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Headache disorders: differentiating and managing the common subtypes

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Abstract

Headache is an extremely common symptom and collectively headache disorders are among the most common of the nervous system disorders, with a prevalence of 48.9% in the general population.[1] Headache affects people of all ages, races and socioeconomic status and is more common in women. Some headaches are extremely debilitating and have significant impact on an individual's quality of life, imposing huge costs to healthcare and indirectly to the economy in general. Only a small proportion of headache disorders require specialist input. The vast majority can be effectively treated by a primary care physician or generalist with correct clinical diagnosis that requires no special investigation. Primary headache disorders – migraine, tension headache and cluster headache – constitute nearly 98% of all headaches; however, secondary headaches are important to recognise as they are serious and may be life threatening. This article provides an overview of the most common headache disorders and discusses the red flag symptoms that help identify serious causes that merit urgent specialist referral. The current pathway of headache care in the UK is discussed with a view to proposing a model that might fit well in the financially constrained National Health Service (NHS) and with new NHS reforms. The role of the national society, the British Association for the Study of Headache, and the patient organisations such as Migraine Trust in headache education to the professionals and the general public in shaping headache care in the UK is described. The article concludes by summarising evidence-based management of common headache diagnoses.

Keywords
Headache, migraine, tension headache, cluster headache, medication overuse headache

The burden of headache

Around 95% of the general population have experienced headache at some stage in their life with a 1-year prevalence of nearly one in two adults.[1] Headache accounts for 1 in 10 general practitioner (GP) consultations,[2] 1 in 3 neurology referrals[3] and 1 in 5 of all acute medical admissions.[4] The World Health Organisation includes headache among the top 10 causes of disability,[5] and in women headache is among the top 5,[5] with an impact similar to arthritis and diabetes and worse than asthma.[6,7] In the UK, for example, 25 million working days are lost every year because of migraine alone[8] with an indirect cost of nearly £2 billion per year to the economy in addition to the direct healthcare costs of drugs, GP consultations, specialist referrals and attendance at emergency care. The impact on an individual's quality of life is difficult to quantify with 75% of patients reporting functional disability during a migraine attack and 50% requiring the help of family and friends with a major impact on their social life.[9]

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Table 1. Key questions in headache history.

- When did the headache first start?
- How many different types of headache do you have?
- How often do you get a headache? (to establish chronic vs episodic)
- How long does a headache episode last? (with or without treatment)
- Have you recently noticed a change in the characteristic of your headache?
- What is the intensity, location, nature and quality of pain?
- What associated symptoms do you get? (such as nausea, vomiting)
- Are their any aggravating or relieving factors? (early morning headaches and worse on straining suggest raised intracranial pressure)
- Is there a presence of focal neurological symptoms? (visual, sensory, speech that may suggest aura)
- What do you do when you have a headache? (patients with migraine typically avoid physical activity)
- What worries you about your headache? (most patients worry about brain tumours)

Table 2. The red flag symptoms (adapted from BASH, 2010).[10]

1. Thunderclap headache (intense, exploding and hyperacute onset)
2. New-onset headache in patients >50 or <10
3. Persistent morning headache with nausea
4. New onset of headache in a patient with history of cancer
5. New onset of headache in a patient with history of HIV infection
6. Progressive headache, worsening over weeks
7. Headaches associated with postural changes
8. Aura symptoms that
   - Last longer than an hour
   - Include motor weakness
   - Are different from previous aura
   - Occur for the first time on using oral contraceptive pill

Secondary headache disorders

Headaches are broadly divided into primary and secondary. Secondary headaches are uncommon but their recognition is extremely important as timely intervention may be life saving. The most crucial aspect of headache diagnosis is history taking (Table 1); most patients, including those with common secondary headaches, have no signs and investigations are rarely required to exclude a secondary headache. Furthermore, unnecessary investigations must be avoided as around 8% of the population may have incidental abnormalities not related to headache. The most common secondary headaches include:

- space-occupying lesions, mainly intracranial tumours;
- infections of the central nervous system, mainly meningitis or encephalitis;
- subarachnoid haemorrhage;
- giant-cell arteritis;
- cerebral venous thrombosis;
- idiopathic intracranial hypertension.

Patients with secondary headaches have symptoms or red flags in their patient history that will help in the diagnosis. The common red flags are given in Table 2.[10]

In a published series of patients presenting to the primary care with a new onset of headache diagnosed as primary, the 1-year risk of a malignant brain tumour was found to be 0.045%.[11] It is unusual for a brain tumour to cause headaches at an early stage, when focal neurological deficit or seizure are more likely to be presenting features. Headaches may be the sole presenting symptom in 3–4% of tumours at a later stage.[12]

A sudden onset of exploding headache (thunderclap) that peaks within a minute should be investigated for subarachnoid haemorrhage, especially when there is no previous history of such attacks. Patients may complain of pain and stiffness in the neck with intense photophobia and/or vomiting. Thunderclap headaches may also be a presenting feature of pituitary apoplexy, intracranial hypotension, arterial dissection and reversible intracranial vasospasm. In the absence of an identifiable cause, such headaches are described as idiopathic and considered as possible acute migraine episodes. Recurring thunderclap headaches are unlikely to be serious, for example headaches during sexual intercourse (orgasmic headache or coital migraines). These can be effectively treated with conventional migraine prophylaxis.

Headaches associated with fever, rash, reduced or altered consciousness level suggest central nervous system infection (meningitis or encephalitis) and an urgent referral to infectious disease or neurology is required. A loading dose of antibiotics is given if the diagnosis is suspected, in order to avoid delay in treatment.

Patients over 50 years of age with a new onset of headaches associated with systemic symptoms of fever, malaise, night sweats, insomnia, and loss of appetite and weight should alert the clinician to the possibility of giant-cell arteritis. Acute inflammatory markers such as erythrocyte sedimentation rate, plasma viscosity and C-reactive protein are often, but not always, raised. Temporal artery biopsy may help but, if this cannot be arranged urgently, treatment with steroids must be commenced where the diagnosis is strongly suspected.

Headaches due to cerebral venous thrombosis are common in young women, particularly those who smoke and/or use oral contraceptive pills. The risk is high immediately after childbirth and in those with

dehydration. The condition causes raised intracranial pressure and presents with early morning headaches, nausea, altered levels of consciousness, papilloedema and seizures. Diagnosis is suspected clinically and confirmed on imaging with computed tomography venogram or magnetic resonance angiogram.

Those with normal imaging and high cerebrospinal fluid pressure on lumbar puncture have idiopathic intracranial hypertension and are usually overweight. These patients must have their visual field assesed and regular monitoring by the ophthalmologist is required because of the risk of permanent visual impairment.

Headaches due to sinus disease are extremely rare in the absence of other suggestive symptoms and chronic sinusitis does not cause headache unless there is an acute exacerbation.[10] Errors of refraction are often over-estimated as a cause of headaches.[13] The suggestion is that, in the absence of relevant symptoms, headache should not be attributed secondary to disorders of teeth, neck, teeth or temporomandibular joint.

Primary headache disorders

Primary headache disorders constitute the vast majority of headache disorders, with migraine and tension-type headache (TTH) being the most prevalent. TTH affects 60–80% of the population while migraine has a prevalence of 15% (male 7.6%, female 18.3%).[8] Cluster headache is uncommon (0.1%)[14,15] but often misdiagnosed and mismanaged.[16] Medication-overuse headache (MOH) is a secondary headache disorder and often co-exists with primary headache disorders, and is often described with them.

Short-duration versus long-duration headaches

An important first step in the diagnostic process is to distinguish primary headaches on the basis of their duration. Classification is based on whether an untreated headache episode lasts for less or more than 4 hours. The vast majority of short-duration headaches belong to a specific category of headache disorder termed 'trigeminal autonomic cephalalgia' (TAC), of which cluster headache is the most prevalent; cluster headache is described later. The long-duration headaches are either migraine or TTH.

Episodic versus chronic

This classification is based on the number of days of headache that a person experiences in a month. The International Headache Society (IHS) defines chronic headaches or chronic daily headaches (CDH) as headaches that affect an individual for 15 or more days in a month,[17] and this affects 4% of the population.[18] The vast majority of episodic headaches are tension type or migraines and are less disabling than the chronic variant. Chronic migraine accounts for a significant number of CDH. The other subtypes include chronic TTH (CTTH), hemicrania continua and new daily persistent headache.

Migraine

Migraine is the second most common form of headache, often described as recurrent throbbing or pulsating, moderate to severe, and often unilateral pain that lasts 4–72 hours with complete freedom between the attacks (episodic). The headache is associated with nausea, vomiting and/or sensitivity to light, sound or smell. The patient prefers to lie still in a dark and quiet room, and to avoid physical activity. Around one-third of patients perceive an aura, described as a progressive focal neurological symptom lasting 5–60 minutes. Visual aura, in the form of zigzag lines or spreading scintillating scotoma (diminished sight), is by far the most common, although unilateral sensory disturbances and/or dysphasia may occur either at the same time or sequentially. Sometimes, particularly in older individuals, aura may occur without headache (migraine equivalent) and must be differentiated from transient ischaemic attack. Typically a migrainous aura evolves over a few minutes and marches from one area to the other.

Around 1.3–2.4%[19] of migraine sufferers have chronic migraine defined by the IHS as headaches on 15 or more days in a month of which 8 or more days have migrainous features. Chronic migraine is the most disabling form of migraine with substantial impact on health-related quality of life,[20] co-morbidities[21] and frequent accompaniment of medication overuse.[22] Unlike episodic migraine, patients with chronic migraine are more likely to be unemployed, have relationship difficulties and family problems, and be refractory to conventional acute and preventive treatments.[23]

Tension-type headache

This is often described as a featureless headache because of the lack of associated symptoms that accompany migraine. The condition is often diagnosed but very poorly understood. The pain is described as aching or pressure, and as feeling as if the head is in a vice or has a tight band around it. TTH is commonly episodic and rarely impacts on activities of daily living. The chronic variant is uncommon and may be associated with medication overuse.

Cluster headache

Cluster headache is the most prevalent headache disorder among TAC. These are a specific subtype of primary headache disorders characterised by headaches that are of short duration, are strictly unilateral and have accompanying autonomic features of lacrimation, rhinorrhea, conjunctival injection and ptosis.

Cluster headaches are more common in young men (3.5:1) who smoke (65%) and the pain is excruciating, often described as 'suicidal headaches'.[24] The attacks last between 15 minutes and 3 hours, occurring from once every other day to up to eight per day. The patient is extremely restless and agitated and often sweats profusely. The striking feature is the circadian rhythmicity with attacks occurring at the same time every day. Alcohol triggers an attack in almost all cases. Cluster headache is episodic in 80–90% of cases, with attacks occurring daily for a few weeks to a few months, followed by a gap of a few months to a few years. The chronic variety has continuous attacks for a year or longer with no symptom-free interval or a remission period that lasts for less than a month.

The other TAC include paroxysmal hemicrania and short-lasting unilateral neuralgiform headache with conjunctival tearing, which are extremely rare and beyond the scope of this article.

Medication-overuse headache

The IHS definition for MOH is outlined in Table 3.[25] MOH often complicates primary headache disorders and is a common accompaniment to various CDH disorders. It remains unclear whether MOH is a cause or an effect of CDH and whether preventive treatment should be introduced before or after withdrawal of the overused medications. MOH affects 1–1.5% of the general population and accounts for 50–80% of patients presenting to the specialist headache clinic.[26] Women are affected three times more often than men.[27] Around two-thirds of patients overusing analgesics have migraine and 27% have tension-type headache.[27]

Any painkilling medicine can cause MOH although combination analgesics, particularly those with opioids, barbiturates and caffeine, carry a high risk. Non-steroidal anti-inflammatory drugs (NSAIDs) are least likely to be implicated with medication overuse. Combination analgesics account for 39–42% of cases[28] although 90% of sufferers take more than one painkilling medicine.[29] MOH develops faster and on a much lower dose intake with triptan than with simple or combination analgesics. In the same way, withdrawal symptoms are much shorter and milder with triptans than with other painkillers.[30,31]

Table 3. Appendix criteria for medication-overuse headache (Headache Classification Committee, 2006).[25]

8.2 Medication-overuse headache

Diagnostic criteria

a) Headache present on ≥15 days per month
b) Regular overuse for >3 months of one or more acute/symptomatic treatment drugs as defined under subforms of 8.2
   i) Ergotamine, triptans, opioids or combination analgesics medications on ≥10 days per month on a regular basis for >3 months
   ii) Simple analgesics or any combination of ergotamine, triptans, analgesics, or opioids on ≥15 days per month on a regular basis for >3 months without overuse of any single class alone
c) Headache has developed or markedly worsened during medication overuse

It is unclear who develops MOH and why. Some clinicians recommend early treatment of a migraine attack when it is mild to achieve good treatment efficacy whilst others feel this could increase the risk of medication overuse.[32] It is interesting that those taking painkillers for other conditions, such as arthritis or low back pain, will develop MOH only if they have a primary headache disorder. Similarly, not all patients with primary headache disorder will develop MOH having consumed excessive painkillers,[33–35] suggesting there may be a genetic predisposition in some patients. Psychological and physical dependence has been postulated with opioids and barbiturates[36] and the risk is high among those with a previous history of alcohol or substance overuse and those who smoke.[37] Sensitisation of pain pathways and down-regulation of pain receptors at the second-order neurons may be implicated in the underlying pathophysiology.[38]

Headaches: the current pathway

The neurological services in the UK are different from the rest of Europe, where all aspects of neurological care are provided by trained neurologists. For example, Holland has one neurologist for a population of 30,000 and in Italy one neurologist provides services to every 10,000 people. In comparison, a neurologist in the UK serves a population of between 117,000 and 200,000.[2] Most of the acute neurological services are provided by interns or general physicians, particularly in small district general hospitals where the neurology in-reach is limited to a visiting neurologist from a neighbouring tertiary centre for a day or two per week (hub and spoke model). There has been an expansion of consultant posts since the mid-1990s without much

increment in the trainee posts. As a result, recruiting to consultant neurologist posts has been extremely difficult over the last decade. The situation is unlikely to change and may even be worse considering the lack of additional funding to the National Health Service (NHS) bodies.

The headache services in the UK are restricted to only a few tertiary centres with no more than 20 out of 514 consultant neurologists considering themselves as having a specialist interest in headache disorders. There are 12 specialist headache nurses and no more than a handful of GPs with specialist headache interest. Although headaches are extremely prevalent and some are extremely debilitating, very few headaches are serious or life threatening. This may account for the general perception that headache disorders are not important enough to merit research and investment and are not as attractive to a young trainee when it comes to choosing a specialist interest. Undergraduates receive very little training on headache disorders even in their placement within the neurosciences. It is, therefore, unlikely that a medical graduate would be expected to make an accurate diagnosis on headache disorders. This may be the reason why around 50% of headache sufferers do not consult their doctor either because they do not want to bother or because they feel there is nothing the doctor will be able to offer.[39] Currently, 9% of patients with headaches seen in primary care are referred and seen by the general neurologist, of whom many are discharged with reassurance.[40]

In the current financial climate, the NHS has to make tougher decisions in delivering quality services within limited resources. The trend is to move non-acute services into primary care with provision of healthcare closer to home. It is likely that some of the out-patient work in many specialities will be moved to the community with secondary and tertiary services confined to acute services and consultations for more complex and rare cases. Most of the neurological conditions are out-patient based, of which headache accounts for more than one-third. It is likely that progressively more and more headaches will be managed by the primary care or generalists in the new NHS.

The most important aspect of headache care is to make an accurate diagnosis to be able to prescribe the most appropriate medication and to refer only those who would benefit most from specialist consultations. Effective history taking is all that is needed to make a correct diagnosis, with the vast majority of patients requiring no special investigations. Most of the physicians in primary care are well aware of the available treatment options and, with effective skills in diagnosis, most headache disorders are well managed by them. This can be achieved through dedicated headache educational programmes for those who are more likely to see headache patients, that is doctors in primary care and emergency departments in the NHS acute trusts.

The availability of modern technology, such as the internet and mobile communication, has made it easier for patients to obtain information about their condition, although it can be difficult for patients to interpret and with limited knowledge they are more likely to become worried about their diagnosis. Public education is therefore becoming increasingly important in setting directions for the future of the healthcare, and in appropriate utilisation of scarce resources.

Headaches: who and when to refer?

Chronic migraine, medication overuse and TAC account for the vast majority of disabling headaches that are misdiagnosed and mismanaged and should be referred to physicians with an interest and experience in headaches. These together constitute fewer than 5% of all headache disorders. Migraine and tension-type headaches account for the vast majority of remaining headaches (95%) presenting to primary or secondary care.

Steiner et al (2011)[41] propose a three-tier model of care with 90% of headaches being looked after by the primary care physicians (Level 1) with minimal training on headache disorders through educational lectures delivered at a local setting. This should enable them to recognise the red flags (Table 2) and refer some of the difficult cases to GPs with a specialist interest (Level 2), who should be able to treat 9% of patients, leaving only 1% for the specialist headache clinics or neurologists. The Level 2 doctor will require some affiliation with the headache clinic in addition to theoretical training and be able to manage most of the primary headache disorders apart from the rare ones.

Over the last few years, the British Association for the Study of Headache (BASH), Migraine Trust and other patient organisations have taken the initiative to promote headache education among professionals and the general public. The BASH has been organising educational meetings and workshops in all corners of the UK for GPs and general and emergency physicians on the diagnosis and management of common headache disorders. In conjunction with the Migraine Trust, professional meetings are followed by a public event to educate the public and increase awareness of the common headaches and advise when it is appropriate for individuals to consult or self-treat with over-the-counter (OTC) painkillers. The BASH has produced guidelines for doctors and other healthcare professionals in both primary and secondary care that are updated every 3 years and are available on its website (www.bash.org.uk) to help physicians recognise secondary disorders

and manage the common primary headache disorders (i.e. tension headache, migraine and cluster headache).

Managing common headaches

Tension-type headaches

TTHs, both acute and chronic, are rarely disabling and OTC analgesics such as paracetamol and ibuprofen are an effective treatment strategy for infrequent episodes. Those occurring more frequently may be prevented by the use of tricyclic antidepressants, such as amitriptyline, for a few months.[42]

Migraine

The first line treatment for a migraine attack includes paracetamol gm or ibuprofen 600–800 mg or aspirin 900 mg with or without anti-emetics such as domperidone 10–20 mg.[10] These are available OTC and patients are advised to take them as soon as they know they have migraine. Those with aura should take the treatment at the start of the headache phase. Critics argue that early treatment when the headache is mild may lead to medication overuse; therefore, such advice is best for those who can differentiate migraine from non-migraine headaches.[32]

Other NSAIDs, such as naproxen and diclofenac, are equally effective but are prescription-only medications.[10,43,44] Combination analgesics with caffeine and barbiturates and opioids must be avoided and the intake of acute medications must be restricted to less than 2 days/doses per week. Those who fail to respond or are unable to tolerate the first line are given triptans (stepped-care approach) although they may be used as the first line if it is judged to be the most appropriate acute treatment.

The various triptans in the market are listed in Table 4. Some have a rapid onset of action, such as zolmitriptan 5 mg, rizatriptan 10 mg and eletriptan 40 or 80 mg, although recurrence of symptoms within 24 hours is a problem because of their short half-life; others such as naratriptan and frovatriptan have a slower onset of pain relief but are good in preventing recurrence.[32] There is evidence that combining a triptan and an NSAID such as naproxen is more effective than using in isolation. Patients who fail to respond to a particular triptan in three migraine attacks may respond to another triptan, and around one-third of patients are triptan non-responsive.[10] In addition to oral forms, some triptans are available in injectable or nasal formulation that might suit those with profound vomiting at the onset of migraine attack.

Preventive treatment must be considered in those with frequent migraine attacks or if there is lack of adequate response to acute medication. The chosen medicine must be titrated slowly to the optimum dose, unless there are side effects or tolerance issues, and to be effective must be continued for at least 4–6 months before considering a gradual withdrawal. First-line preventive treatments include beta-blockers such as propranolol, tricyclic anti-depressants such as amitriptyline, and the anti-convulsant topiramate. The other medicines with proven efficacy include sodium valproate and methysergide. Pizotifen and clonidine have been used widely with limited evidence of efficacy (Table 5).[10]

OnabotulinumtoxinA (Botox) received its license for prophylaxis in adult patients with chronic migraine in

Table 4. Various triptans and their formulations.

Sumatriptan	Over the counter as Imigran Recovery/ Migraleve Ultra (50 mg tablets)
	Tablet 50 mg, 100 mg, nasal spray 10 and 20 mg, subcut injection 6 mg
Zolmitriptan	Tablet 2.5 mg, 5 mg, nasal spray 5 mg
Rizatriptan	Tablet 5 mg, 10 mg
Naratriptan	Tablet 2.5 mg
Almotriptan	Tablet 12.5 mg
Eletriptan	Tablet 20 mg, 40 mg, 80 mg
Frovatriptan	Tablet 2.5 mg

Table 5. The choice of preventive treatment for migraine.

	Dosage
First line preventive medicines	
Beta-blockers	
Propranolol	80–320 mg daily
Metoprolol	50–200 mg daily
Atenolol	25–200 mg daily
Bisoprolol	5–10 mg daily
Tricyclic anti-depressants	
Amitriptyline	10–150 mg daily
Desipramine	100–300 mg daily
Nortriptyline	10–150 mg daily
Protriptyline	5–60 mg daily
Anti-convulsants	
Topiramate	25–100 mg daily
Second line preventive medicines	
Anti-convulsants	
Sodium valproate	300–2000 mg daily
Gabapentin	300–2400 mg daily
Serotonin antagonist	
Methysergide	2–6 mg daily
Pizotifen	1.5–6 mg daily
OnabotulinumtoxinA[a]	

[a]Licensed for prohylaxis in adults with chronic migraine.
Desipramine and Protriptyline are not in the BNF.
Imipramine 25-200 mg daily can be used instead of desipramine.
Lofepramine 70-210 mg daily can be used instead of protriptyline.

2010 and is now recommended by the National Institute of Clinical Excellence to those who have failed to respond to at least three preventive treatments.[45] The treatment must be discontinued if there is lack of response to two treatments or when the migraine becomes episodic. A greater occipital nerve block with local anaesthetic with or without steroids can sometimes bring short-term improvement in those with chronic migraine.[46]

Non-drug interventions such as herbal medication (butterbur), acupuncture, homeopathy, Indian head massage and cognitive behaviour therapy may well help although the evidence remains inconclusive.

Cluster headaches

An acute cluster attack responds well to injectable or nasal sumatriptan or nasal zolmitriptan unless contra-indicated.[47] Oxygen 100% 10–15 l per minute through a special mask can terminate an attack in 10–20 minutes.[48] This can be prescribed using home oxygen order form to the local supplier.

A rapid and effective remission can be achieved in some cases with a short course of a high-dose steroid for a few days. Prednisolone 60 mg per day for 5 days with a reduction of 5–10 mg every day can allow the preventive treatment to take effect. Verapamil is used as the first-line treatment for both episodic and chronic forms of the disorder. The treatment is commenced as 80 mg tds and a dose up to 960 mg daily is sometimes required. Verapamil can occasionally cause block in conduction of cardiac impulses. A PR interval of 0.2 millisecond or longer in the ECG signifies atrio-ventricular block (AV block). Methysergide may be an effective second line for episodic cluster headache in the short term. Lithium is another alternative for both episodic and chronic cluster headache in a dose of 800–1600 mg daily. The drug has a narrow therapeutic window and regular blood monitoring is required. Other drugs with some indication of efficacy include topiramate, gabapentin, melatonin and pizotifen.[10]

Medication-overuse headache

Patients consuming simple analgesic medicines are less likely to respond to both acute and preventive treatments and hence cessation of the overused medicine is the first priority in all cases.[49] Those overusing simple analgesics can be asked to stop their medication abruptly, although opioid-containing analgesics must be stopped gradually over a few weeks. An out-patient withdrawal with explanation and reassurance is sufficient in the vast majority of patients.[50] Patients need to be aware that their headaches may get worse before they get better. The duration of rebound symptoms varies depending on the overused medicine, being shortest for triptan and longest for combination analgesics.[51] There are no guidelines for treating rebound symptoms although use of NSAIDs such as Naproxen 500 mg bd for 2 weeks is widely recommended.[52] The role of steroids remains unclear. The use of preventive treatment before or after withdrawal of the painkillers remains controversial and the choice remains with the treating physician. Those requiring in-patient care to manage the process of withdrawal often benefit from continuous or intermittent infusion of intravenous dihydroergotamine with anti-emetics.[53]

Conclusion

Headache is one of the most common symptoms in the general population. Migraine and tension-type headache accounts for the vast majority and, with minimal education and training, these could be diagnosed and managed in primary care or by general and emergency physicians working in acute medicine. The training of GPs through affiliation with the headache clinics could develop local champions (GPs with a specialist interest or Level 2) who should be able to see some of the more complex patients and filter only those referrals to the specialist headache clinic that are rare or refractory to treat. This would form the basis of a cost-effective three-level care for headaches in the general population, because in the current financial climate the NHS will not be able to cope with the vast majority of headache referrals to secondary and tertiary care.

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