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Aims and Scope

The aim of the quarterly is to monitor and compare healthcare systems and their performance in the European Union as well as in the accession countries, Switzerland and the United States. Health System Watch has a distinct international perspective. Each edition covers one or two topical issues from the field of health care. Furthermore it presents standardised tables which provide time series data in absolute numbers and in relation to the EU-15 / EU-27 weighted averages. The data sources for this publication are the World Health organization's Health For All Database, the Organization for Economic Cooperation and Development's (OECD) Health Data and EUROSTAT as well as the World Bank and national data. Being a quarterly, Health System Watch provides the most recent data available from international databases. The quarterly has been produced since 1999 and published in German and English: www.ihs.ac.at.

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The IHS was funded in 1963 as a private, non-profit, independent policy oriented think tank on the initiative of Paul F. Lazarsfeld and Oskar Morgenstern with the help of the Ford Foundation, the Austrian Federal Ministry of Education and the City Council of Vienna. Since then it has combined theoretical and empirical research in economics and the social sciences with its function as a postgraduate training centre for these scientific fields.

The multi-disciplinary research group IHS HealthEcon forms part of the Department of Economics and Finance of the IHS. Being devoted to the systematic development of scientific methods and applications to public health services research, IHS HealthEcon incorporates in its research economic, demographic, epidemiological and political aspects.

Clinical practice guidelines:

A quality instrument comes of age

Abstract

Guideline work has made great progress in qualitative and quantitative terms at international level. Greater use needs to be made of quality-assured guideline development. In view of the considerable amount of time and effort required for guideline development, international cooperation is a must. Further implementation methods need to be developed and involve collaboration of all stakeholders. Practically all countries that are leading in terms of guidelines have organisations at national level to promote, methodically support or coordinate guideline work.

Introduction

Physicians, patients, hospital managers, health planners, funding bodies and other groups associate different expectations and fears with the term “clinical practice guideline”. In this issue of Health System Watch, we want to describe the state of affairs as regards guidelines and to present the national and international organisations participating in guideline work. Austria’s increased efforts at guideline work can gather considerable momentum from the international situation.

Basic facts

German terminology related to clinical quality frequently causes confusion. The German terms “Leitline” and “Richtlinie” are not synonym and yet often mixed up. In the USA there is no clear distinction between these two terms and both correspond to “guideline”. In Europe, the German term “Richtlinie”, literally “directive”, means a legally binding approach, with non-compliance carrying sanctions. Summarising common guideline definitions reveals a series of important characteristics[1]:

Guidelines *assist in decision making* about the appropriate approach for specific conditions. They have been *developed systematically* and are *scientifically sound*. They are oriented towards *practical application* and have to be *updated* at regular intervals. Rather than being rigid rules, they provide *direction for the appropriate action and decision*, with deviations being possible, if not compelling, in justified cases. They assist *physicians* and *patients* in decision making.

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[1] Field MJ, Lohr KN: Clinical Practice Guidelines: Directions for a New Program, Institute of Medicine, Washington, DC: National Academy Press, 1990.
Bloch, R et al.: Beurteilungskriterien für Leitlinien in der medizinischen Versorgung. Beschlüsse der Vorstände von Bundesärztekammer und Kassenärztlicher Bundesvereinigung, June 1997
Deutsches Ärzteblatt 94, no. 33, August 15, 1997, p. A-2154 / B-1831 / C-1635
Definition of AWMF at www.awmf-online.de [accessed on October 2, 2006].

We will deal with the systematic development of guidelines in detail later. Their scientific soundness today is reflected in evidence basing. With guidelines being predominantly intended for the user, they have to contain clear instructions and aids on what to do in a specific situation. Since medical knowledge is subject to rapid change, updating is a crucial issue. Only up-to-date guidelines can be trustworthy and helpful. It is important to point out that they are not intended to dictate to physicians what they have to do. Rather, they aim to provide physicians with a framework of action within which they have to make the most appropriate decision in the specific case, i.e. in the individual situation of a specific patient. This may also mean that physicians make a decision not complying with the guideline if there are justified reasons. After all, guidelines cannot foresee every single individual case.

Reasons, goals and application of guidelines

So what speaks for the use of guidelines and what objectives can be pursued through them? Firstly, a massive expansion, but also intensification and specialisation of **medical knowledge** can be observed.[2] Guidelines can make this flood of information easier to handle. This of course happens after a certain delay, but ideally follows a more encompassing analysis of the available knowledge than one single practitioner could perform. The latter would basically not be able to keep up to date on the basis of – partly contradictory – scientific primary literature. Therefore, guidelines also serve the purpose of **education and continuing medical education**. They can also increase **transparency** of the **information** of the patient and the public and promote **compliance**. They offer patients an alternative to hearsay and partly questionable internet sources and thereby help them better understand the decisions of their physicians, participate in decision making and contribute to their treatment more actively. Finally, a certain level of **standardisation** of medical care benefits the patients. If every physician applies a tested and evidence-based guideline for a certain treatment, universally equal treatment can rather be assured. In this sense, guidelines are important **QM instruments**, since they provide standards whose implementation can be reviewed and improved. To this end, guidelines also serve as a starting point for the establishment of **quality indicators** and are ideally immediately applied within a range of QM measures. When it comes to efficient planning in hospitals, they form, thanks to their algorithmic structure, the basis of **clinical paths** and facilitate the design of **medical information systems**. Similarly, guidelines form the backbone of Disease Management Programmes (**DMP**) and assist in Health Technology Assessment (**HTA**) and Health Impact Assessment (**HIA**). At the funding level they thereby form the basis of **remuneration flat rates**. For politicians and **health planners** guidelines summarise important information about what goes on in medicine. Cross-sector guidelines can help **overcome interface problems**.

However, there are indeed also controversial and problematic goals that can be pursued through guidelines. What is intended as an aid to physicians might possibly be turned into a control instrument. This can lead to a severe disturbance of the physician-patient

[2] PubMed, e.g., today contains more than 13 million clinical and scientific articles.

relationship. Another problem is juridification that results in a minimum medicine trying to avoid any risk instead of weighing the risks to the benefit of the patient.

With all these multiple targets in mind, it must not be forgotten that guidelines are first and foremost aimed to optimise the treatment of patients. This should be the main consideration when developing guidelines.

From the idea to the sickbed

Guideline-like recommendations come from a series of institutions, such as quality circles, specialty societies, hospitals or enterprises. The development of encompassing guidelines that meet maximum quality requirements, however, is time and human resource intensive[3] and may therefore require national or international cooperation. SIGN 50, the developers' handbook of the Scottish Intercollegiate Guidelines Networks, recommends 15 to 25 group members. In a study, the AGREE Collaboration speaks of development costs (depending on the guideline's nature and extent and the developing organisation) of 10,000 to 200,000 euros[4]. NICE reports 12 to 18 months' development per guideline.

Therefore, instead of developing completely new guidelines, existing recommendations are often modified, based on sound scientific evidence and thereby lifted to a higher quality level. AWMF[5], for example, has identified three quality levels, with level 1 (S1) corresponding to a representative expert consensus and level 3 to the consideration of all methodical elements, which we will describe in the following. Guidelines can first be established on level 1 or 2 and later be developed to level 3, see table 1.

Table 1: AWMF levels of guideline development

Development level		*Characteristics*	*Development effort*	*Scientific legitimacy of the method*	*Legitimacy of implementation*
S3	evidence and consensus-based	representative board systematic evidence-based approach structured consensus building	very high	high	high
S2e	evidence-based	selective board systematic evidence-based approach no structured consensus building	high	high	medium
S2k	consensus-based	representative board no systematic evidence-based approach structured consensus building	medium	low	high

[3] Burgers JS et al.: Characteristics of high-quality guidelines: evaluation of 86 clinical guidelines developed in ten European countries and Canada. Int J Technol Assess Health Care. 2003 Winter;19(1): 148-57.
[4] Burgers J et al.: Internationaler Vergleich von 19 Leitlinienprogrammen – Eine Übersicht der AGREE Collaboration. Zeitschrift für ärztliche Fortbildung und Qualität im Gesundheitswesen. Year 97(1). 2003. pp 81.
[5] Association of the Scientific Medical Societies in Germany, see below.

S1	Recommendation for action	selective board no systematic evidence-based approach no structured consensus building	low	low	low

Source: Information from Prof. Hans-Konrad Selbmann, chairman of the guideline commission of AWMF.

Smaller countries in particular are recommended to adapt existing and tested international guidelines to their individual situation (*trans-contextual adaptation*). This is a very important step towards taking into consideration e.g. regional characteristics, cultural differences or differences in the health systems[6]. International cooperation like Guidelines International Network facilitates this work considerably. Further, ADAPTE, a research group founded in January 2006, is currently developing a systematic method of guideline adaptation[7].

But also nationally developed guidelines have to be tailored to the individual situation, e.g. to their application in a certain hospital or a region. This regards not only the technical level, but also the individual users, whose needs have to be considered in order to prevent "dilution" on site.

Considering the effort needed, the de novo development of guidelines of the highest quality level requires exact planning and has to follow a series of quality criteria. Once developed, a guideline has to be **disseminated** and finally **implemented**. Subsequent **evaluation**[8] and, in any case, **maintenance** of the guideline, integrating the experience drawn from its application as well as new scientific findings, are desirable.

The development of guidelines – a delicate task

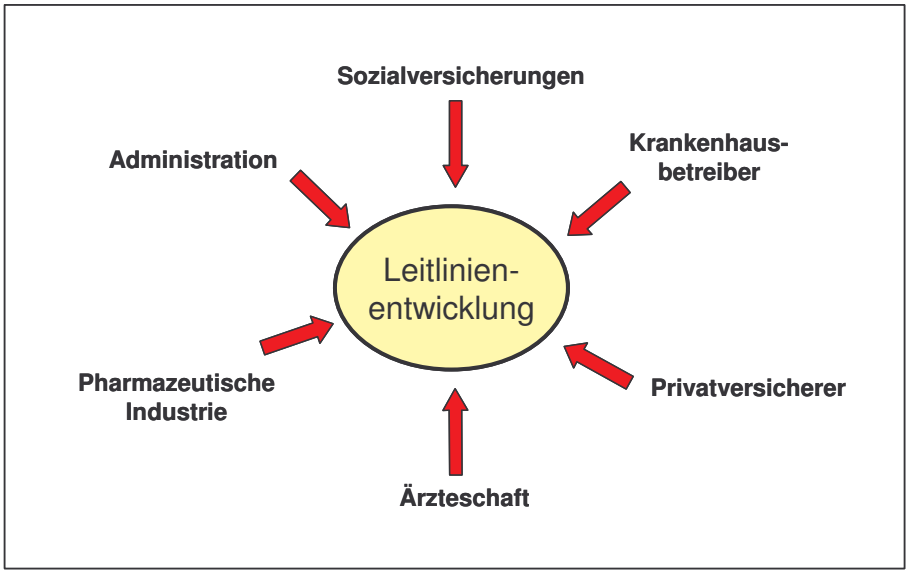
Today's method of guideline development is based on a long and not always friction-free learning process. Medical specialty societies have always made recommendations on the "how" of specific clinical questions. These recommendations mostly came from one or few experts considered as luminaries or were based on an expert consensus – however this was built – and were sometimes influenced by personal opinions, traditions and schools. Progress in information technology made it increasingly easier to put such recommendations on an objective, scientific basis.

The development of guidelines is influenced by numerous different interests. If successfully implemented, a national or international guideline inevitably exerts considerable influence on the approach taken in the treatment of a certain condition. The decision as to whether and what class of medicines is the first choice in a defined case can have a massive impact on sales figures of the pharmaceutical industry. If a certain surgical method is recommended, part of the surgeons and hospitals might be forced to abandon a trained and established procedure. Methods one might continue doubting come to be standard and start questioning one's own research work. Health insurances or the government may also put the focus on

[6] Fervers B. et al.: Adaptation of clinical guidelines: literature review and proposition for a framework and procedure. Int J Qual Health Care. 2006 Jun;18(3):167-76.
[7] Website: www.adapte.org
[8] E.g. by quality indicators, which are ideally developed simultaneously, as discussed in Health System Watch III/06.

cost considerations, since guidelines can possibly recommend a more expensive approach than that used before.

Figure 1: Between the conflicting priorities of guideline development



Source: IHS HealthEcon 2006.

Sozialvers. = Social insurances; Pharma-Industrie = Pharmaceutical industry; Ärzteschaft = physicians; KH-Betreiber = hospital operators; Privatversicherer = private insurers;

A similar area of tension can also be found when looking at guideline quality. For example, if an incorrect guideline on the laparoscopic removal of the gall bladder was applied in all Austrian hospitals, nearly 16,000 operations per year would be suboptimal[9]. Guideline development therefore involves an enormous amount of responsibility for quality. In addition, quality substantially influences guideline acceptance.

Today's guideline development methodology faces the tensions between different interests and high quality demands by quality assurance measures. With existing guidelines, quality assurance can take place in the course of *clearing*. Clearing means the revised presentation of existing guidelines, often combined with a critical evaluation.

Quality assurance has also become part of today's methodical handbooks. The ideas of quality-assured guideline development are very similar across the publications that are relevant today, such as the recommendation of the Council of Europe on the methodological

[9] In 2003, 15,881 laparoscopic cholecystectomies were performed, cf.: Jahrbuch der Gesundheitsstatistik 2004 (Yearbook of health statistics) of Statistik Austria.

quality of guidelines[10], the SIGN developers' handbook[11], NICE[12], the checklist and guideline manual[13] of AWMF and AQuMed and the AGREE Instrument[14].

This applies already to the first stage of guideline development, namely the identification of the developers and the guideline's topic (*prioritisation*). Today's methodology demands a clear declaration of sponsoring and conflicts of interests. Reasons, objectives and target groups as well as the concrete questions have to be stated explicitly. The same applies to the composition of the expert group. It should consist of representatives of the relevant specialties, professions and interest groups (and thereby always include patients) as well as methodological experts. The nature of their contribution also has to be stated in the guideline. This is the only way to make sure that all relevant aspects are considered and to guarantee the acceptance among the relevant groups.

Systematic development[15] is the most important characteristic of modern guidelines. It consists of five elements: In the *outcome analysis* the results crucial to the individual health problem are identified. Attention is being paid to using real endpoints instead of surrogate parameters[16] and to considering not only physiological parameters like survival rates or blood counts, but also factors reflecting the patient's quality of life[17]. The effects that measures have on outcomes have to be determined by *evidence-based medicine*. The recommendations proper, however, have to be worked out in a formal *consensus process*. *Decision analysis[18]* can be helpful here. It represents a technique searching for the optimal solution for a series of decisions that have to be made, taking into account the effects on outcomes. The guideline has to be presented in a logically consistent *algorithm*, whether the latter is verbalised, a flow chart or a checklist.

Evidence-based Medicine (EbM)

Evidence-based medicine is a cornerstone of guideline development today, with evidence meaning an objective proof. The German term "Evidenz", in turn, rather means "an obvious fact". The elaboration of objective data on a clinical question from the knowledge currently

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[10] Council of Europe: Developing a methodology for drawing up guidelines on best medical practices. Recommendation Rec(2001)13 and explanatory memorandum.

[11] SIGN 50: A guideline developers' handbook. Scottish Intercollegiate Guidelines Network, March 2004. For download at the SIGN website: www.sign.ac.uk

[12] National Institute for Health and Clinical Excellence (April 2006) 'The guidelines manual'. London: National Institute for Health and Clinical Excellence. Available at www.nice.org.uk

[13] Das Leitlinienmanual von AWMF und ÄZQ. Supplement I der Zeitschrift für ärztliche Fortbildung und Qualitätssicherung (German Journal for Evidence and Quality in Healthcare). 1995. Urban und Fischer 2001.

[14] AGREE Collaboration. Checkliste zur Qualitätsbeurteilung von Leitlinien (AGREE-Instrument) – German version. Ärztliche Zentralstelle Qualitätssicherung, Cologne -Verbindung der Schweizer Ärztinnen und Ärzte FMH, Bern. January 2002.

[15] According to: Lauterbach KW, Schrappe M: Gesundheitsökonomie, Qualitätsmanagement und Evidence Based Medicine. Schattauer, 2004, p. 509-511.

[16] A surrogate parameter is a measure having a postulated correlation with a clinical endpoint and which is easier to measure than the latter. Surrogate parameters have to be assessed critically, since they might not correlate with the desired endpoint that clearly or reflect the opposite of what is real.

[17] As if to say: A physician should not treat blood lipids, but the patient.

[18] The origins of decision analysis lie in game theory. It is particularly appropriate for clinical questions, since the latter often involve decisions with insecurity.

available is what EBM basically means. This seems to contrast the former understanding of medicine, which was dominated by traditions and schools, and therefore has always triggered controversy. This is even though the most common definition of EBM (by David Sackett et al.)[19] establishes a synthesis of these contradictory viewpoints:

Evidence based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research.

This definition relates to the treatment of individual patients, but is highly relevant to the development of guidelines, whose final aim is the application in a concrete case. The definition, just as the publication it is drawn from, clearly states that the application with individual patients has to be based not only on the systematically elaborated research result, but also on clinical experience. Both should be used conscientiously, unequivocally and reasonably to the benefit of the patient.

The definition comprises another important element, which tends to be forgotten: Best evidence can only be *currently available* evidence.

Today evidence is worked out using quite complex methods, which we cannot describe in detail here[20]. This is important for assuring the quality of a statement that can be made on a question thanks to evidence. The evidence gained for a certain question is classified on the basis of the quality of the available studies. A recommendation grade for the guideline or certain key statements is then determined on the basis of the quality of the available evidence.

One of the first appraisal systems was launched by the Canadian Task Force on Periodic Health Examination. Further classification models, such as those of AHRQ[21] and the Scottish Intercollegiate Network, which is still widely used today, followed.

Table 2: SIGN levels of evidence and associated grades of recommendation

Levels of Evidence	
1++	High quality meta analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias

[19] Sackett DL et al.: Evidence based medicine: what it is and what it isn't. BMJ. 1996 Jan 13;312(7023):71-2.

[20] For further reading e.g.: Greenhalgh T: Einführung in die Evidence-based Medicine: kritische Beurteilung klinischer Studien als Basis einer rationalen Medizin. 2nd ed. Huber 2003.
Lauterbach KW, Schrappe M: Gesundheitsökonomie, Qualitätsmanagement und Evidence Based Medicine. Schattauer 2004.
Strauss SE et al.: Evidence-based medicine: how to practice and teach EbM. Elsevier, Churchill Livingstone 2005.

[21] Formerly AHCPR. The widely-used scheme was originally presented in: AHCPR: Acute Pain Management: Operative or Medical Procedures and Trauma. Clinical Practice Guideline No. 1. AHCPR Publication No. 92-0032: February 1992.

1+	Well conducted meta analyses, systematic reviews of RCTs, or RCTs with a low risk of bias
1 -	Meta analyses, systematic reviews of RCTs, or RCTs with a high risk of bias
2++	High quality systematic reviews of case-control or cohort studies High quality case-control or cohort studies with a very low risk of confounding, bias, or chance and a high probability that the relationship is causal
2+	Well conducted case control or cohort studies with a low risk of confounding, bias, or chance and a moderate probability that the relationship is causal
2 -	Case control or cohort studies with a high risk of confounding, bias, or chance and a significant risk that the relationship is not causal
3	Non-analytic studies, e.g. case reports, case series
4	Expert opinion
Grades of Recommendation	
A	At least one meta analysis, systematic review, or RCT rated as 1++, and directly applicable to the target population; or A systematic review of RCTs or a body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results
B	A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; or extrapolated evidence from studies rated as 1++ or 1+.
C	A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or extrapolated evidence from studies rated as 2++.
D	Evidence level 3 or 4; or extrapolated evidence from studies rated as 2+.

Source: SIGN 50: A guideline developers' handbook. Scottish Intercollegiate Guidelines Network, March 2004.

Prudent use of evidence

Certain flaws of the rather mechanistic assessment based on this scheme are a topic of current debate. Evidence assessment is still predominantly formal and methodical. The level of evidence does not say anything about the real clinical relevance of a recommendation. In particular, it does not say anything about the real benefit for the patient, either. In schemata used so far, randomised controlled trials (RCT[22]) are considered most convincing. When it comes, e.g., to identifying the optimal diagnostics, this applies only to a limited extent. In certain cases RCTs cannot be performed in the first place, because case numbers are too low (so-called orphan diseases) or because therapy alternatives are lacking and non-treatment would be unethical, so that there is no control group.

In this context, IQWIG provides an example of problematic use of EBM in its evaluation of stem cell therapy in severe aplastic anaemia[23]. *All* of the 1,967 studies on this topic were finally excluded by several criteria. The conclusion was that there are no studies proving a relevant benefit of the therapy and that the latter should therefore not be applied outside randomised, controlled trials. However, incidence is two per million inhabitants. Further, a reasonable alternative therapy for a control group is not available. The study simply cannot be performed that way, and the best *available* evidence was excluded.

[22] The acronym is also used in the German language.

[23] IQWIG: Stammzelltransplantation bei erworbener schwerer aplastischer Anämie. Vorbericht N05/03-B. Cologne: Institute for Quality and Efficiency in Health Care. July 2006.

The discrimination of qualitative studies that might be valuable for a particular question has raised criticism. The additional consensus process can help overcome these problems only partly.

The GRADE Working Group[24]

Therefore, a system is being developed[25] that aims to take a more complex approach of translating evidence into grades of recommendation. What had started as an informal collaboration of experts resulted in the GRADE Working Group, which is developing a new solution for grading the evidence used in a guideline.

First, the essential desired and undesirable outcomes of an intervention are identified and ranked by importance (from 1 – unimportant to 9 – critical). The quality of the studies for each outcome is assessed, taking into account not only the formal study design, but also data quality, consistency of the findings with other studies and the generalisability of the statements, e.g. on the grounds of the sample size. The relative and absolute effects of an intervention on health benefits and harms as well as the costs are weighted and included into the final judgement. When high quality evidence suggests that the benefits of an intervention clearly outweigh its risks, a strong recommendation is made. When this is not so clearly the case, a weak recommendation is offered.

Consensus building and recommendation

Representative expert panels work out the practical guidelines on the basis of evidence. To avoid negative group dynamics, this is done according to a system such as the consensus conference, the nominal group process or the Delphi method. The guideline should state the methods used, give an explicit link for each statement with the underlying evidence and mention any cost and benefits/risks related considerations. The draft guideline is then made accessible to third parties not involved in the development. Their remarks are integrated and the guideline is possibly pilot-tested. Finally, the guideline is adopted and published. In this context as well, quality criteria like clarity, unambiguousness, conclusiveness etc., exist.

There should be four versions. The scientific version includes most comprehensive, also impractical information for the purpose of objective proof and scientific reviewing. The practitioner's version comprises the actual manual that physicians can use as a support. In addition there can be a short (pocket) version. The patient version, which makes the essential content of the guideline accessible to the patient in an *appropriate language*, is also of importance.

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[24] Website: www.gradeworkinggroup.org. GRADE is the acronym for Grades of Recommendation Assessment, Development and Evaluation.

[25] Atkins D et al.: GRADE Working Group: Systems for grading the quality of evidence and the strength of recommendations II: pilot study of a new system. BMC Health Serv Res. 2005 Mar 23;5(1):25.
Atkins D et al.GRADE Working Group: Grading quality of evidence and strength of recommendations.
BMJ. 2004 Jun 19;328(7454):1490.

For reasons of access and topicality, a large number of guidelines is available in the internet today and can be loaded onto PDAs for mobile application. However, their mere existence does not guarantee that they are really used in practice.

Ready guideline – what next?

While the theoretical efficiency of evidence-based guidelines is obvious, the practical benefit does not occur automatically. The problems in implementation, that is, in putting into practice, have been known and are currently the subject of intensive research. Studies on the impact of guidelines (e.g. on diabetes[26] or asthma[27], to mention only a few) have revealed that proven benefits cannot be capitalised on because of problems to put the guideline into clinical practice, and that implementation measures are necessary. In the project "Changing Professional Practice" over the period 1996-1999[28] tools were developed to analyse the implementation of guidelines. The authors of a large meta analysis[29] of 235 studies that investigated the effects of implementation strategies came to the conclusion that a considerable part of the implementation strategies (e.g. education material, reminders of the use of the guideline, workshops) improved medical care, however with large variations. This raises the question of what is the optimal implementation strategy to guarantee a sustainable use of best practice, considering the limited budget. To answer this question, great efforts are being made to investigate the barriers and facilitators of guideline uptake and to find ways to overcome and use them, respectively. The following facts have been identified so far[30]: The clearer a guideline is associated with a benefit and the more likely it is that feedback will be provided, the more probable it is that the guideline will be used. This speaks for the joint development of quality indicators on the basis of which such a feedback is possible. Accessibility, comprehensibility, practical orientation and the confidence in quality also play a role. This should be considered already during the development by thinking from the point of view of the user and by including ideas from pilot projects. The type of the guideline as well seems to influence the optimal choice of the implementation strategy: If the guideline mainly comprises minor changes compared to the prior approach, it is more easily accepted. However, there should be frequent reminders, e.g. by post, to comply with the modifications. If there are major changes to the practical approach, the new skills required should be taught actively, e.g. in workshops. If the guideline recommends unpleasant diagnostic or therapeutic measures, a lot has to be done on the patient information side. Overall it can be said that the implementation of numerous guidelines will only be possible in

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[26] Bryant W et al.: Diabetes guidelines: easier to preach than to practise? A retrospective audit of outpatient management of type 1 and type 2 diabetes mellitus. Med J Aust 2006; 185: 305-309.

[27] Timmermans S, Mauck A: The promises and pitfalls of evidence-based medicine. Health Aff (Millwood). 2005 Jan-Feb;24(1):18-28.

[28] More information and complete report at www.dsi.dk/projects/cpp/cpp.htm

[29] Grimshaw JM et al.: Effectiveness and efficiency of guideline dissemination and implementation strategies. Health Technol Assess. 2004 Feb;8(6):iii-iv, 1-72.

[30] Cf. e.g.: Burgers J et al.: Characteristics of effective clinical guidelines for general practice. Br J Gen Pract. 2003 Jan;53(486):15-9.

Eccles MP, Grimshaw JM: Selecting, presenting, and delivering clinical guidelines: are there any "magic bullets"? Med J Aust. 2004 Mar 15;180(6 Suppl):p.52-4.

Grol R, Buchan H.: Clinical guidelines: what can we do to increase their use? Med J Aust. 2006 Sep 18;185(6):301-2.

a concerted action and that cultural changes will be unavoidable. Against this background, NICE has set up an implementation programme.[31]

Austria

In Austria the topic of guidelines is still at a comparably early development stage, even though there are some remarkable isolated initiatives. Section 4 of the Austrian Health Services Quality Act says that the Health Ministry can support the development of quality standards, but also recommend them as federal quality guideline or adopt them as federal quality order via a directive. These terms are of course not concurrent with clinical practice guidelines, but the commentary on the act suggests that these can be part of the measures described and that the Ministry can give goals regarding guideline development.

Guideline work in Austria is done mainly by the **medical specialty societies**. The **centre for quality in medicine of the Medical Chamber of Upper Austria** organises EBM courses and provides links to important Austrian guidelines. The Austrian organisation for standardisation will soon publish a standard on guideline development. The current draft[32] basically summarises the already mentioned methodical instruments. However, there is no concerted action like in Germany.

Austrian pioneers: The initiative "Medicines & Reason"

In 1994 the initiative Medicines & Reason was introduced on the initiative of the Federation of Austrian Social Security Institutions, Pharmig and the Federal Economic Chamber, with support from the Medical Chamber and the Chamber of Pharmacists. The initiative's aim is to promote a more reasonable use of medicines. To this end, renowned experts develop guidelines for particular diseases. In 2003 the Medical Chamber and the Chamber of Pharmacists became full members and a more formal process of guideline development was introduced. Its compliance is examined at regular intervals by an external QA professional. Further, there is the possibility of make statements on guideline proposals, citing at least two references, via internet[33]. This allows for a larger circle of professionals to participate.

The first guideline of 1997 compiled frequent infections, together with a short description, diagnosis and therapy including recommended antibiotics and their dosage, in the form of a checklist. Misconceptions, like the treatment of common colds with antibiotics, and warning signs of complications are also dealt with. In 1999 a guideline on blood lipids was published to raise awareness to this epidemiologically important topic.

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[31] Website: www.nice.org.uk/page.aspx?o=280304
[32] We have available the draft of 1 September 2006.
[33] Website: http://www.arzneiundvernunft.info

Table 3: Guidelines of Medicines & Reason

Infection 1997
DMP blood lipids 1999
Disease Management Asthma and COPD part 1 (adults) 2001
Disease Management Asthma and COPD part 2 (children) 2001
Disease Management Asthma and COPD part 3 (COPD) 2001
DMP stomach diseases 2003
Guideline diabetes type 2 2004
Guideline osteoporosis 2005

Source: Federation of Austrian Social Security Institutions.

Following the encompassing guidelines on asthma, stomach diseases, diabetes and osteoporosis, a guideline on depressive conditions is being developed.

A particularity of the project is the joint work of various institutions with different interests, which means consensus at its best. In addition, a patient brochure that has been published right from the beginning fosters compliance.

evidence.at

Evidence.at and the same-named website is a society for the advancement of quality in health care that is committed to the promotion of evidence based medicine and guideline work in Austria. It is a founding member of Guidelines International Network (GIN) and cooperates with the German network for evidence based medicine and with the Agency for Quality in Medicine, next to participating in the AGREE project 2.

ÖGAM[34]

The Austrian Society of General Practitioners[35] was founded in 1966 as a specialty society for general medicine. Its main activities relate to continuing education for general practitioners and quality assurance, like quality circle and guideline work. The project “EBM guidelines for general medicine” is particularly commendable. It is a translation and adaptation of the originally Finnish guideline compendium of Duodecim in Finland, which published guidelines for the first time in 1989. Eight translators produced the German version and 35 physicians adapt it to the Austrian situation. The current edition[36] comprises almost 1,000 guidelines covering a large part of the questions relevant to general medicine. A continuously updated online version has been available for some weeks.[37] It enables physicians to access information on diagnosis and treatment at any time, even during a consultation, directly on the screen and to include it into their considerations.

[34] We thank Vice-President of ÖGAM, Ms. Dr. Susanne Rabady, for her contributions.
[35] Website: www.oegam.at .
[36] Rebhandl E.[ed.] : EbM-Guidelines für Allgemeinmedizin. Vienna. Verl.-Haus d. Ärzte 2006.
[37] Website: https://www.ebm-guidelines.at/

Germany

In Germany guideline work is fairly advanced. In 1993 already the advisory council for concerted action in health care (now advisory council on the assessment of developments in the health care system[38]) called upon the specialty societies to work on guidelines. In 1995 it recommended in a special expert opinion[39] to entrust the Association of the Scientific Medical Societies in Germany (AWMF) with coordinating and collecting the results. Jointly with the Agency for Quality in Medicine (AQuMed) the latter worked on the quality assurance of guidelines in the following years in a way that was pioneering for the German language area. In 2000, e.g., the above mentioned guideline manual was published. In the prior year AQuMed introduced the Guideline Clearinghouse. The cooperation with AGREE resulted in the German Instrument for Methodological Guideline Appraisal (DELBI) in 2005.

AWMF

The Association of the Scientific Medical Societies in Germany, **AWMF**[40], has existed since 1962 as an interest group of specialty societies in Germany, whose number has meanwhile reached 151. Within the context of guideline work it has coordinated their guideline activities since 1995. It provides the necessary methodology, controls prioritisation and interdisciplinary coordination and deals with quality assurance during and after the development process, thereby also supervising the need for updating. It also makes the specialty societies' guidelines available online[41]. The AWMF database today comprises 1,537 guidelines, around 670 of which have become outdated. At present 703 guidelines are at the S1 development stage, 119 at S2 and 45 at S3.[42]

AQuMed

The Agency for Quality in Medicine **AQuMed**[43], founded in 1995 by the German Medical Association and the National Association of Statutory Health Insurance Physicians, deals with quality assurance in medicine and has done essential work regarding all aspects of QM in medicine in the German-speaking area. It organised the German clearinghouse for guidelines in medicine[44] from 1999 to 2005, which aimed to analyse and assess the bulk of globally existing guidelines following a clearly structured process. During this period, 15 reports on the major diseases were published. They summarised the results of the qualitatively best guidelines, recommended their strengths for further guideline work and

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[38] Website: www.svr-gesundheit.de.

[39] Sondergutachten des Sachverständigenrats für die Konzertierte Aktion im Gesundheitswesen (Special expert opinion of the advisory council for concerted action in health care): Gesundheitsversorgung und Krankenversicherung 2000. Baden-Baden 1995.

[40] Website: www.awmf-online.de

[41] Website: www.leitlinien.net

[42] Information provided by AWMF as of 6 November, 2006

[43] Website www.aezq.de

[44] Further participants were the major associations of the statutory health insurance fund, the German hospital association, the German retirement insurance and the Association of Private Health Insurance.

revealed improvement potentials. When guideline assessment was assigned by law to IQWIG in the course of the health reform of 2003, guideline clearing at the AQuMed ended.

AQuMed hosts the offices of the German Network for Evidence-based Medicine DNEbM[45] and of the Guidelines International Network (GIN) and holds the editorship of the German Journal for Evidence and Quality in Healthcare. It operates numerous websites on quality topics, with www.leitlinenwissen.de as a prominent example. This website offers evidence-based continuing medical education, with points being recognised also by the Austrian Medical Chamber.

IQWIG

The Institute for Quality and Economic Efficiency was established in June 2004 following section 139 of Book V of the Social Code. Its tasks include the assessment in terms of medical benefit, quality and economic efficiency of medical services. Along with therapeutic and diagnostic procedures and medicines, it assesses guidelines and DMPs. The orders come from the Federal Joint Committee and the Federal Ministry of Health.

National disease management guidelines

The German Medical Association, the National Association of Statutory Health Insurance Physicians and AWMF set up the national disease management guidelines programme[46] in 2002 with the aim to provide guidelines as a basis of structured treatment programmes. Structured treatment programmes generally comprise longer-term patient care with several disease management stages and disciplines. Correspondingly, the development is based on existing guidelines that are touched by the programme, and there is a need to involve more stakeholders into the development.

National disease management guidelines currently exist for[47]:

- Asthma
- Diabetes mellitus type II
- Chronic obstructive pulmonary disease
- Coronary heart disease

Disease management guidelines for depression, back pain and heart failure are under development.

The programme not only overcomes limits in disease management, but also between the individual guidelines. It offers internet-based practice aids for physicians as well as patient guidelines.

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[45] Website: www.ebm-netzwerk.de
[46] Website: www.versorgungsleitlinien.de
[47] As of October 25, 2006

USA

One of the first, if not the very first, national guideline programme was the **Consensus Development Program**[48] set up by the **National Institutes of Health (NIH)**[49] in the USA in 1977. NIH was established in 1887 and represents one of the eight agencies of the Public Health Service of the Department of Health and Human Services. Together with institutions dealing with particular health issues, NIH works out evidence-based consensus statements. The evidence required for this purpose comes from an interesting system: The **AHRQ**[50] awards 5-year contracts to institutions in the United States and Canada to serve as **Evidence-based Practice Centers** (currently 13), which elaborate systematic reviews and improve methodology. Originally, from 1992-1996, AHRQ itself also issued guidelines. The method of evidence appraisal used was included in many of the subsequent guidelines.

In addition, AHRQ operates the **National Guideline Clearinghouse**[51]. It administers a database of various clinical practice guidelines, provides tools for their analysis and works out summaries. National and international **specialty societies** and universities provide the guidelines. Currently[52] there are 2,078 ready guidelines, 197 are under elaboration.

United Kingdom

The independent, but NHS-financed **National Institute for Health and Clinical Excellence (NICE)** was set up in 2005. It was preceded by the National Institute for Clinical Excellence, which was founded in 1999 and joined with the Health Development Agency. NICE has three major tasks – HTA, guidance on health promotion and prevention and clinical guidelines. Its responsibility in these areas, however, is restricted to more or fewer countries of the UK – in the case of guidelines, e.g., to England and Wales. NICE assumes a coordinating function in guideline development. The topics are selected by the Department of Health and other institutions. The topic is then assigned to the appropriate National Collaborating Centre (NCC). Each of these eight NCC has a speciality, like acute care, cancer or chronic conditions, and consists of the relevant Royal Colleges, university units and patient organisations and professional and academic partners. After a framework plan has been defined, the guideline development group is established and the guideline is developed following a similar procedure as described above. Stakeholders can register with NICE at any point of time and contribute their justified interests. In addition, an independent review board supervises the guideline development.

Founded in 1993 by the Royal Medical Colleges, the **Scottish Intercollegiate Guidelines Network (SIGN)**[53] assumes a similar task for Scotland and also plays a role at international

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[48] Website:consensus.nih.gov
[49] Website: www.nih.gov
[50] Agency for Healthcare Research and Quality, the quality agency of the health ministry. Website: www.ahrq.gov
[51] Website: www.guideline.gov
[52] As of 31 October, 2006
[53] Website: www.sign.ac.uk. Information as of 31 October 2006

level. Since 2005 it has been part of the initiative NHS – Quality Improvement Scotland. There are currently 113 guidelines available, partly ready and partly under development.

Other countries

In other countries as well there are national control centres that methodically support, promote, coordinate or even are in charge of guideline work. In France, the **Haute Autorité de Santé (HAS)**[54] is an independent government agency dealing with guideline methodology and development along with many other public health tasks. With its medical-scientific society **Duodecim**[55], the comparably small Finland has assumed an important role in guideline work. In its Current Care Programme[56] it develops national guidelines, which are made accessible in the internet. The guidelines for general medicine have been compiled in a book that has been translated into several languages, including German (cf. above), and adapted to the individual countries. With **CBO**[57], the **Netherlands** have an independent, renowned quality institute that was founded in 1979 by two medical associations and has coordinated and supported guideline work in the Netherlands since 1982.

Similar organisations driving forward guideline work at national level exist in many other countries.

International organisations

Against the background of the considerable amount of guideline development work, the advantages of international cooperation are obvious. A very lively guideline scene has developed from the pioneer work of individual scientists and institutions, with national organisations also having played an important role, in particular in the past. The Institute of Medicine (IOM)[58] of the National Academies in the USA did the pioneering work. Further important contributions came from AHRQ, SIGN, NICE, the AGREE Collaboration, the Council of Europe and WHO. Today, most of the national organisations are members of the Guidelines International Network.

Guidelines International Network (GIN)

The Guidelines International Network[59] (GIN) was founded in 2002. With 67 member organisations from 33 countries, it has become the major international guideline organisation. Its aim is to create synergies by global cooperation and to bundle resources. The exchange of experience and information is to accelerate guideline work and to improve its quality. Coordination helps avoiding duplication of efforts; methodologies for guideline development are being harmonised. To this end, GIN maintains an encompassing database of guideline projects at various development stages. In September 2006 more than 3,650

[54] Website: www.has-sante.fr
[55] Website: www.duodecim.fi
[56] Website: www.kaypahoito.fi
[57] Kwaliteitsinstituut voor de Gezondheidszorg, Dutch Institute for Healthcare. Website: www.cbo.nl
[58] Website: www.iom.edu
[59] Website www.g-i-n.net

documents were available. Further, GIN provides its members with guideline development tools and training materials and organises workshops. Trans-national working groups deal with specific topics aimed at developing the methodology of guideline work or at resolving specific problems in guidelines for certain diseases.

The AGREE Collaboration

The AGREE (Appraisal of Guidelines Research and Evaluation) Collaboration[60] started in 1998 under the BIOMED 2 Programme, funded by the European Union. The aim was to establish an instrument to assess clinical guidelines and to harmonise guideline development in Europe. The project ended in 2001. Further funds were provided from the E.U. Fifth framework programme[61] to develop the AGREE instrument, which is widely known today, and to promote its application in E.U. countries.

The starting point of these efforts was a situation in which the guideline idea was met by great resonance in many countries, whereas development did not follow any standard criteria and quality sometimes offered opponents a large target for criticism. Many of the above presented findings and concepts were reached, developed and considered in guideline work only gradually. To this, AGREE contributed a major share.

The AGREE instrument

The purpose of the AGREE instrument is to assess the quality of guidelines. At least two and preferably four appraisers assess each guideline by 23 criteria from six domains on a 4-point scale from 4 (Strongly Agree) to 1 (Strongly Disagree). Appraisers can comment on each of their responses. To ensure appropriate responses, each criterion is explained. The scores of the domains are summed up and expressed as a percentage of the maximum possible score. The domains are assessed independently and are explicitly not aggregated into an overall score. There is a separate overall assessment of the guideline, the options being “Strongly recommend”, “Recommend (with provisos or alterations)”, “Would not recommend” and “Unsure”. In addition, appraisers are required to comment the overall assessments by explaining the reasons for their responses, taking the appraisal criteria into account. There are no thresholds to mark a good or bad guideline. The AGREE instrument enables guideline developers to improve their work on the basis of the assessment and submit it for assessment again. It also helps other organisations to appraise the quality of a guideline, e.g. if they consider an adaptation.

[60] Website: www.agreecollaboration.org
[61] Information on the research programmes can be viewed at the CORDIS website: http://cordis.europa.eu/

It is important to point out that the AGREE Instrument does not assess the quality of the (clinical) content of a guideline, but the quality of the development process, methodology and formal presentation.

Table 4: Quality assessment of guidelines by the AGREE Instrument

Domains and questions
Scope and purpose
1. The overall objective(s) of the guideline is (are) specifically described.
2. The clinical question(s) covered by the guideline is (are) specifically described.
3. The patients to whom the guideline is meant to apply are specifically described.
Stakeholder involvement
4. The guideline development group includes individuals from all the relevant professional groups.
5. The patients' views and preferences have been sought.
6. The target users of the guideline are clearly defined.
7. The guideline has been piloted among target users.
Rigour of development
8. Systematic methods were used to search for evidence.
9. The criteria for selecting the evidence are clearly described.
10. The methods used for formulating the recommendations are clearly described.
11. The health benefits, side effects and risks have been considered in formulating the recommendations.
12. There is an explicit link between the recommendations and the supporting evidence.
13. The guideline has been externally reviewed by experts prior to its publication.
14. A procedure for updating the guideline is provided.
Clarity and presentation
15. The recommendations are specific and unambiguous.
16. The different options for management of the condition are clearly presented.
17. Key recommendations are easily identifiable.
18. The guideline is supported with tools for application.
Applicability
19. The potential organisational barriers in applying the recommendations have been discussed.
20. The potential cost implications of applying the recommendations have been considered.
21. The guideline presents key review criteria for monitoring and/or audit purposes.
Editorial independence
22. The guideline is editorially independent from the funding body.
23. Conflicts of interest of guideline development members have been recorded.

Note: Each item has to be responded on a 4-point scale ranging from 4 'Strongly Agree' to 1 'Strongly Disagree'.

Source: Appraisal of guidelines for research & evaluation, AGREE-Instrument, AGREE Collaboration, September 2001.

Conclusion

There is real potential to be unleashed through the use of guidelines, however only with the right framework conditions in place. This includes complying with today's well-developed methodology of quality assurance, the primary orientation towards patient benefit, the involvement of all relevant stakeholders and the consensus-based decision on who develops the guidelines and in what way they will be implemented. The development has to be adapted to changed requirements in the health care system, such as more complex patient careers and new care models. Research on implementation is still to be done. First results suggest the question of successful implementation be considered already at the development stage. Successful implementation is a condition of funding for guideline development. Concerted action of all stakeholders to the benefit of the patient seems in any case a precondition.

For Austria, due to its small size, it seems to make sense to benefit from international networks and to adapt existing quality-assured guidelines to its own situation, as it is already

practiced by ÖGAM and Medicines & Reason. Overall, there is still need to catch up with the international guideline community. It is above all from and with relevant institutions in Germany that Austria can benefit. A national competence centre supporting guideline work would be a possibility. Our examples show that due to the considerable time and effort invested, but also the manifold interests concerned, all countries with an advanced guideline culture have relevant institutions.

Table A1: Lebenserwartung mit 65 Jahren, Frauen									Index EU25= 100							Veränderung in %	Veränderung in Jahren
	1990	1995	2000	2001	2002	2003	2004	2005	1990	1995	2000	2001	2002	2003	2004	erstv.-letztv. J.	erstv.-letztv. J.
Austria	18.2	18.9	19.9	20.2	19.9	19.9	20.3	20.5	99	100	101	102	101	103	102	12.5	2.3
Belgium	18.5	19.1	19.5	19.7	19.7	n/a	n/a	n/a	101	101	99	n/a	n/a	n/a	n/a	6.5	1.2
Denmark	17.8	17.5	18.3	18.4	18.3	18.6	n/a	n/a	97	92	93	93	n/a	n/a	n/a	4.5	0.8
Germany	17.8	18.8	19.7	19.9	19.8	19.7	20.2	n/a	97	99	100	100	101	102	101	13.1	2.3
Estonia	15.8	16.2	17.1	17.4	17.4	17.5	17.9	18.1	86	85	87	87	88	91	90	14.7	2.3
Finland	17.9	18.8	19.6	19.9	19.9	20.1	20.8	n/a	98	99	100	100	101	104	105	16.2	2.9
France	20.8	21.5	21.6	21.6	21.5	n/a	n/a	n/a	113	114	110	109	109	n/a	n/a	3.7	0.8
Greece	18.2	18.4	18.6	18.9	18.9	18.9	19.1	n/a	99	97	95	95	96	98	96	5.0	0.9
Ireland	16.9	17.3	17.8	18.2	18.6	18.9	n/a	n/a	92	91	91	92	n/a	n/a	n/a	11.8	2.0
Italy	19.1	19.8	20.7	21.0	n/a	n/a	n/a	n/a	104	104	105	106	n/a	n/a	n/a	9.8	1.9
Latvia	15.9	15.9	17.0	16.9	17.1	16.9	17.2	n/a	87	84	86	85	87	88	87	8.8	1.4
Lithuania	17.1	17.0	18.0	18.1	17.9	18.2	18.0	n/a	93	89	92	91	91	95	91	5.5	0.9
Luxembourg	18.2	19.8	20.6	19.9	20.1	19.1	20.7	n/a	99	104	105	100	102	99	104	13.8	2.5
Malta	17.1	17.6	18.6	18.9	19.3	18.7	19.2	n/a	93	93	95	95	98	97	96	12.0	2.1
Netherlands	19.2	19.3	19.4	19.5	19.5	19.6	20.0	n/a	105	102	99	98	99	102	101	4.2	0.8
Poland	16.3	16.6	17.6	17.8	18.2	18.1	18.4	n/a	89	88	89	90	92	94	93	13.3	2.2
Portugal	17.2	18.2	19.0	19.2	19.3	19.1	n/a	n/a	94	96	97	97	98	99	n/a	11.2	1.9
Sweden	19.0	19.6	20.0	20.1	20.0	20.3	20.6	n/a	104	103	102	101	102	n/a	n/a	8.4	1.6
Slovakia	15.7	16.1	16.5	16.8	16.9	16.9	n/a	n/a	86	85	84	85	86	n/a	n/a	7.6	1.2
Slovenia	17.2	17.8	18.9	19.1	19.1	18.8	19.5	n/a	94	94	96	96	97	98	98	13.6	2.3
Spain	19.2	20.2	21.0	21.2	21.2	21.0	21.6	n/a	105	106	107	107	108	109	109	12.3	2.4
Czech Republic	15.4	16.3	17.4	17.4	17.4	17.3	17.7	n/a	84	86	88	87	89	90	89	14.9	2.3
Hungary	15.5	16.1	16.8	17.1	17.1	17.0	n/a	n/a	85	85	86	86	87	88	n/a	9.7	1.5
United Kingdom	18.1	18.3	19.1	19.3	19.3	19.2	19.7	n/a	99	97	97	97	98	100	99	8.7	1.6
Cyprus	n/a	n/a	18.5	19.5	19.2	19.2	19.5	n/a	n/a	n/a	94	98	98	100	98	5.5	1.0
EU25*	18.3	18.9	19.6	19.8	19.7	19.3	19.9	n/a	100	100	100	100	100	100	100	8.5	1.6
EU15*	18.8	19.4	20.1	20.3	20.1	19.7	20.3	n/a	103	103	102	102	102	102	102	8.0	1.5
EU10*	16.0	16.5	17.4	17.6	17.8	17.7	18.3	n/a	88	87	89	89	91	92	92	14.0	2.2
EU12*	18.9	19.7	20.3	20.5	20.3	19.8	20.5	n/a	103	104	103	103	103	103	103	8.1	1.5
Bulgaria	15.4	15.4	15.4	15.8	15.8	15.9	16.3	n/a	84	81	78	79	80	83	82	5.8	0.9
Romania	15.3	15.4	16.0	16.1	15.8	15.9	16.2	n/a	83	81	81	81	80	83	82	6.4	1.0
Croatia	16.1	16.6	15.5	17.0	17.1	16.8	17.7	n/a	88	88	79	86	87	87	89	9.6	1.5
Macedonia	n/a	15.3	15.5	16.1	15.3	15.5	n/a	n/a	n/a	81	79	81	78	80	n/a	0.9	0.1
Turkey	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Switzerland	19.7	20.5	21.0	21.5	21.4	n/a	n/a	n/a	108	108	107	108	109	n/a	n/a	8.4	1.7
USA	18.9	18.9	19.2	19.4	19.5	19.8	n/a	n/a	103	100	98	98	99	103	n/a	4.8	0.9

*weighted average

Source: WHO Health for all database, June 2006; OECD Health data, June 2006 for BEL, DEN, IRL, SLK, SWE and the USA; IHS HealthEcon calculations 2006.

Table A2: Lebenserwartung mit 65 Jahren, Männer									Index EU25= 100							Veränderung in %	Veränderung in Jahren
	1990	1995	2000	2001	2002	2003	2004	2005	1990	1995	2000	2001	2002	2003	2004	erstv.-letztv. J.	erstv.-letztv. J.
Austria	14.6	15.3	16.4	16.8	16.4	16.5	17.0	17.2	101	102	104	104	103	104	103	17.7	2.6
Belgium	14.3	14.8	15.5	15.8	15.8	n/a	n/a	n/a	99	99	98	98	99	n/a	n/a	10.5	1.5
Denmark	14.0	14.1	15.2	15.2	15.4	15.5	n/a	n/a	97	94	96	95	96	98	n/a	10.7	1.5
Germany	14.1	14.9	16.0	16.3	16.3	16.3	16.8	n/a	98	99	101	101	102	103	103	19.4	2.7
Estonia	12.1	12.0	12.7	12.7	12.8	12.8	13.0	13.1	84	80	80	79	80	81	79	8.4	1.0
Finland	13.8	14.6	15.6	15.9	15.9	16.3	16.7	n/a	96	98	99	99	100	103	102	20.5	2.8
France	16.1	16.7	16.9	17.1	17.2	n/a	n/a	n/a	112	112	107	106	107	n/a	n/a	6.4	1.0
Greece	15.8	16.1	16.3	16.7	16.7	16.8	17.0	n/a	110	107	103	104	105	106	104	7.5	1.2
Ireland	13.3	13.6	14.6	15.0	15.3	15.7	n/a	n/a	92	91	92	93	96	99	n/a	18.0	2.4
Italy	15.1	15.8	16.6	16.9	n/a	n/a	n/a	n/a	105	105	105	105	n/a	n/a	n/a	11.9	1.8
Latvia	12.2	11.4	12.5	12.6	12.6	12.7	12.7	n/a	85	76	79	78	79	80	77	4.0	0.5
Lithuania	13.4	13.0	13.8	13.5	13.4	13.4	13.5	n/a	93	87	87	84	84	85	82	0.9	0.1
Luxembourg	14.2	15.0	15.8	16.3	16.2	15.6	16.8	n/a	99	100	100	101	101	99	102	18.3	2.6
Malta	14.2	15.4	15.2	15.8	15.4	15.7	16.5	n/a	99	103	96	98	96	99	100	15.9	2.3
Netherlands	14.5	14.8	15.4	15.6	15.7	15.9	16.4	n/a	100	99	98	97	98	101	100	13.3	1.9
Poland	12.5	13.0	13.7	14.0	14.0	14.0	14.2	n/a	87	87	87	87	88	88	87	13.7	1.7
Portugal	14.1	14.8	15.5	15.7	15.8	15.8	n/a	n/a	98	98	98	98	99	100	n/a	12.3	1.7
Sweden	15.3	16.0	16.7	16.9	16.9	17.0	17.4	n/a	106	107	106	105	106	108	106	13.7	2.1
Slovakia	12.2	12.7	12.9	13.0	13.3	13.3	n/a	n/a	85	85	82	81	83	84	n/a	9.0	1.1
Slovenia	13.4	13.7	14.3	14.6	14.7	14.4	15.1	n/a	93	92	91	91	92	91	92	12.4	1.7
Spain	15.5	16.2	16.8	17.0	17.0	16.9	17.4	n/a	108	108	106	106	106	107	106	12.5	1.9
Czech Republic	11.7	12.8	13.8	14.0	14.0	13.9	14.3	n/a	81	85	88	87	88	88	87	22.1	2.6
Hungary	12.1	12.3	13.0	13.3	13.2	13.1	n/a	n/a	84	82	82	83	83	83	n/a	7.9	1.0
United Kingdom	14.2	14.7	15.9	16.2	16.3	16.4	16.9	n/a	98	98	100	101	102	104	103	19.2	2.7
Cyprus	n/a	n/a	16.0	17.2	16.5	16.7	16.6	n/a	n/a	n/a	101	107	103	106	101	3.7	0.6
EU25*	14.4	15.0	15.8	16.1	16.0	15.8	16.4	n/a	100	100	100	100	100	100	100	13.8	2.0
EU15*	14.8	15.4	16.3	16.5	16.5	16.4	17.0	n/a	103	103	103	103	103	104	103	14.3	2.1
EU10*	12.4	12.8	13.6	13.8	13.8	13.7	14.2	n/a	86	85	86	86	86	87	86	14.6	1.8
EU12*	15.0	15.6	16.3	16.6	16.6	16.4	17.0	n/a	104	104	103	103	104	104	103	13.4	2.0
Bulgaria	12.9	12.8	12.8	13.1	13.1	13.0	13.3	n/a	89	85	81	81	82	82	81	3.0	0.4
Romania	13.3	12.9	13.5	13.5	13.0	13.1	13.4	n/a	93	86	85	84	81	83	82	0.3	0.0
Croatia	13.0	13.1	11.4	13.6	13.5	13.3	14.0	n/a	90	88	72	85	85	84	85	8.0	1.0
Macedonia	n/a	13.3	13.3	13.7	13.2	13.4	n/a	n/a	n/a	89	84	85	83	84	n/a	0.5	0.1
Turkey	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Switzerland	15.4	16.3	17.1	17.5	17.7	n/a	n/a	n/a	107	108	108	109	111	n/a	n/a	15.2	2.3
USA	15.1	15.6	16.3	16.4	16.6	16.8	n/a	n/a	105	104	103	102	104	106	n/a	11.3	1.7

*weighted average
Source: WHO Health for all database, June 2006; OECD Health data, June 2006 for BEL, DEN, IRL, SLK, SWE and the USA; IHS HealthEcon calculations 2006.

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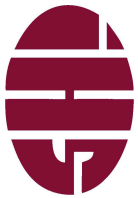

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