RESULTS

DATA QUALITY

REPRESENTATIVENESS

In full or simplified versions, the neurologist questionnaire was returned from 101 countries (in 65 cases the simplified version), the GP questionnaire from 47 countries (four simplified) and the lay questionnaire from 48 countries (16 simplified).

At least one questionnaire was obtained from each of 101 countries (figure 1.1): 18 in the African Region (39% of all countries in the region), 19 in the Americas (54%), 13 in the Eastern Mediterranean (62%), 38 in the European Region (72%), five in South-East Asia (46%) and eight in the Western Pacific (30%) (figure 1.2). These numbers might suggest less than 50% representation from three regions, but the data in fact portrayed to 86% of the world’s population: 71% of the population in Africa, 85% in the Americas, 83% in the Eastern Mediterranean, 86% in Europe, 82% in South-East Asia and 93% in the Western Pacific (figure 1.3).

Response rates (i.e., returns per contact made) for the neurologist questionnaire reflected country-income categories: the highest rate (77%) was from high-income countries, with other categories following in order: upper middle- (54%), lower middle- (46%) and low-income (38%). Response rates of GP and lay questionnaires are unknown since these were passed in many cases by neurologist-respondents to contacts known to them.

FIG. 1.1 World map of countries contributing data

YES  NO
RESULTS

DATA QUALITY

LIMITATIONS

No data were obtained from 92 (48%) of the 193 Member States. Although responding countries represented a large majority (86%) of the world’s population, some bias was possible. Particularly in low-income countries it was difficult to identify likely respondents; it may therefore be expected that unrepresented countries are those where health services for headache are least developed. If this is so, the most disadvantaged countries are under-reported. At most, six key persons in each country (but in many countries only one) were the source of all information other than epidemiological data. Many respondents, particularly those from large countries, found it difficult to complete the questionnaire since there might be significant variation from area to area within the country. Hence, answers from one respondent might not be representative of the whole country. Many of the originally-identified contacts did not respond, and in some countries there was nobody known to work in the field of headache medicine. Hence, the level of headache expertise of respondents might vary considerably.

For other reasons, the quality of responses was probably quite variable. In some countries, some answers could be based on empirical studies (for example, of use of health-care resources for headache), whereas in other countries the questions could be answered only on the basis of clinical experience, or by extrapolation of data from nearby countries. For most countries, the scientific basis of the responses could not be known.

In spite of these limitations, the Atlas of Headache Disorders is the most comprehensive compilation of resources for headache in the world ever attempted.

DATA ORGANIZATION AND PRESENTATION

The information is organized in eight themes and divided regionally and by income categories within each theme. Data are presented as graphics, world maps and written text. Bar and pie charts illustrate frequencies, medians or means as appropriate. Because the distributions of most of the data are skewed, the median has been used to depict the central tendency of most variables.

It has not been possible to present all the findings from the analyses. Limitations specific to each theme are to be kept in mind when interpreting the data and their analyses. Implications of the findings for development of resources for headache care are highlighted within each theme.
RESULTS

THEMES

THEMES - EPIDEMIOLOGY

Epidemiological data were compiled from a systematic review of published literature (1) supplemented by data collected through Global Campaign door-to-door surveys in China (23), India and the Russian Federation (24). Only epidemiological data of sound provenance were accepted for this analysis: i.e., those deriving from surveys of verifiably high quality; expert estimates having no evidence base were not included (see Methods). The enquiry was limited to adults because relatively few data would be available for children and adolescents, and most studies focused on the age-range 18–65 years. Accordingly, the results summarized in table 2.1 are wholly from population-based studies that employed adequate methods, achieved acceptable response rates and used established diagnostic criteria (26, 27). The term “1-year prevalence” means percentage of the population reporting at least one headache episode meeting diagnostic criteria for the relevant headache disorder during the previous 12 months.

SALIENT FINDINGS

- Approximately half to three quarters of adults aged 18–65 years have had headache in the last year in studies from all regions except Africa, where the estimated 1-year prevalence is lower at 22%.
- Migraine is reported, in these studies, in more than 10% of adults in this age range, except in Africa and Eastern Mediterranean.
- Headache on 15 or more days every month affects 1.7–4% of the world’s adult population, according to these studies. Much of this may be medication-overuse headache, but data on this are lacking from most regions.

- In many countries, and some regions, the data are uncertain because of a scarcity of good epidemiological studies.

- Worldwide, migraine on its own is the cause of 1.3% of all years of life lost to disability (YLDs) (10). The burden of all headache disorders is substantially higher according to a systematic review of the published literature (1). Health-policy makers everywhere therefore need to be well informed about headache disorders in their countries. Yet, in many countries, and at least four of the six WHO regions, there are gaps in the knowledge needed to inform health-care policy. More high-quality epidemiological studies are required in order to fill these.

TABLE 2.1 Mean 1-year prevalences (%) in adults aged 18–65 years of all headache, migraine, tension-type headache and medication-overuse headache from population-based studies by WHO region

<table>
<thead>
<tr>
<th>Region</th>
<th>All headache</th>
<th>Migraine</th>
<th>Tension-type headache</th>
<th>Medication-overuse headache</th>
<th>Headache on ≥15 days/month (including MOH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>21.6 (n = 2)</td>
<td>4.0 (n = 2)</td>
<td>nr</td>
<td>nr</td>
<td>1.7 (n = 2)</td>
</tr>
<tr>
<td>Americas</td>
<td>46.5 (n = 1)</td>
<td>10.6 (n = 1)</td>
<td>nr</td>
<td>nr</td>
<td>4.0 (n = 1)</td>
</tr>
<tr>
<td>Eastern Mediterranean</td>
<td>78.8 (n = 2)</td>
<td>6.8 (n = 2)</td>
<td>nr</td>
<td>nr</td>
<td>80* (n = 2)</td>
</tr>
<tr>
<td>Europe</td>
<td>56.1 (n = 8)</td>
<td>14.9 (n = 9)</td>
<td>nr</td>
<td>60* (n = 2)</td>
<td>34.8 (n = 1)</td>
</tr>
<tr>
<td>South-East Asia</td>
<td>63.9 (n = 1)</td>
<td>15.9 (n = 1)</td>
<td>nr</td>
<td>1.2 (n = 1)</td>
<td>19.7 (n = 3)</td>
</tr>
<tr>
<td>Western Pacific</td>
<td>52.8 (n = 4)</td>
<td>10.4 (n = 6)</td>
<td>nr</td>
<td>nr</td>
<td>19.7 (n = 3)</td>
</tr>
</tbody>
</table>

n = Number of studies in the WHO region contributing to the reported mean.

* The discrepancy between 80% for tension-type headache and 56.1% for all headache arises because these are means of estimates from different studies. Those focusing on the former generally made greater effort to include infrequent tension-type headache (by definition occurring less than once a month), which is commonly unreported, whereas all headache might overlook this.

IMPLICATIONS

- The findings in table 2.1 confirm that headache disorders, including migraine and tension-type headache, are among the most prevalent disorders of mankind.
- Relatively few studies have included children or adolescents, and data from these are not presented. The focus on adults aged 18–65 years is not inappropriate from a public-health perspective as these are the productive years.
- Worldwide, migraine on its own is the cause of 1.3% of all years of life lost to disability (YLDs) (10). The burden of all headache disorders is substantially higher according to a systematic review of the published literature (1). Health-policy makers everywhere therefore need to be well informed about headache disorders in their countries. Yet, in many countries, and at least four of the six WHO regions, there are gaps in the knowledge needed to inform health-care policy. More high-quality epidemiological studies are required in order to fill these.
RESULTS

THEMES - IMPACT ON SOCIETY, AND NATIONAL DATA

SOCIETAL IMPACT

Respondents were asked whether information was available on the impact of headache on society, including economic impact. In very few countries was this so. The responses are presented in figures 3.1–3.3.

SALIENT FINDINGS

- Globally, information on the societal impact of headache exists in very few countries: only 18% of those that responded (figure 3.2).
- Regional variations are marked: Europe has by far the most access to information, but still only in one third (32%) of countries. Following in order are the Americas (16%), Western Pacific (13%), Eastern Mediterranean (8%) and Africa (6%), with none in South-East Asia.
- A huge differential exists between high-income countries (still only one third, at 35%) and all others (6–10%) (figure 3.3).

FIG. 3.1 Countries with information on the societal impact of headache

FIG. 3.2 Countries with information on the societal impact of headache, worldwide and by WHO region (% positive responses among those responding)

FIG. 3.3 Countries with information on the societal impact of headache, by income category (% positive responses among those responding)
RESULTS

THEMES - IMPACT ON SOCIETY, AND NATIONAL DATA

NATIONAL HEALTH REPORTING

Respondents were asked whether headache disorders were included in an annual national health-reporting system or national expenditure survey. The results are presented in figures 3.4 and 3.5.

SALIENT FINDINGS

- Worldwide, headache disorders are included in an annual health-reporting system in only 12% of countries that responded.
- There is variation between regions, but in none is the proportion higher than 18%. There is no consistent trend by income.
- Worldwide, headache is rarely included in national expenditure surveys: only 7% of responding countries, all of which are within three regions – Eastern Mediterranean (15%), European (11%) and the Americas (5%). None are low-income countries.

IMPLICATIONS

- Very few countries have nationally-derived data on impact of headache disorders, upon which adequate health-care provision for headache disorders is dependent.
- Population-based studies, which must be well-conducted if they are to be reliable, are needed in many countries throughout the world, in all regions, but especially in resource-poor countries. Ideally these should be performed in ways that allow comparison with other common and disabling disorders. Many studies are now underway within the Global Campaign against Headache (22).
- It would be highly informative to health policy if accurate information existed within countries on direct and indirect costs attributable to headache, given the huge disparity between the two (28, 29). However, little such information exists worldwide.

FIG. 3.4 Countries including headache disorders in the annual health-reporting system

FIG. 3.5 Countries including headache disorders in the annual health-reporting system, worldwide and by WHO region (% positive responses among those responding)
RESULTS

THEMES - HEALTH-CARE UTILIZATION

SELF-TREATMENT VERSUS PROFESSIONAL HEALTH CARE

Respondents were asked to estimate the percentages of all people with headache who were primarily self-treating or consulting health professionals (primary-care physician [PCP], neurologist, alternative or complementary medicine practitioner or others). Their responses are summarized in figure 4.1.

SALIENT FINDINGS

Worldwide, about 50% of people with headache are estimated to be primarily self-treating, without contact with health professionals. However, some 10% are reportedly treated by neurologists, although fewer, as might be expected, in Africa and South-East Asia.

CONSULTATION RATES

Neurologists and primary-care physicians were asked what percentages of consultations for headache in their settings were for each headache disorder. The responses are presented in figures 4.2 and 4.3.
### RESULTS

#### THEMES - HEALTH-CARE UTILIZATION

**FIG. 4.3** Estimated percentages of all headache consultations made for each headache disorder, in primary and specialist care, by WHO region (medians of responses within regions, adjusted to total 100%) *(TTH: tension-type headache; M+TTH: combined migraine and TTH; MOH: medication-overuse headache; Other secondary: other secondary headache)*

#### A. AFRICAN REGION

- **Primary care**
  - Migraine: 20
  - TTH: 13
  - M+TTH: 22
  - Cluster Headache: 4
  - MOH: 3
  - Other Secondary: 5
  - Others: 11

- **Neurologist**
  - Migraine: 32
  - TTH: 32
  - M+TTH: 33
  - Cluster Headache: 7
  - MOH: 18
  - Other Secondary: 19
  - Others: 13

#### B. REGION OF THE AMERICAS

- **Primary care**
  - Migraine: 14
  - TTH: 16
  - M+TTH: 10
  - Cluster Headache: 5
  - MOH: 7
  - Other Secondary: 4
  - Others: 3

- **Neurologist**
  - Migraine: 28
  - TTH: 28
  - M+TTH: 26
  - Cluster Headache: 10
  - MOH: 10
  - Other Secondary: 8
  - Others: 14

#### C. EASTERN MEDITERRANEAN REGION

- **Primary care**
  - Migraine: 22
  - TTH: 23
  - M+TTH: 22
  - Cluster Headache: 4
  - MOH: 5
  - Other Secondary: 8
  - Others: 7

- **Neurologist**
  - Migraine: 38
  - TTH: 32
  - M+TTH: 26
  - Cluster Headache: 10
  - MOH: 10
  - Other Secondary: 11
  - Others: 21

#### D. EUROPEAN REGION

- **Primary care**
  - Migraine: 13
  - TTH: 16
  - M+TTH: 10
  - Cluster Headache: 1
  - MOH: 6
  - Other Secondary: 13
  - Others: 6

- **Neurologist**
  - Migraine: 32
  - TTH: 33
  - M+TTH: 22
  - Cluster Headache: 1
  - MOH: 13
  - Other Secondary: 6
  - Others: 2

#### E. SOUTH-EAST ASIA REGION

- **Primary care**
  - Migraine: 21
  - TTH: 22
  - M+TTH: 8
  - Cluster Headache: 8
  - MOH: 6
  - Other Secondary: 11
  - Others: 8

- **Neurologist**
  - Migraine: 26
  - TTH: 26
  - M+TTH: 22
  - Cluster Headache: 8
  - MOH: 9
  - Other Secondary: 8
  - Others: 2

#### F. WESTERN PACIFIC REGION

- **Primary care**
  - Migraine: 22
  - TTH: 10
  - M+TTH: 5
  - Cluster Headache: 14
  - MOH: 9
  - Other Secondary: 5
  - Others: 14

- **Neurologist**
  - Migraine: 41
  - TTH: 27
  - M+TTH: 21
  - Cluster Headache: 10
  - MOH: 4
  - Other Secondary: 5
  - Others: 14
SALIENT FINDINGS

• Globally, the top three causes of consultation for headache, in both primary and specialist care, are migraine, tension-type headache and the combination of these. Tension-type headache is the more prevalent disorder worldwide (see p 25), but consultation frequencies overall for migraine and tension-type headache only partially reflect this difference. Migraine is associated with a higher probability (per person affected) than tension-type headache of consultation for headache, and more so in specialist than in primary care. Primary-care physicians, almost universally, are consulted more often for tension-type headache, which almost certainly reflects its greater prevalence. Specialists on the other hand see more migraine, probably a reflection of its relative severity (greater individual burden).

• Regionally, migraine is the most frequent cause of consultation for headache in responding countries of the Americas, Europe, South-East Asia and the Western Pacific. This is contrary to relative prevalences (see p 25) and again probably reflects relative individual burdens attributable to migraine and tension-type headache. Tension-type headache is the more frequent cause for consultation, better reflecting prevalence, in the Regions of Africa and the Eastern Mediterranean.

• By income category, consultations for migraine rise from 20 % of all headache consultations in low-income countries to 32 % in high-income countries. Conversely, and reflecting the regional variations noted above, consultations for tension-type headache make up 25 – 30 % of headache consultations in low-and lower middle-income countries and 18.5 – 20 % in upper middle- and high-income countries. An explanation does not appear to lie in regional prevalence variations, although epidemiological data are few from African and Eastern Mediterranean Regions and from resource-poor countries generally. Cultural differences may play a part. In addition, there are generally fewer neurologists in resource-poor countries, which may result in different diagnostic practices and, particularly, less usage of standard diagnostic criteria. However, the low denominators (few consultations overall for headache) should be kept in mind.

• Cluster headache is the cause of 1 – 3.8 % of specialist consultations for headache. This is rather consistent across all regions and income categories. Expectation based on the prevalence of this relatively uncommon disorder is much lower than this, and the explanation undoubtedly lies in the extreme severity of this headache, demanding medical attention.

• Medication-overuse headache as the cause of specialist consultation rises from 1 % in low-income countries to over 10 % in upper middle- and high-income countries. This is in line with the finding, reported above, that secondary headaches are more commonly seen in resource-poor countries. Drugs and medications are the top risk factor in upper middle- and high-income countries, which is consistent with the higher consultation rates in these countries for medication-overuse headache.

REMEDIEABLE RISK FACTORS

Respondents were asked to identify three treatable risk factors that were, in their view, of greatest importance for headache causation or aggravation.

SALIENT FINDINGS

• Globally, four categories of risk factor are rated of highest importance: social (20.8 %), including quality of life, domestic circumstances and life events; other medical conditions (15.8 %), including hypertension, depression and infectious diseases; drugs or medications (12.9 %), particularly medication overuse; and lifestyle factors (7.9 %), for example substance abuse and dietary habits.

• Other medical conditions constitute the top remediable risk factor in lower-middle-income and low-income countries. This is in line with the finding, reported above, that secondary headaches are more commonly seen in resource-poor countries. Drugs and medications are the top risk factor in upper middle- and high-income countries, which is consistent with the higher consultation rates in these countries for medication-overuse headache.

IMPLICATIONS

• The proportion of people with headache estimated to be self-treating (about 50 %) is not unexpected, given that much tension-type headache and some migraine manifests only as infrequent and/or mild attacks. Not everyone with headache would benefit from professional health care.

• This proportion is unlikely to change even with better health care; consequently, education of people with headache about how to treat their headaches effectively and efficiently is of considerable public health importance. This is particularly relevant to the avoidance of medication overuse and risk of medication-overuse headache.

• On the other hand, if it is correct that about 10 % of people with headache are seen by neurologists, this is far too great a proportion (30). These data appear robust, as they were supplied with a high degree of consistency by neurologists, primary-care physicians and lay representatives, but all these groups may have over-estimated numbers seen within the health system. The question specified people with headache, but was perhaps interpreted as patients with headache. Even if this were the case, there is a strong efficiency-based argument for expanding primary-care management of headache (30).

• The principal primary headaches generate most consultations for headache, both primary-care and specialist, in all regions and all income groups. Whilst secondary headaches assume greater importance in resource-poor countries, it is still primarily for migraine and tension-type headache that headache services throughout the world must cater.

• Cluster headache is important not for its prevalence but for its severity. Not all cases are coming to specialist attention. This is indicative of failure of headache services, and is equally true regardless of income category.

• Medication overuse is a behaviour dependent upon unrestricted access to medication. Better-resourced countries are more likely to provide this, and in these countries more medication-overuse headache is seen. The implications are educational: better public awareness is required.
RESULTS

THEMES - DIAGNOSIS AND ASSESSMENT

FIG. 5.1 Estimated percentages of people with specific headache disorders who have been professionally diagnosed, worldwide and by WHO region (medians of individual responses)

FIG. 5.2 Estimated percentages of people with specific headache disorders who have been professionally diagnosed, by country-income category (medians of individual responses)

DIAGNOSTIC RATES

Respondents were asked to estimate the percentages of patients with migraine, tension-type headache or medication-overuse headache who had been diagnosed by a health professional. The results are presented in figures 5.1 and 5.2.

SALIENT FINDINGS

- Globally, health professionals diagnose migraine and tension-type headache in only about 40% of people with these disorders, and medication-overuse headache in a small minority (10%) of cases.

- There are small regional variations: the lowest percentages are in the African Region, which may be a true finding but it is based on a low number of respondents.

- There is a consistent trend whereby the rate of diagnosis of migraine increases with income category, and an almost consistent similar trend for medication-overuse headache. There is no clear trend for tension-type headache.
RESULTS

THEMES – DIAGNOSIS AND ASSESSMENT

USE OF DIAGNOSTIC CRITERIA

Neurologist respondents were asked whether a set of explicit diagnostic criteria was routinely used, in specialist care, to support the diagnosis of patients with headache. Their responses are presented in figures 5.3–5.5.

SALIENT FINDINGS

In specialist care, explicit diagnostic criteria are routinely used to support diagnosis of patients with headache in 56% of countries that responded. The criteria cited were, invariably, International Headache Society criteria (either first (26) or second editions (27)). There is some regional variation, with usage in only a minority of countries that responded in African, Eastern Mediterranean and South-East Asia Regions. Low-income countries mostly do not routinely use explicit diagnostic criteria.

FIG. 5.3 Countries making routine use in specialist care of explicit diagnostic criteria to support headache diagnosis

FIG. 5.4 Countries making routine use in specialist care of explicit diagnostic criteria to support headache diagnosis, worldwide and by WHO region (% positive responses among those responding)

FIG. 5.5 Countries making routine use in specialist care of explicit diagnostic criteria to support headache diagnosis, by income category (% positive responses among those responding)
RESULTS

THEMES – DIAGNOSIS AND ASSESSMENT

USE OF INVESTIGATIONS

Respondents were asked to estimate the percentages of patients, in their settings, receiving specified investigations as part of the diagnostic or assessment procedures for headache disorders. The results of this are in Table 5.6. Respondents were also asked to identify the principal reasons for conducting these investigations.

SALIENT FINDINGS

- Investigation rates are generally high, more than is expected on the basis that headache disorders mostly do not require investigations either for diagnosis or assessment. This is particularly true of EEG.
- Regional variations are evident, especially for sinus and eye (refractory error) examinations.
- Globally, the most-reported reason for performing investigations in specialist care is to aid diagnosis (70%). This is the most-cited reason (≥ 55%) in all regions and for all income categories. Reassurance of patients and family members (20%) is less often cited, and frequency varies by region, from 10% in African to 40% in the Western Pacific Regions, and to a lesser extent by income, from 20% in low- and lower-middle-income countries to 27.5% in upper-middle- and high-income countries. Also cited is avoidance of litigation (10%).

<table>
<thead>
<tr>
<th>WHO region</th>
<th>MRI (%)</th>
<th>CT (%)</th>
<th>Sinus examination (%)</th>
<th>EEG (%)</th>
<th>CSF (%)</th>
<th>Refractory errors (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>PC</td>
<td>N</td>
<td>PC</td>
<td>N</td>
<td>PC</td>
<td>N</td>
</tr>
<tr>
<td>African (n = 17)</td>
<td>0</td>
<td>1</td>
<td>28</td>
<td>5</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Americas (n = 19)</td>
<td>15</td>
<td>8</td>
<td>30</td>
<td>10</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Eastern Mediterranean (n = 12)</td>
<td>10</td>
<td>2</td>
<td>60</td>
<td>10</td>
<td>18</td>
<td>28</td>
</tr>
<tr>
<td>Europe (n = 34)</td>
<td>10</td>
<td>3</td>
<td>30</td>
<td>4</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>South-East Asia (n = 5)</td>
<td>5</td>
<td>1</td>
<td>30</td>
<td>2</td>
<td>45</td>
<td>8</td>
</tr>
<tr>
<td>Western Pacific (n = 8)</td>
<td>23</td>
<td>20</td>
<td>20</td>
<td>64</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>World (n = 95)</td>
<td>10</td>
<td>3</td>
<td>30</td>
<td>5</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

TABLE 5.6 Estimated percentages of headache patients in specialist and primary care receiving specified investigations (medians of individual responses)

MRI = magnetic resonance imaging; CT = X-ray computed tomography; EEG = electroencephalography; CSF = cerebrospinal fluid examination; N = specialist (neurologist) care; PC = primary care; n = number of countries contributing data

FIG. 5.7 Countries making routine use in specialist care of an assessment instrument for quality of life or disability in people with headache

USE OF ASSESSMENT INSTRUMENTS

Neurologists were asked whether assessment instruments, either disease-specific or generic, were routinely used in their setting for quality of life or disability in people with headache. Their responses are shown in Figures 5.7–5.9.

SALIENT FINDINGS

- Globally, assessment instruments are not widely used – routinely in only 24% of countries that responded. The most-cited instruments are the MIDAS questionnaire (31–33) and HIT-6 (34, 35).
- Regionally there are wide variations. Estimates are uncertain because of low numbers of responders, but assessment instruments appear not to be routinely used at all for quality of life or disability in people with headache in the African or South-East Asia Regions.
- Low- and lower middle-income countries use these instruments less (5–12.5%) than upper middle- and high-income countries (29–43%).
RESULTS

THEMES - DIAGNOSIS AND ASSESSMENT

IMPLICATIONS

- To the extent that diagnosis rate reflects quality or reach of headache services, there is much room for improvement in all regions. Both educational and political remedies are needed.

- Low professional diagnostic rates are partially a consequence of poor resources, which may be reflected in lower availability of doctors (or health care more generally) and less usage of explicit diagnostic criteria. But this is far from being the whole cause, since diagnosis rate (as a percentage of prevalence) is higher for tension-type headache than for migraine in resource-poor countries but the reverse is true in upper middle- and high-income countries. Explanations are speculative. Under-diagnosis of all headache disorders occurs everywhere, but better diagnosis of migraine in high-income countries may be the result of better availability of specific medications, perhaps coupled with pharmaceutical industry awareness campaigns. In some high-income countries, reimbursement policies favouring migraine over tension-type headache lead directly to relative over-diagnosis of migraine (or, rather, increase the likelihood that tension-type headache will not be recorded as a formal diagnosis).

- Medication-overuse headache is both preventable and remediable. As a chronic headache, typically present daily, it is a high cause of disability. It is also unlikely to resolve without medical care. The low diagnosis rate of 10% is a failure of health care that has important adverse health and economic consequences.

- Penetration of International Headache Society diagnostic criteria is high, but their usage is not universal and is low in low-income countries. Little is done to encourage their use in low-income countries. The remedy for this is educational, but this requires policy-support. Part of the problem is likely to be the complexity of ICHD-II, describing 200 headache entities in 160 pages (27). Translation of the full criteria requires considerable commitment of resources, and is unnecessary for management of most headache in primary care: a much-reduced set of criteria for about 15 core diagnoses is sufficient (36).

- Investigation rates may be driven by tradition, culture and expectation rather than clinical need. There is potential for substantial reductions, with resource savings.

- Assessment of impact of headache on an individual should be part of management. This is especially true where resources are limited, in order to direct them efficiently.

- Existing instruments are easy to use, but have very low usage. There is large potential for improvement globally, and particularly in resource-poor countries.

- Two simple instruments are apparently preferred, both of which are appropriate. MIDAS measures time lost to headache (31–33), which reflects disability. A more cross-culturally acceptable version of this is the HALT index (37). HIT-6 assesses impact more broadly, including aspects of quality of life (34, 35). There is no reported use of pure quality-of-life instruments such as WHOQoL, and these may not be useful in routine clinical management of people with headache.
RESULTS

THEMES – TREATMENT

GUIDELINES
Neurologist respondents were asked whether guidelines or recommendations for the management of headache disorders were routinely used in specialist care in their country. Their responses are shown in figures 6.1–6.3.

SALIENT FINDINGS
- Globally, guidelines or recommendations are in routine use in headache management in rather more than half (55%) of the responding countries. National guidelines are in use in 26 countries.
- Regional variation is marked: guidelines or recommendations are widely used – in three quarters of countries – in the Americas, Europe and Western Pacific, much less in Africa and barely at all in Eastern Mediterranean and South-East Asia Regions.
- These differences appear to be driven by the low-income countries (figure 6.3), which may be expected. About 40% of the world’s population live in low-income countries.

FIG. 6.1 Countries making routine use of management guidelines or recommendations in specialist care of headache

FIG. 6.2 Countries making routine use of management guidelines or recommendations in specialist care of headache, worldwide and by WHO region (% positive responses among those responding)

FIG. 6.3 Countries making routine use of management guidelines or recommendations in specialist care of headache, by income category (% positive responses among those responding)
RESULTS

THEMES - TREATMENT

AVAILABILITY OF MEDICATIONS

The main classes of drugs to treat headache disorders were listed in the questionnaires: analgesics, anti-emetics, specific anti-migraine drugs and prophylactic medications. Respondents were asked about availability and regulatory status of each, and reimbursement policy.

The listed analgesic drugs were paracetamol (acetaminophen), aspirin, other non-steroidal anti-inflammatory drugs (NSAIDs), barbiturate-containing analgesic compounds, opiates/opoids (including codeine or dihydrocodeine) and opioid-containing analgesic compounds.

The listed anti-emetic drugs were domperidone and metoclopramide, both of which are prokinetic (by enhancing gastric emptying) and particularly appropriate for migraine.

The listed specific anti-migraine drugs were ergots (ergotamine and dihydroergotamine) and triptans (almotriptan, eletriptan, frovatriptan, naratriptan, rizatriptan, sumatriptan and zolmitriptan).

The listed prophylactic drugs were beta-blockers, flunarizine, methysergide, pizotifen, valproate (sodium valproate, valproic acid or divalproex), tricyclic antidepressants and topiramate.

Results are set out in figures 6.4 – 6.9.
SALIENT FINDINGS

Analgesics

- Paracetamol and aspirin are available in all countries that responded, in all regions and all income categories. Other NSAIDs are available in two thirds (67%). These drugs are almost always obtainable over-the-counter.

- Opiates/opioids are available in 65% of countries, barbiturate-containing analgesic compounds in half this number (33%). These drugs are mostly available only on prescription.

- Analgesics are reimbursed in about half of the countries that responded, with variations between drug classes.

Anti-emetics

- Metoclopramide is available in all countries (100%), domperidone in most (96%). A doctor’s prescription is usually needed, but purchase over-the-counter is possible in about one third of countries.

- These drugs are reported to be reimbursed in two thirds of countries.

Prophylactic drugs

- The most widely available specific anti-migraine drug is ergotamine (96% of responding countries), closely followed by sumatriptan (93%). Of the other triptans, only zolmitriptan (66%) is in more than half of the corresponding countries. Rizatriptan (47%), eletriptan (45%) and naratriptan (44%) are similarly but less-widely available and almotriptan (22%) and frovatriptan (21%) are reached fewer than one quarter of countries.

- All of these drugs are prescription-only (GP or specialist) in most countries (figure 6.8). They are reimbursed, at least in part, in about two thirds of countries, but in full in fewer than half (figure 6.9).

Anti-migraine drugs

- The most widely available specific anti-migraine drug is ergotamine (96% of responding countries), closely followed by sumatriptan (93%). Of the other triptans, only zolmitriptan (66%) is in more than half of the corresponding countries. Rizatriptan (47%), eletriptan (45%) and naratriptan (44%) are similarly but less-widely available and almotriptan (22%) and frovatriptan (21%) reach fewer than one quarter of countries.

- All of these drugs are prescription-only (GP or specialist) in most countries, but ergotamine, notably, is obtainable over-the-counter in almost a quarter (23%) (figure 6.5). They are reimbursed at least in part in about two thirds of countries, but in full in only between one third and one half (figure 6.6).

- These drugs are reported to be reimbursed in two thirds of countries.
RESULTS

THEMES - TREATMENT

USE OF MEDICATIONS

Respondents were asked for their preferences among the drugs listed (not frequency of use, since reliable data on this were unlikely to be available).

SALIENT FINDINGS

Migraine
- For treatment of acute episodic migraine, other NSAIDs (than aspirin) are, as a class, the most widely preferred drugs (86% of countries that responded). Paracetamol (69%) and aspirin (52%) follow. Both these drugs are listed by WHO as essential medicines for migraine and probably are the leading preferred single drugs (as opposed to drug classes) in all regions and income categories (figure 6.10).
- Metoclopramide is the preferred anti-emetic drug for acute episodic migraine (71% of countries), and this held true in all regions except South-East Asia.
- Globally, the equally-preferred specific anti-migraine drugs are ergotamine (34% of countries that responded) and sumatriptan (33%) (figure 6.11). These overall numbers conceal marked regional differences, with ergotamine preferred in all but Europe and the Western Pacific, where sumatriptan leads (with four-fold preference in Europe).
- Beta-blockers are the preferred migraine prophylactic drugs worldwide (85% of countries) and in every region (figure 6.12). Tricyclic antidepressants (56%) follow, second in all regions except Western Pacific. Sodium valproate (40%), topiramate (34%) and flunarizine (34%) are used less, with regional variations.

Tension Type Headache
- For treatment of episodic tension-type headache, other NSAIDs (than aspirin) are, collectively, the most widely preferred drugs (87% of countries that responded). Paracetamol (75%) follows, but is probably the leading single drug in all regions and income categories. Aspirin (45.5%) appears to be less used.
### RESULTS

#### THEMES – TREATMENT

**ALTERNATIVE OR COMPLEMENTARY THERAPIES**

Respondents were asked to identify the three most frequently used alternative or complementary therapies for headache in their country. The responses are summarized in table 6.13.

### SALIENT FINDINGS

- Physical therapy (44% of countries that responded), acupuncture (39%) and naturopathy (25%) are the most frequent overall by a clear margin. At least one of these is in the top three such therapies in all regions and all income categories.

- Other alternative or complementary therapies in frequent use in at least some countries are biofeedback / relaxation, herbal preparations, traditional medicine, exercise or yoga, psychological therapies, religious forms of treatment, dietary alterations, Ayurveda, reflexology and aromatherapy.

### IMPlications

- Guidelines, especially those developed locally and appropriate to local illness patterns, resources and culture, are expected to improve management and outcomes, and this is true at all resource levels. Most low-income countries do not routinely use guidelines, a finding that signals a major and low-cost opportunity for service improvement. However, these countries also have the fewest professional organizations (see pp. 58 – 59) to help raise awareness of, or indeed develop, guidelines and recommendations.

- It is true, of course, that, if people with headache do not consult doctors, headache management guidelines for doctors lose relevance. In such circumstances, guidelines for other healthcare providers such as clinical officers and nurses may be as or more important.

- There are many widely available drugs, generally reflecting their efficacy and offering an adequate range. There is, therefore, good potential for effective management, using these drugs according to guidelines.

- When there is no or only partial reimbursement, a barrier is placed in the way of best management. Generally, the available drugs are fully reimbursed in fewer than half of countries (although at least partial reimbursement is offered for most drugs in up to two thirds of countries). Given the cost-effectiveness of most drugs for headache (in that the indirect costs of inadequately-treated headache are very high (6, 12, 28, 29)), policies of wider reimbursement would be advisable.

- The most preferred drugs for acute treatment and prophylaxis of migraine are also the most widely available drugs (in > 96% of responding countries), but they are not necessarily the most efficient. A particular example is ergotamine, which remains the most available specific anti-migraine drug worldwide, despite its removal from WHO’s essential medicines list in 2005 (38). Ergotamine is low-cost compared with triptans and, although the differential cost has reduced since sumatriptan became available as a generic product, this appears to drive widespread preference for a drug with quite inferior efficacy (39). Furthermore, over-the-counter availability in about one quarter of countries raises concerns in view of its toxicity, accumulation and overdose potential (39). Triptans, especially sumatriptan, should be more widely available and more commonly used.

- Treatment of tension-type headache, when it is treated, is much the same everywhere. It is not known how much of it is treated, or how much needs to be treated: the symptoms of this disorder are, in many cases, mild and infrequent.

- Opiates / opioids are widely available, but do not feature as preferred drugs for either migraine or tension-type headache. This is correct. They are not particularly effective for either disorder, whilst opioid dependence, even with codeine or dihydrocodeine, becomes a clear risk in users of these drugs who have frequent headache episodes.

#### TABLE 6.13 The three most frequently used alternative or complementary therapies for headache, worldwide and by WHO region (% positive responses among responding countries)

<table>
<thead>
<tr>
<th>WHO region</th>
<th>Acupuncture (%)</th>
<th>Naturopathy (%)</th>
<th>Physical therapy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>African (n = 18)</td>
<td>22</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>Americas (n = 19)</td>
<td>32</td>
<td>26</td>
<td>42</td>
</tr>
<tr>
<td>Eastern Mediterranean (n = 13)</td>
<td>31</td>
<td>15</td>
<td>23</td>
</tr>
<tr>
<td>Europe (n = 38)</td>
<td>50</td>
<td>32</td>
<td>68</td>
</tr>
<tr>
<td>South-East Asia (n = 5)</td>
<td>60</td>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td>Western Pacific (n = 8)</td>
<td>38</td>
<td>0</td>
<td>38</td>
</tr>
<tr>
<td>World (n = 101)</td>
<td>39</td>
<td>25</td>
<td>44</td>
</tr>
</tbody>
</table>

\( n \) = number of countries responding
RESULTS

THEMES – PROFESSIONAL TRAINING

UNDERGRADUATE AND POSTGRADUATE MEDICAL TRAINING

Physician respondents were asked to estimate the number of hours of training in headache disorders in the formal undergraduate medical curriculum. Neurologists were additionally asked how many hours were spent on headache in postgraduate specialist training. The findings are summarized in figures 7.1 and 7.2.

Respondents were not asked about continuing medical education for primary-care physicians.

SALIENT FINDINGS

- Worldwide, just four hours are committed to headache disorders in formal undergraduate medical training, and 10 hours in specialist training. The latter in particular demonstrates regional variations, with more hours committed in the Americas and Europe. However, wide variations are reported between individual countries within all regions and income categories: from 0–20 hours of undergraduate medical training and from 0–720 hours of specialist training. The means (4.8 for undergraduate and 37 for specialist training) suggest the former is not strongly skewed but the latter clearly is. This probably reflects very differently structured training programmes for specialists; it may also reflect what is variably included within the definition of “training” (for example, clinical attachment to a specialist headache service).

IMPLICATIONS

- The key finding is that fewer than five hours of undergraduate training (in a course of 4–6 years’ duration) are committed, on average worldwide, to a set of disorders that represent a high proportion of medical practice in both primary care and specialist neurology (43).

- Accordance of low priority to headache is why it is given little educational emphasis, which translates later into ineffective management and poor outcomes. Benefits that would accrue from good management are not seen, which appears to justify and therefore maintains, with a self-sustaining circularity, the initial low priority.

- Instead, better education will improve usage of available treatments and lead to better outcomes and lower overall costs.

- International and regional initiatives on headache education are needed. Because most headache should be treated in primary care, the emphasis should first be on undergraduate training, and then more on continuing medical education for general practitioners than on specialist training.
Neurologist respondents were asked whether there was a national professional organization for headache disorders in their country. If there was not, they were asked if a headache chapter existed within another national professional organization (for example, for neurology). In either case, respondents were asked about the size (number of members) of these organizations or chapters and their activities (from a pre-specified list).

The reported results combine the two: there is no crucial difference between them (figures 8.1–8.6).

FIG. 8.1 Countries with either a national professional organization for headache disorders or a headache chapter of another national organization

FIG. 8.2 Countries with either a national professional organization for headache disorders or a headache chapter of another national organization, worldwide and by WHO region (% positive responses among those responding)

FIG. 8.3 Countries with either a national professional organization for headache disorders or a headache chapter of another national organization, by income category (% positive responses among those responding)

FIG. 8.4 Size (number of members) of national professional organizations for headache disorders or headache chapters of other national organizations, by WHO region (medians of individual responses)
RESULTS

THEMES - NATIONAL PROFESSIONAL ORGANIZATIONS

**FIG. 8.5** Size (number of members) of national professional organizations for headache disorders or headache chapters of other national organizations, by country-income category (medians of individual responses)

**FIG. 8.6** Activities of national professional organizations for headache disorders or headache chapters of other national organizations (% positive responses among those responding)

**SALIENT FINDINGS**

- A national professional organization for headache disorders, and/or headache chapter in another organization, exists in two thirds (67%) of the countries that responded.

- Regionally, such organizations are most common in Europe (85% of countries) and the Americas (73%), less so in the Western Pacific (50%) and South-East Asia (40%) and least common in the Eastern Mediterranean (31%) and Africa (29%).

- There is a very marked difference between high- and lower middle-income countries (all in the range 71–76%) and low-income countries (16%).

- Regional variation is apparent also in the size (number of members) of these national professional organizations or chapters. Judged by medians, the largest are in South-East Asia (median 85). Following in order are Europe (median 70), the Western Pacific (median 50), the Eastern Mediterranean (median 36), the Americas (median 30) and Africa (median 18). Large standard deviations in the Americas and Western Pacific indicate wide variations between countries.

- Size appears to correlate with country-income category: low (median 25 members), lower middle (median 21), upper middle (median 50) and high (median 113).

- Over one third of professional headache organizations or chapters arrange meetings or conferences (39%), raise awareness of headache-related issues (36%) or are involved in setting guidelines and/or recommendations for the management of headache disorders (30%). These are the top three activities in all regions and income categories, although not necessarily in that order. Meetings or conferences, as might be expected, are an income-related activity performed in 69% of responding high-income countries, 38% of upper and lower middle-income countries and only 21% of low-income countries.

- Not so many organizations participate in the construction of postgraduate training curricula (20%), and even fewer do so in the development of undergraduate curricula on headache (0–15% by region, and 10% overall).

- Only 13% lobby governments on headache-related issues (0–25% by region, most commonly in the Western Pacific and Europe). Lobbying is income-related: most likely (16–19%) in high- and upper middle-income countries, less so (6%) in lower middle-income and least (5%) in low-income countries.

- Slightly more organizations (17%) advise governments on these issues (0–32% by region, most commonly in Europe and the Western Pacific).

**IMPLICATIONS**

- Since their top three activities in all regions are conferences, raising awareness of headache and guideline-setting, these organizations probably perform valuable roles in education and maintenance of standards of care, at least in specialist settings.

- National professional organizations also maintain links with international organizations, importing awareness of international standards and guidelines and knowledge of new research conducted worldwide. Almost all national organizations are member societies of the International Headache Society, which has a policy of offering free membership to interested health professionals working in the 100 poorest countries.

- Whilst national professional organizations for headache disorders appear to be common (existing in two thirds of responding countries), a large bias is likely: respondents were much more readily identified in countries where such organizations exist, and countries without them are certainly under-represented in the survey. If the denominator is taken to be all 193 WHO Member States rather than the 101 responding countries, the proportion with such organizations falls to 35%, which is probably close to the truth. If so, there is considerable potential benefit in raising this to a much higher level, especially in low-income countries.

- Benefits at primary-care level are less certain. National professional organizations apparently have limited roles in promoting headache within formal training curricula but, of course, specialists have a key role in continuing medical education of primary-care physicians.

- Lobbying and advising governments is a minority activity, with an income-relationship that is probably the inverse of what is needed.

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ATLAS OF HEADACHE DISORDERS AND RESOURCES IN THE WORLD 2011
RESULTS

THEMES - ISSUES

ENCOUNTERED PROBLEMS

Neurologist respondents were asked to list up to five major problems encountered by health professionals involved in the care of people with headache in their setting in their countries. Their free-text responses were placed into 18 categories, shown in figure 9.1.

SALIENT FINDINGS

- The reported major problems are diverse: at the top of the list are lack of professional education (34 % of responding countries), patient-related problems including co-morbidities but excluding medication overuse (33 %), headache-specific lack of health-care resources (33 %), non-availability of appropriate medications (29 %) and lack of public awareness (26 %).

- Low- and lower middle-income countries focus more on lack of health resources generally, whilst upper middle- and high-income countries report lack of headache-specific resources.

- All income categories identify non-availability of appropriate medication. This is surprisingly the case in high-income countries, where the various drugs for headache are reported to be widely available within countries (see pp 46–49). Responses may reflect limited reimbursement, which restricts access by individual patients, rather than complete non-availability. A number of responses refer specifically to high costs of medications. Others comment on lack of efficacy of prophylactics generally.

SUGGESTED CHANGES

Neurologist and GP respondents were asked to list up to five major changes that would improve the care of people with headache in their countries. The responses, sorted into nine categories, are shown in figure 9.2.

SALIENT FINDINGS

- Among changes that would improve the care of people with headache, professional education is by far the highest on the list (75 % of countries that responded).

- Next, recommended by almost half (49 %) of responding countries, is awareness-raising, reflecting the under-recognition of headache referred to earlier.

- About one third of countries list improved availability of health care (57 %) and improved organization and delivery of health care (54 %) for headache.

- Other suggested changes are introduction of management aids, improved reimbursements, creation or support of professional societies, research, advocacy and lobbying, creation of lay support groups and better controls and regulation of medicines.

IMPLICATIONS

- Most problems encountered by neurologists and headache specialists reflect the low priority given to headache disorders and under-recognition of their impact. The effects of this low priority are seen throughout all sections of this Atlas of Headache Disorders.

- Better education ranks far above all other proposals for change, and lack of education is seen as the key issue impeding good management of headache disorders. This issue is addressed above (see pp 54–55).

- In addition, better availability and better organization and delivery of headache services are widely called for.