STROKE
A PUBLIC HEALTH APPROACH

Director of Public Health
Annual Report 2018

cwmtaf.wales

GIG CYMRU NHS WALES
Bwrdd Iechyd Prifysgol
Cwm Taf
University Health Board

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Foreword

In my time as Director of Public Health for Cwm Taf UHB it is extremely heartening to witness the constant drive to improve the standards of care delivered by our organisation. This is particularly true of our local stroke services that have undergone major redesign and ongoing review and development in recent years. However, despite improvements including a reduction in mortiality associated with stroke, the burden of this condition continues to have a major impact on our communities adding to the picture of multi morbidity and growing health and social care needs. This burden is heaviest in our more deprived communities and will undoubtly rise as our elderly population increases.

This is not inevitable. It is estimated that 70% of strokes are preventable if healthier lifestyles and optimum management of clinical risk could be achieved.

We need a focused whole system approach to tackling these risks and reducing inequalities. There is already much positive work being undertaken through our local multisector partnerships to tackle the wider determinants that influence our lifestyles, which needs to be maintained and extended. Alongside this within health services, we need to give the same priority and investment to prevention and early intervention as we do to acute care if we are to effectively deal with the challenge of chronic conditions within our population.

Professor Kelechi Nnoaham
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Acknowledgements

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Executive Summary

Profile of Stroke in Cwm Taf

Cwm Taf Health Board has the highest rate of stroke admissions in Wales =

Over 10 patients a week

Stroke is life changing for many

2 out of 3 stroke survivors

leave hospital with some form of disability

Average age of onset:

70.1 years in males

75.3 years in females

Both are lower than the UK average

The survival rate for stroke is only

just over 75%

at 6 months' post event

GP registers indicate 6188 patients in our population have previously experienced a stroke or TIA (2017)

This number continues to grow as does the demand for care and support

However, it is estimated that 70% of strokes are preventable

Modifiable Contributing Factors within our Population increasing Stroke Risk

High levels of deprivation

High levels of lifestyle risk factors

High levels of clinical risk

To tackle these risks our prevention strategy for stroke requires both individual targeted and population approaches, both with a strong focus on equity

A multiagency, whole system approach is needed to tackle the wider determinants of health and their effect on lifestyle behaviours.

The Cwm Taf Well-being Plan provides the opportunity to revisit the multiagency objectives with a focus on chronic disease prevention

Development of a chronic condition focussed, population health management framework to ensure early recognition and optimum treatment of clinical risk has the potential to reduce the incidence of strokes in Cwm Taf

For example, in Cwm Taf UHB area

500 people have untreated high risk atrial fibrillation.
If given optimal anticoagulant treatment about 14 strokes a year could be averted

Just over 9000 people have uncontrolled blood pressure.
If optimally managed, about 27 strokes a year could be averted

Total potential savings to NHS = £546,000 in first year

When stroke does occur, early recognition, prompt access to medical assessment and time appropriate, specialised stroke care improve patient outcomes significantly

There is much good work underway in Cwm Taf, with steady improvements in the stroke bundle targets as illustrated by SSNAP data.
Key challenges remain however:

Late presentation of patients following onset of symptoms

**Insufficient capacity of specialised clinical and therapy staff to maintain all guidelines within a 24/7 service.
Despite improvements continued difficulties in meeting target for stroke unit admission within 4 hours**

Limited data available regarding long term patient outcomes and their relationship to the patient pathway

90% of our strokes are ischaemic - caused by a blood clot

The most effective treatment is thrombolysis but this must be administered wi[illegible] hours of symptom onset

Less than a third of patients reach hospital soon enough after symptom onset to be considered for thrombolysis even before other eligibility criteria were applied

Despite ongoing improvement to the in-hospital acute care pathways, thrombolysis levels in Cwm Taf remain below the Welsh average

To significantly reduce the burden of stroke within Cwm Taf there has to be an equal if not greater focus and investment on the prevention and early intervention components of the pathway in addition to the acute element

1.0 Introduction

Stroke is a serious, potentially life threatening condition, that occurs when the blood supply to part of the brain is cut off causing damage or death to the brain cells in that area. The severity and effect of a stroke depends on the size and area of the brain affected.

In Wales, around 7,000 people every year have a stroke, while nearly 65,000 people are living with the long term effects of stroke.[1]

Following a stroke, individuals need urgent access to assessment for prompt diagnosis and high quality acute care followed by appropriate support and rehabilitation to increase survival rates and improve long term patient outcomes.

There has been considerable local and national focus in recent years to improve the quality of care across the whole of the stroke pathway. However, many challenges remain and we know there is potential for further improvement particularly in regards to prevention and early intervention.

This is highlighted by the key points below:

- It is estimated that 70% of all strokes could be avoided if clinical risk factors were managed effectively and people adopted healthier lifestyles.
- Although mortality from stroke is decreasing there is not the same rate of decline in numbers experiencing a stroke.
- Stroke is life changing for many. Almost two-thirds of stroke survivors will leave hospital with some form of disability, and the demand for ongoing care and support is growing.

This report aims to complement the current work underway locally to improve, monitor and evaluate the stroke pathway. It has a particular focus on the potential gains that could be made from exploring this topic through public health lenses with emphasis on the whole system approaches needed to maximise the prevention, early identification and treatment of stroke and ensure best outcomes for stroke survivors.

Many of the topics explored are likely to have relevance to other chronic conditions and the need for a more integrated approach across all pathways, particularly with regards to the prevention agenda, might be made evident.

1.1 The Public Health Importance of Stroke

Mortality and morbidity statistics, along with analyses of risk factors, show that stroke within our communities, is a major but largely preventable condition. It contributes significantly to the economic burden of disease in Wales and can have devastating, life changing effects for individuals and their families.

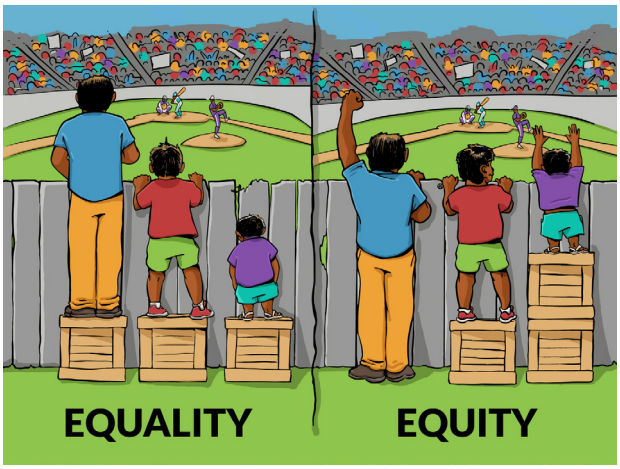
Stroke occurs more commonly in areas of deprivation, highlighting the inequalities in health that exist and has the ability to further add to these inequalities due to the potential for long term disability and loss of independence following stroke.[2]

A key aim of public health is to reduce inequalities. Health equities refer to those inequalities that are avoidable, although to influence these, huge societal or economic change may be needed. Within the remit of healthcare provision and wider public services there are however opportunities to plan and deliver services in a more equitable way.

A frequently cited illustration by Angus Maguire (Figure 1) shows the difference between equality and equity using three individuals of different heights who are attempting to peer over a fence. In order to treat them equally, they would all be given the same size box to stand on to improve their lines of sight. However, doing so wouldn't necessarily help the shortest person see as well as the tallest. In order to give equitable treatment, each person would need to be given a suitable box to stand on that would enable an equally clear view over the fence.

Figure 1 - Equality vs Equity Illustration by Angus Maguire for Interaction Institute for Social Care

http://interactioninstitute.org/illustrating-equality-vs-equity/



Similarly, when considering our population's health, the starting differences or difficulties an individual or community are experiencing mean they might need additional support, improved access or different approaches to care to reach the same outcomes.

When looking at stroke through an equity perspective it is evident that there are differences across our population in terms of the incidence of stroke and the levels of deprivation, behavioural and clinical risk factors that contribute to it.

Table 1 outlines some of the differences between two of our GP clusters in terms of the levels of deprivation and the prevalence of stroke and also hypertension as the most common clinical risk factor for stroke.

Table 1- Deprivation levels, Stroke and Hypertension Prevalence by most and least deprived GP Cluster within Cwm Taf

GP Cluster	% of population living in 40% most deprived households*	% of population on stroke/TIA register**	% of population on hypertension register**
South Taf Ely	26.3% (Lowest level)	1.9%	13.9%
South Rhondda	86.3% (Highest level)	2.3%	17.6%

** Source: Public Health Wales Observatory as at April/May 2016 from Audit+ data*

*** Source: Information from the General Medical Services Quality and Outcomes Framework Statistics for Wales, 2016-17*

Although there is not always a neat correlation between levels of deprivation and stroke prevalence, when comparing our most and less deprived areas, there is a clear indication that those living in our more deprived communities are more likely to have behavioural and clinical risk and are more likely to suffer a stroke.

It is important also to consider that these figures do not include those who have an undiagnosed clinical condition contributing to their overall risk. This is found to be more likely amongst more deprived communities where there are often higher levels of contributing lifestyle behaviours and a tendency to delay investigation of symptoms.

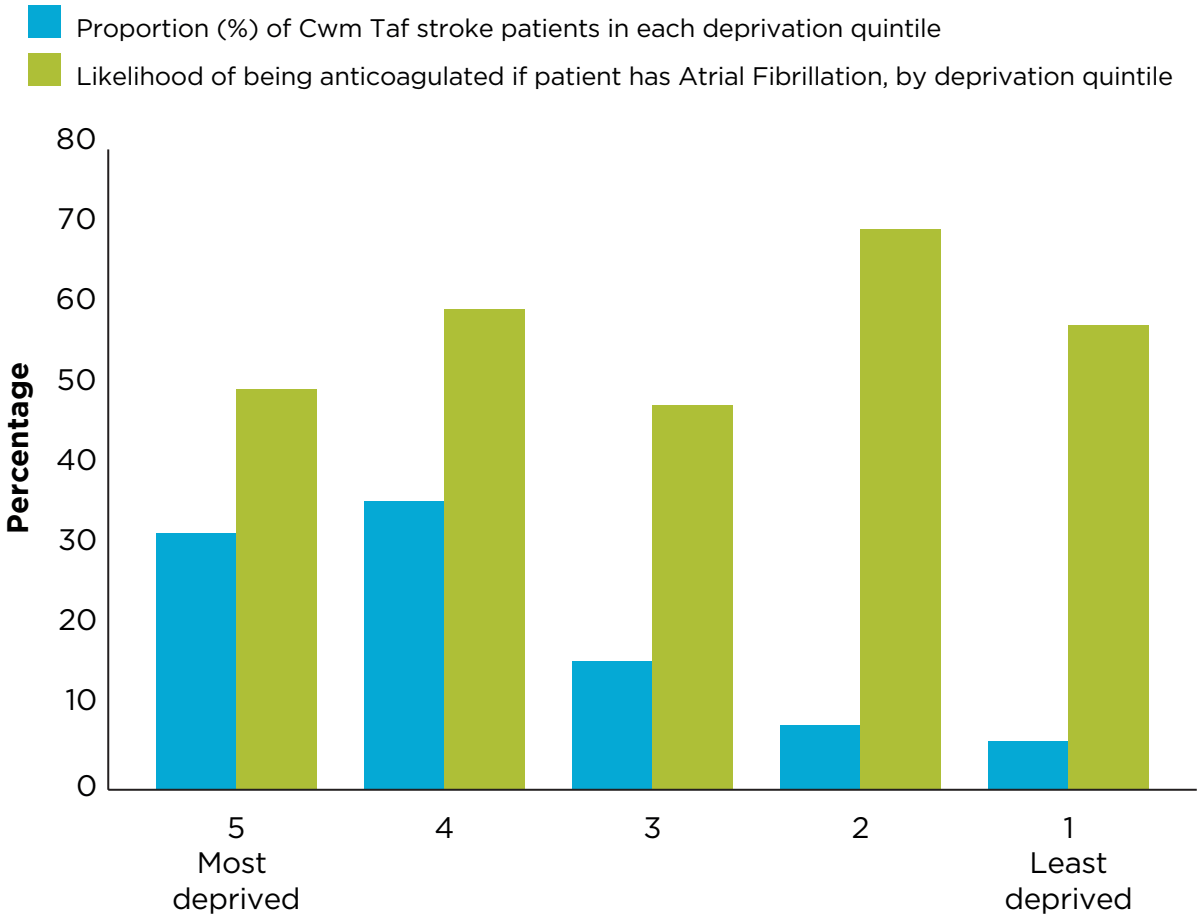
In addition, living in a more deprived area can also mean a person is less likely be in receipt of optimum treatment for that risk or disease – the classical inverse care law proposed by Julian Tudor Hart in 1971.

Figure 2, illustrates a cohort of 225 Cwm Taf patients admitted from April 2015 to April 2018 with a stroke who had a previous diagnosis of atrial fibrillation, (an abnormal heart rhythm).

Atrial fibrillation increases the risk of stroke fivefold. Effective anticoagulation medication can reduce that risk by 60%.[3]

Not receiving the recommended risk assessment and where appropriate subsequent anticoagulation following a diagnosis of atrial fibrillation demonstrates a major inequity in the care received by some members of our population where as indicated in figure 2, patients within the less deprived quintiles have higher anticoagulation rates.

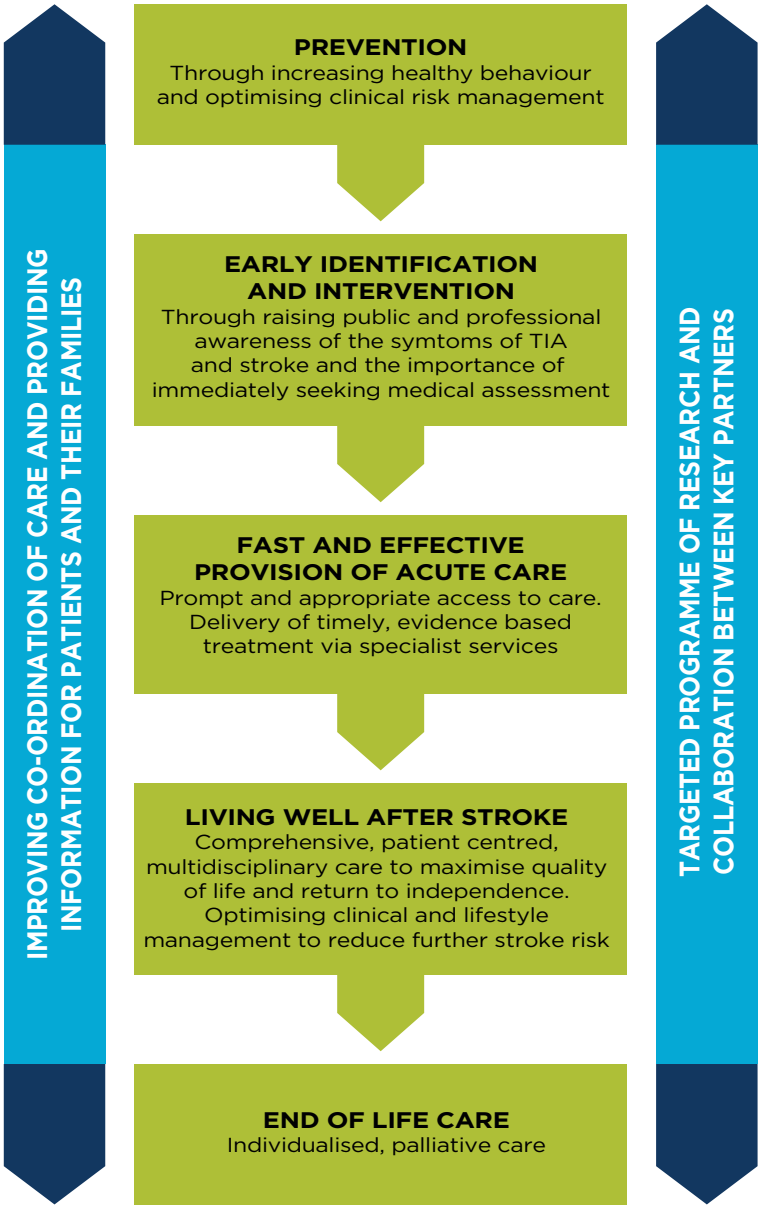
Figure 2 - Illustrating population healthcare equity issues in Cwm Taf using stroke and atrial fibrillation care (Cwm Taf residents only)



Planning and investment in care needs to recognise these differences. We need a population wide approach that ensures the needs of our most vulnerable and disadvantaged individuals are appropriately met. A key message from the Marmot Review, (2010)[4] is particularly applicable to our population:

'Focusing solely on the most disadvantaged will not reduce health inequalities sufficiently. To reduce the steepness of the social gradient in health, actions must be universal, but with a scale and intensity that is proportionate to the level of disadvantage. We call this ***proportionate universalism****.'*

Figure 3 – Stroke Pathway



When looking at stroke, as with other chronic conditions, it is vital to address the entire pathway from primary prevention, right through to rehabilitation and where appropriate long term care and support and/or end of life care.

Alongside this is the need to improve co-ordination of care and cross sector working. An integrated, whole system approach is required.

The 2017 Director of Public Health Report, '**The Fifth Wave**' outlined the four major population health challenges within Cwm Taf as frailty, obesity, inequalities and loss of wellbeing, referred to collectively as '**FOIL**'. The complex and varied factors contributing to these challenges endorse the need for a system wide approach to tackling stroke. Effective action focused on prevention will reduce the burden of stroke and many other chronic diseases within our population.

1.2 The Profile of Stroke within Cwm Taf

In Wales, around 7,000 people every year have a stroke.[1]

Emergency admissions data can act as a proxy for stroke incidence although it is likely to under-estimate stroke incidence as not all strokes result in a hospital admission.

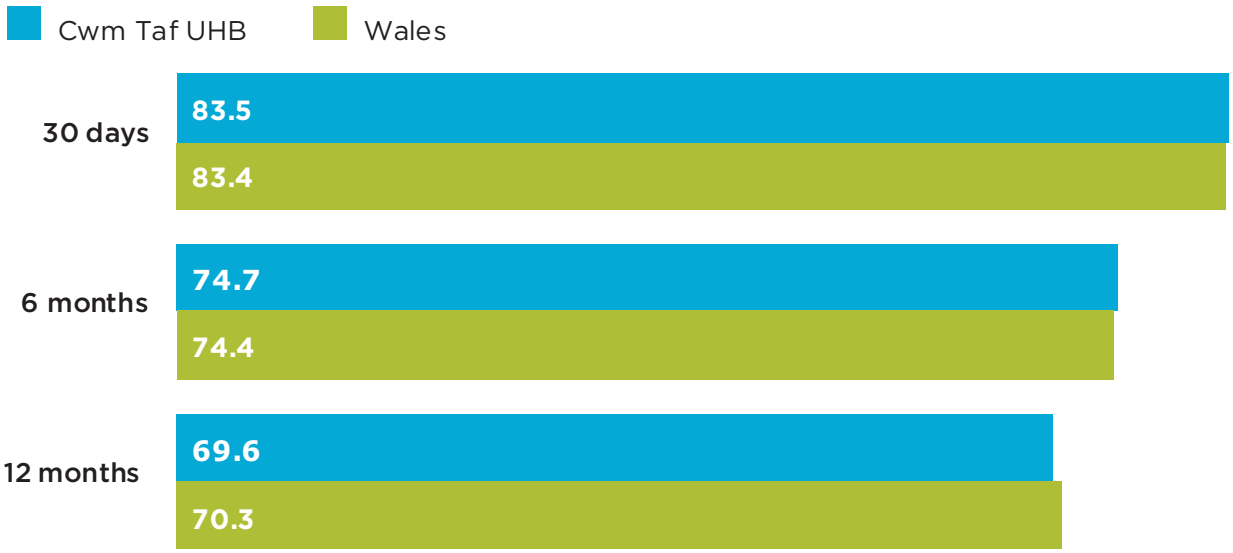
Emergency admissions have fallen across all Health Boards in Wales. Cwm Taf UHB had **576 admissions during 2016/17** - a rate of **207.3 admissions per 100,000** age standardised population. This is a decrease from previous years but still above the average rate for Wales of 191.9 and is **the highest of all Health Board areas**.

Stroke survival continues to improve across Wales in all age groups. Comparison of survival rates at 30 days, 6 months and 12 months for Cwm Taf is comparable to the Wales average as shown in Figure 4.

Despite a similar picture to the Welsh average, it is important we maintain the drive to reduce mortality as around a quarter of patients admitted with a stroke currently do not survive past 6 months.

Figure 4 - Stroke Survival Rates - Survival at 30 days, 6 months and 1 year following an emergency admission for stroke (ICD-10 I61-I64), percentage, persons all ages, Cwm Taf UHB and Wales, 2013-15

Produced by Public Health Wales Observatory, using PEDW (NWIS) and PHM (ONS)



Data includes emergency admissions for stroke between 2013 and 2015, therefore deaths could have occurred in 2016.

The quality and outcomes framework (QOF) is part of the General Medical Services (GMS) contract for general practices. An important feature of QOF is the establishment of disease registers which help identify cohorts of patients that have a particular condition or risk factor.

All patients who have experienced a stroke or TIA are placed on a specific disease register. QOF data for 2016/17, looking at 42 practices in Cwm Taf indicated that there were **6188** patients in this category.

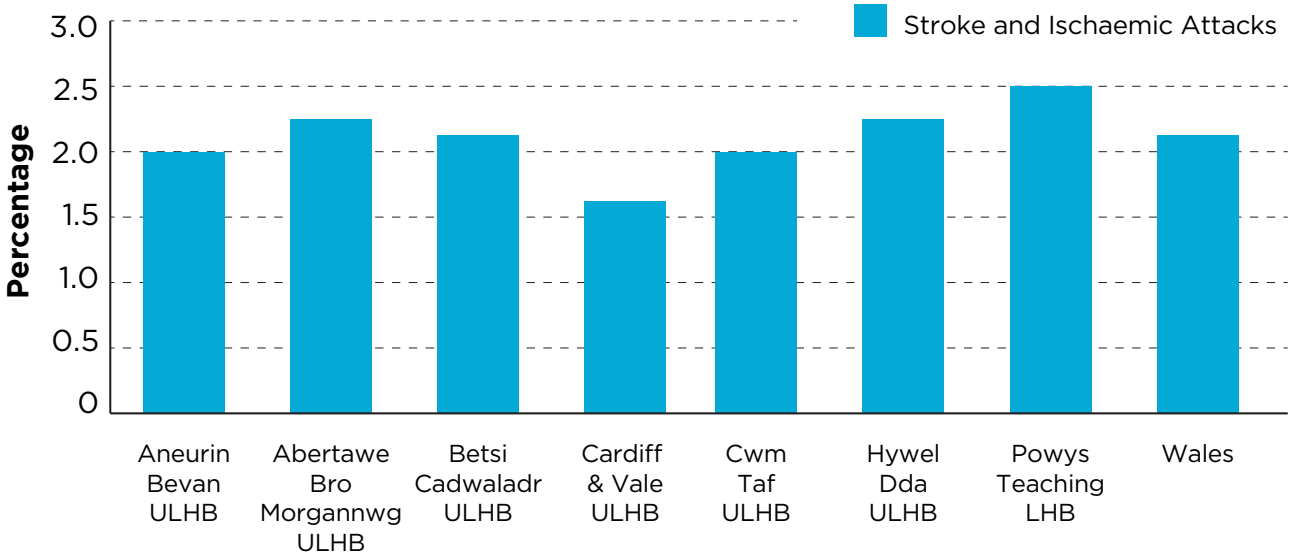
In terms of practice registers Cwm Taf would appear to have a similar profile to the Welsh average as shown in Figure 5. What is unknown however, is the level of disability and support required by these individuals in our population and how this aspect compares with post stroke outcomes in other health board areas.

Throughout Wales the overall numbers of individuals on stroke registers has risen steadily over the past 10 years.

This could either reflect improved recording of stroke occurrence or a real increase in stroke prevalence due to incidence remaining relatively static while mortality has decreased. A combination of both is likely. It does however reflect the growing population of stroke survivors potentially living with life changing disabilities.

Within Cwm Taf the percentage of practice populations placed on stroke registers ranges from an average of 1.7% in the South Merthyr cluster area to 2.3% within South Rhondda.

Figure 5 - Percentage of patients registered with a GP practice who are on a Stroke or Trans ischaemic attack register using QOF data 2016/17



1.3 Overview of Current Stroke Services in Cwm Taf

Driven by the need to improve the quality of services in line with local and national clinical standards, March 2015 saw the culmination of a comprehensive, six-month redesign programme for stroke services in Cwm Taf, incorporating:

- Centralisation of hyper-acute, acute stroke and early stroke rehabilitation services at Prince Charles Hospital.
- Creation of a new community-based, early supported discharge (ESD) rehabilitation service.
- Centralisation of longer term inpatient stroke rehabilitation services at Ysbyty Cwm Rhondda (YCR)

Current specialised provision includes:

- 2.6 wte stroke consultants who cover a five day, 9-5 acute service at Prince Charles Hospital, provide oversight of patients at Ysbyty Cwm Cynon while discharge is planned and run daily TIA clinics. Out of hours' specialist consultant support is provided via a regional on call rota system.
- Two specialist stroke nurses covering acute stroke provision whenever possible on a 7 day 8am – 8pm basis. Limited resource means that this cover is not sustainable.
- Five-day cover of specialised therapy staff (dieticians, physiotherapists and occupational therapists – A seven day working pilot is currently underway utilising national funding.
- Two specialist nurses covering patient follow up on Ward 10 and into the wider community.
- Consultant cover for 10 stroke rehabilitation beds at Ysbyty Cwm Rhondda.

Capacity is an ongoing concern, particularly in terms of provision of seven-day specialised care in line with the RCP National Clinical Guidance for Stroke (2016)[5] which lays down optimum timing for specialist assessment and treatment to be carried out. Current business cases are being considered to try and achieve this. Meanwhile considerable work is ongoing to continually improve services.

The use of SSNAPP data demonstrates the potential to utilise data more effectively in assessing patient care and outcomes when looking at chronic condition pathways. A part time co-ordinator has been employed to oversee data collection and collation. This aspect is strongly supported by the Health Board Performance and Clinical Information Team. Regular performance meetings involve scrutiny of this data and planning to improve delivery of the first 72 hour bundles of care for stroke.

The multidisciplinary Cwm Taf Stroke Steering Group meet quarterly and are responsible for the delivery of the local interpretation of the national stroke plan.

Efforts over the past few years have seen steady improvements in stroke bundle targets.

1.4 Drivers for Change

Within Wales, there is currently a strong policy and legislative context encouraging a more prevention-focused approach to long-term conditions.

In particular, the Well-being of Future Generations (Wales) Act 2015 legally requires public bodies to develop a strong focus on prevention. Cwm Taf has established a single Public Service Board across its two local authority areas to drive this act forward. Following a comprehensive needs assessment and wide consultation the Cwm Taf Well-being Plan was produced in May 2018, as the framework for local action.

The recent Parliamentary Review into health and social care highlighted the Quadruple Aim – the first of which is to "improve population health and well-being through a focus on prevention". In response, the new plan for Health and Social Care, "A Healthier Wales" includes clear ambitions that the health and care system in Wales will be "focussed on health and well-being and on preventing illness".

There is also a continued emphasis on improving care throughout the stroke pathway specifically, as one of the 'Together for Health' work streams. The refreshed Stroke Delivery Plan for NHS Wales and its partners, laying down the direction up to 2020, was published last year and is steered by the national Stroke Implementation Group chaired by national clinical lead and incorporating membership from all health board areas.

At a Health Board level this is translated into local action by the multidisciplinary Cwm Taf Stroke Steering Group.

2. PRIMARY PREVENTION OF STROKE

2.1 Primary Prevention as an Opportunity for Early Intervention

Primary prevention refers to actions aimed at avoiding the manifestation of a disease.

Zola's well known, river analogy as illustrated in Figure 6 is helpful for explaining the role of **primary prevention** (stopping people from coming to harm), **secondary prevention** (minimising the risk of complications through early identification and intervention) and **tertiary prevention** (minimising the consequences of established disease).

Figure 6 – Zola's River Analogy for the Different Stages of Prevention

	The Rio Iguazu River in Brazil		Examples within the stroke pathway
Primary Prevention		**Falling in Upstream** If you are going to fall this is the best place, where it is easiest to get out and you wouldn't come to any permanent harm although preferable not to fall in at all!	Maintaining a healthy weight and being physically active throughout life Drinking alcohol within recommended limits
Secondary Prevention		**Falling in Midstream** More difficult to get out but plenty of opportunities for most to get back on dry land	Taking medication and modifying lifestyle to control blood pressure
Tertiary Prevention		**Falling in Downstream** Clearly the poorest choice but despite it being more challenging still a chance of rescue	Stopping smoking to reduce risk of repeat stroke Undertaking a physio programme to regain strength and movement

All stages are important in the management of stroke although to maximise effect, focus and investment needs to shift to primary and early secondary prevention approaches.

A wide range of statutory and community partners are key to this, with primary care playing a vital role. It is estimated that 90% of health care occurs in primary care. This level of patient interaction, despite general capacity issues in this sector, provides considerable opportunities.

2.2 Targeted and Population Approaches to Prevention

Prevention approaches are often described as targeted (high-risk) or population-based.

Targeted or high-risk prevention is aimed at individuals who are at high risk of a disease. It involves interventions which give people direct support to change their behaviour or involve directly treating the individual, for example via undertaking a certain medical procedure or prescribing medication.

Population-based interventions, on the other hand, aim to change the risks from the social, economic and environmental factors that affect an entire population. This can be achieved through means such as regulation, legislation, subsidy and taxation.

Historically in the UK, interventions focused on individuals have tended to dominate CVD prevention activities and it is important to identify and treat those who are at higher risk. However, a much larger overall benefit could be achieved by making changes (albeit small ones) among any given population as a whole.

Geoffrey Rose's prevention paradox describes the seemingly contradictory situation where the majority of cases of a disease come from a population at low or moderate risk of that disease, and only a minority of cases come from the high risk population. This is because the number of people at high risk is small. As indicated by the Rose hypothesis, a small reduction in risk among a large number of people may prevent many more cases, rather than treating a small number at higher risk. A whole-population approach explicitly focuses on changing everyone's exposure to risk.[6]

The most effective preventative programmes integrate **both** approaches.

Stroke is categorised under cardiovascular disease (CVD). It is included in the NICE guidance PH25 which focuses on CVD disease prevention.[7]

This guidance complements the previous suite of guidance covering individual behaviour change approaches with regard to the major lifestyle risk behaviours and strongly recognises the opportunities for a population approach.

2.3 Overview of Risk Factors for Stroke

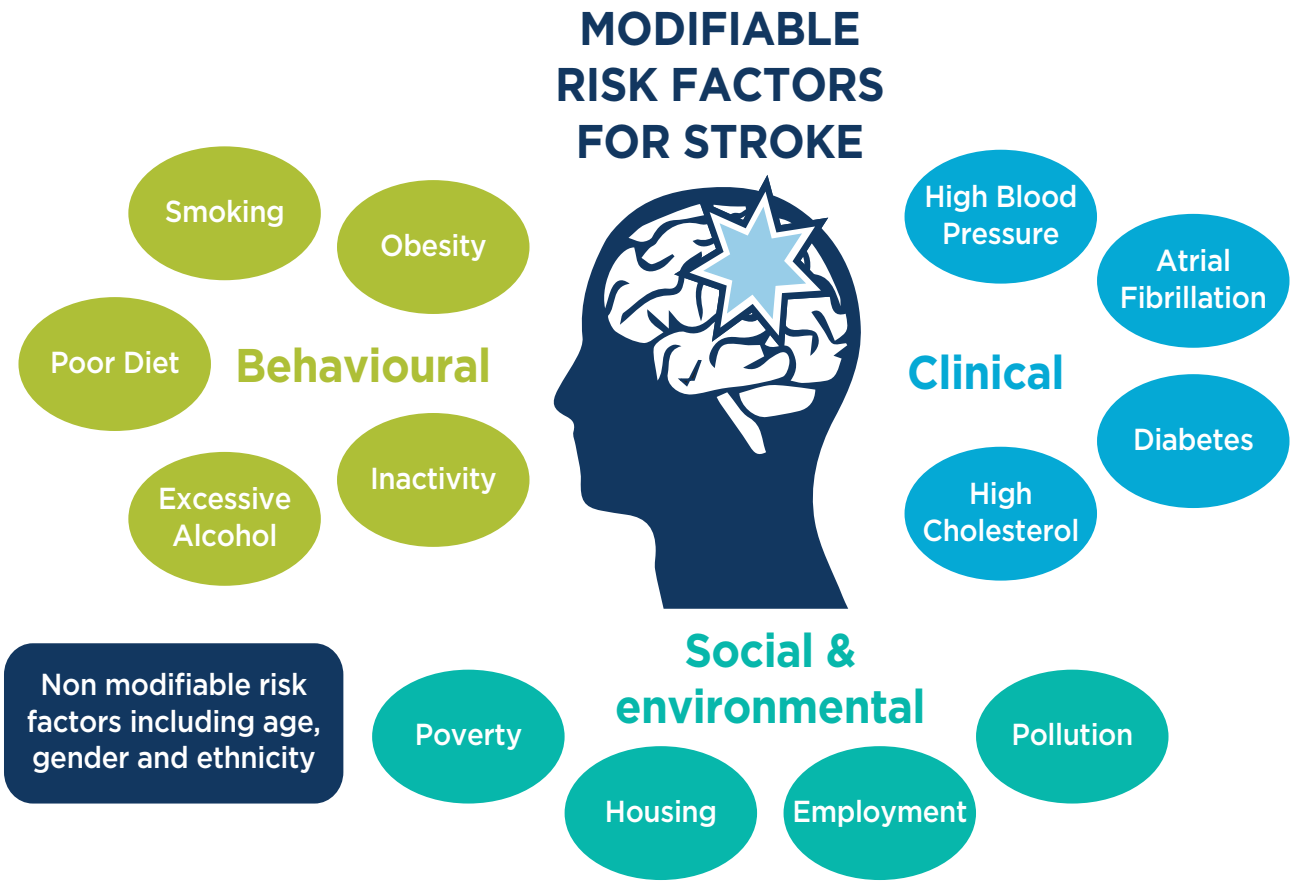
We know that there are a number of risk factors that increase the risk of a stroke, many of which are modifiable.[8] The Royal College of Physicians estimate that 70% of all strokes are preventable if clinical risk factors were managed effectively and people adopted healthier behaviours.

Also for consideration is the use of illegal drugs as a risk factor. Both marijuana and cocaine have been linked to an increased risk of stroke.[9]

The link between severe mental illness and cardiovascular risk should also be considered. This group are at higher risk of avoidable premature mortality. There is both the consideration that this cohort is more likely to experience higher levels of behavioural risk factors such as smoking and alcohol misuse and the fact that they are less likely to engage with screening programmes. NICE recommends the proactive physical assessment of individuals in this cohort to enable any necessary interventions.[7]

The Global Burden of Disease Study is a comprehensive research study of disease burden that assesses mortality and disability from major diseases, injuries, and risk factors. http://www.healthdata.org/gbd

Figure 7 – Key Modifiable Risk Factors for Stroke



The contribution of a risk factor to a disease or a death is quantified using the population attributable fraction (PAF). PAF is the proportional reduction in population disease or mortality that would occur if exposure to a risk factor were reduced to an alternative ideal exposure scenario.[10]

Data from the Global Burden of Disease study was used to estimate the population- attributable fraction (PAF) of stroke using DALYs associated with potential modifiable risk factors.

The disability-adjusted life year (DALY) is a measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death.

The study found that 90.5% of stroke burden (as measured by DALYs) was attributed to modifiable risk factors.

The top risk factors within Wales were identified as shown in Figure 8 below:

There is a clear link between modifiable risk factors. Behavioural risks can be the causative factor behind the development of clinical risk factors. For example, physical inactivity can increase the risk of hypertension by 52%. Figure 9 attempts to demonstrate how we need to direct both population and targeted approaches at influencing wider social, economic and environmental determinants as well as healthcare determinants to efficiently reduce the range of risk factors contributing to stroke.

Figure 8 – Stroke Risk Factor Profile for Wales

Global Burden of Disease identified risks from stroke, percentage of attributable disability-adjusted life years (DALYs), all persons, all ages, Wales 2016

Produced by Public Health Wales Observatory, using Global Health Data Exchange (IHME)

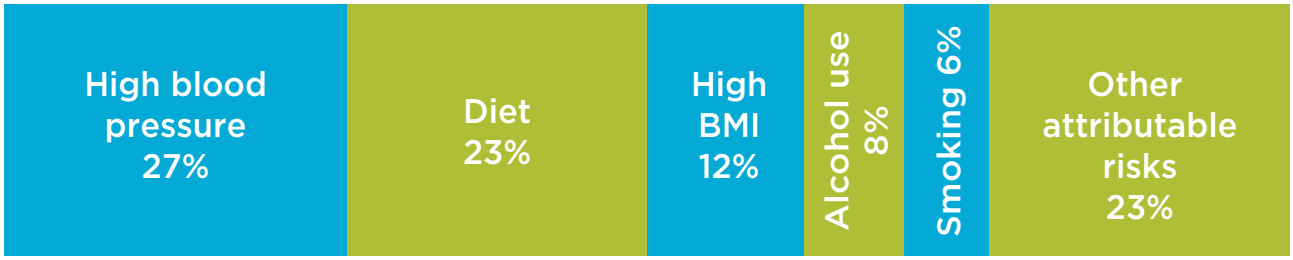
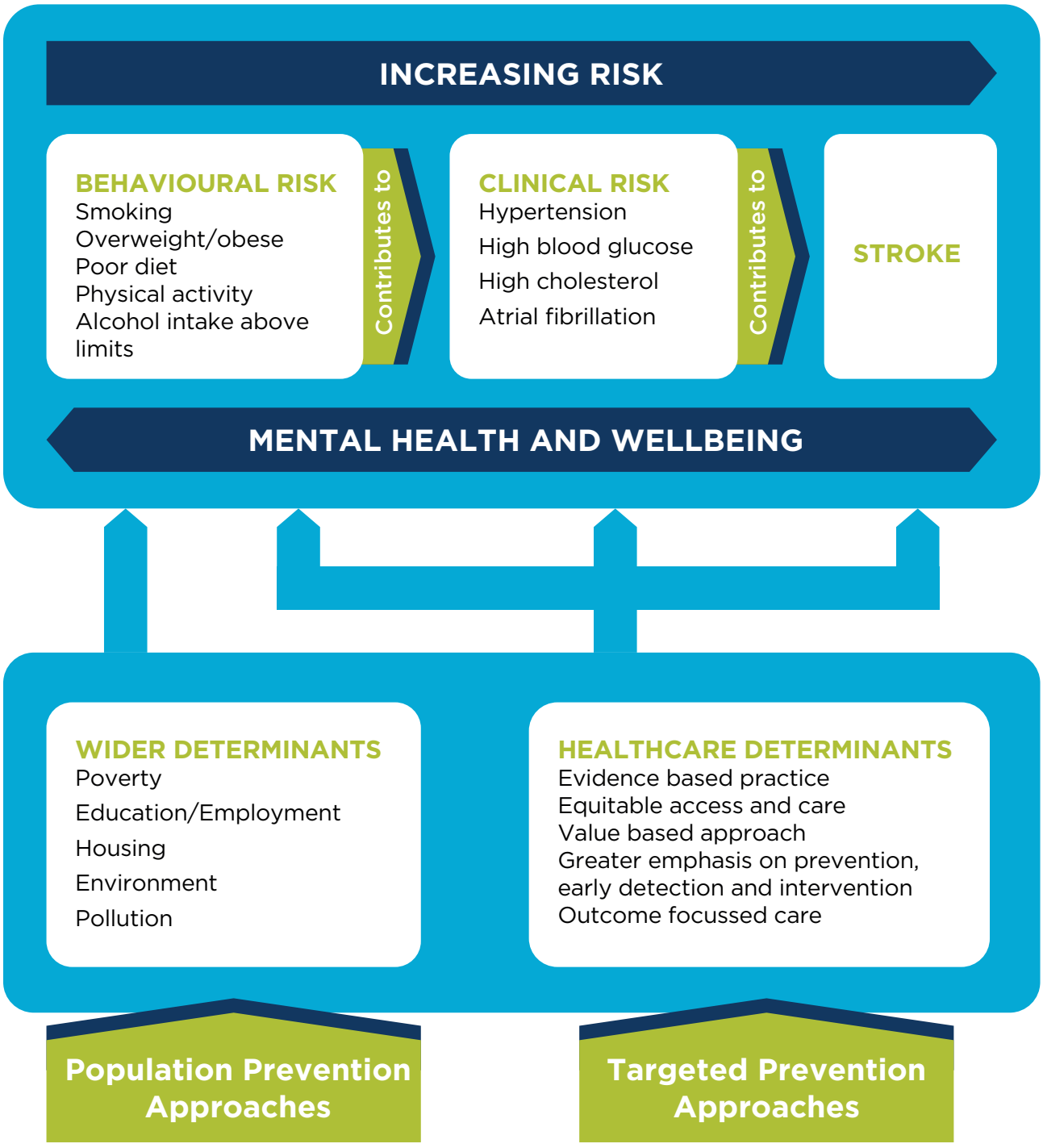


Figure 9 - Framework for Prevention of Stroke



The following sections 2.3.1 and 2.3.2 look at the individual behavioural and clinical risk factors in more depth.

2.3.1 Behavioural Risk Factors for Stroke

Globally, 74.2% of stroke-related DALYs were attributed to behavioural risk factors including smoking, dietary risk, and low physical activity.[10] These modifiable risk factors cause physiological changes in the body which increase the risk of an individual having their first stroke.

The take up of healthy behaviours remains a challenge locally with the latest lifestyle data from the National Survey for Wales 2017/18, as illustrated in Figure 10, showing a generally worse profile than the Welsh average.

Figure 10

The most recent National Survey for Wales data (2017/18) indicates that 13% of the population in Cwm Taf report having only one or no health promoting behaviours. A healthy lifestyle would be said to encompass 4 or 5.

Looking at each behaviour individually we can build up a picture of the current profile in Cwm Taf, the cardiovascular risk it represents and examples of effective action both at a targeted, individual and population level. There is a growing body of evidence to indicate what interventions are effective and just as importantly in the current climate 'good value for money'.[11] Tables 2-6 summarise this information.

Self-reported behaviour by adults in Cwm Taf (National Survey for Wales 2017/2018)

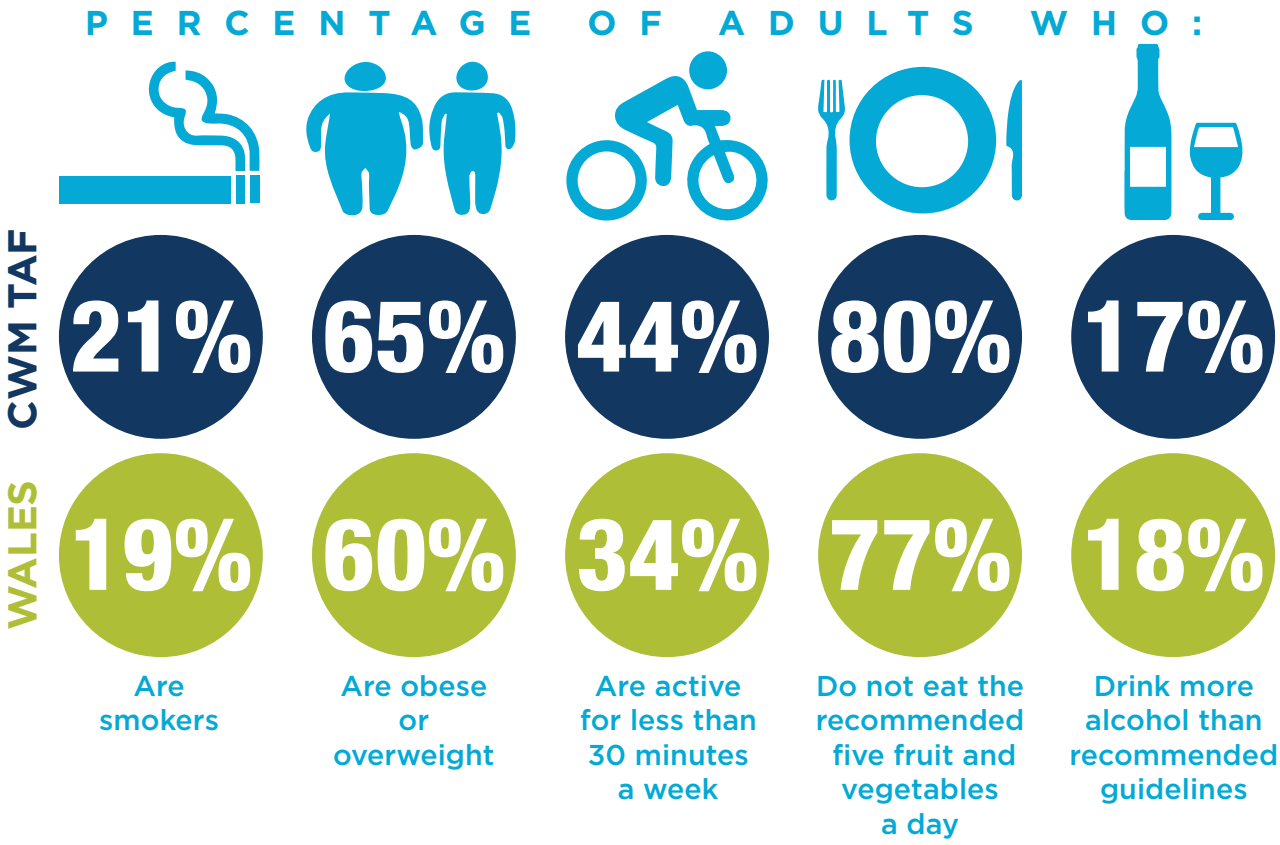


Table 2

Reducing levels of smoking		What can be done?	
Current picture in Cwm Taf	**Why is it important?**	**Individual approaches**	**Population approaches**
21% of adults in Cwm Taf smoke 7% use E-cigarettes (National Survey for Wales data - 2017/18) Estimated number of adult smokers 2017/18 = 51,000 Number treated by NHS cessation services 2017/18 = 2,325	Estimates show a two-fold increased risk of ischemic stroke for smokers versus non-smokers The risk of stroke rapidly reduces with smoking cessation, with 2-5 years' cessation reducing risk to almost the same levels having never smoked	Examples include: Organisation wide adoption of 'A Making every Contact Count' approach across health and social services taking every opportunity to raise the issue of smoking via ASK, ADVISE, ASSIST guidelines Providing cessation services for smokers to quit supported through counselling and medication Specialised support for pregnant women	Examples include: Advertising bans Taxation Enforcing age restrictions regarding purchase Enforcing smoke free environments

The recent revised Tobacco Control Plan for Wales contains a range of actions cutting across all organisations:

https://gov.wales/docs/dhss/publications/170915tobaccoplanen.pdf

Table 3

Maintaining a healthy weight		What can be done?	
Current picture in Cwm Taf	**Why is it important?**	**Individual approaches**	**Population approaches**
65% of adults are overweight or obese (National Survey for Wales data - 2017/18) 28.9% of children aged 4 to 5 are overweight or obese (Childhood Measurement Programme for Wales 2016/17)	Being overweight is estimated to increase the risk of having an ischaemic stroke by 22%. Obesity can increase that risk by up to 64%. The Foresight Report assessed the impact of obesity on the incidence of disease in the future and indicated that if current trends continue the number of strokes could increase by 30% by 2050 Children who are overweight before puberty will be overweight in early adulthood, increasing cardiovascular risk at an earlier age Obesity has a direct impact on the risk of developing hypertension the most common risk factor for stroke	Examples include: Tailored advice in primary care together with the option of referring to counselling and behaviour change initiatives	Examples include: Restrictive policy and taxation on unhealthy foods Food labelling Restrictions on marketing campaigns, aimed at children for unhealthy food and drinks Education campaigns Various initiatives to promote healthy eating in education settings, workplaces and wider communities

The All Wales Obesity Pathway which brings together actions at all levels is currently being reviewed. https://gov.wales/topics/health/improvement/obesity/?lang=en

Table 4

Healthy Diet		What can be done?	
Current picture in Cwm Taf	**Why is it important?**	**Individual approaches**	**Population approaches**
Only 20% of adults in Cwm Taf eat the recommended 5 portions of fruit and veg each day **(National Survey for Wales data -2017/18)** **It is estimated 3 out of 5 adults in the UK have raised cholesterol levels**	**Diets rich in fruits and vegetables and with increased potassium but reduced sodium and fat may reduce risk of stroke** **Reducing cholesterol by 1mmol/L reduces stroke risk by 21%.**	Effective approaches are very similar to those for maintaining a healthy weight Use of lifestyle advice/ statins as appropriate	Effective approaches are very similar to those for maintaining a healthy weight with added emphasis on access and availability of choices.

Table 5

Physical Activity		What can be done?	
Current picture in Cwm Taf	**Why is it important?**	**Individual approaches**	**Population approaches**
44% of adults report being active for less than 30 minutes a week (National Survey for Wales data - 2017/18)	The protective effects of physical activity include the reduction in blood pressure and weight management as well as control of diabetes - in turn reducing stroke risk	Examples include: Tailored advice in primary care together with the option of referring to supported exercise programmes such as the National Exercise Referral Scheme (NERS)	Examples include: Media campaigns Active travel strategies Various initiatives to promote physical activity in education settings, workplaces and wider communities Consideration in all planning applications

Table 6

Drinking alcohol within recommended limits		What can be done?	
Current picture in Cwm Taf	**Why is it important?**	**Individual approaches**	**Population approaches**
17% of adults drink over the recommended guidelines (National Survey for Wales data - 2017/18)	Regularly drinking over the recommended limits increases the risk of stroke	Examples include: Brief interventions and motivational interviewing techniques used by health professionals to raise the issue of alcohol and encourage the patient to modify their intake. Signposting to support if needed	Examples include: Restricting access through - Effective licensing Advertising bans Raising taxation Minimum unit pricing

There are many theories of and approaches to behaviour change.

NICE guidance (PH49) makes recommendations on individual-level interventions aimed at changing health-damaging behaviours.[12]

Alongside our consideration of the evidence base to date however, we need to continue to improve our understanding of its application to our communities.

Of particular relevance within our population are:

- the impact of wider determinants of health influenced by the high levels of deprivation and poverty in some parts of our communities
- the effect of local, cultural beliefs about health and utilisation of services
- the use of unhealthy behaviours as a 'coping mechanism'
- clustering of behaviours with more people having numerous unhealthy lifestyle factors

Implementation of effective behaviour change strategies requires the support of an ongoing research programme to help better understand and work with these challenges.

2.3.2 Clinical Risk Factors for Stroke

The following section looks at the clinical risk factors for stroke. Their management requires a mix of primary care and secondary care interventions. Ideally where possible clinical risk factors can be prevented by lifestyle management and when this is not possible early diagnosis and treatment should be the aim to prevent further disease.

Hypertension

The risk factor attributed with the highest percentage of stroke burden by the Global Burden of Disease Study was identified as high systolic blood pressure at both a global and Wales level, at 64.1% and 27% respectively.[10]

The National Cardiovascular Intelligence Network estimates that hypertension triples the risk of stroke.

A review using General Medical Services Quality and Outcomes Framework (QOF) data for 2016-17 found that on average in Cwm Taf, **16.6%** of the practice populations were recorded as being on a hypertension register.

Prevalence ranged from 13.9% in the South Taf Ely cluster to 18.4% in South Cynon linking to the patterns of higher deprivation in our communities. The Welsh average is 15.6%.

The crucial aspect of care however is ensuring blood pressure is maintained within desired limits. QOF data indicates that almost 1 in 5 patients on registers in Cwm Taf do not achieve even the upper level of 150/90mmHg or less as a desired blood pressure reading, as determined by current NICE guidance. Achievement of this level as a maximum varies across Cwm Taf ranging from 77.7% in North Rhondda to 83.9% in South Rhondda.

There is literature to support lowering systolic blood pressure across various comorbidities.[13, 14] Discussion around the additional benefits of intensive blood pressure lowering explored by the SPRINT[15] study advocates the advantages of a systolic reading below 120mmHg.

Systolic blood pressure is more important than diastolic blood pressure in the elderly patients, in whom the majority of cerebrovascular diseases and strokes occur.[16]

NICE guidance[17] focuses on identifying and treating primary hypertension in individuals aged 18 and over. It provides guidance on diagnosis, cardiovascular risk assessment, antihypertensive treatment and lifestyle modification.

Hypertension is a major public health issue. Public Health England's action plan provides evidence-based advice for partners including local government and the health system. A similar approach in Wales would be beneficial.

As with stroke itself we know hypertension is closely linked to behavioural risk factors.[18] Lifestyle modification is a key component in improving management of blood pressure.

Modelling by the Public Health Wales Observatory and Cwm Taf UHB, based on the 'Size of the Prize' analysis undertaken by NHS England[19], indicates that optimal treatment of hypertension can reduce the number of strokes in our population.

Just over **9,000 people in Cwm Taf have uncontrolled high blood pressure**. If all of these people were to receive optimal treatment to lower their blood pressure, it could avert about **27 strokes** per year

Calculations are based on the number needed to treat (NNT) applied to Cwm Taf patients with diagnosed hypertension who are not achieving desired levels of control (BP=150/90 mmHg or below) in the last 12 months.

For hypertension the NNT with medication for five years to prevent one stroke is 67.

This potential reduction in stroke has considerable estimated savings:

£360,000 =
Estimated NHS saving by optimally treating uncontrolled BP in Cwm Taf in the first year

Atrial Fibrillation

Atrial fibrillation (AF) is a heart condition that causes an irregular and often abnormally fast heart rate. The presence of atrial fibrillation increases overall stroke risk five-fold.[1]

The estimated prevalence of Atrial Fibrillation using QOF data 2016/17 was **2%** for Cwm Taf overall (all ages). The Welsh average is 2.1%.

There remains ongoing debate about routine case finding for AF. In their 2014 review it was not recommended by the UK National Screening Committee, based on lack of data on cost-effectiveness and suboptimal management of known AF. This is anticipated to be reviewed this year.[20]

The general consensus however, is that although screening the whole population is unlikely to be appropriate or cost-effective, a targeted approach directed at high-prevalence groups is likely to be the best strategy.

Optimal management of conditions which are known vascular risk factors, within review clinics, should include routine pulse checks. Within Cwm Taf, the Health Check cardiovascular risk screening programme checks pulse as part of the assessment process and if abnormal ECG follow up is arranged (see section 2.6 for further information).

AF should be treated in accordance with NICE guideline CG180.[21]

Reducing stroke risk is a key part of the guidance. **Effective anticoagulation can reduce risk by 60%.**[3]

All patients with AF should be assessed for their risk of stroke and the need for prophylaxic thrombolysis to prevent clots balanced with the patient's risk of bleeding.

NICE recommends using the **CHA_2DS_2-VASc assessment tool** for stroke risk and the **HAS-BLED tool** for bleeding risk prior to and during anticoagulation. (see Appendix 1)

For those with a CHA_2DS_2-VASc trigger score, options dependant on suitability, should include vitamin K antagonists (such as warfarin) or the newer non vitamin K antagonist oral anticoagulants (NOACs) or Direct Oral Anticoagulant (DOACs). If warfarin is used for stroke prevention, the quality of anticoagulation control within therapeutic range is crucial to equally reduce the risk of stroke and prevent bleeding.

The most common antiplatelet drug aspirin, as a monotherapy for stroke prevention, is no longer recommended.

Both analysis of stroke data within Cwm Taf and work undertaken in neighbouring health boards indicates that a proportion of AF patients who are not currently anti-coagulated, could be.

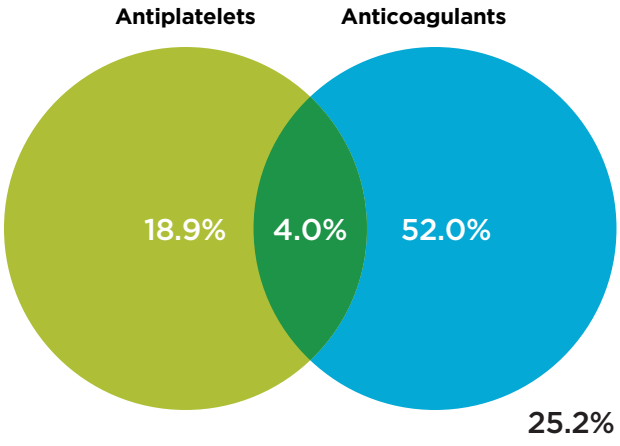
In the period April 2015 To April 2018, out of the 1714 admissions with a diagnosis of stroke **17.6%** (302 patients) had a previous diagnosis of atrial fibrillation. Prevalence rises with patient age as would be expected. It is estimated that individuals are twice as likely to have AF for every decade after 55.

Of these 302 patients, only **56%** were receiving recommended anticoagulant therapy. 4% of these were also on antiplatelet medication (Figure 11).

Just **over a quarter** of patients were not on treatment while a further **18.9%** were on antiplatelet monotherapy (no longer recommended).

Although medication contraindications and patient choice will contribute to this position the numbers seem sufficiently high to suggest optimum treatment for all isn't being achieved.

Figure 11 - Treatment of pre-admission atrial fibrillation within stroke patient cohort (n-302)



The national 'Stop a Stroke - Who cares wins!' programme aims to work with all health boards in Wales to put in place a sustainable model to ensure all AF patients are reviewed and in the future routinely screened for stroke risk and anticoagulated as appropriate. More information is available at: https://www.stopastroke.co.uk/.

A large pilot supported by the '1000 Lives' team was undertaken in Cardiff and the Vale UHB area using the AF Audit Plus tool in line with the NICE guidance to identify patients who need a treatment review. This review was supported with specialist consultant input to primary care.

Further pilots are underway in all Health Board areas including Cwm Taf where the current focus is in the Tonypandy area, which SSNAP data identified as one of the 'hotspot' areas for stroke.

Modelling by the Public Health Wales Observatory and Cwm Taf UHB, based on the 'Size of the Prize' analysis[19] undertaken by NHS England demonstrates the potential benefits of optimising treatment:

Just over **500 people in Cwm Taf have untreated high risk atrial fibrillation**. If all of these people were to receive optimal anticoagulant treatment to reduce stroke risk, it could avert about **14 strokes** per year in our population

Calculations are based on number needed to treat (NNT) applied to Cwm Taf patients with high-risk atrial fibrillation, defined by a CHA_2DS_2-VASc risk assessment score of ≥ 2 but not currently anti-coagulated.

For high-risk AF the NNT with warfarin over 1.5 years to prevent one stroke is 25.

£186,000 =
Estimated NHS saving by optimally anticoagulating high risk atrial fibrillation in Cwm Taf in the first year*

Diabetes

Diabetes is a disease in which the body's ability to produce or respond to the hormone insulin is impaired, resulting in elevated levels of glucose in the blood. There are two types Type 1 and Type 2:

- Type 1 diabetes – where the body's immune system attacks and destroys the cells that produce insulin.
- Type 2 diabetes – where the body doesn't produce enough insulin, or the body's cells don't react to insulin. This type is largely preventable and linked strongly to obesity.

Type 2 diabetes is far more common than type 1. In the UK, around 90% of all adults with diabetes have type 2.

Persistently high levels of blood glucose can raise the likelihood of atherosclerosis where blood vessels become clogged by fatty substances. This in turn can increase the risk of stroke.

Type 2 diabetes almost **doubles the risk of stroke** within the first five years of diagnosis.

It is a contributing factor in up to 1 in 5 strokes in the UK.

SSNAP stroke assessment data for Cwm Taf shows **23.6%** of stroke admissions are diabetic.

Improving optimum management of diabetes in our population would reduce stroke risk. Increasing prevention of Type 2 diabetics through effective lifestyle management would have an even greater effect. These links again illustrate the need for the pathways of care across or major chronic conditions to align.

In Cwm Taf, **6.2%** of the practice population are on a diabetes register. This ranges from 5.4% in the South Taf Ely cluster area to 7% in South Cynon. The Welsh average is 5.9% (QOF 2016-17).

On average across the Health Board area 30.2% do not achieve desired diabetic control, as indicated by a blood IFCC-HbA1c of 59mmols/mol or less.

High Cholesterol

Cholesterol is a fatty substance (lipid) which is made naturally by the liver and is needed for the normal functioning of the body. Diet can also affect cholesterol levels. Cholesterol is carried in the blood by proteins. When the 2 combine, they are called lipoproteins. The 2 main types of lipoprotein are: high-density lipoprotein (HDL) referred to as "good cholesterol and low-density lipoprotein (LDL), "bad cholesterol".

It is the overall balance of good and bad cholesterol in the body that affects your risk of having a stroke.

Statins are medication which limit the production of 'bad' cholesterol in the liver. The use of statins in people at high risk of cardiovascular events reduces the risk of stroke by **25%.**

Reducing cholesterol by 1mmol/L reduces stroke risk by **21%**.

Information on cholesterol isn't collected as part of SSNAP admission data.

Transient Ischaemic Attacks (TIAs)

Although, not a risk factor in the same context, a transient ischaemic attack (TIA) is an important warning sign that the sufferer is at increased risk of a stroke. A TIA is a transient episode of neurological dysfunction causing loss of blood flow to the brain that produces stroke like symptoms but usually only for a few minutes with full resolution within 24 hours.

TIAs need to be treated seriously. Between 8-10% of people will have a full stroke within one week of experiencing a TIA. This rises to 17% at 3 months. NICE guidance CG68 lays down the protocols for assessment and treatment of TIAs.

A recent clinical review in 2016 urged that all patients have access to urgent specialised assessment without further risk stratification because of the substantial risk of subsequent stroke and insufficient evidence on the precision of available risk stratification tools together with differences in their application in practice.[1]

A systematic review of 18 independent cohorts (n = 10,126) reporting stroke risk within 7 days of confirmed TIA found that the risk of completed stroke was much lower if treatment was received in a specialist stroke service (0.9%) compared to a non-urgent setting (11.0%).[22]

Within Cwm Taf, a consultant led, specialist TIA Clinic is run daily Monday to Friday. During the period August 2017 to July 2018, **329** patients attended.

The majority of clinic attendees are over 60, however 36% are under 60 with 7% of the overall being under 40. 52% of attendees are female.

There is no easily accessible information on the source of referrals to this clinic, the onward referral and investigations undertaken or the long term outcomes for patients.

Admission assessment data obtained via SSNAP indicates that **27%** of stroke admissions have experienced a TIA prior to admission but the numbers of these patients who have had previous specialist TIA assessment and treatment are not known.

There are a number of key challenges in optimising management of this patient group. We are unsure how many patients seek no medical advice when experiencing a TIA due to the short lived nature of symptoms and lack of knowledge about their potential importance. Raising awareness can be a challenge when trying to balance public response in relation to recent campaigns such as 'Choose Wisely' which encourage to public to rationalise their use of particularly emergency NHS services, to the need to treat often seemingly brief symptoms urgently.

Once patients are assessed we need to ensure that lifestyle as well as clinical risk factors are fully addressed.

2.4 Further Approaches to Tackling Stroke Risk

There are a number of programmes in Cwm Taf which encompass a wide approach to risk management whether via a population or targeted approach which allow a number of risk factors to be tackled collectively.

Making Every Contact Count

Gwneud i bob cyswllt gyfrif
Making every contact count

Making Every Contact Count (MECC) is an approach to behaviour change that utilises the millions of day to day interactions that staff have with other people to support them in making positive changes to their physical and mental health and wellbeing.

MECC enables the opportunistic delivery of consistent and concise healthy lifestyle information and enables individuals to engage in conversations about their health at scale across organisations and populations.

Within Cwm Taf the local public health team are delivering a level 2 programme providing staff with the language and communication skills to raise the issue of healthy lifestyles as well as making staff aware of the many local services we have in Cwm Taf to support patients. A level 1 e-learning package is available.

We know that not every contact with a patient will have a successful outcome but it is hoped that by consistently highlighting messages and suggesting possible change that more patients will make positive changes. To achieve this, training and implementation of the principles of MECC need to be rolled out and adopted at scale across the Health Board. Further investment is required to ensure sufficient numbers of staff are trained and there needs to be an organisational commitment to embed and implement this approach within normal day to day practice.

Inverse Care Law Cardiovascular Risk Programme

Cwm Taf Health Check
CWM TAF CARES

The Cwm Taf UHB CVD Risk Reduction Programme aims to improve the health and wellbeing of adults aged 40-74 years through promoting and improving the early identification and management of the individual behavioural and physiological risk factors for vascular disease and other conditions associated with these risk factors. The programme forms part of the Cwm Taf University Health Board's 'Inverse Care Law' Programme approach in primary care which seeks to address the mismatch between need and access to services identified by Professor Julian Tudor Hart.[23]

> **"The availability of good medical care tends to vary inversely with the need for it in the population served."**
>
> Inverse Care Law, Julian Tudor Hart, Lancet 1971

Patient assessments are undertaken by trained Health Care Support Workers (HCSWs) using the menu driven IT package. Appointments include measuring blood pressure, pulse, height and weight, blood testing, patient history and assessment of lifestyle factors. Based on this information a revised "heart age" and risk of developing CVD over the next 10 years is calculated and explained to the patient

Patient assessments are undertaken by trained Health Care Support Workers (HCSWs) using the menu driven IT package. Appointments include measuring blood pressure, pulse, height and weight, blood testing, patient history and assessment of lifestyle factors. Based on this information a revised "heart age" and risk of developing CVD over the next 10 years is calculated and explained to the patient.

Practices are targeted wherever possible to prioritise those whose catchment cover the areas of the highest deprivation. Postcode data suggests that 97% of patients undertaking a Health Check assessment reside in the top three deprivation quintiles, based on Welsh Index of Multiple Deprivation (WIMD) 2011.

This together with the fact that around half of participants are men is promising in indicating that the programme is potentially reaching those who are traditionally less likely to engage with screening programmes. However, it is important to remember that the programme has a 45% take up so not all targeted are engaged.

Data collected from the health check assessments indicates that many previously undiagnosed risk factors are being identified as shown in Figure 12.

Figure 12 – Risks identified by the Health Check Programme

- For every 4 Health Checks carried out, 1 person is found to have high blood pressure that requires further investigation
- For every 16 Health Checks carried out, 1 person is found to have a raised HbA1c level that requires further investigation
- For every 1-2 Health Checks carried out, 1 person is found to have raised cholesterol levels. 1 in 15 have a cholesterol of ≥7.5mmols/L

For every 5-6 Health Checks undertaken 1 person is found to have high or very high risk of cardiovascular disease.

The programme has clear potential but we need to ensure that we continue to develop strong pathways post identification of risk to maximise both lifestyle and clinical risk factors management.

The Stroke Association

The Stroke Association is the key charity in the UK that provides a range of advice and information related to all aspects of stroke. A number of their major campaigns have focused on prevention and early intervention including 'Know your BP' and 'FAST'.

2.5 Patient Story: A shot across the bows

Mr Thomas*, a 55-year-old gentlemen would have in his own words considered his health as 'fine'. However, on receiving an appointment to a Health Check at his local GP surgery, being mindful of being a bit overweight, having a young family and having lost his own father to a heart attack aged 46 he decided to attend.

"I thought it was a great opportunity to find out if there was anything wrong no matter what it might be. Better to catch things earlier than later!"

As a non-smoker with no pre-existing conditions, Mr Thomas was fairly confident that all was ok though. He described his shock when the assessment found him to have hypertension 170/100, atrial fibrillation, a high HbA1c blood reading indicative of diabetes and high cholesterol. A combination which put him at high risk of experiencing a cardiovascular event.

Now on a combination of medication and diet to treat his various conditions he has commenced on a local exercise referral programme to help him become more active and lose weight.

His gratitude to the Health check programme is evident both in identifying his risk "before anything happened" and the support he received in helping make changes.

Mr Thomas 's story is one of many - For every 5-6 Health Checks undertaken 1 person is found to have high or very high risk of cardiovascular disease.

3. EARLY DETECTION AND ACCESS TO TREATMENT

Early detection and intervention for stroke patients can improve outcomes. Most importantly for suitable patients who have undergone an ischaemic stroke prompt admission to hospital following onset of symptoms allows consideration of thrombolysis. This 'clot busting' treatment can only be administrated effectively in a short time period following onset of symptoms.

There have been considerable efforts over the last two decades to try and improve understanding of symptoms and the need for urgent medical assessment amongst both public and health professionals.

Lecouturier et al in their systematic review of mass media campaigns designed to improve awareness of stroke symptoms and increase prompt admission showed that there is limited evidence that they change public behaviour and thus time to presentation particularly in older individuals, although generally awareness is increased.[24]

Later studies have been more positive but stress the need for further research and sustained funding.[25, 26, 27]

The best known and most widely promoted campaign is **FAST**.

Recent literature indicates that FAST has increased awareness of symptoms and influenced behaviour to a degree but there are a number of areas for further consideration.

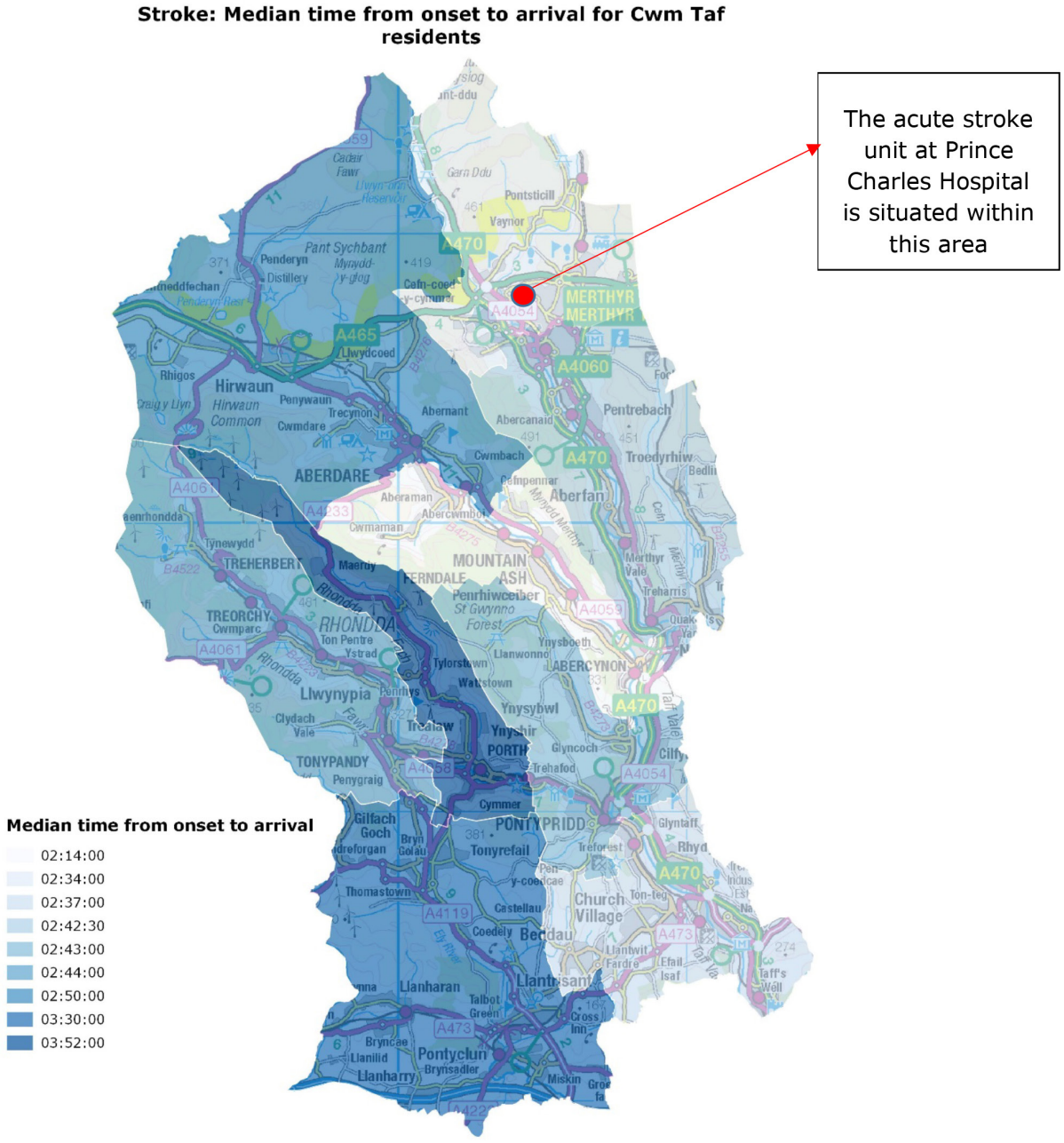
Although FAST encourages seeking medical help promptly, it doesn't specify that in order to be considered for thrombolysis patients need to arrive at hospital a maximum of 3.5 hours post symptom onset.

Figure 13 – Components of FAST

By mapping arrival times against post codes for a cohort of 1345 Cwm Taf patients admitted from April 2015 to April 2018 we see that there is not perhaps the expected pattern across the Health Board area with no consistency between distance from the acute stroke unit at Prince Charles Hospital and time between symptom onset and presentation at A+E.

This may indicate that certain communities within our population are more likely to delay seeking medical attention and should be targeted in public campaigns.

Figure 14 – Median time in hours from onset of stroke symptoms to arrival in hospital for Cwm Taf residents (April 2015-April 2018)



Less than a third of all ischaemic stroke patients reviewed arrived at A+E soon enough after symptom onset to be considered for thrombolysis, even before other eligibility criteria were applied. This includes consideration of in and out of hospital strokes.

We need to raise awareness of thrombolysis as a potentially highly beneficial treatment and ensure the public are aware of the time restrictions around its use.

The FAST campaign tends to use imagery of quite severe symptoms to illustrate their importance. This can lead to the issue of less prominent signs often experienced during a transient ischaemic attack (TIA) being ignored even though this is a strong warning sign for stroke. Similarly, a mild stroke may not lead to individuals urgently seeking help.

Raising awareness of this issue can be a challenge, however when trying to balance public response in relation to recent campaigns such as 'Choose Wisely' which encourage the public to rationalise their use of particularly emergency NHS services, with the need to treat often seemingly brief symptoms urgently.

We also need to explore and make use of the many different digital platforms available to engage with the public, in addition to more traditional mass media routes. It is vital that promotion is not just directed at our most at risk groups, recognition of symptoms and the call to emergency services are most often made by bystanders.

Within Cwm Taf during early 2017, a multi-media campaign was devised in partnership with the Stroke Association to both inform the public and to support clinical and community care staff. Resources developed included a bilingual poster, health promotion flyers and social-media content. The resources targeted friends and family as well as those potentially at risk of a stroke.

Familiar imagery from landmarks around the health board area, making use of 'hyperlocal' content, was used to catch the eye of the population being targeted These were incorporated into a paid-for Facebook campaign targeting specific populations, as well as organic content posted across Cwm Taf-owned social media pages. Two advert sets were created for the campaign. The first with videos aimed at those at risk (45-65 years+) and a second aimed at relatives of those potentially at risk (25-45).

Locations were chosen by postcode in Communities First areas as evidence suggests that those in deprived areas are more likely to suffer from stroke.

Figure 15 - Stroke Campaign Materials

Generally, the campaign received positive feedback but one of the most interesting aspects was the reach achieved over a 6-week period for the Facebook video posts which received over 63,000 viewings.

Although this campaign was developed in a short timescale with a very small budget the potential engagement opportunities would warrant consideration of a professionally developed national campaign using social media networks.

NICE recommends the FAST test as the first identification tool for a stroke.

In 1998, FAST was introduced into the paramedic protocol in Wales to improve the rapid triage of suspected stroke patients. If a patient is assessed as 'FAST positive', A&E are pre-alerted (ASHICE) and the stroke pathway for acute care initiated.

Early studies found a good agreement between use of FAST by paramedics and then physicians once admitted indicating they are using FAST correctly.[28] However, this isn't a consistent finding.

Williams (2017) undertook a cohort study over 2 years identifying paramedic use and recording of the FAST tool and subsequent emergency department diagnosis of stroke.[29] There were two main findings:

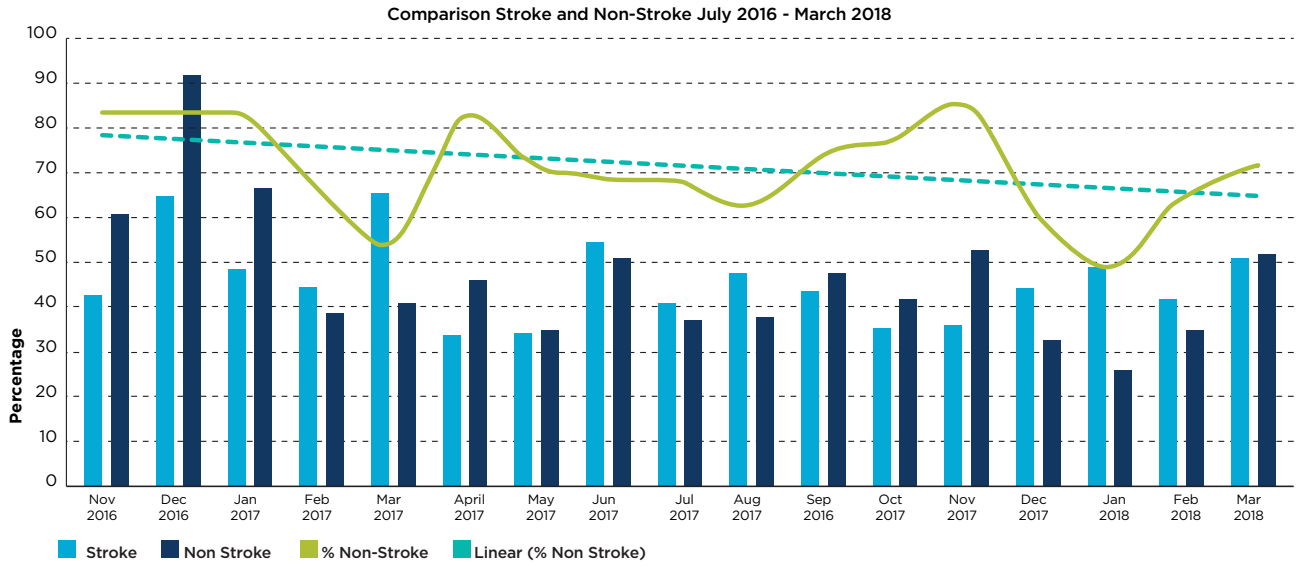
- Paramedic staff often just recorded 1-2 elements of FAST despite the fact that more components included the higher the sensitivity
- Accurate recording and coding of FAST as well as time of stroke was varied.

The study undertaken in Australia reported 52.2% sensitivity. They suggested a systematic approach to clinical assessment and documentation to improve paramedic identification of stroke and ultimately patient outcomes.

A similar picture is seen within Cwm Taf. Previously, the Health Board has monitored the level of 'stroke mimics' - patients who present with stroke like symptoms, but following investigation are not diagnosed as having had a stroke.

For the period November 2016 to March 2018 there were a total of 1,578 cases presenting as potential stroke patients. Of this total, 782 patients (49.6%), were diagnosed as having had a stroke meaning that 50.4% were not stroke patients.

Figure 16 - Monthly Comparison of Stroke and Stroke Mimic Admissions



This supports the long held operational view that the split is around 50:50.

Work is currently underway to revise protocols to attempt to differentiate between true strokes and mimics as soon as possible within the assessment process so that those patients who require care from the specialised stroke team receive it as soon as possible.

The balance between directing specialist resource only where needed versus the risk of missing a diagnosis is likely to remain a challenge however and has a large impact on the capacity of front line specialist staff.[30]

4. FAST AND EFFECTIVE PROVISION OF ACUTE CARE

4.1 The Importance of Acute Care

There is considerable evidence that the best outcomes for stroke patients are achieved when prompt, effective acute care is in place. The Royal College of Physicians, 2016 edition of the National Clinical Guideline for Stroke provides clear guidance.[5] It contains over 400 recommendations for practice covering all aspects of stroke care. www.strokeaudit.org/guideline.

There are a number of aspects of stroke care whose greatest influences on outcomes are time restricted. The 4, 24 and 72-hour stroke bundles monitor performance against guidelines for timely delivery of care. See Appendix 2.

Key areas explored within this report include time to CT scan, administration of thrombolysis and admission to a specialised stroke unit.

Urgent access to a CT scan is a key component of the assessment process to determine the type and extent of stroke which enables treatment to be directed to the pathology of stroke.

Of particular importance to patients found to have an ischaemic stroke is the drive to maximise opportunities to allow consideration of thrombolysis. Although this treatment is associated with a number of contraindications, restricted by a short time window for administration and has potential side effects, evidence shows that it improves patient outcomes both in terms of mortality and functional ability.[31, 32, 33].

Best practice involves prompt access to assessment and treatment by specialised staff. The 2013 Cochrane Review of stroke care found that patients who receive organised in-patient care in a stroke unit are more likely to be alive, independent, and living at home one year after a stroke.[34]

It should also be noted in appreciating the full range of care that there are many other important aspects of stroke care including access to thrombectomy (mechanical clot removal), which is currently the focus of a national working group and potential surgery and supportive treatment for haemorrhagic strokes. These fall outside the scope of this report however as does any detailed review into the vital care provided by a range of staff within the various therapy disciplines.

4.2 Stroke Admissions in Cwm Taf

Using data collected by the Health Board for submission into the Sentinel Stroke National Audit Programme (SSNAP) it is possible to build up a picture of stroke admissions in the Cwm Taf UHB area.

In the period **April 2015 to April 2018, there were 1714 admissions** with a diagnosis of stroke. **88** of these patients (5.1%) were already in hospital when their stroke occurred. **1351 (79%)** of all admissions were residents of the Cwm Taf area. The largest number of outliers came from Caerphilly area (10% of all admissions) followed by Powys residents. For the purposes of this report as indicated where appropriate, certain analysis has concentrated on Cwm Taf residents only.

As would be expected the number of stroke admissions is higher in older age groups. This trend is followed in Cwm Taf although our average age of onset is lower than other areas.

Table 7 - Age of onset Cwm Taf residents

Age at onset of stroke	Number of patients	Proportion
<60	230	17.0%
60-69	258	19.1%
70-79	405	30.0%
80+	458	33.9%
All ages	1351	

The average age of onset for Cwm Taf residents is **70.1** years for males and **75.3** for females a difference of 5.2 years.

SNAPP data for 2016/17 for England, Wales and Northern Ireland indicated that the average age for someone to have a stroke is 72 for men and 78 for women.

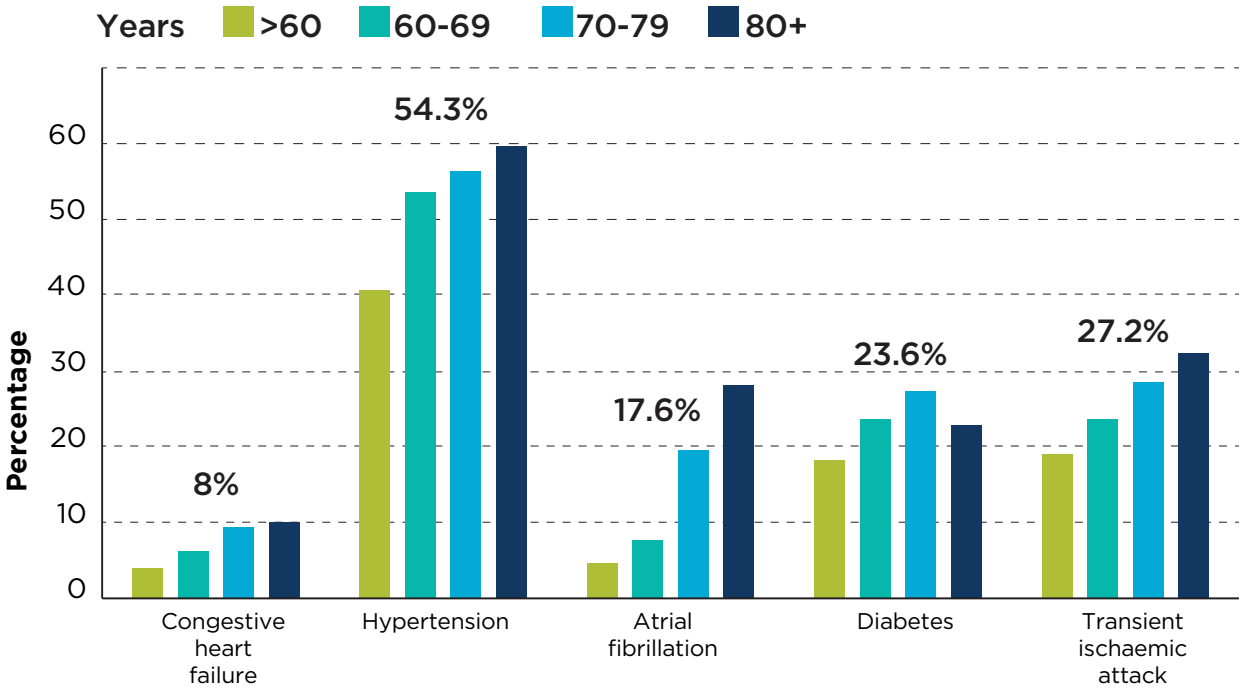
Our population follows the national trend for men to be at a higher risk of having a stroke at a younger age than women.[35] This is generally due to a combination of behavioural and medical risk factors often being more prevalent in males. Both sexes in our area however on average experience stroke at a younger age than the national mean.

Statistics from the Stroke Association's 2018, 'State of the Nation' report indicates that more women than men die of stroke. This is predominately because women tend to live longer than men, and the risk of stroke increases with age.

Due to the small numbers of stroke patients in this area recorded as being of a different ethnic origin, data for this characteristic has not been explored further for this patient cohort. However, as our populations continue to become more diverse we need to be mindful when planning prevention strategies that research indicates that black and South Asian people are at higher and earlier risk of stroke.[36, 37]

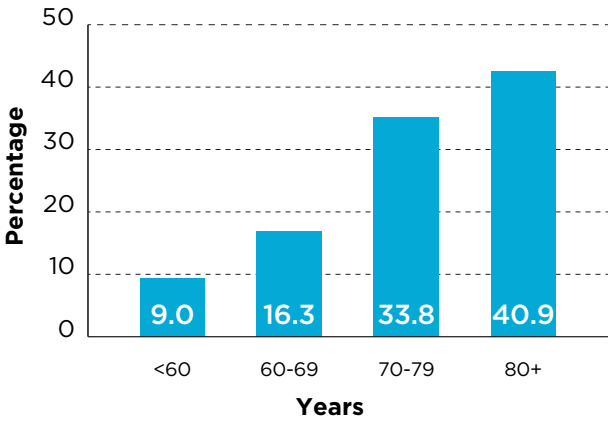
One of the key factors to an increased incidence with age is the increased presence of co-existing conditions. Data collected for SSNAP identifies patients with pre-existing clinical risk on admission as demonstrated in Figure 17:

Figure 17 - Proportions of Stroke admissions with pre-existing conditions by five-year age bands



Risk is also increased in older age groups by the cumulative effect of experiencing 2 or more conditions which are known to affect stroke risk, the incidence of which increases with age as demonstrated in Figure 18:

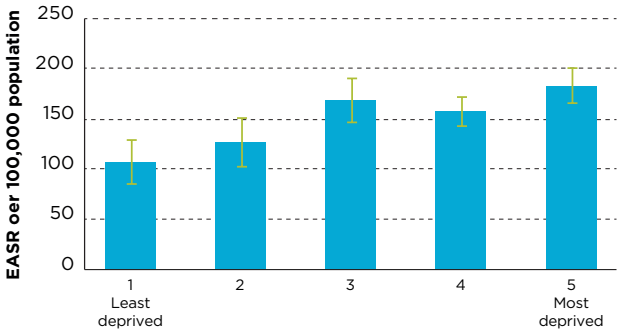
Figure 18 - Proportion of Stroke Patients with 2 or more co-existing conditions as recorded in SSNAP assessment data within different age bands



These figures reinforce the need to ensure stroke prevention is considered within other disease pathways.

Research has also highlighted the increased incidence of stroke amongst lower socioeconomic groups.[2, 38] By looking at stroke admission data for Cwm Taf residents in terms of incidence by deprivation quintile this trend is evident although the high levels of deprivation throughout Cwm Taf means that the differences between quintiles are not so marked as perhaps in other areas.

Figure 19 - Stroke incidence by deprivation (EASRs using 2016 populations for 2017 and 2018)

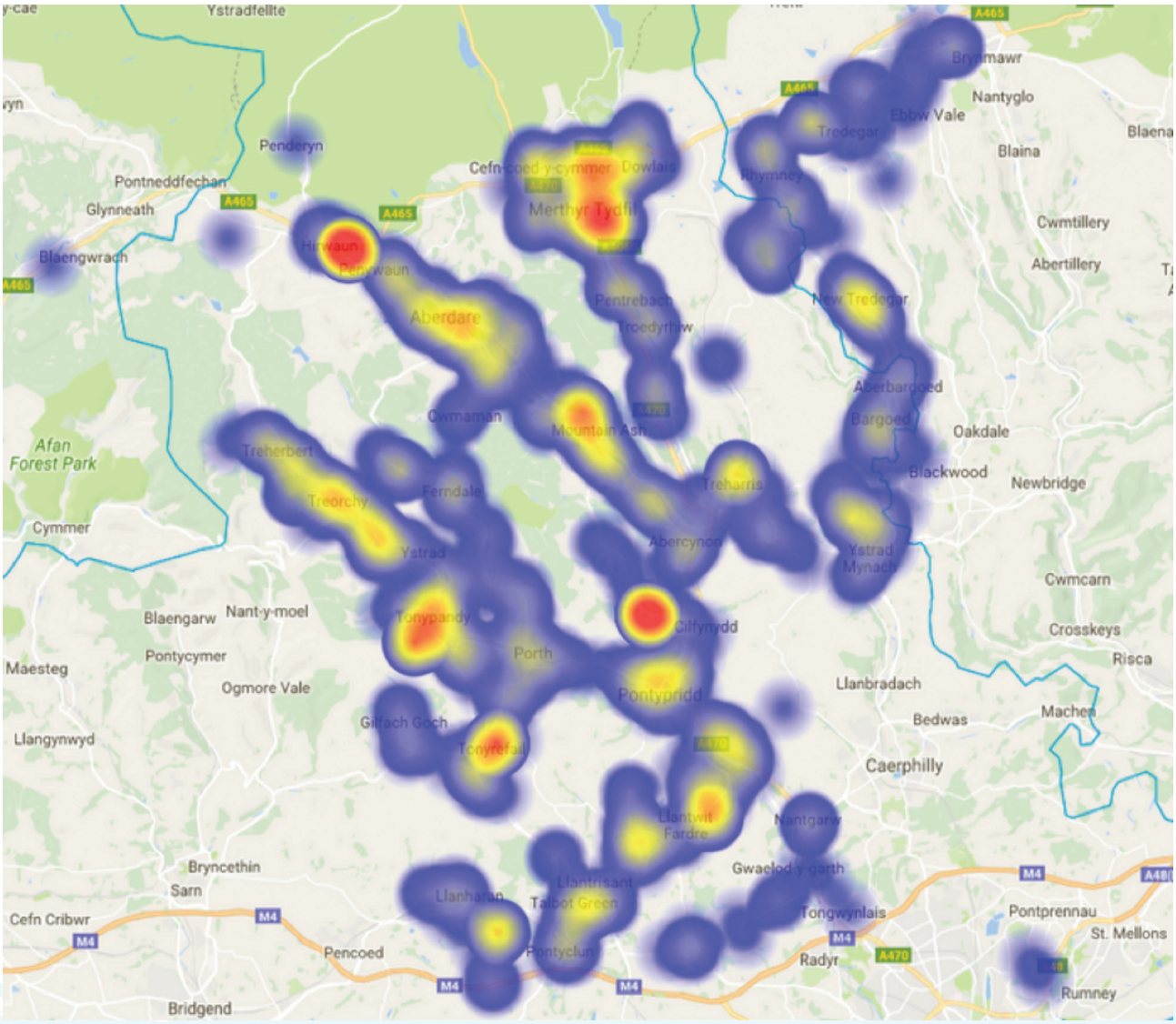


Using all Wales quintiles - Source: WIMD

Examining the postcodes for this patient cohort allows us to explore whether admissions are linked to areas of deprivation as determined by the Welsh Index of Deprivation (WIMD) score mapping and whether there are any areas which can be identified as particular 'hotspots' for admissions.

Previous work undertaken locally examined a cohort of 1029 patients admitted during from April 2015 to January 2017 mapping postcode area of residence as shown in Figure 20. This information will help prioritise future work to improve risk management within our area

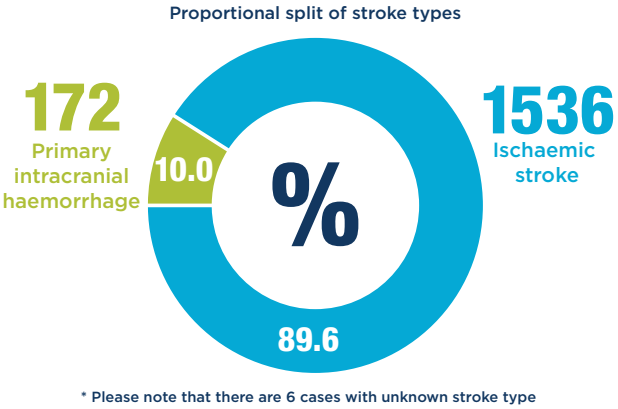
Figure 20 - Heat map based on postcode of residence of stroke patients attending Prince Charles Hospital between April 2015 and January 2017



The main 'hotspots' for stroke over this period appeared to be Merthyr town and immediate surrounding areas, Hirwaun, Penywaun, Tonypandy and Cilfynydd.

Presentation of strokes

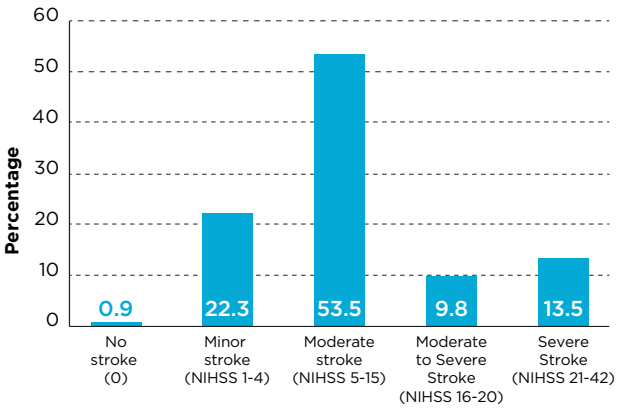
Figure 21 - Proportional split of stroke types



In keeping with the national picture the ratio of ischaemic to haemorrhagic strokes are 9:1.

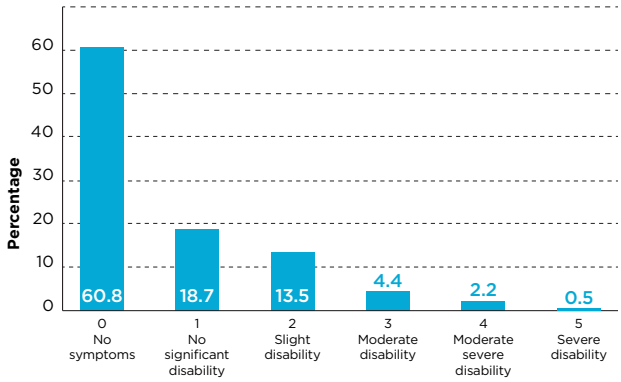
All admissions are assessed using the National Institutes of Health Stroke Scale, (NIHSS) to objectively quantify the impairment caused by a stroke (see Appendix 3). Analysis of the scores for these 1714 admissions indicate that **76.8%** of admissions were graded as having a stroke of moderate or above severity as shown in Figure 22 below.

Figure 22 - Proportion of Stroke Cases in Specific NIHSS Categories on Presentation to Hospital (n1714)



This should be considered alongside the levels of reported functionality pre stroke using the modified Rankin Score (see Appendix 3) during assessment where 79.5% of patients were reported to have no or no significant disability prior to onset of stroke symptoms as shown in Figure 23.

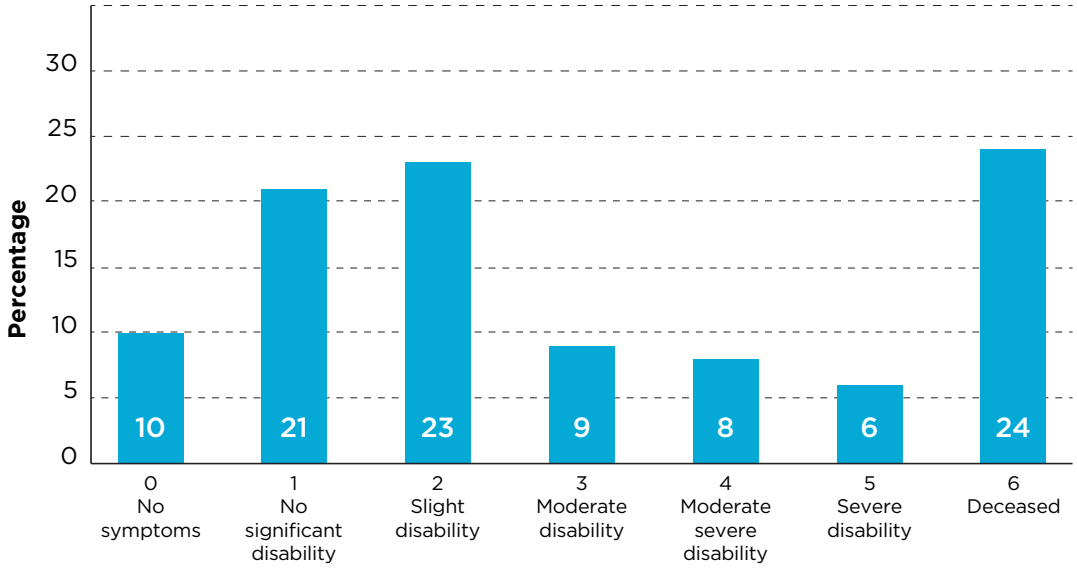
Figure 23 – Functional ability prior to onset of Stroke – Proportion of Patients in each Categories using a modified Rankin Scale Scoring System (n1714)



This demonstrates the extent of the impact of stroke on many individuals. Evidence suggests within the UK around two thirds of stroke patients will be left with some degree of disability at 6 months.

Within Cwm Taf, 6 month follow up data was available for 216 patients who experienced a stroke in 2017. The breakdown of Modified Rankin Scale scores are shown as in Figure 24.

Figure 24 - Functional ability 6 months post Stroke – Proportion of Patients in each category using a modified Rankin Scale Scoring System (n216)



These figures indicate the long term impact stroke has on many patients.

A key issue in our population is late presentation following onset of symptoms.

12% of all patients were coded as a wake up stroke. This is defined as a situation where a patient awakens with stroke symptoms that were not present prior to falling asleep. It is noted that due to the link to early morning circadian rhythms, wake up stroke accounts for a significant number of cases. It is generally estimated in literature to represent roughly 1 in 5 acute ischemic strokes.[39]

Although the average cohort incidence for Cwm Taf would appear lower, despite anecdotal feedback locally that this is a major issue, previous coding practices may affect this figure. It is possible that some cases have been lost by inclusion in other coding categories.

Anecdotally amongst health colleagues there is the feeling that many patients delay investigation of symptoms.

4.3 How Cwm Taf Cares for People experiencing Stroke

As described in 4.1 there is clear guidance to how care needs to be delivered in the acute phase of stroke.

Following centralisation of hyper-acute, acute stroke and early stroke rehabilitation services at Prince Charles Hospital in 2015 considerable work has been undertaken to maximise adherence with the 72 hour recommended care bundles.

This report does not aim to be a comprehensive review of care within the acute period but picks up on a number of key areas within the acute patient pathway that have the ability to strongly influence patient outcomes in the longer term.

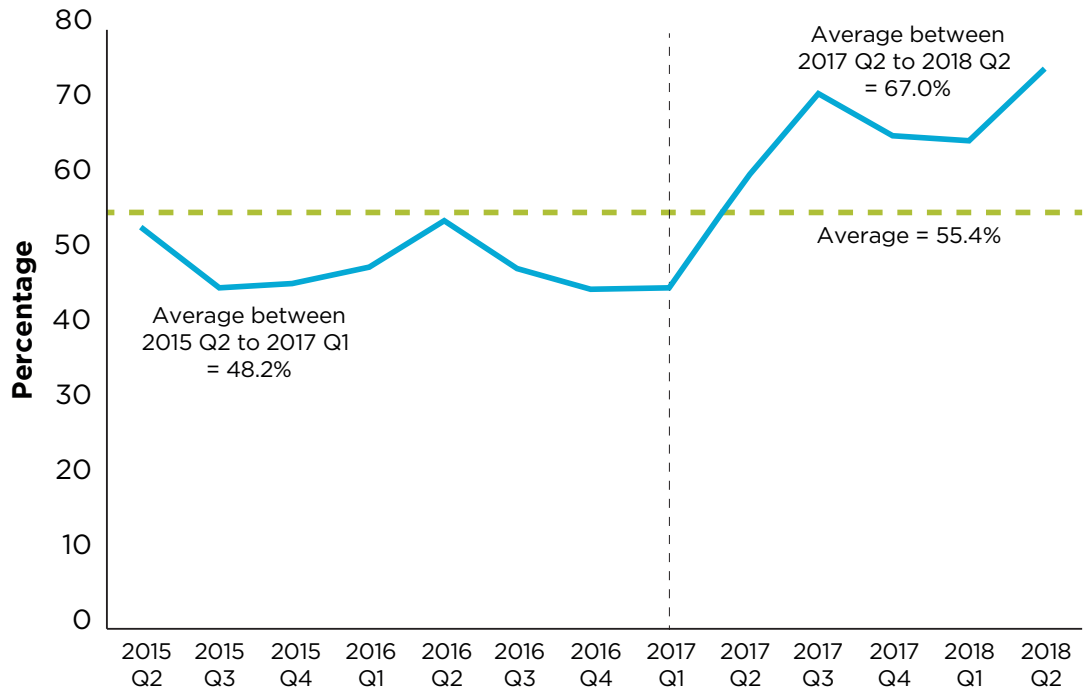
This section explores data for the acute care period for 1714 admissions with a diagnosis of stroke between April 2015 and April 2018.

The data is split into two time periods in places to allow reflection on changes in practice since the last Director of Public Health review of the data in January 2017.

Urgent access to a CT scan is a key component of the assessment process determining the type and extent of stroke. Imaging patients with suspected stroke immediately is cost-effective compared to other approaches because it enables emergency treatments directed to the pathology of stroke.[5]

Work undertaken to streamline the early pathway within A+E and improved access via purchase of a second CT scanner has increased the percentage of patients that undergo a scan within 1 hour of arrival at A+E. This new time limit altered from the previous target of 12 hours, was set out in the 2016 edition of the National Clinical Guideline for Stroke but has been a target in shadow form at Prince Charles hospital since 2015. The Health Board has always shown good compliance on the 12 hour targets reported as part of SSNAP, but Figure 25 below illustrates the extent of improvements made towards the one-hour target.

Figure 25 - Trends in percentage of all stroke patients who undergo brain scan with 1 hr of clockstart



In terms of utilisation for comparison it should be noted that SSNAP data prior to July 2017 may not always have been collected and recorded with the same level of rigour since employed.

There has been considerable work to shorten and strengthen the assessment pathway within A+ E to ensure that all eligible patients that arrive within the permitted time frame are able to undergo thrombolysis. There has also been ongoing clinical review into how eligibility criteria are applied locally and investigation of any potential learning from other areas who have higher thrombolysis rates. As a result, thrombolysis rates have risen as shown in Table 8 for the patient cohort reviewed in this report.

As mentioned previously there has been ongoing review and the introduction of the new patient pathway in A+E saw rates rise to **15.2%** in September 2018 with a significant improvement in door to needle times. At the time of writing the Health Board is awaiting feedback from the all Wales thrombolysis review panel visit.

Table 8 – Administration of Thrombolysis within Cwm Taf

Key Indicator: Thrombolysis	April 2015 - Jan 2017	Feb 2017 - April 2018
Percentage of all ischaemic stroke patients given thrombolysis	8.1% (95% CI* - 6.4%,9.7%)	10% (95% CI – 7.8%,12.3%)
Percentage of thrombolysised patients who commenced treatment within 1 hour of clock start	20.5%	26.1%
Median time between clock start and thrombolysis	83mins	81mins

**95% Confidence Interval*

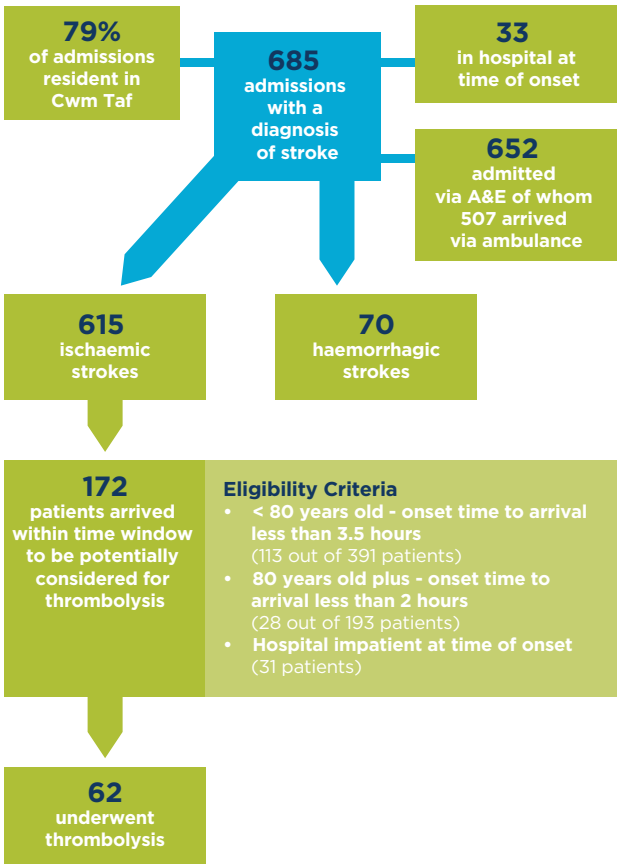
Despite an increase of the percentage of patients receiving thrombolysis Cwm Taf has historically had lower administration rates than the Welsh average. For the period May 2017 to April 2018 SSNAP audit results[40] for the percentage of patients thrombolysised in Wales were as follows:

Wales average	13%
Prince Charles Hospital	10%
Whitybush Hospital	8.85% (lowest)
Bronglais Hospital	22.39% (highest)

More work needs to be undertaken looking not only at clinical judgement and internal patient pathways but also comparisons of the patient profiles, consultant capacity and average times for onset of symptoms to arrival in different areas.[41]

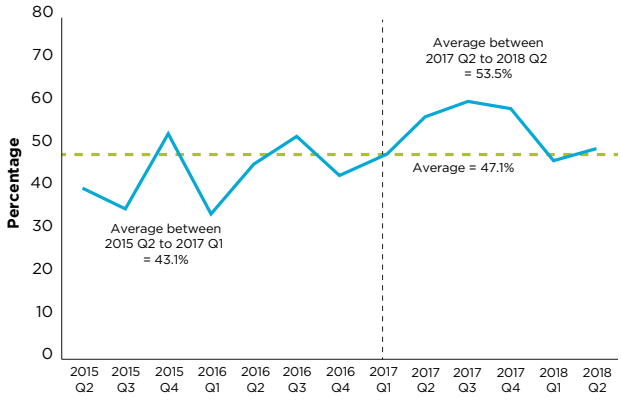
For example, Figure 26 illustrates that for the time period reviewed only 28% of ischaemic stroke patients arrived in hospital in time to be considered for thrombolysis irrespective of any further contraindications.

Figure 26 - February 2017 - April 2018 Patient Eligibility for Thrombolysis treatment



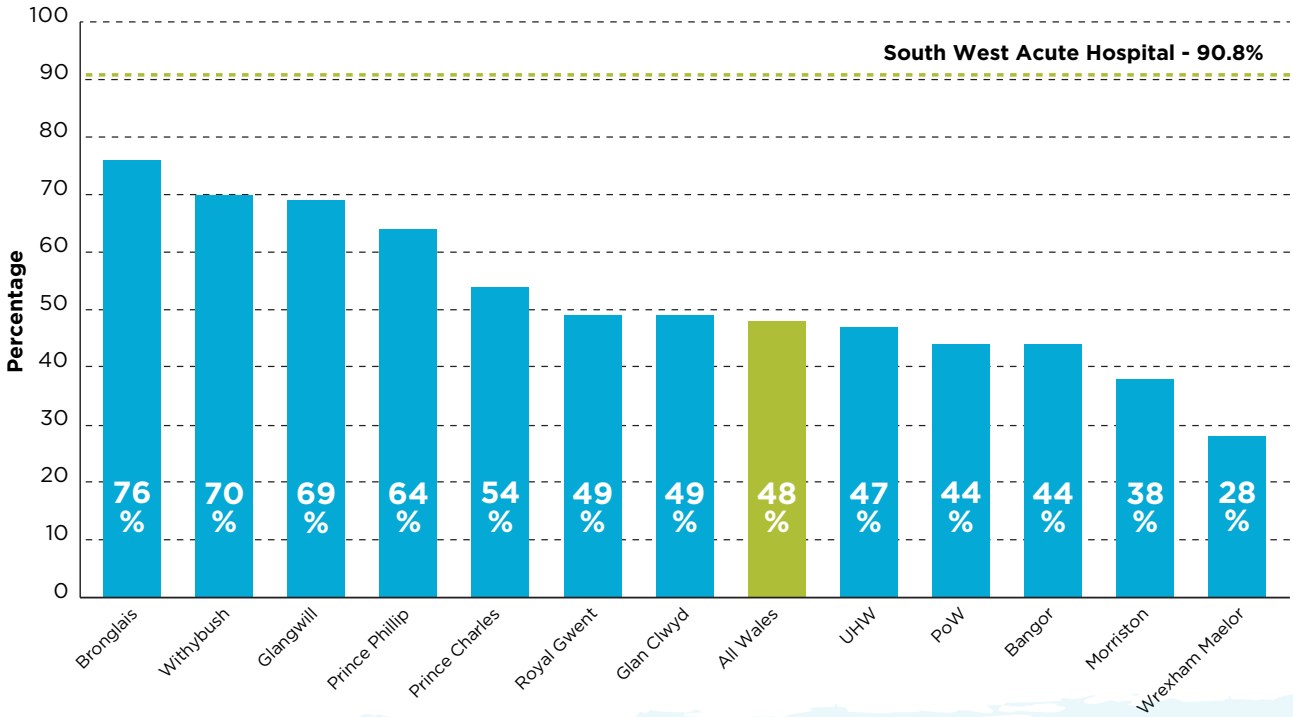
Another area that has been subject to ongoing scrutiny is the target of admission to a stroke unit within 4 hours.

Figure 27 - Trends in percentage of all stroke patients who are directly admitted to a stroke unit with 4 hrs of clockstart



Generally, despite issues with winter pressures there has been improvements in meeting this target with Prince Charles Hospital performing better than the Welsh average during the last financial year as illustrated in Figure 28.

Figure 28 - Direct Admission to Stroke Unit within 4 hours performance comparison (May 2017-Apr 2018)



In addition to considering local care against the stroke bundle targets, reviewing the data has allowed us to undertake some preliminary exploration of the differences in incidence and outcomes for strokes across our Health Board area. Although the maps in Figures 29 and 30 below cover slightly different timescales they are close enough to allow some comparison. It is interesting to note that the areas of highest stroke incidence do not correspond with highest mortality. The causes of this and potential links to impact or potential inequities of care warrant future investigation.

Figure 29 - Stroke: Emergency admission rates per 100k, 3yr avg (2014/15 – 2016/17)

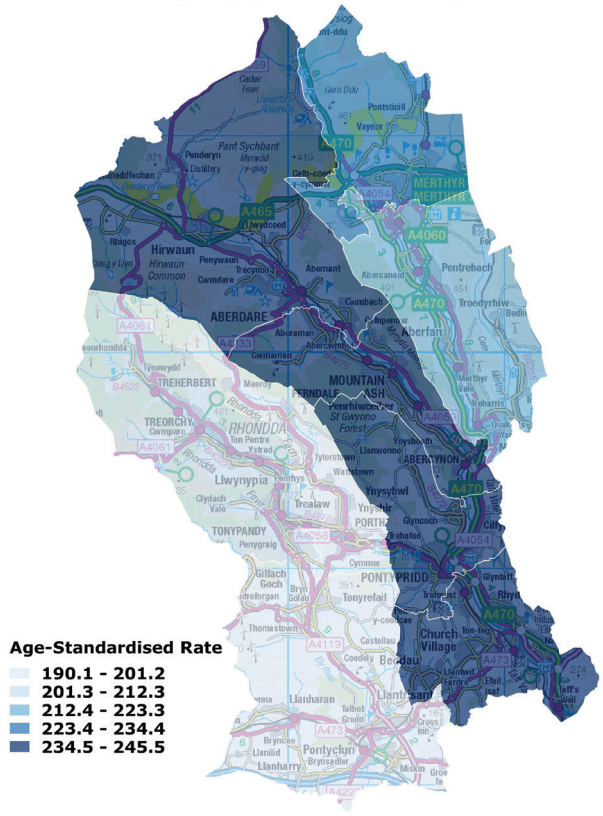
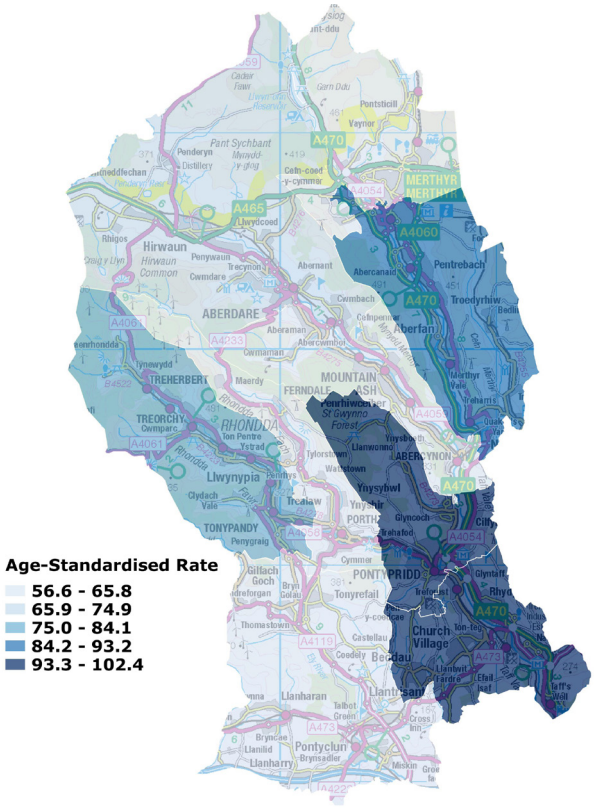


Figure 30 - Stroke: Mortality rates per 100k, 3yr avg (2014-16)



5. LIVING WELL AFTER STROKE

The ongoing care and rehabilitation of patients covers too wide a range of services and interventions to cover in its entirety within the scope of this report but there are a number of key considerations and developments to be noted.

As mentioned previously stroke is a life changing event for many. Post stroke care focusses on helping individuals regain independence, function and quality of life. Secondary prevention through the management of lifestyle and clinical factors is a vital component.

Key provision of post stroke care includes:

Specialist Community Stroke Nurses who form a vital part of ongoing support and review of patients from stroke unit through to 12 month follow up.

The Early Supported Discharge Service (ESD) which is funded via the Intermediate Care Fund (ICF). It aims to deliver intensive multidisciplinary, specialist treatment for mild to moderate strokes within the patients' own home for up to 6 weeks.

Planned and coordinated discharge of stroke patients from hospital to home is a key government priority and is recommended in the National Clinical Guidelines for stroke. Recent trials indicate that ESD can reduce long term dependency and admission to institutional care, improve outcomes for patients, increase patient satisfaction and reduce length of hospital stay.

The acute average length of stay for eligible patients in the most recent performance review is 7 days, the pre-service length of stay being 11 days. Also a far greater than expected number of patients were suitable for the service than originally anticipated, extending possible benefits.

The Community Neuro/Stroke Rehabilitation Team received pilot funding following stakeholder consultation which clearly indicated the need to develop provision of psychological support to increase adjustment and resilience of people who life with life-long neuro-conditions.

The service was launched in February 2017 with the team consisting of a clinical psychologist, occupational therapist and assistant psychologist. The service has developed community activities and support groups as well as providing specialist neuro-assessments, education and consultation to service users, carers and staff groups in generalist services.

The aim of the service is to increase condition/symptom awareness and self-management, enable service users to participate in communities and increase quality of life.

A co-production committee was established to advise on service developments and contribute to innovative approaches to rehabilitation initiatives. Representatives from different third sector organisations, service user forums and Local Authority attended regular meetings. Service users have had an active part in developing media resources. More information is available via http://cwmtaf.wales/services/community-neuro-service/

The Stroke Association has a key role in providing support and information to individuals and their families following a stroke. One of the recent developments is an online stroke support tool. **'My Stroke Guide'** gives free access to trusted information about all aspects of stroke and recovery and access to an online community of other stroke survivors. More information is available via https://mystrokeguide.com/

As discussed in section 4.2 we have little knowledge of the long term outcomes for many of our stroke patients. SSNAP audit data for 6 month follow up is collected but is limited and has not been reviewed fully at either a local or national level.

Similarly, we know that many of the initiatives mentioned collect outcome measures and that PROMS (patient reported outcome measures) and PREMS (patient reported experience measures) are being piloted in this area.

These data sources offer the opportunity to collate and review information about our patients in the post stroke level which would benefit from similar scrutiny to that undertaken of the acute phase of care.

6. CONCLUSION AND RECOMMENDATIONS

Cwm Taf UHB has undertaken a range of work to effectively monitor and develop the quality of the stroke services it delivers despite the ongoing challenges of trying to resource a seven-day service. Improvements have been seen in particular regarding compliance with targets for care within the 72-hour acute care period and in supporting early discharge.

Regarding the wider picture, both incidence and mortality associated with stroke are reducing, but Cwm Taf still has the highest rate of stroke admissions out of all Welsh Health Boards.

However, there still remains huge scope for improvement and the case for investment to allow this, in terms of prevention and early intervention through promoting more effective management of clinical and lifestyle factors. There is also a clear need to improve public understanding, not only of the symptoms of stroke and TIAs, but also the reasons why they urgently need to seek medical assessment to allow optimum treatment and improve outcomes.

There is a need to continue to build collaborative, working relationships between primary and secondary care to ensure an equal focus on improvement across the stroke pathway. Equally there are merits in working in greater partnership with other specialities. Multi-morbidity is common for our populations where individuals often have multiple chronic conditions. Interventions should not just focus on one condition but take into account all the patient history and subsequent needs. Additionally, the preventive work that needs to be undertaken has much common ground across all common chronic conditions.

Use of extensive data collection and monitoring has enabled us to build up a clear picture of patient admissions and care delivered in the acute phase which has informed development of the patient pathways but far less is understood and scrutinised regarding longer term outcomes for patients post discharge.

Supporting our population to make healthier lifestyle choices requires a multiagency, system wide approach. The objectives laid down in the Cwm Taf Wellbeing Plan will help to contribute to this agenda but there is merit in revisiting these with a focus on chronic disease prevention and management to help increase understanding across all partners.

Our prevention strategy for stroke needs both individual targeted and population approaches. Exploring different ways to effectively promote and deliver this within the context of or communities is vital.

Our approach to stroke can be aligned to the aims set out in the last Director of Public Health report:

- A strategic plan for population wellbeing delivered through the Public Services Board with the involvement of our community in shaping and delivering it
- A population health management plan, embedding value based health care in our NHS services
- A population well-being research centre to inform and evaluate progress

Some actions are long term and look to influence large economic and cultural change with our communities but there are a number of recommendations that we can look to implement:

- Roll out and adopt the principles of 'Making Every Contact Count' (MECC) at scale across the Health Board. Further investment in training and organisational commitment is required to embed this approach within normal day to day practice.
- Revise and repeat the previous local social media campaign with more emphasis on the importance of prompt action by the public when stroke or TIA occur. Achieving this could act as a major contributor to increasing thrombolysis rates.
- Establishment of an integrated chronic disease programme which has a key focus on an evidence based approach to prevention and early intervention, increased collaborative working between primary and secondary care and improved equity of access. Development would be based on the principle of patient centred care particularly in the presence of multi-morbidity.
- Extend the comprehensive use of data and monitoring that has helped develop the acute phase of care to other parts of the pathway to help inform our management of risk pre-stroke and better understand how patients' presentation and care has influenced their long term outcomes.
- Consider further research to explore how the existing evidence base around behaviour change and compliance with treatment can be adapted to our population with a particular focus on achieving equity of outcomes

It is our intention as a Local Public Health Team to work in collaboration with the Stroke Implementation Group and wider partners to develop a clear action plan for taking these recommendations forward including exploration of the opportunities to secure additional resource.

7. KEY DEFINITIONS

- **A stroke or cerebro-vascular accident (CVA)** as it is sometimes known, is a serious, potentially life threatening condition that occurs when the blood supply to part of the brain is cut off causing damage or death to the brain cells in that area. The severity and effect of a stroke depends on the size and area of the brain affected.
- **Ischaemic strokes** are the most common type of stroke. They occur when a blood clot blocks the flow of blood and oxygen to the brain. These blood clots typically form in areas where the arteries have been narrowed or blocked over time by fatty deposits, a process known as atherosclerosis.
- **Haemorrhagic strokes** occur when a blood vessel within the brain leaks or ruptures and bleeds into and around the brain.
- **A transient ischaemic attack (TIA)** or "mini stroke" is caused by a temporary disruption in the blood supply to part of the brain normally by a clot. This can cause sudden symptoms similar to a stroke, such as speech and visual disturbance, and numbness or weakness in the face, arms and legs. However, the effects of a TIA are temporary, often only lasting for a few minutes or hours and fully resolving within 24 hours. TIA can be a warning sign, 17% of individuals experiencing a TIA will go on to have a full stroke by 3 months.
- **Atrial fibrillation** is a heart condition that causes an irregular and often abnormally fast heart rate. It increases the risk of stroke.
- **Thrombolysis** is a "clot busting treatment" used with suitable patients who have experienced an ischaemic stroke. It involves injection of a medication called alteplase, which dissolves blood clots and restores blood flow to the brain. It must be administrated with 4.5 hours of onset of symptoms to be effective.
- **High-density lipoprotein (HDL)** – carries cholesterol away from the cells and back to the liver, where it's either broken down or passed out of the body as a waste product; for this reason, HDL is referred to as "good cholesterol", and higher levels are better.
- **Low-density lipoprotein (LDL)** – carries cholesterol to the cells that need it, but if there's too much cholesterol for the cells to use, it can build up in the artery walls, leading to disease of the arteries; for this reason, LDL is known as "bad cholesterol".

The Sentinel Stroke National Audit Programme (SSNAP) is the national stroke audit which measures the quality and organisation of stroke care in the NHS. It is the single source of stroke data in England, Wales, and Northern Ireland.

SSNAP measures both the processes of care (clinical audit) provided to stroke patients, as well as the structure of stroke services (organisational audit) against evidence based standards, including the 2016 National Clinical Guideline for Stroke.

The clinical audit collects a minimum dataset for stroke patients in every acute hospital, and follows the pathway through recovery, rehabilitation, and outcomes at the point of six-month assessment.
https://www.strokeaudit.org/Home.aspx

NICE Guidance - The National Institute for Health and Care Excellence (NICE) provides national guidance and advice to improve health and social care. There are a number of guidance documents that are relative to stroke care and prevention. All guidance is available via:
https://www.nice.org.uk/

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Links to key documents and web resources have been included throughout the body of the report and in the reference section. If any further information is required regarding any sources used please contact the Public Health Team on 01685 351440 or email diane.gibbons@wales.nhs.uk

9. APPENDICES

9.1 Appendix 1 - CHA_2DS_2-VASc and HAS-BLED Risk Assessment Tools

CHA_2DS_2-VASc Stroke Risk Score Tool

More information is available via https://www.chadsvasc.org/

Know Your Stroke Risk			
CHA_2DS_2-VASc		CHA_2DS_2-VASc Score	Adjusted stroke rate (% / year)
Risk	Score		
		0	0
CHF or LVEF <40%	1	1	1.3
Hypertension	1	2	2.2
Age ≥ 75	2	3	3.2
Diabetes	1	4	4
Stroke/TIA/thrombo-embolism	2	5	6.7
Vascular disease	1	6	9.8
Age 65-74	1	7	9.6
Female	1	8	6.7
		9	15.2

CHF = Congestive Heart Failure; TIA = Transient Ischemic attack; LVEF = Left Ventricular Ejection Fraction

HAS-BLED Bleeding risk score tool

More information is available via https://www.evidence.nhs.uk/search?q=HAS+BLED+score

Letter	Parameter	Points (if yes)
H	Hypertension	1
A	Abnormal renal and liver function (1 point each)*	1 or 2
S	Stroke	1
B	Bleeding history	1
L	Labile INRs** (therapeutic time in range <60%	1
E	Elderly (age >−65 years)	1
D	Drugs or alcohol*** (1 point each)	1 or 2
		Maximum 9 points

* Abnormal renal function: CR >2.26 md/dl, dialysis, or renal transplant. Abnormal liver function: cirrhosis or total bilirubin >2x the upper limit of normal (ULN) woith ALT/AST/AP >3x ULN

** This score was developed for patients on warfarin, however it can still be used for anticoagulants.

*** Drugs: antiplatelet agents, nonsterodical anti-inflammatories; Alcohol: 8 drinks per week

9.2 Appendix 2

Stroke Bundles

A Care Bundle is a group of specific interventions or processes of care that have a greater effect on patient outcomes if done together in a time-limited way, rather than separately.

Stroke bundles are translated into performance measures against which stroke services in Wales are monitored on a quarterly basis.

Performance measures
Access
Percentage of **all strokes** thrombolysed - N/A
Percentage of **eligible patients** thrombolysed - 100%
Time
Thrombolysed patients with door-to-needle <= 30 mins - 50%
Thrombolysed patients with door-to-needle <= 45 mins - 90%
Thrombolysed patients with onset to-needle <= 90 mins - N/A
Thrombolysed patients with pre- and post-thrombo NIHSS score - 100%
72-hour pathway care performance indicators
<Four-hours care performance indicator
Direct admission to acute stroke unit
Swallow screening
<12-hours care performance indicator
CT scan
<24-hours care performance indicator
Assessed by stroke consultant
Assessed by stroke nurse
Assessed by either an occupational therapist, physiotherapist or speech and language therapist
<72-hours care performance indicators
Formal swallow assessment
Occupational therapist assessment
Physiotherapy assessment
Speech and language therapist communication assessment

9.3 Appendix 3

Modified Rankin Scale

The modified Rankin Scale is a commonly used scale for measuring the degree of disability or dependence in the daily activities of people who have suffered a stroke or other causes of neurological disability. It has become the most widely used clinical outcome measure for stroke clinical trials.

Modified Rankin Scale (MRS)	
0	No symptoms
1	No significant disability, despite symptoms; able to perform all usual duties and activities
2	Slight disability; unable to perform all usual duties and activities
3	Moderate disability; requires some help, but able to walek without assistance
4	Moderately severe disability; unable to walk without assistance and unable to attend to own bodily needs without assistance
5	Sever disability; bedridden, incontinent and requires constant nursing care and attention
6	Death

The National Institutes of Health Stroke Scale (NIHSS) is a tool used by healthcare providers to objectively quantify the impairment caused by a stroke. The NIHSS is composed of 11 items, each of which scores a specific ability between a 0 and 4. For each item, a score of 0 typically indicates normal function in that specific ability, while a higher score is indicative of some level of impairment.

9.4 Appendix 4

Size of the Prize calculation information

Acknowledgement and method: Calculations by Ciaran Slyne and Arthur Duncan-Jones using Public Health England's **'Size of the Prize' Infographic, 2017 Technical summary draft**.

Based on **Current, future and avoidable costs of stroke in the UK**, Stroke Association 2017; the average 2015 societal cost of stroke per person is £45,409 in the first 12 months after stroke, of which 29% falls on the NHS

Assumptions include that stroke is averted solely due to the intervention; published NNTs apply to the Cwm Taf population; the number of strokes averted is linear over the NNT benefits period; these interventions and populations are independent of each other/ other interventions (not true); hypertensive & AF populations do not require adjustment; intervention provides maximum benefit to all treated patients.

*Based on **Current, future and avoidable costs of stroke in the UK**, Stroke Association 2017; the average 2015 societal cost of stroke per person is £45,409 in the first 12 months after stroke, of which 29% falls on the NHS.

9.5 Appendix 5

Stroke Plan for Wales
Delivery Plan Priorities for 2017–18

For 2017-18 the following national priorities have been agreed:

1. The identification of individuals with atrial fibrillation (AF)
2. Reconfiguration of stroke services in Wales including the development of Hyper-Acute Services in Wales (HASU)
3. Community rehabilitation.
4. Embedding a stroke research infrastructure/network for stroke in Wales
5. Developing and responding to patient experience and outcome measures

Emerging issues have arisen which also require consideration for 2018-19 planning these are:

6. The management of childhood stroke: The Royal College of Paediatrics and Child Health (2017) has produced a guideline in relation to the management of stroke in children **(Stroke in children: clinical guidelines for diagnosis, management and rehabilitation).**

7. Thrombectomy for stroke: The emergence of the evidence base for thrombectomy for stroke has risen to the fore recently and the SIG is committed to ensuring that thrombectomy becomes part of the commissioned stroke pathway in Wales, though recognises that this service development will require resourcing and developing in Wales.

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