What is a Stroke?
A stroke occurs when the brain is deprived of its blood supply for long enough to cause vital brain tissue to die.

Causes of Stroke
The vast majority of strokes are either ischaemic or haemorrhagic. A small number are due to other causes, such as trauma or tumours.

Ischaemic strokes account for approximately 80% of strokes. They are caused by a blockage in the arteries that carry the blood to the brain. This is normally caused by atherosclerosis, which is the gradual buildup of plaque on artery walls. Over time this results in the narrowing of arteries that can ultimately stop the blood flow.

Clots can form on the atherosclerotic plaque within a blood vessel in the brain, or alternatively plaque may break off and cause a blockage in an artery supplying the brain when it is carried in the blood. This is known as a “cerebral embolism”.

Haemorrhagic strokes are the other most common type of stroke, and these account for approximately 15% of strokes. They are caused by ruptured blood vessels which deprive the brain of its blood flow.

2 types of weakened vessel can result in haemorrhagic strokes: aneurysms and Arteriovenous Malformations (or AVMs). Aneurysms are a weak area in a blood vessel that enlarges or “balloons” until it eventually bursts. AVMs are a cluster of abnormally formed blood vessels, similar to a knot or tangle.

Symptoms
The symptoms and duration of strokes can vary considerably depending on the size and type of stroke and also the part of the brain that is affected. Strokes occurring in the left side of the brain cause symptoms on the right side of the body and vice versa.

Common symptoms include:

- Hemiparesis and hemiplegia
- Speech and language disorders (such as dysarthria, dysphasia and aphasia)
- Poor balance, unsteadiness and fatigue
- Difficulty swallowing (known as dysphagia)
- Blurred vision or loss of sight
- Problems with perception and cognitive function
- Incontinence
- Emotional problems; and
- Altered sensation

Diagnosis of a stroke is normally confirmed by a combination of clinical presentation and imaging.

Imaging
Computerized tomography, or computed axial tomography (also known as CT or CAT scans) can show the nature, extent and site of damage. This is the primary method used to determine whether strokes are ischaemic or haemorrhagic. However these scans have a number of limitations.

For example:

- Infarcts may not be seen for 24 - 48 hours after the event
- Small infarcts might be missed
- CT scans do not image some parts of the brain very well (such as the brainstem and cerebellum); and
- Expert interpretation of scan results is not always consistent

Magnetic Resonance Imaging scans have a number of advantages over traditional CT scans. MRIs can demonstrate abnormalities that are too small or located in regions of the brain that cannot be seen well by CT scans.

Imaging can be very useful in confirming the diagnosis of stroke. However incidental or unrelated findings on imaging can cause some difficulties when it comes to assessing stroke claims. Imaging may show abnormalities and death of brain tissue that is not associated with previous neurological symptoms or episodes that are suggestive of a stroke. In this event the patient may be described as having suffered a “silent stroke”.

Silent Strokes

Silent strokes are asymptomatic, in other words they do not cause any symptoms. They are sometimes detected following investigations for completely unrelated conditions or on routine checks.

A study by Bernick C et Al in 2001 looked at a group of 3,324 older participants with no previous history of stroke. Upon imaging they found that 28% had evidence of silent infarcts.

When considering a CI claim for stroke the policy wording needs to be carefully considered. Silent strokes are often specifically excluded from policy definitions so care will need to be taken to determine whether or not the event is covered. However, even if not specifically excluded, they may be implicitly excluded due to a lot of definitions requiring neurological deficit with on-going symptoms.

For the claim to be valid the claims assessor will need to be satisfied that the stroke occurred within the policy term. In the absence of both a definable acute event and persisting symptoms then claims will usually not be valid.

If there is any doubt regarding when the stroke occurred then it may be useful to obtain expert interpretation of MRI or CT scans.

Transient Ischemic Attacks

Transient Ischemic Attacks (also known as TIAs or "mini strokes") are another area that can cause difficulties at claims stage.

TIAs occur when the brain's blood supply is interrupted for a very brief period of time. The underlying mechanism is the same as that for strokes, but the obstruction clears naturally before brain cells are permanently damaged.

Symptoms are similar to those of strokes, but they are only temporary, often lasting only a few minutes or hours before disappearing, and usually resolving within 24 hours. In a TIA there is no permanent damage to brain cells, whereas a stroke leads to permanent brain injury.

TIAs indicate an increased risk of stroke in the future. 10-15% of patients go on to suffer a stroke within 3 months of suffering a TIA. However TIAs do not in themselves result in permanent damage and are therefore not considered to be as "critical" as strokes. For this reason TIAs are often excluded from policy definitions.

Medical Definitions

Medical definitions of TIAs have previously included a time element. For example:

“A sudden, focal, neurological deficit of presumed vascular origin, lasting less than 24 hours”.

However the clinical definition of TIA has recently been revised. The time cut off of 24 hours was not felt to be appropriate for determining whether or not a patient has suffered a TIA or stroke.

Recent improvements in scanning techniques, particularly diffusion-weighted imaging, means that much more precise evaluation of ischaemic issues can be obtained in comparison with standard scanning techniques. Diffusion-weighted MRI scans are far more sensitive and are able to detect much smaller infarcts.

This improvement in technology has revealed evidence of ischemic events which cause infarction but do not result in permanent neurological deficit. In other words there is detectable death of brain tissue on imaging but based on the short duration of symptoms alone the event would previously have been considered as a TIA.

The result of this is that the TIA definition, as defined by the American Stroke Association, has recently been changed to:

“A transient episode of neurological dysfunction caused by focal brain, spinal cord or retinal ischaemia, without acute infarction”.

So the time limit of 24 hours has been removed and the key difference now, between a stroke and a TIA, is whether imaging of the affected area shows any evidence of acute infarction.

Impact of Definition Change on Claims

But what does this mean from a claims perspective? Well, more strokes will be diagnosed as a result of the new TIA definition and it logically follows that this could increase the number of claims which are valid under our definitions of stroke. However the extent of this...
impact will depend on a number of factors, including the precise policy wording that applies.

In areas where diffusion weighted MRIs are commonly available the new definition could have a significant impact on claims figures. If we assume that TIAs were previously excluded from the policy definition, and a proportion of these are now being re-classified as stroke, then it follows that there may be an increased in the number of valid stroke claims.

Research by Ovbiagele et al in 2003 suggests that adopting a tissue-based definition of TIA (as opposed to a time based definition) would reduce the annual incidence of TIA by 33% and increase the annual incidence of stroke by 7%. So should we expect our claims figures to rise by this amount? Not necessarily.

A significant proportion of the incidents that would be newly defined as stroke are likely to be silent strokes, or infarcts which do not result in any long lasting symptoms. These cases are often excluded from our policy definitions, which will be reflected in the impact on our claims figures.

The precise impact will depend on the wording of the policy definition for stroke. If the definition insists upon persisting clinical symptoms then the new clinical TIA definition will not have a significant impact on claims figures. However if the definition does not insist upon these features then there may be a significant increase in the number of stroke claims which could have pricing implications.

It is worth noting that diffusion weighted MRIs are not available to all patients. The impact of the TIA definition change is therefore likely to vary depending on the location where the patient is based and the type of imaging that is commonly available there. It will also be affected by how widely the new medical definition of TIA is being adopted. The new definition is not being routinely applied in all countries and this is likely to affect the extent of impact that it will have on claims figures in different locations.

**Duration of Symptoms**

Another area which can cause us a number of issues at claims stage is the policy requirement of permanent neurological deficit and persisting clinical symptoms.

What do we actually mean by “permanent” and how do we assess this? Well, unless stated otherwise, the usual interpretation of permanence is that it is expected to last throughout the person’s life with no prospect of improvement. This is normally irrespective of when the cover ends or the insured person expects to retire.

There are 2 main underlying causes of symptoms following a stroke: death of brain tissue, and short term swelling

Brain cells that die do not recover, but those that are damaged may recover. In some instances other parts of the brain can compensate for the area that has died. Recovery from cell death is a long term process but the most significant recovery occurs within 2 to 6 months following the stroke.

With regards to short term swelling, symptoms ease as the swelling subsides and / or the blood is reabsorbed. So there tends to be rapid progress in regaining function over the first few weeks following a stroke.

Prognosis can be difficult to determine in early days, and this can be problematic if the policy definition requires permanency of symptoms. Specialist confirmation of permanence is therefore normally required. A reasonable approach should be taken and a decision should be made without postponement, wherever possible, based on the extent of damage & recovery made at point of claim.

The level of deficit can be taken into account when you are considering the likelihood of permanence, as this correlates with the predicted prognosis.

Post-stroke neurological recovery peaks within the first 3 months and it is important to keep in mind that 58% of strokes reach maximum recovery within the first 2 weeks.

When trying to determine whether a deficit is permanent consider the extent of the original stroke, whether recovery is complete, and if not what further improvement is realistically expected.

Risk factors for stroke include hypertension, atrial fibrillation, high cholesterol, smoking, BMI, diabetes, heavy alcohol consumption and drug use. Accurate disclosure of these factors will need to be considered when assessing stroke claims.

If the policy definition calls for “neurological damage” alone then infarction on imaging will normally be sufficient for the claim to be paid. In this event it will not be necessary to insist upon evidence of the nature and extent of the deficit or any ongoing symptoms.

However if the definition calls for “neurological deficit” and / or “persisting clinical symptoms” then there will need to be evidence to confirm that there are ongoing manifestations from the stroke, i.e. an impact on functionality. The actual severity of symptoms will not be significant, unless this is specifically stated in the definition.
Therefore if symptoms are present and expected to be permanent the definition will usually be met. In addition to physical symptoms this could include symptoms such as impaired cognitive function and fatigue, which can be very subjective to assess.

It is important to check the policy definition closely as this may exclude certain types of stroke, for example those resulting from trauma or those which occur outside of the central brain (such as retinal infarcts or spinal strokes).

Summary
Here are a few key points to keep in mind from a claims perspective:

It is important to be clear about the policy definition that applies, as this is likely to impact the validity of the claim and the evidence that will be required to reach a claims decision.

The claims assessor should specifically check that all requirements of the definition have been fulfilled. For example:

- Has the diagnosis of stroke been confirmed by a specialist?
- Is there evidence confirming infarction of brain tissue?
- Did the event occur within the policy term?
- Is there evidence of permanent neurological damage and persisting symptoms (if required) and has permanence been confirmed by a specialist?
- Is the deficit consistent with the damage suffered?
- Is the event excluded under the policy definition (for example due to the location or severity of the infarct?)

If there is any doubt about the diagnosis or any uncertainty as to whether the policy definition has been met then specialist advice should be sought and you may wish to consider CMO input.

CMO referral or further investigation should also be instigated if the claimant is symptomatic but there is normal imaging or the claimant is asymptomatic but has abnormal imaging.

A new clinical definition of TIA has been introduced which may impact the incidence of stroke claims. However the precise extent of this impact will depend on the type of imaging that is undertaken; the clinical definition that is being applied; and the policy definition.