



Original article

The practice of internal medicine in Europe: organisation, clinical conditions and procedures

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ARTICLE INFO

Article history:

Received 1 April 2013

Received in revised form 29 July 2013

Accepted 6 August 2013

Available online 10 September 2013

Keywords:

Europe

Internal medicine

Internist

Specialties

Clinical conditions

Procedures

ABSTRACT

Background: Current information on the role of internists in the European countries is scarce. This report describes the results of a survey of the practice of internists in Europe.

Methods: Two online questionnaire-based surveys were carried out by the European Board of Internal Medicine, one on the practice of internists and the other on postgraduate training in internal medicine. The national internal medicine societies of all 30 member countries of the European Federation of Internal Medicine were invited to participate. The responses were reviewed by internal medicine trainees from the respective countries and summaries of the data were sent to the national societies for approval. Descriptive analysis of the data on the practice of internists was carried out.

Results: Twenty-seven countries (90%) completed the questionnaire and approved their datasets. In 8 European countries, most internists practised internal medicine alone and in 7 countries at least half of physicians practised internal medicine together with a subspecialty. Internal medicine was considered a hospital-based specialty in most countries. The majority of selected presenting problems and diagnoses were rated as commonly encountered in all countries. More variability between countries was observed in the performance of diagnostic and therapeutic procedures.

Conclusion: Many similarities exist in the practice of internal medicine between the European countries, while some differences are present that likely reflect the variable impact of subspecialisation. The results of the survey should prove valuable for the definition of specific competencies and development of a common curriculum for internal medicine at the European level.

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1. Introduction

Despite major changes in the organization of health service delivery in Western countries in recent decades, internal medicine remains the backbone of adult medical care. Increasing prosperity and longevity

have been associated with a rising prevalence of many chronic diseases and increasing complexity of patient care, particularly among the rapidly growing ageing population. In parallel, advances in medical science and technology have led to an augmented role of medical specialties and subspecialties which has influenced the practice of internists in many European countries [1,2]. Although the emergence of specialised medical services has revolutionized the treatment and outcome of numerous disorders, it is not without drawbacks, including fragmentation of care and increasing costs [1,3]. A physician with a broad range of competencies is considered by many to be most suitable for the management of individuals with multiple chronic conditions. Accordingly, internal medicine organizations have emphasized the important role of the specialty in the contemporary health care system [4] and recommend that all subspecialty trainees complete a common trunk of internal medicine before entering the subspecialty [5,6]. However, this requirement

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may vary across Europe due to local traditions and politics. With the growing influence of the European Union, migration of physicians between countries in Europe has become much more common than in the past [7] and, therefore, variation in training and clinical practice may create difficulties. Unfortunately, information on internal medicine in the European countries is very limited, including the practice setting and the profile of clinical disorders and procedures.

The principal objective of the European Board of Internal Medicine is to enhance the quality of postgraduate training in internal medicine throughout Europe. The core competencies of the internist have already been defined [8] and the requirements of an internal medicine training programme have been described [9]. Current work focuses on characterising specific competencies, including clinical conditions and procedures, which are essential for the education of future internists and for credentialing authorities.

A need to gain insight into the practice of internal medicine in individual European countries has become increasingly important. This paper reports the results of a survey of the practice of internists in Europe that was conducted by the European Board of Internal Medicine.

2. Materials and methods

In 2008 and 2009, the European Board of Internal Medicine, which is formed jointly by the European Federation of Internal Medicine (EFIM) and the European Union of Medical Specialists (UEMS) Section of Internal Medicine, launched two online questionnaire-based surveys of internal medicine in Europe. The first survey focused on the practice of internists and their role within the health care system, and the other on postgraduate training in internal medicine. An invitation to participate in the surveys was sent by email to the presidents and secretaries of the national internal medicine societies of all 30 member countries of EFIM. These countries were Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom. The surveys were carried out in an electronic format to facilitate their completion and return. Reminders were sent by email.

In this paper we report the results of the survey of the practice of internists.

2.1. Outline of the survey of the practice of internists

- Part 1. Organisation of internal medicine services
- Part 2. Procedures performed by internists
- Part 3. Medical problems encountered by internists
- Part 4. Medical diagnoses managed by internists

Lists of procedures and common medical problems and diagnoses were created using available training objectives and policies in internal medicine in several countries (UK Specialty Training Curriculum for General Internal Medicine; American Board of Internal Medicine Clinical Competence Requirements for Internal Medicine; CanMEDS Objectives of Training in Internal Medicine) and a recent report from Ireland [10] as a guide.

The following specialties were considered subspecialties of internal medicine: allergy and immunology, angiology (vascular medicine), cardiology, endocrinology and metabolism, gastroenterology and hepatology, geriatrics, haematology, infectious diseases, nephrology, medical oncology, respiratory medicine and rheumatology. These subspecialties were selected as they are recognised in most European countries. However, it should be noted that other subspecialties exist in some countries, for example clinical pharmacology, sleep medicine and palliative medicine.

Parts 1 and 2 of the survey were launched on 29 March 2008 and parts 3 and 4 on 2 October 2008. The survey can be viewed as supplemental materials online at www.ejim.org.

2.2. Data analysis

The European Board of Internal Medicine Competencies Working Group examined and analysed the data. Completed questionnaires had been returned by 28 national internal medicine societies in July of 2010. Only the national internal medicine societies of Luxembourg and Malta did not complete all parts of both surveys and, therefore, were excluded from the analysis. Examination of the responses revealed a number of inconsistencies, particularly when two or more individuals from the same country had completed the questionnaires. In order to verify the data, internal medicine trainees attending the European School of Internal Medicine in Brighton in July of 2010 were interviewed about the responses from their respective countries by two of the authors (MC and RP). Interviews with trainees from 20 countries were conducted, addressing all the items of the questionnaires with emphasis on questions that yielded ambiguous responses. In a similar manner, verification of the data from the remaining countries was obtained from internal medicine trainees through the Young Internists' Assembly. Finally, a summary of the responses to the questionnaires from each country was generated and submitted back to the presidents and secretaries of the respective national internal medicine societies for a final review and approval in November of 2010. All but one of the participating countries (Hungary) had provided a final approval of their respective summaries by March 2011. Thus, 27 countries were included in the final analysis. The data were exported into a Microsoft Excel® spreadsheet and descriptive analysis performed. The data are reported as percent, mean, or median and range. The percentages are rounded off to the nearest whole number. In the presentation of the data, the number of actual responses to each question is used as the denominator for calculation of percentages.

3. Results

Twenty-eight national internal medicine societies completed the questionnaire on the practice of internists, providing a response rate of 93%, and 27 countries (90%) approved their dataset and were included in the analysis. The response rate for individual questions ranged from 85% to 100% for the part on organisation of internal medicine services and was 100% for the parts on medical problems, diagnoses and procedures.

3.1. Organisation of internal medicine services

More than four-fifths of hospitals belonged to the public health system in 17 of the 27 countries (63%) that responded to this question. More than half of ambulatory clinics and physicians' offices were also part of the national health system in 20 countries (20/26, 77%). In 17 countries (17/27, 63%), over half of internists practised exclusively in the public health system and in 10 of the countries (10/27, 37%), this proportion was greater than 70%. In 16 of the 23 countries (70%) that responded, less than 30% of internists worked in both the public and the private sector. Less than one-fifth of internists were only in private practice in 20 of the countries (20/26, 77%) surveyed. In 14 countries (14/27, 52%), physicians were granted privileges to care for private patients in public hospitals, but there were limitations placed on these activities.

Internists in Europe either practised internal medicine alone, internal medicine in conjunction with a subspecialty or a subspecialty only (Table 1). The response to this question from Estonia and Finland was either incomplete or indeterminate, leaving 25 countries with consistent data. In 8 countries (8/25, 32%)—Austria, Czech Republic, France, Germany, Greece, Portugal, Romania, and Spain—more than half of physicians practised only internal medicine. At least half of internists

Table 1
Practice of internal medicine and/or subspecialties among internists in the European countries.

Country	Percentage of internists practising internal medicine only	Percentage of internists practising internal medicine together with a subspecialty	Percentage of internists practising only a subspecialty of internal medicine
Austria	60	30	10
Belgium	10	80	10
Czech Republic	70	25	5
Denmark	25	50	25
Estonia	N/A	N/A	>50
Finland ^a	40	80	60
France	80	20	10
Germany	70	30	30
Greece	60	40	40
Iceland	1	15–20	75–80
Ireland	10	90	20
Israel	30	40	30
Italy	50	40	10
Latvia	5	75	10
Lithuania	5	35	65
Netherlands	30	40	30
Norway	5	10	85
Poland	40	60	0
Portugal	80	15	5
Romania	60	40	0
Slovakia	15	70	15
Slovenia	20	80	10
Spain	60	10	20
Sweden	25	50	85
Switzerland	40	40	20
Turkey	50	10	30
United Kingdom	10	90	20

Note that the sum of the percentages for individual countries is not always 100%.

^a Indeterminate response.

practised internal medicine and a subspecialty together in 7 countries (7/25, 28%) and in 4 countries (4/25, 16%) the majority practised only a subspecialty. In the 24 countries that responded, 62% of internists worked in hospital practice, but less than one-fifth practised exclusively in ambulatory clinics or private offices in 15 countries (15/24, 62%). This was most pronounced in Germany, Greece, Poland, Slovakia and Switzerland where at least half of internists practised solely in an office setting. Hospital-based internists commonly managed patients in intensive care units and emergency wards in 22 of the countries (22/26, 85%). These patients were equally cared for by internists and subspecialists in 9 countries (9/18, 50%), whereas in 5 countries (5/18, 28%)—Czech Republic, Estonia, Israel, Portugal and Turkey—internists were more frequently responsible for their care. In 23 countries (23/26, 88%), the care of elderly patients was shared between geriatricians and internists. Geriatrics existed either as a separate specialty or as a subspecialty of internal medicine, except in Portugal and Slovenia where the specialty did not exist at all.

3.2. Clinical conditions and procedures

The clinical presentations included in the survey are displayed in Table 2. The majority of the presenting problems were rated as commonly encountered by internists in 75% or more of the European countries. Of the exceptions, low back pain, snoring and daytime somnolence, voiding discomfort, numbness, and weakness and paralysis were ranked as common in 65–70% of countries, while bruising and thrombocytopenia, rash, altered mental status, progressive memory disturbance and depression were rated as commonly encountered by internists in approximately 60% of countries. Table 3 shows the medical diagnoses featured in the survey. Most of the disorders were rated as commonly managed by internists in 75% or more of the countries in Europe. Notable exceptions were shock, acute respiratory failure and sepsis, which were ranked as

Table 2
Clinical presentations encountered by internists in the European countries.

Clinical presentations rated as common in $\geq 75\%$ of countries		Clinical presentations rated as uncommon, rare or never encountered in $>25\%$ of countries
Abdominal mass	Dyspnoea	Altered mental status
Abdominal pain	Gastrointestinal bleeding	Bruising/thrombocytopenia
Abnormal thyroid function tests	Haematuria	Depression
Alcohol and substance abuse or intoxication	Heartburn	Headache
Anaemia	Hyperglycaemia	Leg ulcers
Bloating/constipation	Jaundice/abnormal liver function tests	Low back pain
Elevated blood pressure	Joint swelling	Numbness
Elevated serum creatinine	Leg pain or swelling	Progressive memory disturbance
Extracellular fluid depletion	Lymphadenopathy	Snoring/daytime somnolence
Dizziness and syncope	Nausea and vomiting	Rash
Dysphagia	Obesity	Voiding discomfort
Chest pain	Palpitations	Weakness and paralysis
Cough	Sepsis syndrome	
Diarrhoea	Shock	
Fatigue	Unsteadiness and falls	
Fever	Weight loss	
	Wheeze	

commonly cared for by internists in approximately 70% of countries. Dementia and epilepsy were rated as commonly managed by internists in about half of the countries and Parkinson's disease in about 40% of countries. Finally, human immunodeficiency virus infection was rated as commonly cared for by internists in approximately half of the countries.

More variability was present in the diagnostic and therapeutic procedures carried out by internists in the European countries (Fig. 1). Interpretation of electrocardiogram or chest X-ray, abdominal paracentesis, arterial blood sampling for blood gas analysis and emergency cardiac defibrillation were rated as commonly performed by internists in greater than 80% of countries. Among other procedures ranked as common in more than half of the countries were thoracentesis, non-invasive ventilation and lumbar puncture. Elective cardioversion and treadmill exercise testing were also rated as commonly performed in more than half of the countries. Joint aspiration, spirometry, central line placement and bone marrow aspiration or biopsy were rated as common in 40–50% of European countries. Finally urine microscopy, flexible sigmoidoscopy and skin biopsy were rated as uncommonly or rarely performed procedures by internists in most countries. The

Table 3
Medical diagnoses managed by internists in the European countries.

Diagnoses rated as common in $\geq 75\%$ of countries		Diagnoses rated as uncommon, rare or never encountered in $>25\%$ of countries
Acute kidney injury	Heart failure	Acute respiratory failure
Alcohol and substance abuse	Hepatitis	Dementia
Atrial fibrillation	Hypertension	Depression
Anaemia	Hyponatraemia	Epilepsy
Angina pectoris	Hypothyroidism/hyperthyroidism	Extracellular fluid depletion
Asthma	Irritable bowel syndrome	HIV infection
Chronic kidney disease	Myocardial infarction	Osteoarthritis
Chronic pain syndrome	Nosocomial infection	Parkinson's disease
Chronic obstructive pulmonary disease	Peptic ulcer disease	Sepsis
Common cancers	Pneumonia	Shock
Diabetes	Skin infection	Sleep apnoea
Gastroenteritis	Skin infection	
Gastro-oesophageal reflux disease	Stroke	
Gastrointestinal bleeding	Syncope	
	Urinary tract infection	
	Venous thromboembolism	

Abbreviations: HIV, human immunodeficiency virus.

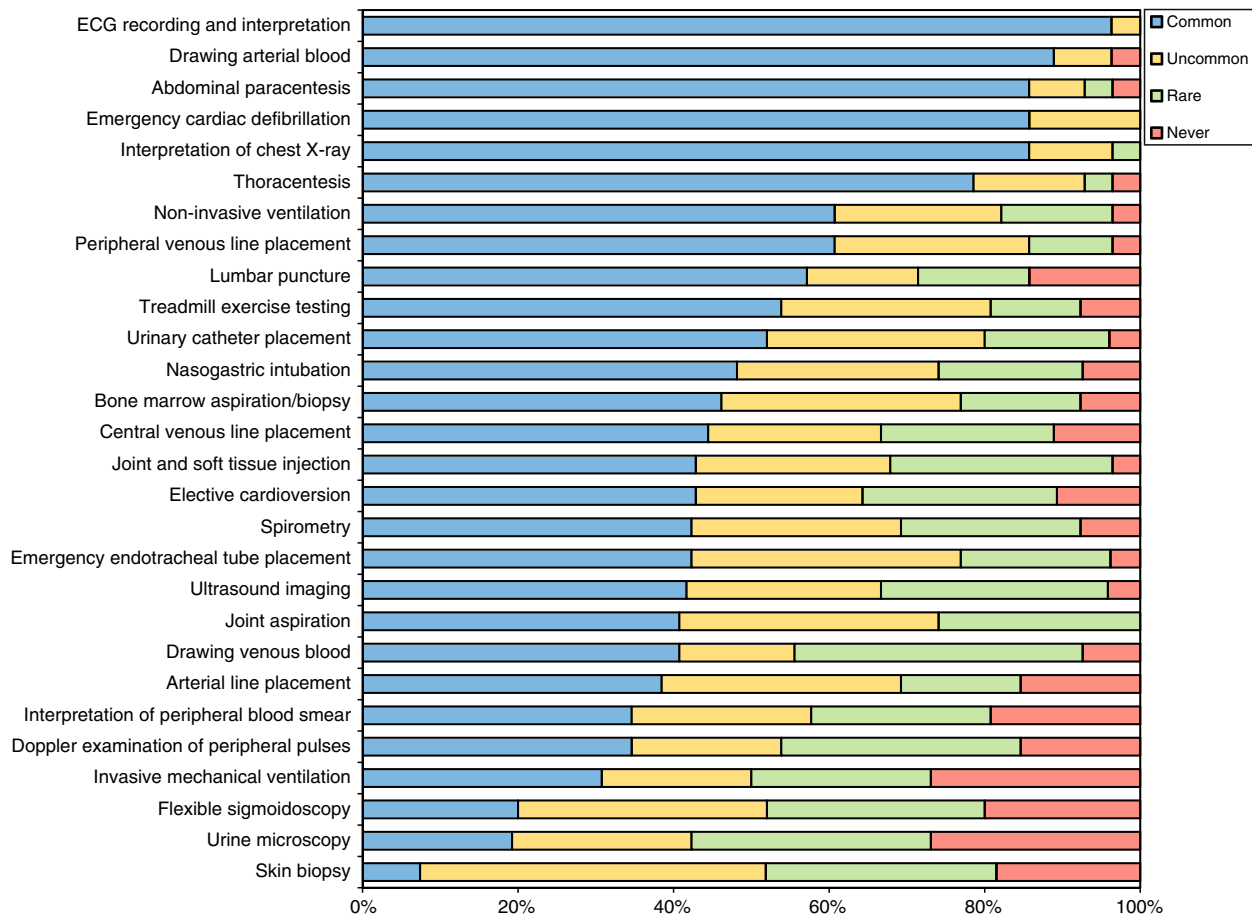


Fig. 1. Procedures performed by internists in European countries. Abbreviations: CXR, chest X-ray; ECG, electrocardiogram.

proportion of all procedures ranked as common by individual countries was 51% on average (range, 19–96%) and this was greater than 80% in Austria, Ireland and the United Kingdom and between 70% and 80% in Germany, Slovenia, Switzerland and Turkey. The only countries where the proportion of procedures rated as commonly performed was lower than 20% were Lithuania and Latvia.

4. Discussion

The survey of the practice of internists in Europe has revealed many similarities, although considerable variability between individual countries was also present. Only in one-third of countries did the majority of internists practise internal medicine as a sole specialty, whereas subspecialty practice was common in the remaining countries. Internal medicine was largely a hospital-based specialty in most countries. The clinical conditions managed by internists were remarkably similar between countries in Europe. However, more differences existed in the performance of diagnostic and therapeutic procedures.

The finding that European internists most frequently practise in the hospital setting may appear surprising in light of increased emphasis on ambulatory care in recent years, which has been paralleled by a reform of hospital services aimed at avoiding inpatient admissions and reducing length of stay [11]. In response to these changes, internists have increasingly assumed the role of effectively managing the care of hospitalized patients, which is best illustrated by the development of acute medicine as a separate specialty in the United Kingdom [1], and similarly the hospitalist movement in the United States [12]. The broad range of knowledge and skills possessed by internists makes them particularly well suited for modern hospital medicine with emphasis on quality and safety, rational use of resources and cost-effective care. Although

several studies [13] suggest that subspecialists produce better outcomes for certain conditions, it has been shown that most common diseases are at least as well managed by generalists as subspecialists [14]. The survey also showed that internists commonly care for patients in emergency wards and intensive care units. While these special units are increasingly run by emergency physicians and anaesthesiologists, internists also appear to carry significant responsibility in the management of patients. However, the survey was not designed to yield detailed information on this item. The management of elderly patients was shared between internists and geriatricians in most countries. Geriatric medicine is a growing specialty which has led to significant advances in the treatment of frail elderly persons who require hospitalization for acute illness [15–17]. Owing to their limited numbers, geriatricians can only manage a small fraction of the rapidly expanding population of older patients. Hence, internists will largely be responsible for providing comprehensive care to these patients in the future. Internists are well suited for this challenging role in view of their broad range of knowledge and skills in managing multiple chronic conditions and problems associated with polypharmacy. Nevertheless, a close collaboration between internal medicine and geriatrics is essential to facilitate the delivery of high-quality medical care to the elderly.

In addition to caring for inpatients, hospital-based internists in Europe are likely to spend substantial amount of time caring for patients in ambulatory clinics. Unfortunately, the survey did not include an inquiry about how much time internists that practise solely in the hospital setting devote to inpatient and outpatient care. However, it is known that in some countries, for example in Switzerland and Germany, internal medicine is also community-based and may overlap with primary care. Nevertheless, our findings suggest that in most European countries internists are generally not involved in primary care.

Our survey showed that in only 8 European countries do most internists practise internal medicine alone. In the remaining countries, the majority of physicians practise internal medicine together with a subspecialty or only a subspecialty of internal medicine. It is intriguing that the countries where traditional internal medicine has prevailed as a dominant specialty are mostly located in the southern part of Europe, while the subspecialties appear to have a stronger position in Northern Europe. Overall, it is clear that subspecialisation has had a large impact on internal medicine practice in Europe. Unfortunately, the survey was not designed to yield data on how internists who are certified in both internal medicine and a subspecialty are appointed and how their practice is divided between the two specialties. The fact that a significant proportion of internists practise both internal medicine and a subspecialty or a subspecialty alone may cause a bias when evaluating the role of internal medicine in hospital and ambulatory care.

The majority of the clinical presentations and diagnoses were rated as commonly encountered and managed by internists in almost all countries. There were several notable exceptions, for example sepsis, respiratory failure and shock, which were somewhat less commonly cared for by internists. One possible explanation may be that patients with these life-threatening conditions are often admitted to high-dependency or intensive care units, where critical care physicians and anaesthesiologists are primarily responsible for their care in many countries. The observation that human immunodeficiency virus infection was not commonly managed by internists in many European countries does not come as a surprise as infectious disease specialists have gradually taken over the care of patients with this disorder. In an identical fashion, neurologists have assumed a primary role in the management of patients with nervous system disorders such as epilepsy, Parkinson's disease and dementia, thus diminishing the contribution of internists. Headache, low back pain, rash and voiding discomfort were not rated among the clinical presentations commonly encountered by internists in most countries, probably because patients with these conditions are frequently seen by general practitioners.

Few studies have investigated the clinical conditions managed by internists in the European countries. A study carried out in a community hospital in Ireland [10] examined ICD-9 coded discharge diagnoses of all acute admissions during the years 2002–2004 and found an average of four diagnoses per patient which in almost all cases were combinations of 74 conditions. More recently, a survey of hospital-based internists in 18 countries in Europe [18] showed that patients cared for in medical wards carried several pre-existing diagnoses and the leading categories of discharge diagnoses were cardiac disorders and infections. The clinical conditions observed in these two studies are largely the same as the ones that were included in our questionnaire. In addition to the high level of co-morbidity, it is intriguing that the total number of medical diagnoses observed among patients managed by internists appears rather limited. This notion is supported by administrative hospital data demonstrating that the majority of hospital admissions are caused by a small number of conditions [19].

Our findings together with those of the two aforementioned studies reflect changes that have occurred in the health care systems of most Western nations in recent decades. A limited number of chronic diseases associated with the lifestyle of affluent populations have emerged as a public health concern and a leading cause of morbidity and mortality [20]. Physicians practising internal medicine or its subspecialties play a central role in the care of patients with most of these chronic diseases, which include diabetes, obesity, hypertension, ischemic heart disease, chronic kidney disease, chronic obstructive pulmonary disease and common types of cancer.

There was much more variability between countries in the performance of diagnostic and therapeutic procedures. Whilst many of the traditional internal medicine procedures, such as abdominal paracentesis, thoracentesis and electrocardiogram interpretation, remain commonly performed by internists in most countries, other procedures have become much less common, for example arthrocentesis, bone marrow

aspiration and biopsy and spirometry. This trend undoubtedly reflects the increasing influence of subspecialists. In addition, procedures such as blood smear examination and urine microscopy, which were rarely performed by internists in most countries, are generally carried out by certified laboratories. Of note, treadmill exercise testing and elective cardioversion were rated as common in more than half of the countries, suggesting that internists continue to be heavily involved in the care of patients with heart disease despite the rapid growth of the subspecialty of cardiology in most European countries. Interestingly, subspecialisation is known to be prevalent in some of the countries reporting the highest number of procedures that are commonly performed by internists, for example in Austria, Germany, Sweden, Turkey and the United Kingdom. One plausible explanation is that many subspecialists are also trained in internal medicine and, thus, are considered part of the internal medicine workforce in these countries.

To our knowledge, comparable studies on procedures carried out by internists in Europe do not exist. In contrast, substantial work in this area has been done in the United States, including a recent study [21] which showed that the average number of different procedures performed by internists declined from 16 in 1986 to 7 in 2004. Overall, procedures appear to be less commonly performed by internists in the United States than in Europe, particularly traditional inpatient procedures such as drawing of arterial blood, cardiac defibrillation, management of ventilatory support and lumbar puncture. This probably reflects a difference in practice setting as internists in the United States predominantly provide primary care. Another possible reason is the wide availability of procedure-oriented services carried out by internal medicine subspecialties and interventional radiology. The rationale for centralising invasive procedures is that procedural skills can affect patient safety and outcome [22,23]. Nevertheless, trainees in internal medicine must learn about the indications, contraindications, complications and cost of commonly applied procedures.

The information generated by this survey will be useful for the definition of specific competencies of internists in Europe. Recently, the Spanish Society of Internal Medicine proposed a series of specific competencies considered common among European internal medicine specialists [24]. The section on clinical knowledge comprised a number of common diseases as well as many other less common and rare conditions, whereas only a few examples of procedures were introduced. Such efforts by individual national societies will be an important contribution to the development of a common European internal medicine curriculum.

While this survey has yielded important information on internal medicine practice in Europe, there are several notable limitations. The results must be interpreted with caution as they are based on general views of the leaders of national internal medicine societies rather than systematic inquiry and may to some extent reflect individual perceptions. The lists of clinical presentations, diagnoses and procedures that the respondents were asked to rate may have been incomplete. However, this approach was chosen because it was considered more likely to yield representative responses than if the respondents were simply asked to name the most common clinical conditions and procedures managed by internists in each country. Inevitably, regional differences may be present in some countries as well as variations between individual hospitals and medical clinics. The contribution of the internal medicine trainees was useful, particularly regarding procedures which in many cases are in fact carried out by physicians in training. Despite the limitation of the methodology, we consider the information on internal medicine practice in the European countries to be reasonably accurate. Although more than 4 years have passed since the survey was launched, we believe that it provides a fairly good picture of the current situation in each country as the final dataset was approved by the national societies in 2011.

4. Conclusion

Our findings demonstrate that internal medicine is principally a hospital-based specialty in the majority of European countries and that

subspecialisation has had a significant impact on the practice of many internists. Nevertheless, the roles of internists are quite comparable across Europe and the differences may be fewer than previously thought despite local traditions and variable influence of subspecialisation in individual countries. Hence, it should be feasible to harmonise training and qualification in internal medicine in the European countries as has been proposed by professional organisations in recent years. The data on medical disorders and procedures will be useful for the definition of specific competencies and generation of a common European curriculum for postgraduate training in internal medicine.

Learning points

- Differences in the organisation of internal medicine practice between the European countries mostly result from the impact of subspecialisation.
- In approximately one-third of countries, most internists practise internal medicine as a sole specialty.
- In many European countries, internists are also qualified in a subspecialty of internal medicine.
- In most European countries, internal medicine is a hospital-based specialty.
- The majority of the clinical conditions managed by internists are quite similar in most European countries. More variability is present in the performance of procedures.

Conflict of interest

The authors state that they have no conflicts of interest.

Acknowledgements

The authors thank Adrian Stevens for his assistance in designing and managing the online surveys and Janet Stevens for providing secretarial support. We are also indebted to the internal medicine trainees attending the European School of Internal Medicine in 2010 and the members of the Young Internists Assembly for their assistance in completing and verifying the information generated by the questionnaires. Finally, we are grateful to the leaders of the national societies of internal medicine across Europe who completed the questionnaires and to the members of the EFIM Executive Committee for their valuable input during different stages of the work.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.ejim.2013.08.005>.

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