report (2001) noted how the cost per quality adjusted life year (QALY) was between £212 and £873 compared to between £4,000 and £8,000 for statins. Regarding the risk threshold for cardiovascular disease, 80% of patients prescribed statins would no longer need them if they were to stop smoking (Muir *et al*, 1999).

Quantifying the impact of smoking cessation interventions

Based on a systematic review of clinical trials, after six months brief advice can reduce the level of smoking by 2.5% compared to no intervention (Silagy and Stead, 2002).

NRT would appear to double the chance of success (Silagy *et al*, 2002).

Evidence from systematic reviews also shows more intensive interventions (such as one to one counselling, smokers' clinics etc) can reduce the level of smoking by 8% compared to no treatment (Raw *et al*, 1998).

Given it is estimated there are 200 emergency admissions per 100,000 for COPD patients and that 80% of these are smokers, a reduction in 4 per 100,000 emergency hospital admissions for COPD may be averted with brief advice alone. This may be doubled to 8 per 100,000 emergency hospital admissions for COPD when NRT is added to the intervention. More intensive interventions may reduce COPD emergency admissions by 12-13 per 100,000 emergency hospital admissions.

Raw *et al* (1998) have calculated that if GPs increased the number of brief interventions by half and recommended NRT, 18 people per five-person practice would stop smoking.

Secondary prevention

Influenza vaccination

Rationale for influenza vaccination

Influenza is a common respiratory disease that is also highly contagious. Up to 20% of the population are likely to be infected each year. For most, it is a relatively harmless disease, although those with a pre-existing respiratory disease are at increased risk of serious complications (such as pneumonia) and even death should they be infected. Influenza is responsible for a significantly large amount of hospital admissions during the winter.

Evidence of effectiveness of Influenza vaccination

Because of antigenic drift, influenza vaccinations are required annually (O'Reilly *et al*, 2002). It is recommended that this be done in October or early November (NHS Centre for Reviews and Dissemination, 1996).

Most of the evidence for the effectiveness of vaccinations relates to older people (see section on older people below). Systematic reviews have found insufficient evidence to assess the benefits and risks of influenza vaccination for people with asthma (Cates *et al*, 2002) and have concluded the most cost-effective action is to take no action in healthy adults aged 14-60 (Demicheli *et al*, 2000).

Quantifying the impact of influenza vaccination

Gross *et al* (1995) found that a significant number of influenza related admissions in the over 65s can be reduced ranging from 28%-72%.

There is insufficient evidence to quantify the impact on admissions.

Pneumococcal vaccination

Rationale for pneumococcal vaccination

Pneumococcal disease is an infection caused by a type of bacteria called *Streptococcus pneumoniae*. When these bacteria invade the lungs, they cause the most common kind of bacterial pneumonia and can then invade the bloodstream (bacteremia) and/or the tissues and fluids surrounding the brain and spinal cord (meningitis). While anyone can contract pneumococcal disease, some people are at greater risk from the disease. These include people 65 and older, the very young, and people with special health problems such as cardiovascular or pulmonary diseases for whom it is widely recommended in the US (National Coalition for Adult Immunization, 2002). However, in the UK it is only recommended for patients with chronic organ dysfunction and immunosuppression (Department of Health, 1996). Pneumococcal vaccination is only required once every five years.

Evidence of effectiveness of pneumococcal vaccination

Evidence for the effectiveness of pneumococcal vaccination is contradictory.

A systematic review by Hutchison *et al* (1999) that vaccination with pneumococcal vaccines reduces the risk of infection by very significant results and is effective in elderly people. Unfortunately, this did not include studies published after November 1996 (which did not show pneumococcal vaccination to be effective) but did include studies from non-industrialised countries which have very different populations and climates.

A very recent systematic review carried out only on studies from the industrialised world found that in industrialised populations, no benefit was detected for outcomes other than pneumococcal bacteraemia, and this did not reach statistical significance. In non-industrial populations, clear benefit was demonstrated for mortality and all-cause pneumonia (Watson *et al*, 2002). These findings have been supported by a systematic review (in Spanish) by Puig-Barbera (2002) and echoed in the evidence-based world where the

following comment was made: “Much resource is put into increasing pneumococcal vaccination in at-risk groups. Perhaps it is time to consider whether this is doing more harm than good” (Anon, 2000).

Indeed, in the analysis confined to the UK defined high risk groups, Watson *et al* (2002) found non-significant adverse effects for overall mortality, pneumococcal and all-cause pneumonia. A non-significant protective effect was found for bacteraemia.

In older adults, estimates for overall mortality and pneumococcal pneumonia showed no significant change, with a significant increase in all-cause pneumonia and non-significant protective effect for bacteraemia.

These findings seem to contradict clinical experience and a further search for evidence is required.

Quantifying the impact of admissions pneumococcal vaccination

There is insufficient evidence to quantify the impact on admissions.

Access to specialist support

Rationale for access to specialist support

Access to specialist support entails access to a specialist nursing teams or physicians for people with asthma or COPD.

Evidence for effectiveness of access to specialist support

In an RCT, Levy *et al* (2000) investigated whether hospital-based specialist asthma nurses improved recognition and self-treatment of asthma episodes by patients followed up after attending A&E for asthma exacerbations. The intervention offered three 6-weekly outpatient appointments with one of two specialist asthma nurses for a structured asthma consultation, after attendance at the accident and emergency department. Following assessment of their asthma treatment and control, the nurses advised patients, through the use of self-management-plans, how to recognize and manage uncontrolled asthma and when to seek medical assistance. Hospital-based specialist nurses reduced asthma morbidity by improving patient self-management behaviour in acute attacks leading to reduced symptoms, improved lung function, less time off work and fewer consultations with health professionals.

An RCT has also suggested that nurse led care for children with asthma may also be beneficial (Madge *et al*, 1997). This was aimed at children who had been admitted to hospital to try to prevent further readmissions. The intervention consisted of a brief meeting with the parents within 24 hours of admission followed by two discussion teaching sessions lasting about 45 minutes in total, with one further appointment 2-3 weeks after discharge. Medication (oral steroids) was provided and telephone advice was also available.

A recent study found that case management of patients with recurrent COPD admissions fared better than those who received no intervention in terms of quality of life and

reduced bed days, but it was concluded more evidence was needed from an RCT (Poole *et al*, 2001).

An unrelated RCT found that following an emergency COPD event, patients discharged early and supported by specialist respiratory nurses fared just as well as those who remained in hospital on the medical ward that they were originally admitted to. However, no differences were found in the subsequent need for readmission (Cotton *et al*, 2000).

Quantifying the impact of access to specialist support

For asthma patients non-significant improvements were found with visits to hospital but the intervention group increased their use of rescue medication by 89% cases compared to controls, and 76% compared to controls (Levy *et al*, 2000).

Madge *et al* (1997) found that in children with asthma, subsequent re-admissions were significantly reduced in the intervention group from 25% to 8%. The intervention group had a NNT of 6.1 (3.8-15.0).

Poole *et al* (2001) found the number of bed days needed by COPD patients fell from 22% to 8% largely due to a reduction in the average length of hospital stay from 5.6 days to 3.5 days.

Cotton *et al* (2000) found a reduction in the average length of hospital stay from 6.1 days to 3.2 days.

There is insufficient evidence to quantify the impact on admissions, although the nurse led service for children with asthma may result in one less child being readmitted for every six seen.

Tertiary prevention

Pulmonary rehabilitation

Rationale for pulmonary rehabilitation

For many people with respiratory diseases, particularly COPD, the only treatment available is rehabilitation. The aim of rehabilitation is to relieve dyspnoea and fatigue.

Evidence of effectiveness of pulmonary rehabilitation

A recent prospective study found a comprehensive interdisciplinary inpatient pulmonary rehabilitation programme with an average length of stay of 21 days to have beneficial results (Stewart *et al*, 2001).

A recent trial evaluated the effectiveness of home visits by a community nurse for patients with COPD after discharge from hospital. These were carried out twice; at 1 and 4 weeks after discharge. At the first visit, there was preventive education and advice. This had no impact on hospital admission or overall functional status (Hermiz *et al*, 2002).

Another study has looked at differences in specialised nursing care at home compared with care at home delivered by non-specialist nurses. This found no differences between the two modes of care at 4 months and 9 months after discharge from hospital (Ketelaars *et*

al, 1998). This may have been because the specialist care was not specific or intensive enough.

A systematic review of trials looked at rehabilitation that consisted of exercise training for at least four weeks with or without education and/or psychological support, compared with conventional community care without rehabilitation (Lacasse *et al*, 2002). This found therapy to be effective in relieving dyspnoea and fatigue.

A comparison of patients with COPD and those without but with other severe pulmonary diseases found similar results in both sets of patients who undertook inpatient rehabilitation for four weeks (Foster and Thomas 3rd, 1990).

Quantifying the impact of pulmonary rehabilitation

The study by Stewart *et al* (2001) found 88% of individuals walked farther, whereas bed-bound patients decreased 10-fold; supplemental oxygen use dropped 33% during the day and 57% during the night; 82% showed improved quality of life scores; 67% showed improved knowledge of COPD; and 67% of the sample spent less time in the hospital during the 12 months after program completion compared with the 12 months before admission (Stewart *et al*, 2001).

A decrease in hospital admissions in 67% of patients may be achieved.

Findings: Interventions to reduce emergency admissions by elderly people (aged 75 and over)

Introduction

Older people are often admitted and readmitted to hospital because they are more likely to have chronic diseases. However, they are often admitted to hospital for social, family and economic conditions.

Older people want, and need, better co-ordinated public services in order for them to stay as independent for as long as possible. A recent report from the Audit Commission (2002) highlighted the impact possible on beds when this is done. A GP practice in Runcorn, working with social services, was able to identify older people most at risk of hospital admission. By doing so, and offering appropriate services, the number of hospital admissions amongst its older patients fell by 15%, reducing the average length of stay from 6.2 days to 4.3 days. Part time care managers are now being appointed in every practice in the PCT (Eaton, 2002). Similarly, a project in Plymouth, Devon, showed how more appropriate interventions could prevent many readmissions and result in better quality and more appropriate care (Bound and Gardiner, 2002).

The National Framework for Older People (Department of Health, 2001) also advocates the use of intermediate care to prevent unnecessary hospital admission and effective rehabilitation services to enable early discharge from hospital and to prevent premature or unnecessary admission to long-term residential care.

As the Audit Commission note, past efforts have concentrated on redesigning health services, but the development of PCTs offers “enormous scope to redesign services across agency boundaries to deliver integrated care locally” particularly where these are coterminous with social services departments. Both this report by the Audit Commission (2002) and the NSF for Older People emphasise the need for multi-agency working.

The NSF for Older People also states that intermediate care should be used as an opportunity to maximise people's physical functioning, build confidence, re-equip them with the skills they need to live safely and independently at home, and plan any on-going support needed.

Primary prevention

Reducing smoking

Reducing smoking in older people can have similar effects on circulatory and respiratory diseases as discussed above (USPSTF, 2002). However, the benefits may be less clear-cut because of other comorbidities associated with advanced age. This is **not** however an argument against interventions being available for older people.

Healthy eating

Rationale for healthy eating

Being either overweight or underweight can have a detrimental effect on an older person's health and well-being. Being overweight is related to a higher risk of developing diabetes, and a higher prevalence of osteoarthritis of the knees, which in turn can lead to falls (see below).

Amongst older women increased risk of hip fracture has also been associated with extreme thinness (Department of Health, 2001). Change to a diet containing whole grain cereals and more fruit and vegetables also has the potential to reduce constipation which affects the quality of life of about 20% of older people (Cummings *et al*, 1992).

Evidence of effectiveness of healthy eating

Evidence on effectiveness of healthy eating interventions for people aged 75 and over appears to be conflicting. On the one hand, the Department of Health (2001) state that healthy eating is likely to promote a sense of well-being and self esteem and recommend that advice on diet is recommended and should take into account the older person's culture and not refer solely to a diet that would be unsuitable for some communities. (Department of Health, 2001). On the other hand, the Scottish Executive (2001) state there is limited evidence for the effectiveness of healthy eating interventions in older people, noting that American studies may not be generalisable in the UK.

Quantifying the impact of healthy eating

Within the time frame of this project, no studies were found quantifying impacts in relation to older people.

There is insufficient evidence to quantify the impact on admissions.

Physical activity

Physical activity in older people can have similar effects on circulatory diseases as discussed above although attempts to lower blood pressure and blood cholesterol by physical activity have not shown to been effective (Ebrahim and Davey Smith, 1996). Physical activity can also be beneficial for falls prevention because of its effect in reducing the rate of bone loss (see below).

Falls prevention

Rationale for interventions for falls prevention

Around 30% of over 65 years living in the community and around 50% living in institutions fall each year (Province *et al*, 1995) accounting for 20% of all orthopaedic beds, with an average bed-stay of 30 days (Todd *et al*, 1995); the proportions are higher amongst people aged 75 and over - by the age of 85, around 50% fall every year (Research into Ageing, 2000).

Around 20% of all falls require medical attention (Gillespie *et al*, 2002). More seriously, around 6% result in a fracture (Province *et al*, 1995), after which less than a third of older people are likely to regain their independence. Some degree of permanent disability is not uncommon and up to 20% may later die (Laxton *et al*, 1997; Todd *et al*, 1995).

Falls are the leading cause of death in over 75s (Health Education Authority, 1999).

The hip is perhaps the most susceptible bone to fracture, with around 1% of all falls resulting in a hip fracture (Province *et al*, 1995). In 1990 there were 249 men and 743 women per 100,000 population in 1990 suffering from hip fracture (Kisely, 1996). Hips and other bones will fracture for different reasons, but osteoporosis will be a major factor in the elderly, especially women. Up to 14,000 people a year die in the UK as a result of an osteoporotic hip fracture (Melton, 1988).

The NSF for Older People states that a specialist falls services should be established within specialist multidisciplinary and multi-agency services for older people and work with older people who are at high risk of falling (Department of Health, 2002). As the Scottish Executive (2001) state: "When advising elderly patients on measures to prevent falls the nurse should involve other services e.g. housing department, social work department or occupational therapists to ensure that environmental risk factors are eliminated or reduced."

Evidence of effectiveness of interventions for falls prevention

A systematic review found that interventions that screen and assess risk for falls, interventions to strengthen muscles and withdrawing psychotropic medication where this is possible all reduce the risk of falls (Gillespie *et al*, 2002).

Individually tailored interventions delivered by a health professional are more effective than standard or group delivered programmes. Counselling older people on measures to prevent falls is recommended although there is insufficient evidence that counselling alone is likely to change behaviour (Scottish Executive, 2001).

A Swedish population based case-control study has suggested that in women, the replacement of endogenous with exogenous oestrogen reduces the risk of hip fracture (Michaëlsson *et al*, 1998). Hormone replacement therapy (HRT) can be initiated several years after menopause without the loss of protection against fracture, although if HRT had been stopped for five years, the benefit had disappeared.

It has been suggested that HRT for hysterectomized women without menopausal symptoms may be cost-effective given that such women are at elevated risk of fracture and need cheaper, unopposed, estrogens (Fleurence *et al*, 2002).

Quantifying the impact for interventions for falls prevention

Multidisciplinary, multifactorial, health/environmental risk factor screening/intervention programmes for unselected community dwelling older people reduce the risk of falls by 27% (RR= 0.73; 95% CI: 0.63-0.86) (Gillespie *et al*, 2002).

A programme of muscle strengthening and balance retraining, individually prescribed at home by a trained health professional reduce the risk of falls by 20% (RR=0.80; 95% CI: 0.66-0.98) (Gillespie *et al*, 2002).

Based on only one trial, it was found that the withdrawal of psychotropic medication reduced the risk by 66% (relative hazard=0.34; 95% CI: 0.16-0.74).

Evidence for the use of HRT has now been backed up with evidence from meta-analyses of randomised trials which found a 33% reduction in vertebral fractures and 27% reduction in nonvertebral fractures (Torgerson and Bell-Syer, 2001a, 2001b).

The impact on emergency admissions from falls prevention could be significant. This could be a minimum of 20% based on the above evidence.

Secondary prevention

Minimising the impact of falls

Rationale of interventions for minimising the impact of falls

As well as falls prevention, there is often the need for minimising the impact of falls, i.e. targeting those already known to be at risk.

Evidence of effectiveness of interventions for minimising the impact of falls

Multidisciplinary, multifactorial, health/environmental risk factor screening/intervention programmes for older people with a history of falling were found in a systematic review to be effective (Gillespie *et al*, 2002).

Home hazard assessment and modification by a health professional was even more effective. A reduction in falls was seen both inside and outside the home (Gillespie *et al*, 2002).

Quantifying the impact of interventions for minimising the impact of falls

Multidisciplinary, multifactorial, health/environmental risk factor screening/intervention programmes for older people with a history of falling, or selected because of known risk factors reduced the risk of falling by 21% (RR= 0.79; 95% CI: 0.67-0.94) (Gillespie *et al*, 2002).

Home hazard assessment and modification by a health professional and prescribed for older people with a history of falling reduced the risk of falling by 36% (RR=0.64; 95% CI: 0.49-0.84) (Gillespie *et al*, 2002).

The impact on emergency admissions from interventions to minimise falls could be significant. This could be a minimum of 21% based on the above evidence.

Influenza vaccination

Rationale for influenza vaccination

As noted above, influenza vaccination is widely recommended for vulnerable groups, which includes the elderly. Most of the deaths from influenza occur in this age group, it being estimated that 85% of deaths occur in the over 65s (NHS Centre for Reviews and Dissemination, 1996). The UK national target for influenza immunisation coverage in older people is 70%. Everyone aged 65 and over should be actively contacted and offered flu vaccine (Department of Health, 2001).

A recent audit of 12 GP practices participating in the Northern Ireland Data Retrieval in Primary Care Project found that nearly two-thirds of people aged over 65 were vaccinated against influenza in the winter of 2000 (O'Reilly *et al*, 2002). However, the rates peaked at the age of 85 and thereafter declined, so that only half those aged over 90 were vaccinated. It was also thought that those living in residential homes were less likely to be vaccinated. These are likely to be even more vulnerable groups of elderly people.

Evidence of effectiveness of Influenza vaccination interventions

Because of antigenic drift, influenza vaccinations are required annually (O'Reilly *et al*, 2002). It is recommended that this be done in October or early November (NHS Centre for Reviews and Dissemination, 1996).

Evidence for both the effectiveness and cost-effectiveness of influenza vaccinations is extremely strong from systematic reviews (Gross *et al*, 1995; NHS Centre for Reviews and Dissemination, 1996).

To increase coverage, immunization needs to be part of a multi-strategy. Evidence from systematic reviews has found strong evidence for reminder/recall systems for improving vaccination coverage, as well as multicomponent interventions (Task Force on Community Preventive Services, 2000a; 2000b). These multicomponent interventions included education, but evidence for education alone is insufficient. Home visiting also increases coverage, but is unlikely to be cost-effective.

Quantifying the impact of influenza vaccination

The following impacts are from Gross *et al* (1995):

In the cohort studies there were the following findings as a result of vaccination:

- 68% (95% CI: 56%-76%) reduction in mortality
- 56% (95% CI: 39%-68%) reduction of respiratory illness
- 50% (95% CI: 28%-65%) reduction in pneumonia
- 50% (95% CI: 28%-65%) reduction in hospital admissions.

The trial demonstrated similar results, i.e.:

- 69% (95% CI: 54%-79%) reduction in mortality caused by influenza
- 49% (95% CI: 27%-64%) reduction in respiratory illnesses resulting from influenza
- 59% (95% CI: 35%-74%) reduction in pneumonia resulting from influenza
- 56% (95% CI: 32%-72%) reduction in influenza related hospital admissions

Vaccine efficacy in the case-control studies ranged from 32% to 45% for preventing hospitalisation for pneumonia, from 31% to 65% for preventing hospital deaths from pneumonia and influenza, from 43% to 50% for preventing hospital deaths from all respiratory conditions, and from 27% to 30% for preventing deaths from all causes.

A significant impact on reducing hospital admissions in the 75s and over can be expected, ranging from 28% to 72%.

Information from Manitoba in Canada has shown that over half of the patients admitted for influenza are aged over 65. The vast majority of these are aged 75 or over (40% of all influenza admissions in 1998/99) (Menec *et al*, 2001).

Blood pressure management

Rationale for blood pressure management

Controlling blood pressure is important for reducing the risk of stroke and other circulatory diseases. An increase in systolic blood pressure to 140mmHg or over and a decrease in diastolic blood pressure to under 90mmHg causes isolated systolic hypertension which increases the risk of CHD and occurs in three quarters of all people aged 75 and over (Basile, 2002).

Behavioural interventions include educational approaches to help patients adopt healthy lifestyle changes (e.g. diet and exercise) and self-monitoring of blood pressure to increase patients' awareness about their condition (which may lead to positive behaviour changes such as improved adherence to medications).

Evidence of effectiveness of blood pressure management

The evidence of healthy eating interventions, physical activity interventions and smoking cessation programmes is presented elsewhere, although systematic reviews have found eating oily fish - rich in omega-3 fatty acids - and taking fish supplements are more beneficial for people with hypertension than those without (Ebrahim and Davey-Smith, 1996; Marckmann and Gronbaek, 1999).

Cutting down on alcohol is also beneficial (Ebrahim and Davey-Smith, 1996). There is a dose-response relationship between daily alcohol consumption and elevations in blood pressure although moderate consumption may have beneficial effects on CHD risk (USPSTF, 2002).

A systematic review found equivocal results regarding the effectiveness of primary care based interventions on diet and physical activity to reduce blood pressure but concluded this should not be considered as proof of no effect (Margetts *et al*, 1999).

Another systematic review found a small but clinically significant impact of aerobic exercise in reducing systolic and diastolic blood pressure (Halbert *et al*, 1997).

There is strong evidence to support medical treatment of even mild degrees of hypertension (Ebrahim and Davey-Smith, 1996). Basile (2002) has highlighted reductions in systolic blood pressure reduce the risk of stroke, heart failure, coronary events and mortality. However, systolic blood pressure is more difficult to control than diastolic blood pressure (Hyman and Pavlik, 2001).

The absolute effects of treatment are far greater at older than younger ages (Ebrahim and Davey-Smith, 1996). It is important to note that this evidence of medical treatment benefits applies to elderly people who are not suffering from other serious conditions, for whom use of antihypertensive drugs may be hazardous.

Evidence exists from a RCT that reducing salt intake in elderly patients by 5g per day can significantly reduce blood pressure with an effect similar to the reductions achieved in trials assessing treatment with a single anti-hypertensive (Cappuccio *et al*, 1997).

A recent systematic review showed that when counselling to encourage lifestyle changes (healthy eating, weight loss, exercise and smoking cessation) is added on top of antihypertensive medication, blood pressure management is further improved (Boulware *et al*, 2001).

Self-monitoring of blood pressure at home to have a small but significant effect on blood pressure control, which may also be cost saving. Nevertheless, the evidence-base was found to be small and more studies are required (Ebrahim, 1998). More recently, a systematic review found insufficient evidence to conclude whether self-monitoring offers consistent improvement in blood pressure over counselling or usual care (Boulware *et al*, 2001).

Quantifying the impact of blood pressure management

The systematic review of end-point trials has indicated that for a reduction of 10-12 mm Hg in systolic blood pressure or 5-6 mm Hg in diastolic blood pressure, the incidence of stroke is reduced by 38% and ischaemic heart disease by 16% (Swales, 1999). According to the USPSTF (2002), a 5-6 mm Hg in diastolic blood pressure in everyone with hypertension (i.e. everyone of any age) could reduce the incidence of CHD by 14% and the incidence of strokes by 42%.

Despite this, studies on the effectiveness of treatment - carried out both in specialist hypertension clinics and in the community - have all shown that patients receiving treatment for hypertension continue to be at increased risk of cardiovascular disease (Swales, 1999).

One trial found that restricting salt intake to 80 mmol daily reduced systolic blood pressure by 4.3 mm Hg and diastolic blood pressure by 2 mm Hg, and a combination of

weight loss and salt restriction reduced blood pressure more than either strategy by itself and decreases the need for antihypertensive treatment (Whelton *et al*, 1998).

Aerobic exercise training reduced systolic BP by 4.7 mm Hg (95% CI: 4.4 mm Hg - 5 mm Hg) and diastolic BP by 3.1 mm Hg (95% CI: 3.0 mm Hg - 3.3 mm Hg) as compared to a non-exercising control group (Halbert *et al*, 1997).

Ebrahim and Davey-Smith (1996) found a reduction of between 25% - 33% in the risk of CHD and stroke with medical treatment. Basile (2002) has highlighted two trials which showed that when systolic blood pressure is reduced by 20mm Hg to under 150mm Hg or 160mm Hg, there was a 35%-40% reduction in stroke, 50% in heart failure, 16% in coronary events and a 10%-15% reduction in mortality.

The additional benefit of counselling found by Boulware *et al* (2002) is difficult to estimate because counselling varied in length, frequency and duration.

Ebrahim and Davey-Smith (1996) found 60 people over 65 years must be treated with antihypertensive drugs for five years to avoid one cardiovascular death (compared with 200 people aged about 50 years old).

There is insufficient evidence to quantify the impact on admissions.

Tertiary prevention

Stroke rehabilitation

Background

Stroke has a major impact on people's lives. It is the single biggest cause of severe disability and the third most common cause of death in the UK. The risk increases with age. Each year 110,000 people in England and Wales have their first stroke, and 30,000 people go on to have further strokes. It starts as an acute medical emergency, presents complex care needs, may result in long-term disability and can lead to admission to long-term care. Around 30% of patients die in the first month after a stroke, most in the first ten days. Although after a year, 65% of surviving stroke patients can live independently, 35% are significantly disabled and many need considerable help with daily tasks or visits from a district nurse. Recovery can continue for several years after a stroke (Department of Health, 2001).

Some population groups are at higher risk of stroke than others. Data from the Health Survey for England show that amongst African-Caribbean and South Asian men the prevalence of stroke was between about 40% and 70% higher than that of the general population after adjusting for age. People in socio-economic group V (unskilled manual workers) have a 60% higher chance of having a stroke than those in socio-economic group I (professionals), and the mortality rates from stroke are 50% higher in socio-economic group V than in socio-economic group I (Clark and Opit, 1994; Stewart *et al*, 1999).

Evidence of effectiveness of stroke rehabilitation

Rehabilitation reduces the risk of older people being readmitted to hospitals or being placed in long-stay residential care and improves survival rates and physical and

cognitive functioning, provided there is timely access to services, comprehensive assessment leading to implementation of individual care plans, and effective co-ordination and continuity in service delivery (Audit Commission, 1998; Evans *et al*, 1995). Effective rehabilitation can also ensure that, where people do need to enter long-term residential care, they can enter the most appropriate type of care and do so in ways that maximise their independence.

There is strong evidence from systematic reviews that people who have a stroke are more likely both to survive and to recover more function if admitted promptly to a hospital based stroke unit (Langhorne and Dennis, 1998). Although the evidence is less clear, stroke units may also reduce the number of inpatient days spent in hospital.

The NSF for older people states that given the higher prevalence of stroke in some minority ethnic communities, integrated stroke services and stroke prevention advice should take into account the need for interpreting or advocacy support, especially for those patients and carers for whom English is not their first language (Department of Health, 2001). It also states that whilst rehabilitation will vary according to needs, it might include:

- Speech and language therapy for patients with communication or swallowing difficulties;
- Nutritional advice if texture modification or other nutritional support is required;
- Physiotherapy to improve mobility and independence at home;
- Occupational therapy to help adjustment back to the workplace;
- Occupational therapy to assess and manage problems with activities of daily living;
- Clinical psychology for patients with problems affecting intellectual function or mood;
- Specialist treatment for patients with bladder or bowel problems;
- Equipment to support independent living.

Long-term support is likely to be needed. The NSF for older people states that this should include:

- Providing patients and carers with the name of a stroke care co-ordinator they can contact for advice or to discuss changing needs or to facilitate access to rehabilitation services as appropriate;
- Making sure stroke patients are followed up to ensure expert team care, including medical care to prevent further stroke;
- Hospital outreach teams delivering care in people's own home;
- Regular reviews of medication and nutritional well-being;
- Providing patients with advice, treatment and support to reduce risk of further stroke;

- Providing social and emotional support to minimise the loss of independence following the stroke, and help manage the consequences of stroke;
- Ensuring that accommodation after discharge - whether ordinary housing, sheltered accommodation or a care home - is suitable to meet individual needs and that adaptations and community equipment services are provided where appropriate.

There is no evidence that services which aim to avoid hospital admissions for stroke patients can achieve the same benefits as inpatient stroke units (Langhorne *et al*, 2002). However, a recent systematic review suggested early discharge followed by home-based rehabilitation could be both effective and cost-effective (Anderson, 2002).

Quantifying the impact of stroke rehabilitation

There is insufficient evidence to quantify the impact on admissions.

Findings: Alcohol problems

Introduction

In Britain, 93% of men and 87% of women drink alcohol (Waller *et al*, 2002). Small doses of alcohol (1-4 units of alcohol a day) appear to have some beneficial effects on health, in particular coronary heart disease (Cleophas, 1999). Excessive alcohol consumption on the other hand is a cause of many health problems including coronary heart disease, liver disease and hemorrhagic stroke and is on the increase in the UK, particularly binge-drinking, most notably amongst younger people and women. The increasing number of young drinkers may lead to the development of alcohol dependence at an earlier age in a number of drinkers and the associated complications will increase the burden of alcohol related illnesses on the NHS (Pirmohamed *et al*, 2000). Currently 38% of men and 21% of women drink in excess of recommended levels (ONS, 2000).

Alcohol is often a contributory factor to suicide, self-injury, accidents and injuries relating from violence – it has been estimated that 40% of violent crimes take place when offenders are under the influence of alcohol (Blears, 2002) and 65% of suicide attempts are linked to heavy drinking (Alcohol Concern Factsheets. Factsheet 9). Alcohol misuse is a major cause of attendance and admission to general hospitals in both the A&E/trauma and non-emergency setting. It may cause admission directly, or together with other causes contribute to admission. Up to 30% of male admissions and up to 15% of female admissions to general surgical and medical wards are alcohol-related (UK Alcohol Forum, 1997). A&E staff estimate that one in six patients they see have an alcohol-related injury or problem rising to 8 out of 10 at peak times such as weekends (Waller *et al*, 1998).

Around 7% of people in England are dependent on alcohol (12% of men and 3% of women) with 15% of young people exhibiting some alcohol dependency (Single *et al*, 2001). While alcohol dependency is often considered a psychiatric disorder in its own right, it is not uncommon for people who suffer from emotional distress and mental illnesses to also suffer from problem drinking (which includes hazardous and harmful drinking)* and/or alcohol dependence. People who suffer from alcohol dependence are at substantial risk for multiple medical disorders and hospital admissions for these (Piette *et al*, 1998).

Furthermore, half of the rough sleepers are alcohol dependent (Rough sleepers unit, 1999) and over half of male prisoners (58% remand and 63% sentenced) and over a third of female prisoners (36% remand and 39% sentenced) are engaged in hazardous drinking the year prior to going to prison (Single *et al*, 1999).

The Government is committed to producing a National Alcohol Strategy, stating in the NHS Plan that this would be implemented by 2004 (Blears, 2002).

* Hazardous drinking is defined as a quantity or pattern of alcohol consumption that places patients at risk for adverse health events, while harmful drinking is defined as alcohol consumption that results in adverse events (e.g., physical or psychological harm).

Primary prevention

Primary care interventions for reducing patterns of problem drinking

Rationale for primary care interventions for reducing patterns of problem drinking

Given the health problems associated with alcohol, and the prevalence of problem drinking, primary prevention has an obvious and important role. Much of this can be done in primary care with screening for alcohol problems followed by a brief intervention by the GP. Brief interventions by the GP are increasingly being recognised as an effective means of addressing many health problems, most notably smoking cessation. Problem drinking is another area where brief interventions are gaining enthusiastic support, it being argued that they are more likely to be acceptable to individuals with less severe drinking problems than more intensive treatments, can be administered by a wider variety of providers in a wider range of settings, and are less expensive (Heather, 1986; Freemantle *et al*, 1993).

There have been a wealth of systematic reviews of brief interventions for reducing alcohol intake, all seemingly throwing up different findings. But as Waller *et al* (2002) have noted, this is largely because brief interventions to reduce alcohol intake are not homogeneous. The duration and modes of delivery as well as the contexts, all vary.

There are essentially two types of brief interventions –

1. Opportunistic brief interventions offered opportunistically in health care settings to people not specifically seeking advice or treatment for alcohol problems.
2. Specialist brief interventions offered to those who already recognise they have an alcohol problem and are seeking help for this.

The former can be viewed as primary prevention, the latter as secondary prevention

Evidence of effectiveness of primary care interventions for reducing patterns of problem drinking

A systematic review of 38 studies performed in primary care found the use of formal screening instruments to be effective in identifying people with alcohol problems (Fiellin *et al*, 1999). A variety of screening methods were evaluated. The Alcohol Use Disorders Identification Test (AUDIT) and CAGE questions consistently performed better than other methods, including quantity-frequency questions with AUDIT performing best for problem drinking and CAGE for alcohol dependence. However, more recently Rumpf *et al* (2002) noted that screening questionnaires are developed in clinical settings and there are few data on their performance in the general population. Rumpf *et al* (1997) previously advocated the use of LAST (Leubeck Alcohol dependence and Abuse Screening Test – a composite of two CAGE and five MAST [Michigan Alcoholism Screening Test] questions) in both the general practice and hospital settings. When they tested both LAST and AUDIT in a general population sample in northern Germany they found that AUDIT and LAST showed insufficient sensitivity for at-risk drinking and alcohol misuse using standard cut-off scores, but had satisfactory detection rates for alcohol dependence (Rumpf *et al*, 2002). In logistic regression analyses, having had a hospital admission increased the sensitivity in detecting any criterion group of the LAST, and the number of

recent general practice visits increased the sensitivity of the AUDIT in detecting alcohol misuse. Women showed lower scores. It was therefore concluded that setting specific instruments (e.g. primary care or general population) or adjusted cut-offs should be used.

Few published trials of brief interventions have been performed exclusively in community-based primary care settings (Fleming and Manwell, 1999).

Moyer *et al* (2002) found strong evidence for very brief interventions delivered opportunistically by healthcare professionals to non-treatment seeking populations from their systematic review of 34 such studies. According to Heather (2002), this review is: "the most comprehensive and methodologically sound of any to have appeared on this topic so far ... the effectiveness of brief interventions has been proved, to borrow the legal concept, beyond reasonable doubt."

However, while the brief interventions of 5-10 minutes that Heather argues are effective do tend to be the ones offered in primary care, and thus seen as primary prevention, more intensive interventions have also been conducted in primary care. Poikalainen's (1999) systematic review of seven studies found that when a distinction is made between very brief interventions (lasting between 5 and 20 minutes) and extended brief interventions (which may comprise several visits and counselling), only the more extensive interventions were found to be effective. Furthermore, these more intensive interventions could only be concluded to be effective for women (but from only two RCTs) as while the evidence also suggested effectiveness for men, a significant lack of statistical homogeneity between these studies was found. Ashendon *et al* (1997) found from their systematic review of six RCTs which aimed to reduce alcohol intake, the trial showing the greatest effectiveness was concerned with more intensive advice and they concluded the evidence was inconclusive.

It has also been questioned whether the findings from these studies can be replicated to the general population because of the barriers that exist to carrying out brief interventions. For example, McAvoy (2000) notes that currently in the UK there is no centrally funded approach to improve medical education about alcohol problems while Beich *et al* (2002) found Danish GPs unable to establish a rapport with patients screening positive for alcohol problems. In this qualitative study, brief interventions required considerable resources and screening and advice interrupted the natural course of consultations and was inflexible, creating more problems than solved for participating GPs. GPs also questioned at times the honesty of patients answering the AUDIT questionnaire and many heavy drinkers avoided screening or when identified as at risk by screening, resisted advice on modifying their drinking behaviour. Pirmohamed and Gilmore (2000) note that Alcohol Concern recommend the employment of addiction counsellors in primary care while Owens *et al* (2000) found in Liverpool that while most practice nurses give routine advice on sensible levels of alcohol consumption (96%), many also lack training. An interesting, if old, US study found that in identifying "alcoholics" among 1,355 hospital admissions, primary care physicians had an 11% lower recognition rate for "alcoholism" than admitting physicians, and primary care nurses had a 12% lower recognition rate than admitting nurses (Cohen *et al*, 1986).

Ashenden *et al* (1997) conclude that chances of brief interventions having an effective outcome need to come from more GPs offering advice routinely and repeatedly or directing advice at more high-risk groups. Owens *et al* (2000) conclude that practice nurses

are under-utilized for the management of alcohol misuse in the community and their involvement needs to be encouraged further. Training for nurses will increase their knowledge and confidence and could even lead to participation in, for example, home detoxification of patients.

Quantifying the impact of primary care interventions for reducing patterns of problem drinking

Up to 20% of patients presenting to primary care may be hazardous drinkers (USPSTF, 2002) and these could thus be identified by screening.

As noted above AUDIT was most effective in identifying subjects with at-risk, hazardous, or harmful drinking (sensitivity, 51%-97%; specificity, 78%-96%), while the CAGE questions proved superior for detecting alcohol abuse and dependence (sensitivity, 43%-94%; specificity, 70%-97%).

Moyer *et al* (2002) found small-medium sized effects of brief advice. A small effect size (0.20) in favour of brief interventions translates into 55% of individuals treated with brief interventions falling above the median on a given outcome compared to only 45% of individuals in the control condition; a medium effect size (0.50) in favour of brief interventions translates into corresponding percentages of 62% and 38%. None of the outcome measures related to hospital admissions but were a composite of drinking behaviour, alcohol related problems and severity of dependence.

Freemantle *et al* (1993) found brief interventions can result in a 24% (95% CI: 18%-31%) reduction in alcohol consumption.

Poikolainen (1999) found that extended brief interventions could result in a decrease of alcohol intake by an average of half a drink a day in women.

Results from the RCT of Project TrEAT (Fleming *et al*, 1997) resulted in a significant reduction in 7-day alcohol use (19.1 at baseline to 11.5 at 12 months for the experimental group vs 18.9 at baseline to 15.5 at 12 months for controls), binge drinking (5.7 at baseline to 3.1 at 12 months for the experimental group vs 5.3 at baseline to 4.2 at 12 months for controls) and frequency of excessive drinking (47.5% drank excessively at baseline compared to 17.8% at 12 months for the experimental group vs 48.1% at baseline to 32.5% at 12 months for controls). The chi² test of independence revealed a significant relationship between group status and length of hospitalisation over the study period for men (P<0.01).

Lindholm (1998) notes that advice from primary health care staff has a potential to be a very cost-effective means of intervention. The crucial point seems to be the number of people that makes durable changes in consumption. Based on the work of Fleming and Manwell (1999), Ludbrook *et al* (2002) estimated the cost of a GP consultation to be £1.92 a minute (£20.80 for a 15 minute consultation) with this reducing to 30p a minute if the advice was delivered by a practice nurse. Screening costs are only given for time spent with a practice nurse – this being £1.50 for 5 minutes. (i.e. the same cost as a five-minute assessment with a practice nurse). They modelled the total cost as follows (based on the assumption that 22.8 screenings and 3.78 assessments are required for every patient receiving a primary care intervention):

Costs for a total of 22.8 patients screened	£34.20
Costs for a total of 3.78 patients assessed*	£5.67
Intervention of 15 minutes	£20.80
Follow-up also of 15 minutes	£20.80
Two telephone follow ups:	
Five minutes of practice nurse time for each call	£3.00
Training costs per patient	£2.27
Total cost of extended brief intervention	£86.74

* Assuming there are 92 interventions per year

However, Ludbrook *et al* (2000) also note that savings from reduced future use of health care services need to be interpreted with care. It is more likely that resources will be released for alternative uses than that financial savings will be achieved.

Secondary prevention

Preventing alcohol related injuries

Rationale for interventions for preventing alcohol related injuries

International studies show that alcohol is estimated to be a factor in 20-30% of all accidents (Honkanen, 1993). Research and statistics indicate that in the UK alcohol is a contributive factor in 20% of fatal accidents at work, 15% of drownings and 39% of deaths in fires. Furthermore, one in seven traffic deaths were alcohol-related in 1998 and 460 people died in drink-drive accidents and 2520 were seriously injured. 36% of pedestrians killed on the roads had drunk over the legal limit for driving in 1998 (Alcohol Concern Factsheets. Factsheet 9).

The A&E department offers arguably the greatest window of opportunity for preventing alcohol related problems - one in eight attendances at the Royal Liverpool University Hospitals A&E department are overtly alcohol related and 277 new outpatient visits were generated (mean 4.6 per patient) over an 18-month period from initial attendance with an alcohol related problem. A third of outpatient visit were for orthopaedics and a third of all outpatients failed to keep their appointments (Pirmohamed *et al*, 2000). Waller (1998) has shown that one in six people attending A&E for treatment had alcohol-related injuries or problems, rising to 8 out of 10 at peak times. Furthermore, Alcohol Concern note that around half of seriously injured patients admitted via A&E and needing to stay on in hospital have an alcohol related injury. Road accidents are the most prominent cause of injury and fatalities with alcohol intoxication estimated to be a factor in 20% to 33% of all road injuries (Alcohol Concern Factsheets. Factsheet 9). Pirmohamed *et al* (2000) found that the under-40 year olds represented half of all A&E attenders; most of these will be hazardous drinkers and thus amenable to intervention, such as brief advice. Brief interventions may or may not be more intensive and less opportunistic in such settings than interventions for primary prevention.

Walk-in centres may offer another opportunity for offering interventions (Lynn Owens, personal communication, 7th February 2003).

Evidence of effectiveness for preventing alcohol related injuries

A systematic review of 19 RCTs by Dinh-Zarr *et al* (1999; 2003) found that treatment for problem drinking was associated with reduced suicide attempts, domestic violence, falls, drinking-related injuries, and injury hospitalisations and deaths, with reductions ranging from 27 to 65%. Interventions among convicted drunk drivers reduced motor vehicle crashes and injuries. However, they were not able to draw any firm conclusions about effectiveness and it should be noted that the range of treatments were heterogeneous, a diverse range from brief interventions through to detoxification, aftercare and comprehensive inpatient and outpatient treatments.

Moyer *et al* (2002) found brief interventions by healthcare professionals delivered to treatment seeking individuals to be no more effective than control conditions from their systematic review of 20 such studies. The implication is, therefore, that brief interventions have limited value in secondary prevention as much of this type of prevention tends to be provided by specialists who are better suited for delivering more promising specialist treatment approaches (Drummond, 1997).

However, not all brief advice in a secondary prevention context need be offered by specialists and to people actively seeking treatment, it can again be offered opportunistically. As Heather (2002) argues: "a longer type of brief intervention based on principles of motivational enhancement could be offered usefully to excessive drinkers who do not recognize a problem with their alcohol consumption, assuming that certain classes of health professionals have the time and inclination to deliver it. There is some evidence to support this hypothesis from a trial of brief interventions among hospital inpatients in Sydney (Heather *et al*, 1996), but more research is clearly needed on this key issue." Wilk *et al* (1997) pooled data from six trials of interventions in inpatient and outpatient settings and found those receiving motivational behaviour were twice as likely as controls to change their behaviour. These were all in a secondary prevention context although their intensity varied.

More recently, effective brief interventions have been demonstrated in a trauma clinic, capitalising on the "teachable moment" which is the removal of sutures by trauma clinic nurses 5-7 days after sustaining an alcohol-related injury (Smith *et al*, 2003). But no benefit was found for patients presenting to general medicine with ulcer, cirrhosis or pancreatitis (Kuchipudi, 1990) and as Waller *et al* (2002) note, there is currently no systematic review on the effectiveness of brief interventions in hospital settings in the UK. In an earlier national survey, few hospital departments screened or offered brief interventions and considerable barriers to the implementation of a preventive response were reported (Waller *et al*, 1998).

In hospital settings, it is increasingly likely that brief advice will come from a nurse. Brown *et al* (1997) found from a survey of nurses at the Royal Liverpool and Broadgreen University Hospital NHS Trust that only 15% felt completely confident in alcohol-related skills. Most experience had been gained amongst nurses in assessment of alcohol use while least had occurred in providing alcohol use and prevention education and referring patients for alcohol counselling. As with training for GPs, there is little attention given to alcohol issues in the basic nurse training curriculum. Thus they concluded that it may be useful to have a small number of nurses trained in specialist forms of alcohol counselling or to have an alcohol specialist nurse in every hospital who could have an important role in screening for alcohol misuse and delivering brief interventions, particularly in A&E

(Pirmohamed and Gilmore, 2000; Pirmohamed *et al*, 2000). A specialist nurse has now been appointed in Liverpool. Training of A&E staff has also occurred and the findings from an evaluation of the effectiveness of this are positive, including patient usage of A&E, outpatients and inpatients (Lynn Owens, personal communication, 7th February 2003).

Within the general hospital there needs to be a change of culture to move beyond treating the presenting disease towards tackling the underlying alcohol problem and assuming a wider responsibility for health promotion. Poor liaison between acute hospital and mental health trusts, under-resourced liaison psychiatric services and lack of support for junior staff from senior medical and nursing colleagues, all need to be tackled before a local hospital alcohol strategy for harmful and hazardous drinkers can be devised and implemented (Royal College of Physicians Working Party, 2001).

Once again, screening instruments may be useful for identifying patients in need of opportunistic brief advice, particularly in A&E. But in this setting a Swedish study found both MAST and CAGE to be insensitive to identifying binge drinking amongst women (Forsberg *et al*, 2001). As noted above (under primary prevention), CAGE is less insensitive to hazardous drinking anyway, being more suitable for detecting alcohol dependence while Bradley *et al* (1998) found from a systematic review of nine studies that AUDIT questionnaires performed adequately for women when lower cut off points (for problem drinking) were used than for men. However, Rumpf *et al*'s (2002) study suggested that LAST might be most appropriate in hospital settings while MAST has been found to be useful for psychiatric settings (Teitelbaum and Mullen, 2000).

From currently available examples of best practice, the Royal College of Physicians Working Party (2001) identified several components that appeared to be critical for the development of a successful hospital alcohol strategy:

- A screening strategy for early detection of harmful/coincidental hazardous drinkers
- Early assessment of dependence severity by appropriately trained staff
- Widely available protocols for the pharmacotherapy of detoxification
- Good links with committed liaison or specialised alcohol psychiatry services for the management of patients with more complex alcohol withdrawal
- Assessment of the need for referral to on-going support services by appropriately trained staff with knowledge of local services
- Provision of brief interventions for coincidental hazardous drinkers
- Provision of general staff education and support
- Service support from senior medical, psychiatric and nursing staff
- Research and audit.

Quantifying the impact of evidence for preventing alcohol related injuries

Heather (2001) cites one trial in which a treatment group were given a brief intervention which involved assessment of alcohol consumption, advice about the potential harmful effects of current consumption and provided with an information booklet. Here, after one year the proportion of men with excessive alcohol consumption had fallen by 44% in the treatment group compared with 26% in controls, among women the corresponding proportions were 48% and 29%.

Wilk *et al* (1997) found those receiving motivational behaviour were twice as likely as controls to change their behaviour (OR=1.95; 95% CI: 1.66-2.30).

Heather (2001) suggests that reduced drinking following a brief intervention can be maintained for four years, resulting in less than half the number of hospital days in the following 12 months among the treatment group than the control group.

Up to 2800 new outpatient visits may be avoided with effective brief advice in A&E where 1952 patients attended with alcohol-related problems – 6.2% of all A&E attendances during the time of Pirmohamed *et al*'s (2000) study. This study suggests that for every 100 patients attending A&E with an alcohol related problem, at least 31 new patients will be seen in outpatients attending 144 appointments over an 18 month period.

At the trauma clinic, Smith *et al* (2003) found a significantly greater reduction in the percentage of hazardous drinkers in the motivational intervention group (from 60% to 27%, $P < 0.009$) compared to the control group (from 54% to 51%, NS).

Kuchipudi *et al* (1990) reported the failure of a motivational intervention on injury-related hospitalisations amongst patients presenting with ulcer, cirrhosis or pancreatitis (2/59 vs 3/55; RR=0.62; 95% CI: 0.11-3.58) and on falls (3/59 vs 4/55; RR=0.70; 95% CI: 0.16-2.98).

Services for people with co-existing psychiatric or psychological disorders

Rationale for services for people with co-existing psychiatric or psychological disorders

Many people have co-existing psychiatric or psychological disorders, or a dual-diagnosis, i.e. a mental or emotional or personality disorder and a substance misuse problem (including problem drinking and/or alcohol dependence). Estimating the scale and nature of the problem is difficult as there is no agreed consensus as what constitutes a dual diagnosis, there being broad unrestricting definitions as well as more restricted definitions (Alcohol Concern, 2001). It is not only users of alcohol services who may have psychiatric or psychological disorders but also their relatives (Preisig *et al*, 2001).

However, Brady and Randall (1999) have found that women have a significantly higher prevalence of comorbid psychiatric disorders than do men and that these typically predate the substance misuse problem. Hasin *et al* (2002) recently found 75% of patients in a dual-diagnosis facility met the DSM-IV criteria for alcohol dependence and found: "Prior-onset MDD [major depressive disorder] was associated with reduced likelihood of remission of substance dependence, as was substance-induced MDD current at baseline ... Abstinence MDD was associated with substance use after hospital discharge and relapse into dependence after a stable remission." Barrowclough (2000) reported that surveys indicate

20%-60% of clients with schizophrenia may have a substance use problem. Problem drinking and/or alcohol dependence would appear to be one factor predicting recidivism for schizophrenics (Tavkar and Dernovsek, 1997).

Amongst offenders with mental disorders, prevalence rates of people with alcohol problems are likely to be higher. For example, an American study found that symptoms of alcohol/drug abuse or dependence were reported by 92% of offenders with antisocial personality disorder and by 82% of individuals with depression (Chiles *et al*, 1990). Indeed, a history of violence or offending is one of four risk factors associated with dual diagnosis identified by the Mental Health Foundation (1999), the others being: homelessness and poverty, more than one period of detention under the Mental Health Act (1983) and failure to respond to mental health services and/or treatment.

Since the 1950s, an increasing number of psychiatric services have been provided away from the inpatient setting (although it has been argued that the opposite is now occurring in some cases, e.g. compulsory admissions) (Priebe, 2003) and in the community and outpatient setting and the same has been true for alcohol services (Edwards, 1987). This was especially true in the 1990s with the emphasis on community care. It has been argued that this has increased access to alcohol (and/or illicit drugs) for people with severe mental health problems who are now living in the community (Alcohol Concern, 2001).

A Swedish study examining the effect of a move from inpatient to community mental health units found a 29% increase in patients, most having "registered alcohol abuse" (Stefansson and Cullberg, 1986) while US studies found significantly more people who had multiple admissions to a psychiatric hospital were problem drinkers and/or alcohol dependent when compared to those who were only admitted once (Carpenter *et al*, 1985; Viesselman *et al*, 1975). More recently, Wright *et al* (2000) found that in inner city populations, dual-diagnosis patients are not admitted more often than patients with psychosis alone, but they have, on average, double the inpatient stay (Wright *et al*, 2000), a problem found common to comparison with other single psychiatric diagnoses (Alcohol Concern, 2001). People with a dual diagnosis are also more frequent users of A&E (Graham *et al*, 2001).

As well as problems about definitions as to what constitutes a dual diagnosis, there are also problems concerning diagnosis. For example, it is difficult to determine the extent to which a disorder such as depression is independent to the problem drinking and/or alcohol dependence. In a recent US study, the majority of alcohol-dependent patients presented for treatment with co-existing psychological symptoms, but, for both men and women, these decreased rapidly after a 10-day detoxification period. For patients who remained abstinent over the next six weeks there was a further decline in psychological symptoms to almost asymptomatic levels. For those who resumed drinking, no such improvement was apparent. The clinical implication is that treatment for what may at first appear to be an independent co-morbid disorder may not be necessary once the patient has been withdrawn from alcohol and has achieved a period of abstinence (Allan *et al*, 2002). However, Ludbrook *et al* (2000) argue that it is important to treat co-existing psychiatric problems. Treating depression, for example, improves outcomes for drinking.

Evidence of effectiveness of services for people with co-existing psychiatric or psychological disorders

Given the added problems of service use for people with a dual diagnosis, many gaps in service provision exist. For example, many mental health services do not treat people who have an alcohol problem either because services are separated into alcohol and mental health services. Or services often believe that treatment for people with a dual diagnosis should be done in sequence, as opposed to the same time. Prejudice towards people with alcohol problems may also occur. A recent US study found that health care systems subjected people with alcohol problems to greater scrutiny before agreeing to treat them and that there was a low prevalence of such patients being seen by psychiatrists (Svikis *et al*, 2000). US studies have also suggested that integrated services are however effective. In the UK the Department of Health has established a steering group to ensure that people with a dual diagnosis receive an integrated, effective and efficient service (Alcohol Concern, 2001).

Assertive treatment (ACT) is a team-based approach aiming at keeping ill people in contact with services, reducing hospital admissions and improving outcome, especially social functioning and quality of life. In an RCT examining the effectiveness of ACT programmes for individuals with dual-diagnosis, it was found that clients in high-fidelity program had higher rates of retention in treatment and fewer hospital admissions than those in low-fidelity programs (McHugo *et al*, 1999). High-fidelity programmes consisted of four programmes and low-fidelity programmes consisted of three programmes. A systematic review into ACT for people with severe mental disorders found ACT, if correctly targeted on high users of inpatient care, can substantially reduce the costs of hospital care whilst improving outcome and patient satisfaction (Marshall and Lockwood, 2003). In this study, substance abuse (including alcohol) was not considered to be a severe mental disorder in its own right, however studies were eligible if they dealt with people with a dual diagnosis.

Quantifying the impact for people with co-existing psychiatric or psychological disorders

As noted above, a study of patients using psychiatric inpatient services in Croydon found people with a dual-diagnosis had on average twice the length of inpatient stay compared to people with psychosis alone (mean difference 67.3 days, 95% CI -205.9-71.2days) (Wright *et al*, 2000).

For all patients with a psychiatric disorder (i.e. not necessarily those with a drinking problem), those receiving ACT were more likely to remain in contact with services than people receiving standard community care (OR=0.51; 99%CI: 0.37-0.70). People allocated to ACT were less likely to be admitted to (psychiatric) hospital than those receiving standard community care (OR=0.59; 99%CI: 0.41-0.85) and spent less time in hospital (Marshall and Lockwood, 2002).

Those receiving ACT were no more likely to remain in contact with services than those receiving hospital-based rehabilitation, but confidence intervals for the odds ratio were wide. People receiving ACT were significantly less likely to be admitted to (psychiatric) hospital than those receiving hospital-based rehabilitation (OR=0.2; 99%CI: 0.09-0.46) and spent less time in hospital (Marshall and Lockwood, 2002).

Thus, it is suggestive that impacts can be made in reducing demand for admissions and bed usage although caution can be taken in extrapolating the findings from Marshall and Lockwood's review.

Tertiary prevention

Alcohol detoxification

Rationale for detoxification

There are different definitions, aims and objectives of alcohol detoxification. Some stress the engagement in aftercare but whilst this is undoubtedly important, a pragmatic definition is "treatment designed to control both the medical and psychological complications which may occur temporarily after a period of heavy and sustained alcohol use" (Stockwell, 1987). The criteria for assessing the effectiveness of detoxification tend to be severity of withdrawal symptoms and presence of medical complications, i.e. the management of alcohol withdrawal syndrome (AWS). However, alcohol detoxification in the UK is not standardized and treatment is usually determined by local policies (Williams, 2001): "What is lacking is a set of empirically based guidelines to aid decision-making about matching patients to particular types of detoxification services" (Allan *et al*, 2000).

Home detoxification tends to be a nurse-led approach with the responsibility for medication being held with the GP, although sometimes this is also held by the nurse or even the individual detoxifying from alcohol or a carer (Fleeman and Keeling, 1996). Day hospital and outpatient detoxification, like inpatient detoxification, usually come under the supervision of a specialist although inpatient detoxification can occur in general medical and psychiatric hospitals.

Evidence of effectiveness of alcohol detoxification

In keeping with the shift of services away from the inpatient setting, support for home detoxification, outpatient detoxification and day hospital detoxification is growing and there is a growing body of evidence to suggest this is no less effective than inpatient detoxification (Fleeman, 1987; Allan *et al*, 2000) and this is becoming routine practice (Watts, 2001).

It is recognised that home detoxification is not going to be suitable for everyone (for example, people with a history of fits or DTs during withdrawal) (Rassool, 1998), emphasising the need for a thorough assessment which should include criteria such as environmental and psychosocial issues alongside physical and psychological aspects. Nevertheless, a recent study has suggested that even severely problem drinkers can be detoxified at home, although this study also suggested that such drinkers might prefer and be better treated on a day hospital basis (Allan *et al*, 2000). Watts (2001) examined the concordance between the severity of alcohol dependency and nursing activity found in an episode of care for home detoxification and concluded that criteria such as environmental and psychosocial issues should be considered as seriously as physical and psychological aspects when considering the setting for detoxification. For patients for whom there is

poor psychosocial support in the home and where triggers to drink are plentiful, the home will not be the best setting for detoxification.

Medication plays a key role in managing AWS with benzodiazepines (such as chlordiazepoxide, diazepam, oxazepam, etc) commonly being recommended and used (Ludbrook *et al*, 2002). Mayo-Smith (1997) found benzodiazepines to reduce withdrawal severity and the incidence of DTs and seizures.

Usually standard dosages of medication are administered in decreasing frequency over 8-10 days. However Mayo-Smith (1997) has argued that "treatment should allow for a degree of individualization so patients can receive large amounts of medication rapidly if needed" and one method of achieving this is diazepam loading in which medication is only administered when required. This has been found to be safe and effective in three studies of inpatient detoxification and also shortens the AWS which otherwise usually lasts 5 days, the greatest risk of severe withdrawal occurring in the first 24-48 hours (Williams, 2001).

However, there are a lack of studies on the effectiveness of diazepam loading outside of inpatient settings. Williams (2001) argues how this could possibly be managed but concludes: "It would be unrealistic to transfer an inpatient diazepam loading regime directly into the community without a radical change in home detoxification operational policies." In a more recent retrospective study, symptom triggered therapy (where patients are given medication only when signs or symptoms of withdrawal appear) was found to be effective treatment for inpatients, decreasing the occurrence of DTs, especially amongst patients with no previous history of DTs (Jaeger *et al*, 2001). Patients with a history of DTs are the types of patients for whom home detoxification may be inappropriate.

Quantifying the impact of alcohol detoxification

In Allan *et al*'s (2000) study, around one in ten individuals suffered complications during withdrawal in both the home and day hospital settings. It is not stated whether this resulted in the need for admission or not. Around half in both groups became involved in further treatment which was associated with an improved outcome at 60 days. In the home detoxification group, 45% were categorized as having a "good" outcome compared to 31% in the day hospital group.

Fleeman and Keeling's (1996) review found that home detoxification on average took 10 days, the same as needed for inpatient detoxification in an Australian study (Bartu and Saunders, 1994) but with more favourable outcomes than amongst inpatients in terms of health (70% Vs 35% of inpatients) and relationships (60% Vs 35% of inpatients). Collins *et al* (1990) found that outpatient detoxification appeared to reduce the demand for inpatient detoxification by 74 inpatient weeks a year (assuming an average stay of ten days). However, home detoxification "is likely to increase demand because it attracts client groups not attracted to other forms of detoxification [Stockwell *et al*, 1990; 1991], but this should hopefully ensure that problem drinkers are helped at an earlier stage than would otherwise be the case.... It should also prove to be more cost effective" (Fleeman and Keeling, 1996). Bartu and Saunders (1994) found home detoxification to be between 12% and 26% the cost of detoxification in a specialist inpatient unit (which was, in turn, 2.7 times more costly than detoxification in a general hospital).

Alcohol “treatment” and “aftercare”

Rationale for alcohol “treatment” and “aftercare”

Many alcohol interventions are referred to as “treatment” and are clearly vast and varied and it is beyond the scope of this report to review these, not least because the aim (regarding alcohol problems, at least) is to examine public health interventions. Miller and Wilbourne (2002) have noted, determining how to classify therapeutic interventions within the catalogue of treatment modalities is clearly a difficult task. Nevertheless, they arrived at the following modalities: brief interventions, motivational enhancement (which can include brief interventions), medications, teaching coping skills, psychotherapy, marital and family therapies, mutual help approaches, specific behavioural procedures, milieu therapy and other clinical methods (such as acupuncture, physical exercise, hypnosis and educational lectures and films).

All but brief interventions may be incorporated into “aftercare” (although perhaps rather tenuously, it has been theorised that nicotine may be a relapse factor for resuming alcohol use [Stuyt, 1997] and thus the brief interventions for smoking cessation may be effective in reducing alcohol related problems as well) which is often required following “treatment” (including detoxification) for reducing the likelihood of relapses and readmissions, with the length of aftercare also being important. For example, in one study: “The transition from inpatient to aftercare services was identified as a crucial point in treatment. Aftercare S[ubject]s who did not receive services beyond 6 mo[nths] in the community were likely to be readmitted, suggesting that this period is also an important focus for treatment planning.” (Siegal *et al*, 1984).

Evidence of effectiveness of alcohol “treatment” and “aftercare”

Evidence here is limited to studies that specified they were “aftercare” and not “treatment” because of the difficulties in classification mentioned above.†

Both psychosocial and pharmacological (Disulfiram, Naltrexone and Acamprosate) interventions can be clinically effective with US, German and Belgian studies also finding them to be cost-effective. But savings from reduced future use of health care services need to be interpreted with care as they are dependent upon the key patient characteristics of alcohol dependence, psychiatric severity and the level of network support for drinking (Ludbrook *et al*, 2000).

In a study by Siegal *et al* (1984) aftercare was shown to reduce hospital readmissions. Aftercare in conjunction with inpatient stays of treatment that included rehabilitation services was singled out as the most effective form of aftercare. However, given the increasing shift of services to community and outpatient settings, the aftercare provided in these settings may now be of a higher standard and thus drawing conclusions about the

† For the record, Miller and Wilbourne (2002) found that among psychosocial treatments, strongest evidence of efficacy was found for brief interventions, social skills training, the community reinforcement approach, behaviour contracting, behavioural marital therapy and case management. For the first time, two pharmacotherapies also appeared among the most strongly supported approaches: opiate antagonists (Naltrexone, Nalmefene) and acamprosate. Least supported were methods designed to educate, confront, shock or foster insight regarding the nature and causes of alcoholism.

setting from a study this old is problematic. Two US studies have found partial hospitalisation and outpatient treatment to be more cost-effective than inpatient treatment (Ludbrook *et al*, 2000). Nevertheless, it is argued that the inpatient setting does still have its place (Edwards, 1987) and indeed, the partial hospitalisation group had been inpatients for evaluation / detoxification before they received aftercare.

In a comparison of aftercare for people dependent on alcohol provided by a community psychiatric nurse with aftercare on an outpatient basis it was found that after five years, aftercare provided by a CPN produced significantly more favourable results in terms of abstinence, blackouts, gambling and attendance of hospital meetings (Patterson, 1997). After one year, it was also reported that there were fewer hospital admissions amongst those receiving CPN aftercare (Patterson, 1991) but this was not the case at the five-year follow-up where there were no differences between the groups (1997). It should be noted that the generalisability of this study might be problematic as subjects were not randomly assigned and the study was conducted in a rural area of Northern Ireland, thus potentially preventing outpatient attendances in the control group.

It has been suggested that GPs can play an important role in relapse prevention (Friedmann *et al*, 1998), although limitations that apply to giving brief interventions may also apply.

Quantifying the impact of alcohol “treatment” and “aftercare”

Patterson (1997) reports that aftercare provided by a CPN produced significantly more favourable results in terms of abstinence rates (36% compared to 6% in the control group). Ludbrook *et al* (2000) note how one large study has shown that psychosocial interventions can result in abstinence or controlled drinking rates of between 56%-60% compared with an estimated spontaneous remission rate of 33%. Short-term results for Naltrexone suggest that relapse rates may be reduced by half. Acamprosate could save up to £600 per patient.

Findings: Musculoskeletal disorders

Introduction

In a recent exercise undertaken in the Netherlands, Musculoskeletal disorders were ranked as having the greatest impairment on quality of life of all chronic conditions and diseases (Sprangers *et al*, 2000). Osteoarthritis was ranked as the worst within musculoskeletal disorders followed by back impairments.

A recent survey has suggested that around half the population suffer from some form of chronic pain, this increasing with age (Elliott *et al*, 1999). Chronic and acute low back pain is possibly the most common musculoskeletal problem with surveys suggesting around 40% of all adults suffering from back pain lasting more than one day each year (Department of Health Statistics Division, 1999). In Elliott *et al*'s survey (1999), chronic back pain and osteoarthritis accounted for a third of all complaints, osteoarthritis rising dramatically with age. According to Bandolier, this survey indicates that much of the pain is poorly treated and that there is a potentially large demand for more or better pain relief services for the community (Anon, 1999).

Most interventions for musculoskeletal disorders are concerned with relieving pain, particularly following orthopaedic surgery. Therefore they are largely secondary and tertiary interventions.

Many patients who suffer from musculoskeletal disorders are also likely to suffer from depression. Pain can make depression worse (and vice-versa). A German study has found that anxiety, affective disorders and substance-related disorders (including alcohol) are also common and recommend that patients undergoing musculoskeletal rehabilitation should be assessed carefully for comorbid psychiatric disorders (Harter *et al*, 2002).

For severe pain opioids are the first line treatment. In a systematic review by Gould *et al* (1992), it was found that intermittent opioid injection could provide effective relief of acute pain (Gould *et al*, 1992). Unfortunately, adequate doses are often withheld because of traditions, misconceptions, ignorance and fear (McQuay, 1997). Addiction is not a problem with opioid use in acute pain. Over 11,000 patients were followed up a year after opioids were given for acute pain, and just four were considered addicts (Porter and Jick, 1980). Opioid adverse effects include nausea and vomiting, constipation, sedation, pruritus, urinary retention and respiratory depression.

Analgesics are also commonly used for pain management. Ibuprofen 400 mg (which is a non-steroidal anti-inflammatory [NSAID] drug), for example, will produce at least 50% relief of pain for one out of two postoperative patients. Ibuprofen is also the NSAID with the lowest risk of induced gastric bleeding (McQuay, 1997). Data from RCTs has suggested that phytodolor is as effective as synthetic drugs in the symptomatic treatment of musculoskeletal pain. Few adverse effects were noted with phytodolor use (Ernst, 1999).

A brief summary of effective interventions is given in *Table 7*. Interventions where there was conflicting evidence or evidence of ineffectiveness are excluded – it is noticeable how many methods of pain relief that are utilised do not have proven effectiveness (which isn't to say they are ineffective), although evidence in this area is always emerging and thus

Table 2 should not be seen in any ways as being definitive. As has been highlighted: “Those involved in the treatment of acute and low back pain need to maintain an up-to-date knowledge by regularly checking one or more sources of relevant evidence such as the Cochrane Library” (NHS Centre for Reviews and Dissemination, 2000). The same applies for all musculoskeletal disorders.

Table 7: Summary of evidence of effectiveness of interventions for reducing pain

Intervention	For	Reference (all systematic reviews)
Non-steroidal anti-inflammatory drugs*	Acute low back pain Chronic low back pain	NHS Centre for Reviews and Dissemination (2000)
Muscle relaxants*	Acute low back pain	NHS Centre for Reviews and Dissemination (2000)
Analgesics*	Acute low back pain	NHS Centre for Reviews and Dissemination (2000)
Advice to stay active	Acute low back pain	NHS Centre for Reviews and Dissemination (2000)
Back schools	Chronic low back pain	NHS Centre for Reviews and Dissemination (2000)
Behavioural treatments	Chronic low back pain	NHS Centre for Reviews and Dissemination (2000)
Exercise therapy	Chronic low back pain	NHS Centre for Reviews and Dissemination (2000)
Manipulation*, mobilisation or physiotherapy	Subacute neck pain Chronic neck pain	Hurwitz <i>et al</i> (1996)
Multidisciplinary programmes	Chronic low back pain	NHS Centre for Reviews and Dissemination (2000)

* Potentially harmful side effects which may outweigh their effectiveness, certainly for certain populations.

The development of new healthcare technologies has meant that for more and more patients, hospital admissions may not be required, even when surgery is required. With the political impetus to reduce emergency admissions and the increasing demand for acute hospital beds, alternative settings for surgery as well as pain management are increasingly being sought. Different settings may result in different levels of intensity across settings, although intensity will still vary within settings (Haldorsen *et al*, 2002).

Thus the main focus of this section on musculoskeletal disorders is to concentrate on effective settings for managing musculoskeletal disorders rather than on the interventions themselves, not least because “The orthopaedic trauma session is almost universally adopted as a means of coping with non-elective orthopaedic demand” (Bowers and Mould, 2002).

However, in considering alternative settings, the evidence of effective interventions must also be borne in mind (even though it is beyond the scope of this section) as highlighted by findings from a recent systematic review of multidisciplinary approaches for inpatient rehabilitation in which it was stated: “although further evidence of the potential costs and benefits of co-ordinated multidisciplinary inpatient rehabilitation are required, there is some rationale to justify its adoption in the meantime. The optimal structure setting and intensity of this care is not known.... Some account should be taken of other strategies including those of early discharge and a more community-based emphasis” (Cameron *et al*, 2002).

Evidence for the effectiveness of alternative settings to the inpatient setting for managing musculoskeletal disorders

Pre-admission initiatives

Rationale for pre-admission initiatives

One way of reducing admissions is to do more in primary care so that only appropriate referrals reach the orthopaedic surgeon. This can be done by GPs assuming more responsibility (as appears to be happening in the US [Connolly *et al*, 1998]) or physiotherapy outreach clinics being set up in primary care. In addition to ensuring appropriate referrals are made to the orthopaedic surgeon, the initial assessment of patients should be sped up by such initiatives.

Pre-admission clinics that are developed in collaboration between nursing and medical staff can also be important in educating patients about their musculoskeletal disorder, surgery and rehabilitation. This is perhaps even more so when surgery is not done on an inpatient basis (see below for more on alternatives to inpatient surgery).

Evidence of effectiveness of pre-admission initiatives

Over the first seven months of physiotherapist outreach in a primary care practice just 7.4% [40] of the 541 patients seen by the orthopaedic physiotherapy practitioner were referred to a consultant. Less than 1% [3] were referred to a pain clinic with most being referred to physiotherapy (56.6% [306]) or discharged (23.3% [128]). Physiotherapists were also able to provide injections at their clinic for 6.3% (34) of patients and follow up 5.5% (30), more. There was a high level of patient satisfaction with the service (Anon, 2001). A range of outreach clinics have increased outpatient capacity (Hill and Rutter, 2001).

A qualitative study of patients' perceptions of a pre-admission clinic in an orthopaedic hospital have been explored by Malkin (2000). Here it was found that the clinic appeared to relieve patients' anxiety with both "experienced information" and "given information" being important to patients. In another UK hospital, pre-admission clinics reduced the number of operation cancellations on the day of admission and the workload of junior medical staff (Asimakopoulos *et al*, 1998). In an Australian study, Lewis (1997) found that for patients undergoing total knee and hip replacements, the pre-admission clinic increased patient satisfaction as well as reducing the length of time spent in hospital.

In an RCT looking at the effectiveness and cost effectiveness of specially trained physiotherapists Vs doctors in the assessment and management of defined referrals to hospital orthopaedic departments, patients' measures of pain, functional disability and perceived handicap were comparable (Daker-White *et al*, 1999). However, it was significant that patient satisfaction was greater amongst those who had been seen by a physiotherapist. Thus it was concluded that orthopaedic physiotherapy specialists are as effective as post-Fellowship junior staff and clinical assistant orthopaedic surgeons in the initial assessment and management of new referrals to outpatient orthopaedic departments, and generate lower initial direct hospital costs.

Quantifying the impact of pre-admission initiatives

The Australian study by Lewis (1997) found that the average length of stay for those who attended the clinic after it had become compulsory, compared with before, was 3.8 days shorter for patients with total knee replacement. For total hip replacement patients, the reduction was 1.1 days.

Diagnostic and treatment centres (DTCs)

Rationale for DTCs

As Harley (2001) noted: "The number of orthopaedic consultants has increased by 78 per cent since 1984, but average waiting time has hardly changed. Orthopaedics is one of the greatest problem areas for waiting lists although workloads have fallen by about a fifth in the past five years. An extra 85,000 orthopaedic patients will have to be admitted over the next five years if the government is to eliminate waits of more than six months. Consultants oppose the expansion of the staff grades. Specialist centres may have to be established to deal with the backlog." Chesson and Isaacs (2002) surveyed orthopaedic inpatients at a UK hospital and found that nearly 80% of respondents indicated that a purpose-built unit on site was acceptable.

DTCs are purpose-built units that can offer orthopaedic surgery (as well as other types of surgery) and have developed in the US, Australia and Scandinavia. In the UK, the Department of Health announced the development of DTCs in the July 2000 NHS Plan. DTCs aim to offer elective operations on a day case basis in the vast majority of cases, with a few very short stay cases for whom day surgery is not possible. Most DTCs are on the same site as emergency or critical care services but with their work insulated from emergency pressures, DTCs can serve as a reliable and dedicated high volume service which can safely, quickly and conveniently provide routine diagnosis and elective surgery, and the patient can be guaranteed that they will be treated. The aim is to reduce waiting times by expanding NHS capacity in diagnostic and acute elective treatment. But all DTCs will differ so as "to suit the needs of the community it serves" (NHS Estates, http://www.diagnosticandtreatmentcentres.com/information_resources/index.asp).

The first DTC in the UK opened in July 1999 (Ambulatory Care and Diagnostic Centre [ACAD]) and treated its first patients in September. It is built on the site of Central Middlesex Hospital. Much has been made about the architectural qualities of this building but: "although the design of the building is important, it should serve the philosophy not drive it" (NHS Estates, <http://www.diagnosticandtreatmentcentres.com/about/index.asp>). This has been described as a "centre of excellence" being the "nearest thing to a production line hospital in the UK" while offering a standard of service and accommodation "commensurate with the best available in the private sector" (NHS Estates, 2001).

There are now currently ten DTCs in the UK (including one privately run DTC), all in the south of England, but more are under development and just before Christmas, a further 23 were announced, but only 12 of these were to be NHS owned, the other 11 being private DTCs (Meikle, 2002) which raises important questions about access.

Evidence of effectiveness of DTCs

With DTCs being a new development, there is understandably very little evidence of effectiveness available, with the exception of the evaluation of the first DTC (ACAD) in the UK (NHS Estates, 2001) which concludes: "as yet there is little if any evidence to support a claim that this model of care is more clinically effective than the traditional model.... Evidence-based care is a new science and it is only now that intuitive practice is being proved to be best practice in many instances. It is suggested that the intuitive implementation of ACAD may well prove in the future to be best practice" (NHS Estates, 2001).

The case for DTCs has come from evidence of the US experience where, for example, it has been shown that since 1986, the number of outpatient surgeries in all specialties has exceeded that done on an inpatient basis while complication rates are less than 0.2% (PowerPoint presentation from Johnson & Johnson Health Care Systems Inc. available at NHS Estates, <http://www.diagnosticandtreatmentcentres.com/about/index.asp>). But as the NHS Estates (2001) note, the model of DTC that the UK is based on is more similar to those in Scandinavian countries rather than the US.

While the evidence for the effectiveness of DTCs is awaited, the evaluation of the ACAD in Middlesex has given some idea as to its efficiency and effectiveness, and the following is all taken from the report of this evaluation (NHS Estates, 2001).

It was concluded that: "no conclusions can be drawn with regard to the clinical effectiveness of ACAD." However, there appeared to be "improved continuity of care, a minimum duplication of care and a decreased length of stay." This was helped by there being a pre-assessment area enabling assessment (by a registered nurse) to take place on the same day as the initial outpatient appointment which is usually a week before the operation. Thus there is a rapid referral system that should benefit patients. It is noted that the ACAD protocol for admission has reduced the number of steps for admission from seven to two. However, without patients having a network of informal carers, it would not be possible for ACAD (or any DTC) to discharge patients home so quickly.

However, some concerns relating to patient care were also raised.

It was noted how there was a state of the art MRI suite owned by a private health care company. While GPs are able to rapidly refer their patients to this facility for patients experiencing acute back pain through a prolapsed disc, it is also noted that this is being used for private patients and that an MRI scanner exists on the main hospital site. Thus it is unclear as to the extent of this facility's availability for NHS patients.

Issues surrounding the security of patient records and issues around access to these were raised.

It was also noted how waiting areas were small and overcrowded. In the pre-operative waiting area it was noted how this was not as a result of poor design, but because of medical staff refusing to accept "staggered admissions" so four patients are admitted in the morning and four in the afternoon. Thus patients scheduled at the latter part of the operating list on any given day have long waits in their operating gowns, with little to do, "thus increasing boredom and, most importantly, raising their anxiety levels." If

“staggered admissions” are not to be employed, an alternative solution would be to have two admission periods in the morning and two in the afternoon.

Another issue raised by overcrowding, that of the risk of hospital-acquired infections (HAIs), as most who are waiting would be immuno-suppressed. In hospital settings, it has been estimated by the Audit Commission (1990) that 9% of patients have HAIs at any given time and: “the type of person who is a candidate for admission to ACAD is vulnerable to peri-operative death” (NHS Estates, 2001).

The unit closes at 8pm every night except for the “step-down” area (which offers up to two-nights stay for those patients who can’t be treated as a day case). But there appeared to be a lack of medical cover between 5.30pm and 8pm, particularly from an anaesthetist. Similarly, there is no clear directive about medical staff visiting patients in the “step-down” area.

Finally, there are issues relating to the quality of care at discharge. While all patients receive a full explanation of what their surgery entailed and made aware of any potential complications, concerns were expressed about pain relief and whether patients were given enough. This is arguably more of a concern than for inpatient surgery because as the report notes: “once the local anaesthetic has worn off ... The pain kicks in and becomes steadily worse, frequently during the night” by which time the patient will be back at home. There was no follow-up procedure of patients and with there being no outpatient appointments scheduled either (unless re-referred by the GP), there was no way of determining clinical outcome, successful or otherwise. And similarly it is not possible to determine if patients have HAIs or not. The most frequent causal factors of HAI are blood infections, post-operative wound infections, urinary tract infections, chest infections and skin infections.

Thus it is stated: “In the absence of an appropriate audit and effective post-discharge monitoring of the ACAD patients, no conclusions with regard to post-operative morbidity and mortality can be drawn. Urgent consideration should be given to rectifying this situation, as irrefutable evidence is needed that proves or disproves that ACADs are effective in reducing hospital-acquired infections.” But it is also noted that there has been no negative feedback from primary healthcare teams related to the ACAD discharge, although it was also reported that a few GPs refused to remove patient’s sutures which means patients have to return to ACAD which would appear to be at odds with efficient care.

Staffing issues should probably also be mentioned. In 1995 it was stated that: “The medical staff must be senior in rank, and it has been concluded that ACAD is not the place for junior members of the medical staff to learn and practice their skills” (NHS Estates, 2001). While this should ensure that DTCs produce care of a very high standard, as more and more DTCs are developed, this could have serious training implications which would inevitably affect patient care. At the ACAD, recruiting the right skill mix has not always been possible (although it appeared to be possible for orthopaedics) and some doctors who have reached registrar grade were working at the ACAD but always under consultant supervision, this therefore being considered in training. Registered nurses make up the largest professional group working within the unit but were not employed on the traditional NHS grading system. Professions allied to the medicine such as physiotherapists were not being employed. Nevertheless, at the ACAD a sense of staff

teamwork pervaded in an “open and friendly” culture which delivered “impressive” output and despite the non-NHS standard contracts, the relationship between management and unions was described as being “on the whole very good.”

Quantifying the impact of DTCs

Black (1999) has suggested that DTCs can deal with at least 90% of the traditional non-emergency workload traditionally undertaken in district general hospital. In March 2000, at the ACAD in Middlesex, 40 NHS patients were being operated upon weekly, with 16 of these being orthopaedic patients (NHS Estates, 2001).

Ambulatory pain management/rehabilitation

Rationale for ambulatory pain management/rehabilitation

More intensive outpatient follow-up is seen as a less costly alternative to inpatient rehabilitation, freeing beds and reducing costs (at least in the short term). Furthermore, it has been argued “that behaviours established in one setting (e.g. inpatient) frequently fail to generalize to other settings, whereas behaviours established in the outpatient setting are more likely to be maintained post-treatment (Emmelkamp 1986). On the other hand, inpatient programmes typically offer a more intensive intervention with maximum control of environmental contingencies and, for practical reasons, constitute the only treatment available to severely disabled patients” (Williams *et al*, 1996).

Evidence of effectiveness of ambulatory pain management/rehabilitation

German studies have shown that different settings for rehabilitation seem to fare just as well in terms of patient satisfaction (Morfeld, 2002) as well as clinical outcomes (Wolf *et al*, 1999). This latter study found that AOTR [Ambulant Orthopaedic-Traumatologic Rehabilitation] and inpatient rehabilitation both are effective for treating subgroups of patients with low back pain and AOTR is effective for treating patients with cruciate ligament injury.

Outpatient rehabilitation facilities in Germany are characterized by a stronger accentuation of functional therapy, in particular physiotherapy and sports therapy. Functional therapy is of greater importance in the self-concept of the outpatient rehabilitation facilities and is also applied there more often (Dietsche, *et al*, 2002). Economic analyses showed better cost effectiveness in outpatient treatment by comparability of treatment, patients, and results (Burger *et al*, 2002), although as another German study suggested, this may not be the case in the short term (i.e. at the end of treatment) but over a sustained period of time (up to a year) (Klingelhofer and Latzsch, 2002).

In UK studies comparing inpatient and outpatient pain management, inpatients made greater gains than outpatients (Peters and Large, 1990; Peters *et al*, 1992; Williams *et al*, 1996). In this latter study, which aimed to address methodological flaws of the earlier UK study (Peters and Large, 1990; Peters *et al*, 1992) patients (who all suffered from chronic pain that seriously disrupted their lives) were randomised to inpatient, outpatient or a waiting list control group. Both treatment programmes ran in parallel with the same content, materials and staff but the outpatient programme was only as quarter as intensive

as the inpatient programme. As noted, inpatients made greater gains than outpatients (and both made greater gains than controls) and required lower dosages of medication and less pain-relieving and manipulating procedures (e.g. acupuncture, TENS, physiotherapy and osteopathy).

Nevertheless: "Overall there was a significant pre- to post-treatment improvement in both groups on measures of mood, physical performance, overall function and medication use, many of which were maintained to 1-year follow-up. The results also demonstrated that the inpatient programme was superior to the outpatient programme in effecting cognitive and physical gain in the long term." (Williams *et al*, 1996)

However, it should be noted that referrals to the Pain management Unit were from all over the UK, predominantly from other pain clinics. Thus outpatient attendance depended mainly on distance to the Unit, on the difficulty of that journey and in some cases, expense. Outpatients were also significantly less likely to have 11 years of education than inpatients.

Furthermore, there was a greater non-response amongst outpatients for data at one-month follow up (response rates being 81% for outpatients and 93% for inpatients) although at one-year the rates were more or less the same (71% although it has been argued a response rate of 80% would have been ideal).

Finally, inpatients were resident in an unstaffed hostel in the hospital grounds, which may not be typical and the authors themselves note that: "Although the major reasons for ineligibility for randomisation were geographical (for instance, patients living too far away to accept outpatient treatment), it might nonetheless be argued that the results of this small population of patients cannot be generalised to the majority of chronic pain patients" (Williams *et al*, 1996).

The use of an unstaffed hostel may, in many ways, be similar to the German concept of partial hospitalization which is a relatively recent form of rehabilitation, which, as opposed to the ambulatory approach, comprises the entire programme available for inpatient medical rehabilitation except for accommodation and full board. Great expectations are attached to partial hospitalization: it is supposed to cost less than a comparable in-patient measure but matching in terms of quality. Indeed, preliminary analyses of patient self-report data showed a strong similarity of inpatient and partial hospitalization clients as far as admission parameters, rehabilitation treatment, perception of rehabilitation and its effects are concerned (Buhrlen and Jackel, 1999). However, Haase *et al* (1998) found that partial hospitalization rehabilitation is no general alternative to inpatient programmes as it is realistically suitable for only a small proportion of orthopaedic patients.

Quantifying the impact of ambulatory pain management/rehabilitation

There is insufficient evidence to quantify the impact on admissions.

Hospital at home schemes

Rationale for hospital at home schemes

In the UK hospital at home concentrates on providing personal, nurse-led care rather than technical services. This is in contrast to the development of home care in other countries. The type of patient admitted to hospital at home varies between schemes, as does the utilisation of technology. Some schemes are designed to care for specific conditions or more commonly schemes are designed to care for patients discharged early from hospital following specific interventions, such as orthopaedic surgery.

The only known systematic review of hospital at home schemes concluded: "This review does not support the development of hospital at home services as a cheaper alternative to in-patient care. Early discharge schemes for patients recovering from elective surgery and elderly patients with a medical condition may have a place in reducing the pressure on acute hospital beds, providing the views of the carers are taken into account. For these clinical groups hospital length of stay is reduced, although this is offset by the provision of hospital at home.... There is some evidence that admission avoidance schemes may provide a less costly alternative to hospital care." (Shepperd and Iliffe, 2003).

The evidence presented below looks at evidence of schemes not included in this review as well as two (Shepperd *et al*, 1998a; Richards *et al*, 1998) of which were included. These latter two are considered separately to the systematic review for two reasons: they were the only two RCTs included in the review and they consider evidence in relation to orthopaedics whereas the other studies were concerned with other areas of care in the review, such as care for older people. Hospital at home schemes for older people are likely to play the role of intermediate care that is referred to in the National Framework for Older People (Department of Health, 2001).

Evidence of effectiveness of hospital at home schemes

Early discharge schemes

Shepperd *et al* (1998a) found little differences in outcome between inpatients and hospital at home patients. Those who had undergone a hip replacement were however significantly more likely to report a greater improvement in quality of life if they had undergone the hospital at home treatment. Carers of those who had undergone a knee replacement also reported more satisfaction with the hospital at home service but it was found that 30% of patients receiving hospital at home care remained in hospital primarily because of postoperative complications. Thus it was concluded that for patients undergoing a knee replacement, hospital at home was not a viable alternative.

An Australian study by Bonevski *et al* (2002) also found little differences in outcome between inpatients and those discharged early to a pilot Post Acute Community Care (PACC) programme but the average length of stay for hospital at home patients was two-thirds that of general orthopaedic patients. Similarly, another Australian study in which a physiotherapist, occupational therapist and social worker provided services within an interdisciplinary model of care (Allied BONE [Best Orthopaedic New Enterprise]) with the aim of reducing the length of stay of acute adult orthopaedic patients (Brandis *et al*, 1998). The team provided intervention in the community, the accident and emergency

department, pre-admission clinic and orthopaedic wards to patients with hip and knee replacements, back pain and upper femoral fractures. Allied Health BONE improved continuity of care and reduced the length of stay in target groups by a quarter.

Richards *et al* (1998) also found little differences in outcome between inpatients and hospital at home patients. This evaluation varies to the ones above in that this included patients who had been admitted for an emergency to a variety of specialties as well as patients undergoing hip or knee replacement. However, most (68%) patients had still been admitted for orthopaedic procedures. Another noticeable difference of this study was that the length of stay was found to be significantly shorter for inpatients than hospital at home patients. But as the authors note: "hospital at home care can be of variable intensity, tailing off towards the end of an episode of care".

An earlier study by Hensher *et al* (1996) had also found that the length of stay for hospital at home patients to be greater than those in hospital. And although costs per day of hospital-at-home care were lower than those of inpatient care, the schemes appeared to increase the total duration of orthopaedic episodes, so that the costs of standard care, per episode, were lower than those of hospital-at-home. On the other hand, Coast *et al* (1998) found that the cost of hospital at home scheme evaluated by Richards *et al* (1998) to be less costly than inpatient care, despite a lengthier episode of care. Shepperd *et al* (1998b) reached a different conclusion yet again, that there were no differences in health costs between inpatient care and the hospital at home scheme.

The early discharge of people with musculoskeletal disorders may have other implications which may or may not be considered in hospital at home schemes. For example, major joint surgery (elective hip or knee replacement, or hip fracture) carries a high risk of postoperative deep vein thrombosis (DVT) and pulmonary embolism. DVT prophylaxis has become an essential part of routine management but Gallus (1999) argues that shorter hospital stays after elective surgery means that prophylaxis given only in hospital may not be sufficient.

A collaborative scheme of early supported discharge for trauma patients aged over 70, involving hospital and community staff has improved early rehabilitation, discharge planning and follow-up and substantially reduced the length of hospital stay. Central to the scheme is a dedicated occupational therapist who coordinates discharge arrangements for eligible patients. An evaluation of the experiences of patients, carers, general practitioners and other community staff indicated that shorter stays in hospital have been achieved without undue problems for patients during the immediate post-discharge period (Closs *et al*, 1995).

Indeed, key to the success of early discharge schemes would appear to be good liaison between hospitals and community services (Court, 1994). A recent evaluation revealed that although integrated care pathways led to improved outcomes, there was little evidence to suggest that interprofessional relationships and communication were enhanced. Furthermore, key factors in discharge delays appeared to be organizational rather than professional (Atwal and Caldwell, 2002).

Admission avoidance schemes

Hardy *et al* (2001) evaluated an emergency admission avoidance scheme based in an A&E department. Here 1560 patients were admitted for trauma (2.75% of all patients attending A&E and 13.67% of all patients admitted from A&E) with 531 patients requiring minimal medical treatment but requiring analgesia, nursing care and mobilisation as well as detailed assessment of their needs on discharge. Most patients were female and over the age of 75. This group formed a retrospective control group to patients recruited to the AA scheme.

The AA scheme involved an assessment followed by fast track occupational therapy and physiotherapy (where appropriate) and finally discharge to a rapid response community team (RRCT) who cared for patients in their homes for up to two weeks, with close links to community therapists. Following RRCT care, patients were either discharged or transferred to social services and outpatient follow-up was arranged in the usual way.

Liaison between the hospital and community teams became a vital and highly effective part of successful early discharges and admission avoidances. The number of bed days was significantly reduced and readmission rates were similar for both inpatients and hospital at home patients. Furthermore, 97% of patients were discharged within 2 weeks and 60% regained their former level of independence (and 20% more managed this with extra district nurse support).

Many of the patients in both the intervention and control groups were over the age of 75 and had suffered falls – minimising the impact of falls and falls prevention is discussed above.

Quantifying the impact of hospital at home schemes

Early discharge schemes

It is not possible to estimate bed days saved by early discharge schemes. In fact, Richards *et al* (1998a) found that the length of episode for people treated at home was actually 38% (95% CI: 25%-49%) longer than for inpatients, although admittedly this was not in hospital. However, this study included non-orthopaedic patients, as did the systematic review by Shepperd and Iliffe (2003).

The two Australian studies (Bonevski *et al*, 2002; Brandis *et al*, 1998) were just concerned with general orthopaedic patients and the average length of stay here was just 7.7 days for PACC patients compared to 12.3 days for inpatients while the length of stay in target groups seen in the Allied BONE programme was reduced by 24%.

Admission avoidance

The AA team assessed 785 patients (7.1% of A&E admissions) of whom 257 were discharged to the RRCT. The number of bed days used was just 1.7 days compared to 6.3 days for the control group and the readmission rate was similar to the control group (1.2% Vs 1.5%). This 4.6 reduction in bed days per patient amounted to a total of 685 bed days. More bed days could have been saved had another 90 patients suitable for the AA scheme been included – they were excluded because they lived in other counties so had no AA scheme.

Discussion

The findings presented in this report need to be interpreted with some caution as they cannot claim to be definitive; literature searches were undertaken in only four weeks and so the search for evidence could not possibly be all encompassing. As a result of the timescale available, a pragmatic approach was employed where emphasis was placed on finding evidence from systematic reviews. Where systematic reviews did not appear to exist, the next best available evidence was sought.

A large amount of information was nevertheless obtained. In addition, many health academics and practitioners suggested interventions outside the scope of this study, e.g. Simple interventions such as hand washing (Pittet *et al*, 2000; Ryan *et al*, 2001). This study was limited to specific preventive interventions that could be employed by the NHS. There are many more global population and community based projects that could have been cited that have achieved impressive results over a number of years such as the Action Heart project in Rotherham (Baxter *et al*, 1997) and the North Karelia project in Finland (Puska and Vartianinen, 1999) and the impact of legislation on alcohol and smoking could be much larger than anything the NHS can offer.

Nevertheless, as a recent [BMJ](#) editorial noted: “changes to the organisation or delivery of care can improve the quality of care and certain outcomes of chronic disease” (Wagner and Groves, 2002). The aim of this review to try and identify such changes which could impact on hospital admissions.

However, it has been difficult, if not impossible, to quantify impacts from the evidence obtained by this short project, particularly for circulatory and respiratory diseases and interventions aimed at the over 75s. There are a number of reasons why. A common problem is the outcome measures used in these studies. Perhaps understandably, these often focus on mortality and quality of care for circulatory and respiratory diseases and interventions aimed at the over 75s rather than admissions or emergency admissions because the emphasis is on chronic diseases. And Drummond (2002) believes “that the alcohol field is still more at the efficacy phase than at either the effectiveness or meta-analysis phase (with a few exceptions such as brief interventions in screened samples, but even this area needs cost-effectiveness studies).”

Where data on hospital admissions is available, some caution should be taken in generalising the findings, especially when the findings are from single studies.

There is also the added problem of the length of both intervention and evaluation. By their very nature, chronic diseases are of lifelong duration, yet interventions evaluated are typically short in duration, and often only evaluated over a matter of weeks or months. Only long-term observational studies can address this latter problem, but these are rarely included in systematic reviews (Elphick *et al*, 2002).

However, in many ways, this is less of a limitation than it otherwise might have been as the aim of this project was to find interventions that could have an impact on demand within 3 years.

Very few of the interventions presented here will have immediate impacts on hospital admissions with the possible exception of diagnostic treatment centres (DTCs). But here

there is a dearth of evaluative studies as DTCs are a new concept, certainly in the UK. Furthermore, only last week (14th February) the Health Service Journal reported that “rushed planning underpinning the government's programme of DTCs may result in a one-size-fits-all model which does not meet local needs” according to a survey of chief executives of primary care trusts, acute trusts, strategic health authorities and confederation policy networks by the NHS Confederation. According to this survey's findings, the recent capacity planning process failed to adequately identify capacity gaps. Respondents said the DTC programme has focused on acute activity, even though for many local situations extra secondary elective capacity is not the priority. There were also concerns about the ability of DTCs to fit with long-term service planning and worries that funding would be diverted from local priorities (Anon, 2003).

Furthermore, it has been argued that reducing waiting lists for orthopaedic surgery results in an increase in referrals (Smethurst and Williams, 2002) and little and inconsistent support has been found in a recent study for associations of prolonged waiting with markers of capacity or need (Martin *et al*, 2003). Thus, as Hensher *et al* (1999) argue: “It may ultimately be more profitable to consider alternatives to hospital [such as DTCs, Hospital at Home schemes, etc] not as substitutes that aim to reduce admission but as bridges between hospital and home, by means of which the quality of care can constantly be improved.”

Conclusions

A number of effective interventions were found that could have an impact on reducing the demand for emergency admissions. These are summarised in the Appendix. Extreme caution must be taken in generalising the estimated impact on hospital admissions.

However, it is important to note that in the timescale available, a lot of evidence that either supports or contradicts that presented in this report may not have been found.

More research may be needed to unearth more evidence, for example with regard to pneumococcal vaccination where there appeared to be a lack of evidence for the intervention, and stroke rehabilitation and diagnostic treatment centres (DTCs) where the evidence presented appeared to be largely unqualified.

More evidence may be needed with regard to cost-effectiveness. This may require specialist health economist input.

More evidence may also be needed regarding the relationship between supply, demand and capacity.

It is expected that this report will be circulated to those working within the NHS who will likely know of and be able to present evidence that supports or contradicts the findings presented here.

This report should be seen as a **start** of a process of presenting evidence that may reduce demand for hospital admissions. More evidence will become available, and the potential (greater) impacts of “upstream” interventions (particularly in preventing smoking and alcohol related problems) should not be neglected.

Following a meeting by the Cheshire and Merseyside Directors of Public Health in Stockton Heath, Warrington, on 3rd March 2003, it was decided to examine the following three interventions in more detail in terms of finding a “model” intervention and calculating the likely impact on admissions:

1. Managing heart failure.
2. Pulmonary Rehabilitation.
3. Preventing falls in older people.

The findings from this exercise will be available later this year.

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