

## Results of an international survey

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### Background

The care and counselling of adult patients with rare inborn errors of metabolism is still in its infancy. This is a new category of patients: in recent times, these patients reach adulthood in improved condition through advances in obstetric, neonatal and paediatric care. However, these individuals still require continuous care and support to optimise participation in personal, social and professional life. Since these patients have reached adulthood, transition from paediatrics to adult medicine is deemed necessary. Experience with such transition is limited and a lot of adult waters need to be chartered.

A unquestionable requirement is the evaluation of the current situation in Europe with an assessment of desirable developments in the near future to organise an adequate structure of care for these adult patients. The aim of the Fulda-meeting from 20 to 22 november 2002 was to discuss the future development of such a structure. Such a discussion requires an adequate knowledge of the current situations with all the shortcomings and problem areas. To describe the current situation as preparation for this meeting, a survey was designed. Many centres, mostly from Europe have responded and the methods and results are discussed in this paper.

### Aim of the survey

The aim of the survey was to describe the current situation regarding the care and counselling of adult patients with rare metabolic diseases, including number of patients, most frequent diseases, professionals currently involved and desired future developments.

### Methods

A written questionnaire was sent to a number of persons and clinics in Europe, Canada United States of America, Canada, and Australia. The questionnaire is provided in Appendix A. A total of 131 clinics and persons were selected. Table 1 shows the number of questionnaires sent and completed per country.

**Table 1**

Number of questionnaires sent, number of questionnaires completed, divided by country

Country	Questionnaires sent	Questionnaires completed	Percentage completed
Austria	4	3	75
Belgium	5	1	20
Croatia	1	0	0
Czech Republic	3	0	0
Denmark	2	1	50
France	5	1	20
Germany	13	6	46
Greece	1	1	100
Hungary	3	1	33
Israel	2	0	100
Italy	8	4	50
Netherlands	8	5	63
Norway	1	0	0
Poland	1	1	100
Portugal	3	0	0
Slovak Republic	2	1	50
Spain	3	0	0
Sweden	4	1	0
Switzerland	5	1	20
United Kingdom	17	5	29
Canada	1	0	0
USA	35	1	3
Australia	4	2	50
Sum	131	34	26

The response rate was 26% for the total number of questionnaires, the rate was .....for the European centres.

### **Subject clinics**

Identification of relevant persons and clinics was done on the basis of experience of professionals in the field, the membership list of the Society for the Study of Inborn Errors of Metabolism, and on the basis of suggestions by persons approached to complete the questionnaire. With non-response, professionals were re-invited. First round of questionnaires were sent in January 2002, with a re-invitation in August 2002. Data from the completed questionnaires were collected in a SAS-database, which can be translated into Excell- and SPSS-programmes.

### **Statistical analysis**

Results are presented as total number and percentages, and as mean and SD for normal distributed continuous parameters and as median and 95<sup>th</sup> percentile with skewed distributed variables. Analyses were made with SPSS version 8.0 for Windows.

### **Results**

As shown in Table 1, the response rate was moderate with especially a low response from the United States of America. In Europe, about 40% of clinics responded. As was to be expected, the number of clinics with considerable number of adult patients with rare metabolic diseases was lower than the number of clinics with larger numbers of paediatric patients, Figure 1. Of course, in time the paediatric patients will become adults, although a number of them will have deceased. Figure 2 summarizes the number of adult patients with specific diseases. Phenylketonuria, galactosaemia, and lysosomal storage diseases are in number the most important diseases in adult patients. If we then turn to the professionals currently involved in the care and counselling of adult patient, we see that paediatricians, biochemists, dieticians and subjects involved in 'metabolic medicine' are the most frequent, with classical internists on the fifth place, Figure 3. With classical internists, endocrinologists and general internists are mostly involved. These results are absolute numbers of individuals. If we look at the different centres, it shows that relevant professionals are missing from a considerable number of clinics, Figure 4.

Regarding referrals of patients to clinics, it shows that patients are mostly referred by paediatricians, general practitioners and geneticists, Figure 5, with a small contribution from non-medical professionals, support groups, and insurance companies. On the question of current whether there was currently a combined clinic, 27% of the respondents answered affirmative, 59% negative, 10% answered that there was another kind of facility, and 5% reported a kind of clinic for specific diseases. The specific diseases seen at combined clinics followed the general pattern described earlier. Age of transition from 'paediatric' care to 'adult' care is shown in Figure 6. In the large majority of centres, age of transition was between 16 and 18 years, with a lowest age of 14 years and a highest age of 25 years.

The next questions dealt with the kind of professionals ideally structurally involved in the care and counselling of these adult patients. Apart from professionals currently involved like paediatricians, classical internists, geneticists, 'metabolic medicine' professionals, dieticians, social and psychological workers and biochemists, it showed that a number of professionals were identified that are momentarily conspicuously absent, Figure 7. These latter professionals were most notably neurologists, ophthalmologists, and gynaecologists/obstetricians. With classical internists, there was an equal distribution between general internists, endocrinologists, and nephrologists, with a lesser role for gastro-enterologists.

Turning to shortcomings of the current situation, respondents were asked to define the most important problem areas. These are summarized in Table 2.

### **Table 2**

Shortcomings in the current situation in the care and counselling of adult patients with rare metabolic disorders.

- No separate clinical facilities, including beds and teaching facilities (kitchen)
- Lack of availability of physicians dealing or wanting to deal with these patients
- Lack of knowledge about the (natural) history of the disease
- Lack of adulthood-adjusted diets
- Lack of well-founded diagnostic and therapeutic algorithms
- Lack of awareness of these disorders and these patients by other professionals
- Patients are easily lost to follow up
- Patient compliance is often a problem
- These small numbers of patients take a lot of time and energy

Respondents were also asked to rank the importance of other professional disciplines in further development the care structures for these patients, Figure 8. It showed that internists, neurologists, gynaecologists/obstetricians, and dieticians received most frequently the highest rankings. With classical internists, there was a strong preference for general internists. When asked for the most desired structural developments, more local recognition of the importance of the problem was the first priority, Figure 9. This was followed by the desire for more interdisciplinary collaboration and training possibilities, with more access to more information found to be less important.

### **Conclusions and discussion**

From the results from this international survey, a number of general conclusions can be drawn.

Phenylketonuria is the most frequently seen disorder in adult patients. Apparently, the prognosis of this disease has improved dramatically during the last decades with neonatal screening and improved treatment strategies.

Currently there is extensive involvement of paediatrics, biochemistry and 'metabolic medicine' as well as dieticians and social and psychological workers but other disciplines lag behind. With classical internists, endocrinologists are mostly involved.

Combined clinics are still not common; age at transition is mostly between 16 and 18 years

Regarding desired participants in future care programmes: most wanted are internists, neurologists, ophthalmologists, obstetricians, dieticians, biochemists, and psychological and social workers with in the case of internist, a strong preference for general internists.

However, the lack of a well-organised and well-recognised local structure in the local situation is seen as the first and foremost requirement. These professionals should be helped in these efforts by fellow specialists and their scientific communities and organisations. Also, there is a recognised lack of knowledge of the natural history and prognosis of various diseases.

In conclusion, we need dedicated physicians able to care for patients with a chronic disease, and professionals able to optimally support personal, social, and professional participation; we need much more well-founded information and well-funded research efforts; this requires collaborative efforts transcending national and professional boundaries; all this is required to be able to build lasting care structures for this emerging group of patients.

Legenda with the Figures.

Figure 1: Survey of patients below and above 18 years

Figure 2: Survey of frequency of specific diseases

PKU: Phenylketonuria  
Gal: Galactosaemia  
GSD: Glycogen storage diseases  
HCT: Homocystinuria  
UCD: Urea cycle defects  
MSUD: Maple syrup urine disease  
Acid: Fatty acid disorders  
Mitoc: Mitochondrial diseases  
Perox: Peroxisomal diseases  
Lyso: Lysosomal storage diseases

Figure 3: Number of specialists involved

Paed: Paediatrician  
Cardiol: Cardiologist  
Neurol: Neurologist  
Ophthalmo: Ophthalmologist  
ENT: Ear, nose and throat surgeon  
Gyn/Obs: Gynaecologist/Obstetrician  
Social: Social worker  
Psychol: Psychological worker/psychologist  
Biochem: Biochemist  
MetMed: Metabolic medicine

Figure 4: Number of specialists current involved by centre

Paed: Paediatrician  
Cardiol: Cardiologist  
Neurol: Neurologist  
Ophthalmo: Ophthalmologist  
ENT: Ear, nose and throat surgeon  
Gyn/Obs: Gynaecologist/Obstetrician  
Social: Social worker  
Psychol: Psychological worker/psychologist  
Biochem: Biochemist  
MetMed: Metabolic medicine

Figure 5: Specialists referring patients

Paed: Paediatrician  
GP: General practitioner  
Cardiol: Cardiologist  
Nephrol: Nephrologist  
Endocr: Endocrinologist  
Gyn/Obs: Gynaecologist/Obstetrician

Figure 6: Age of transition

Figure 7: Specialists ideally structurally involved

Paed: Paediatrician  
Cardiol: Cardiologist  
Neurol: Neurologist  
Ophthalmo: Ophthalmologist  
ENT: Ear, nose and throat surgeon  
Gyn/Obs: Gynaecologist/Obstetrician  
Social: Social worker  
Psychol: Psychological worker/psychologist  
Biochem: Biochemist  
MetMed: Metabolic medicine

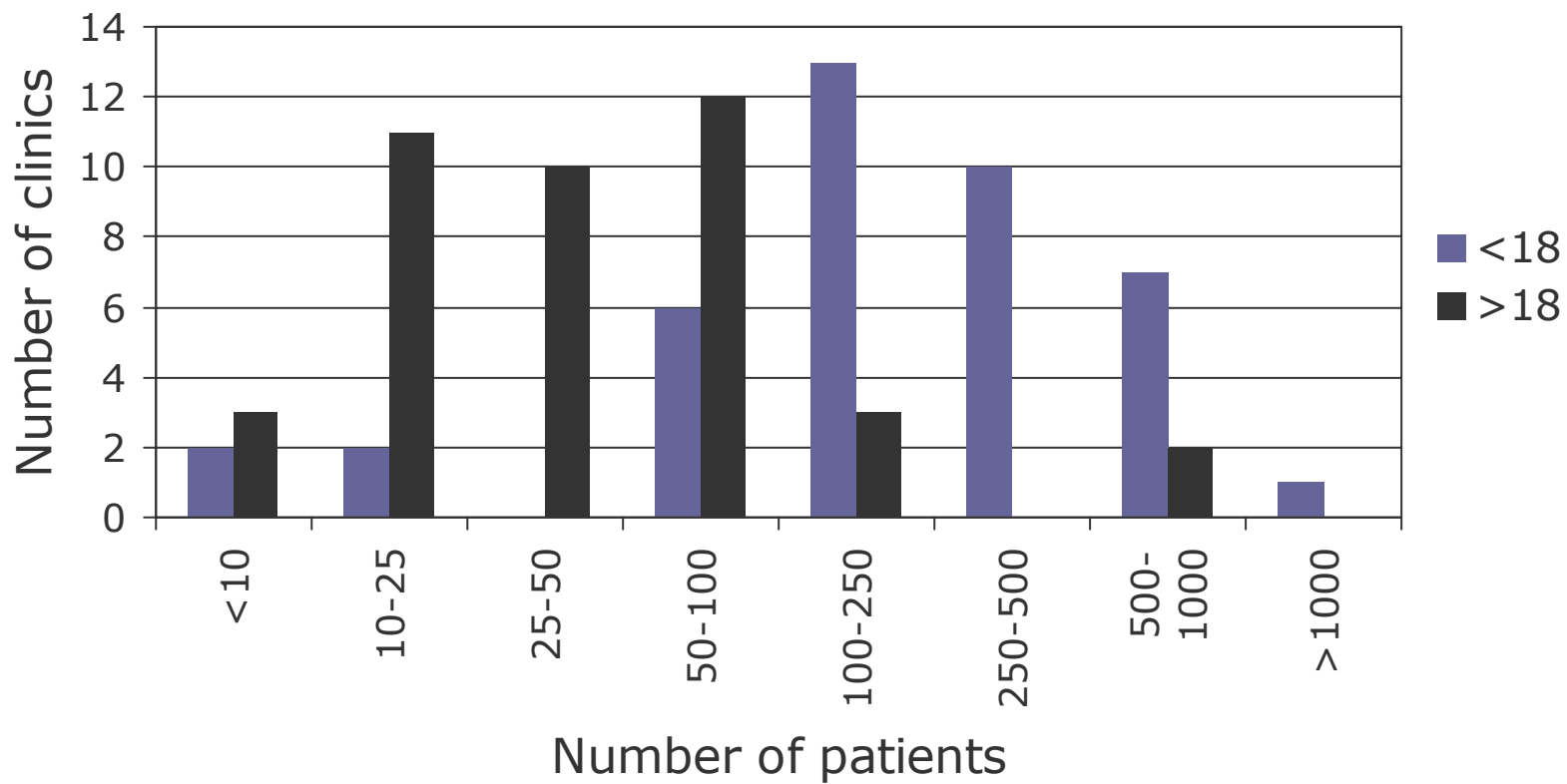
Figure 8: Specialists helpful in optimising care

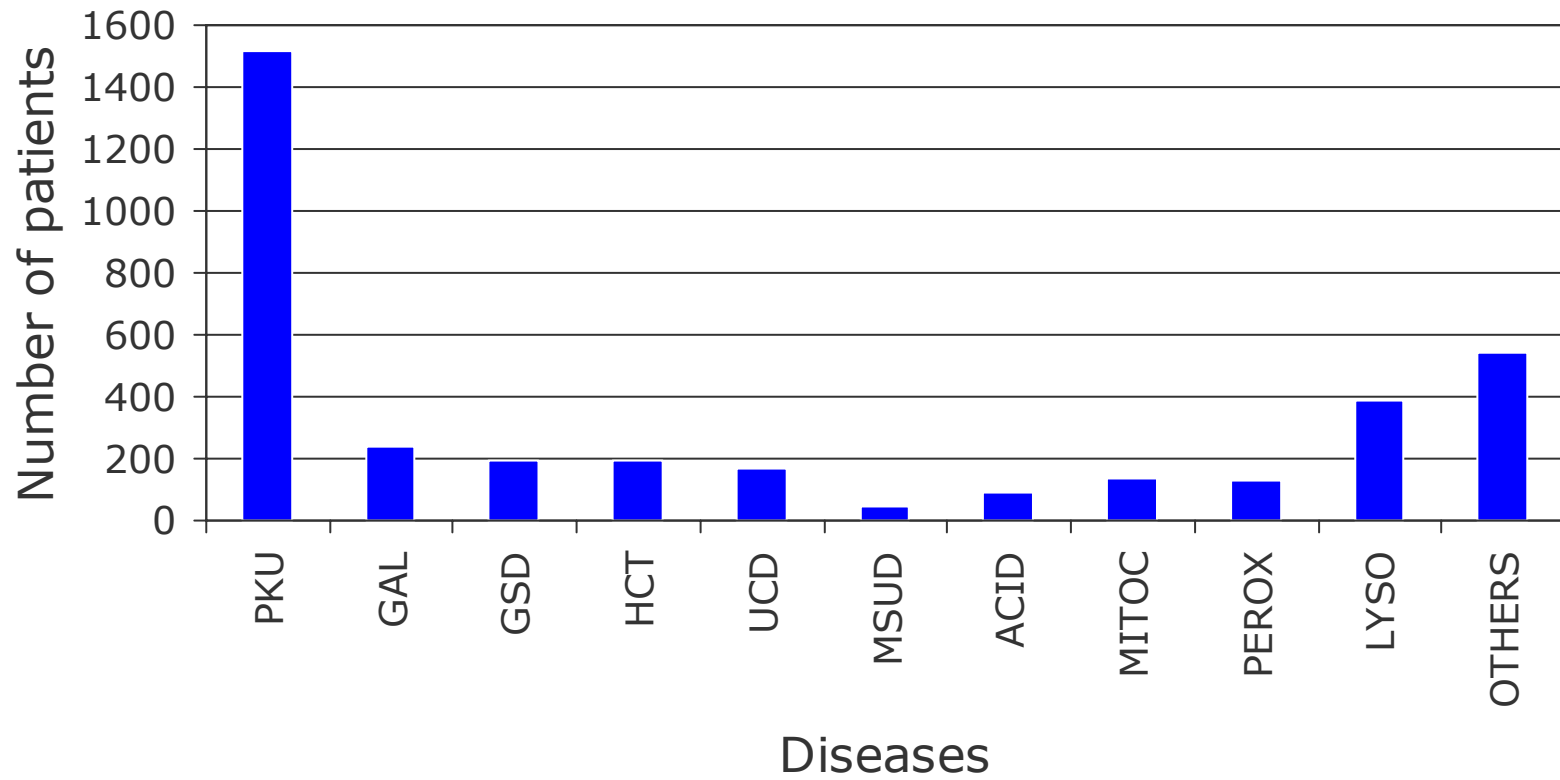
Cardiol:	Cardiologist
Neurol:	Neurologist
Ophthalmol:	Ophthalmologist
ENT:	Ear, nose and throat surgeon
Gyn/Obs:	Gynaecologist/Obstetrician
Social:	Social worker
Psychol:	Psychological worker/psychologist
Biochem:	Biochemist
MetMed:	Metabolic medicine

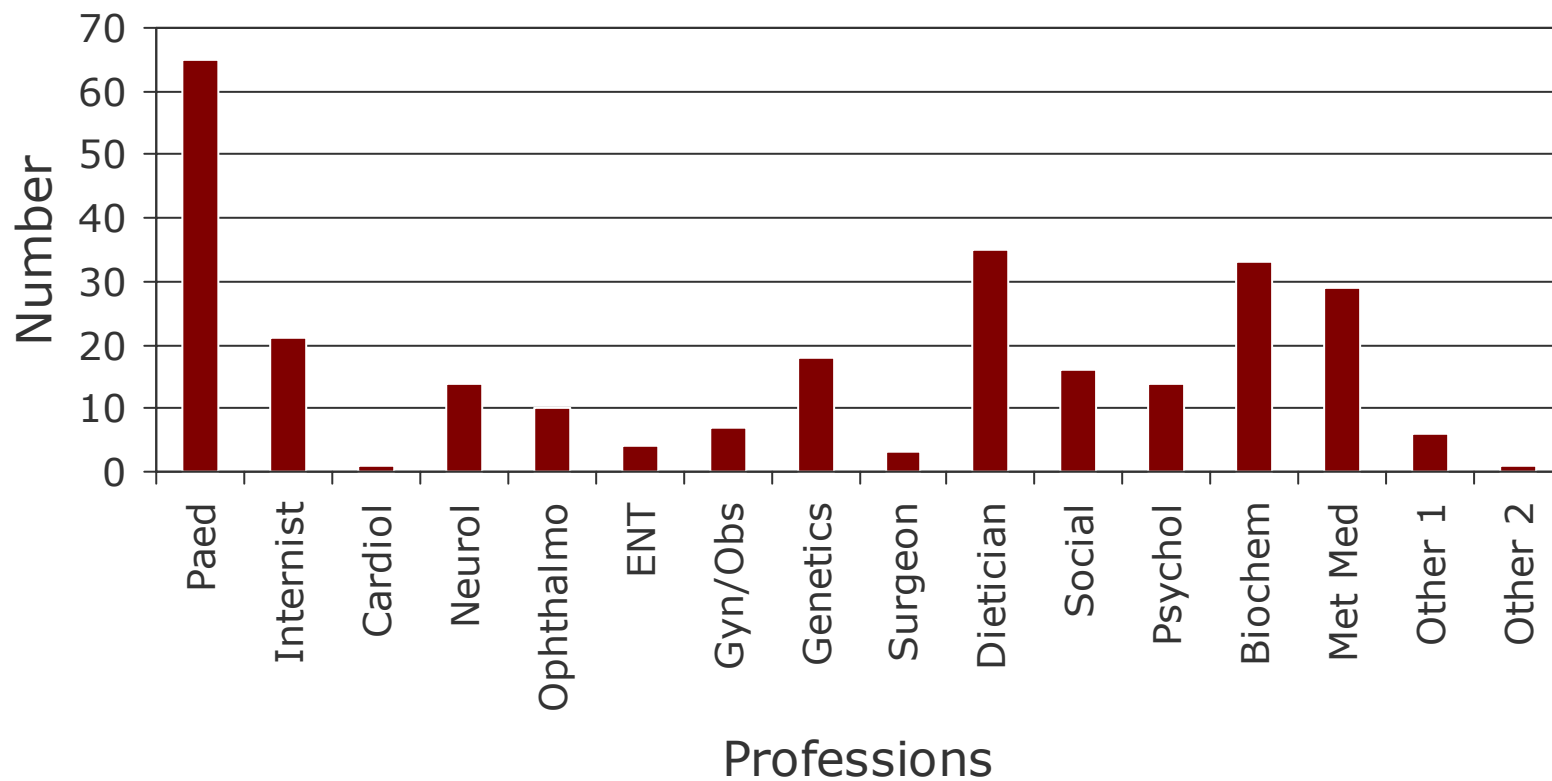
Highest ranking: 1  
Lowest ranking: >5

Figure 9: Facilities helpful in optimising care

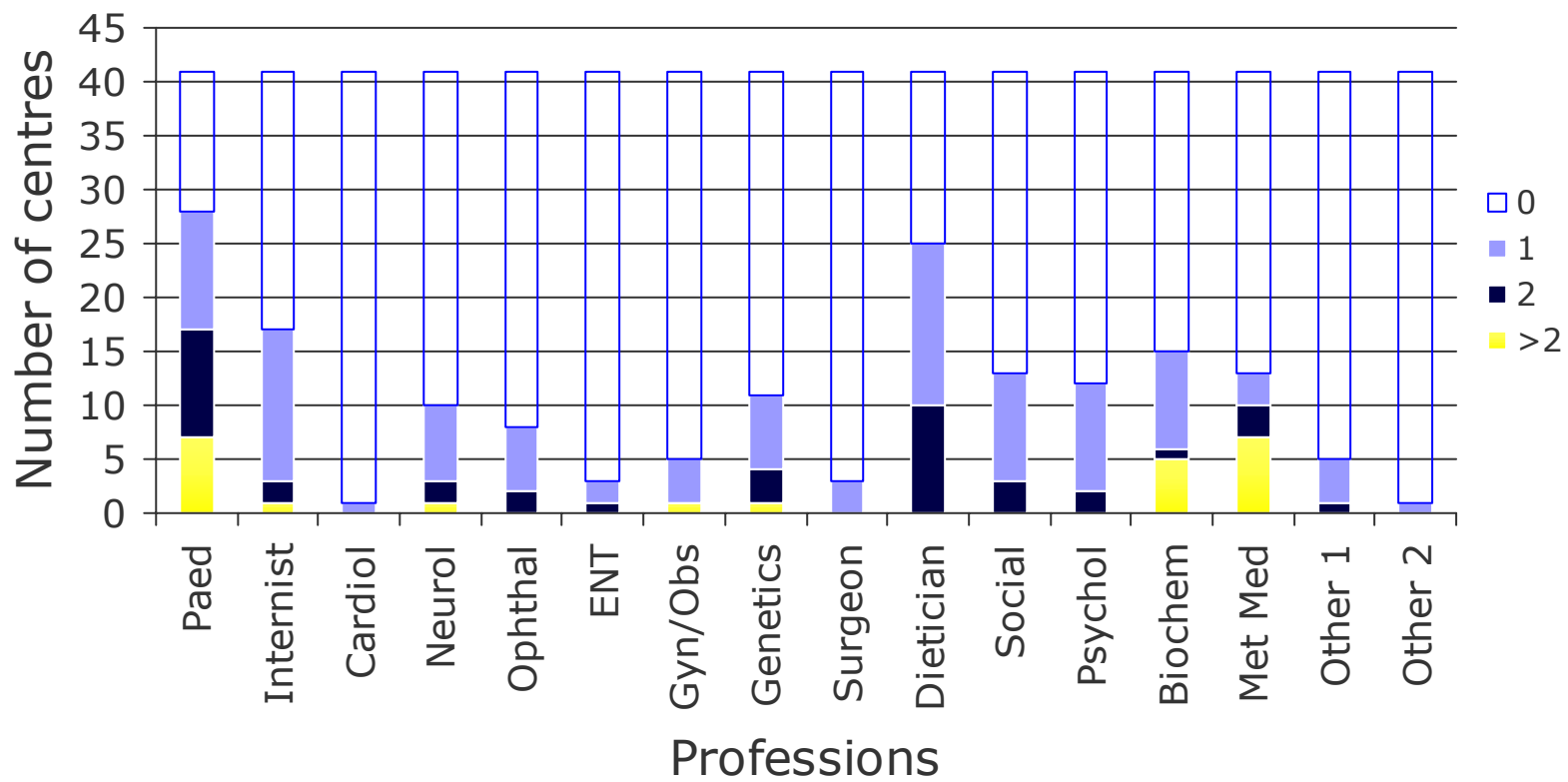
Highest ranking: 1  
Lowest ranking: 4

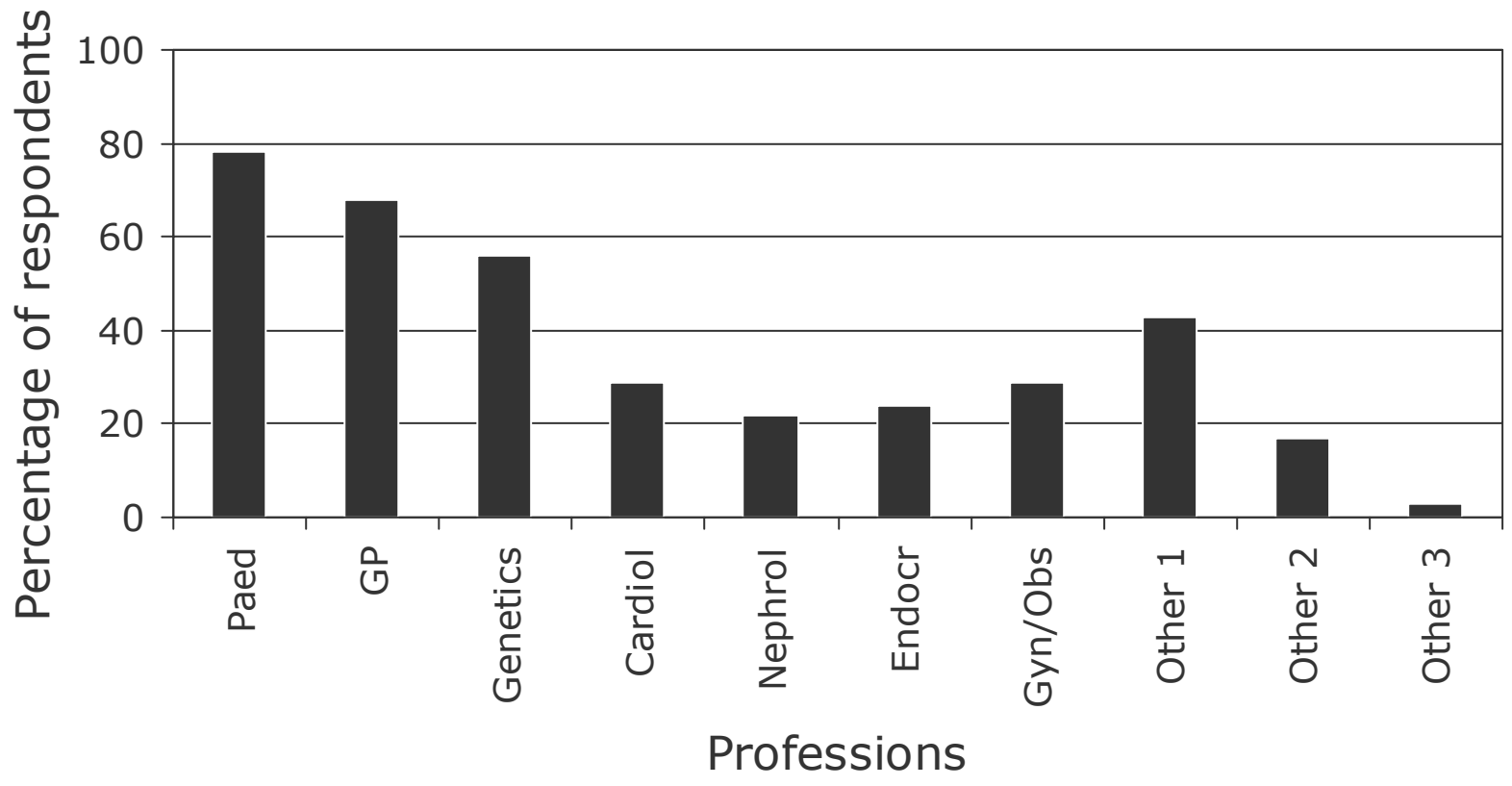


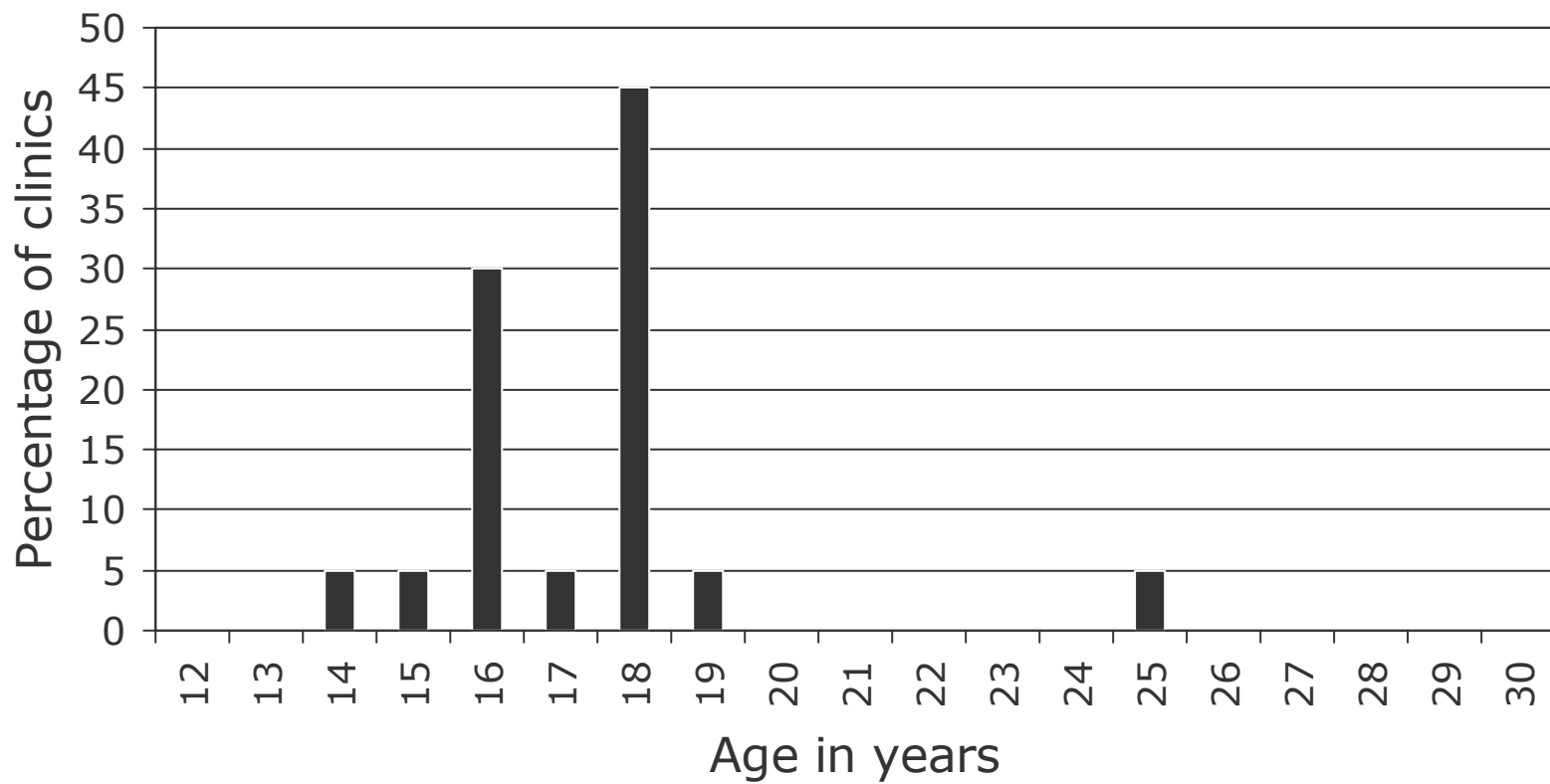


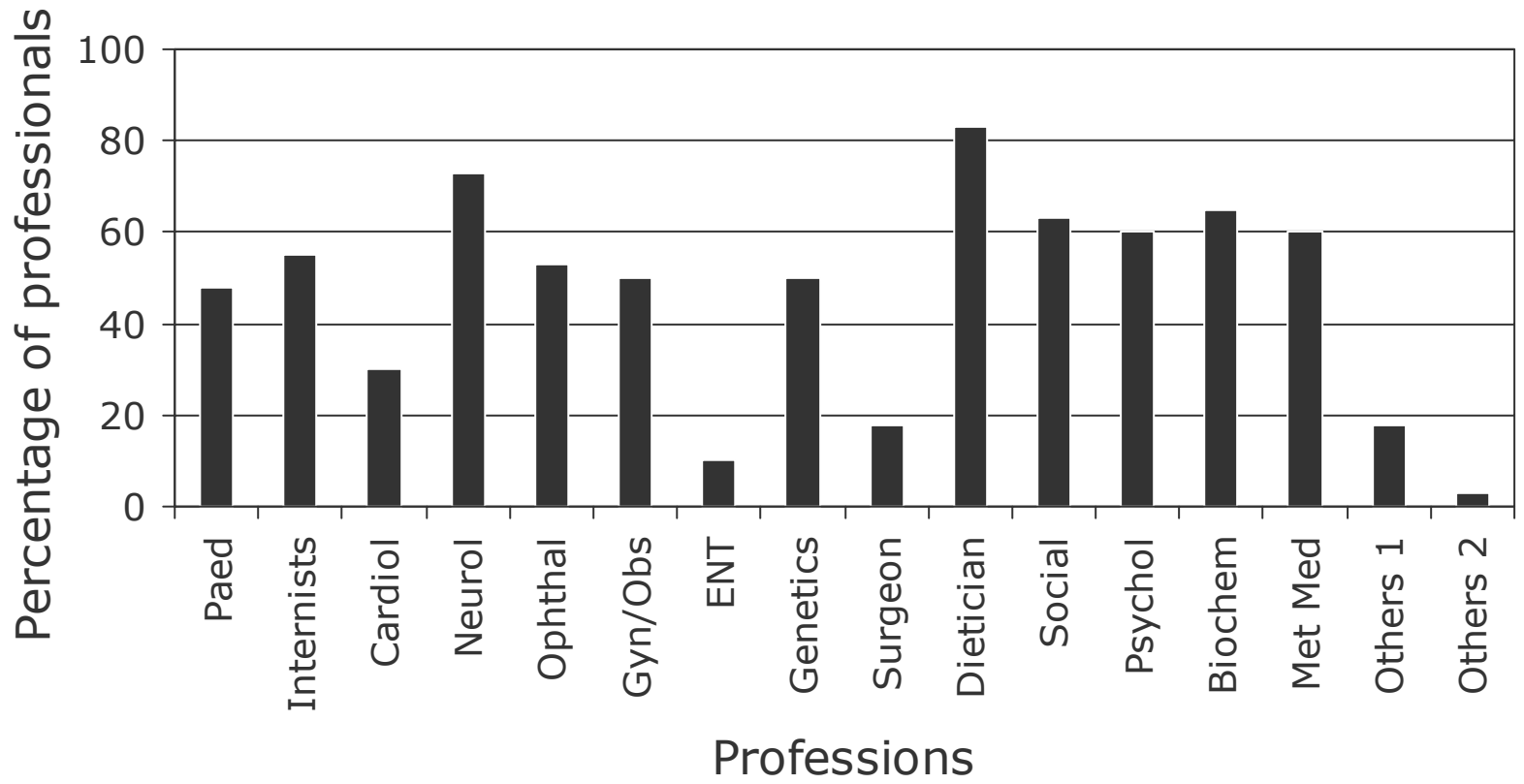


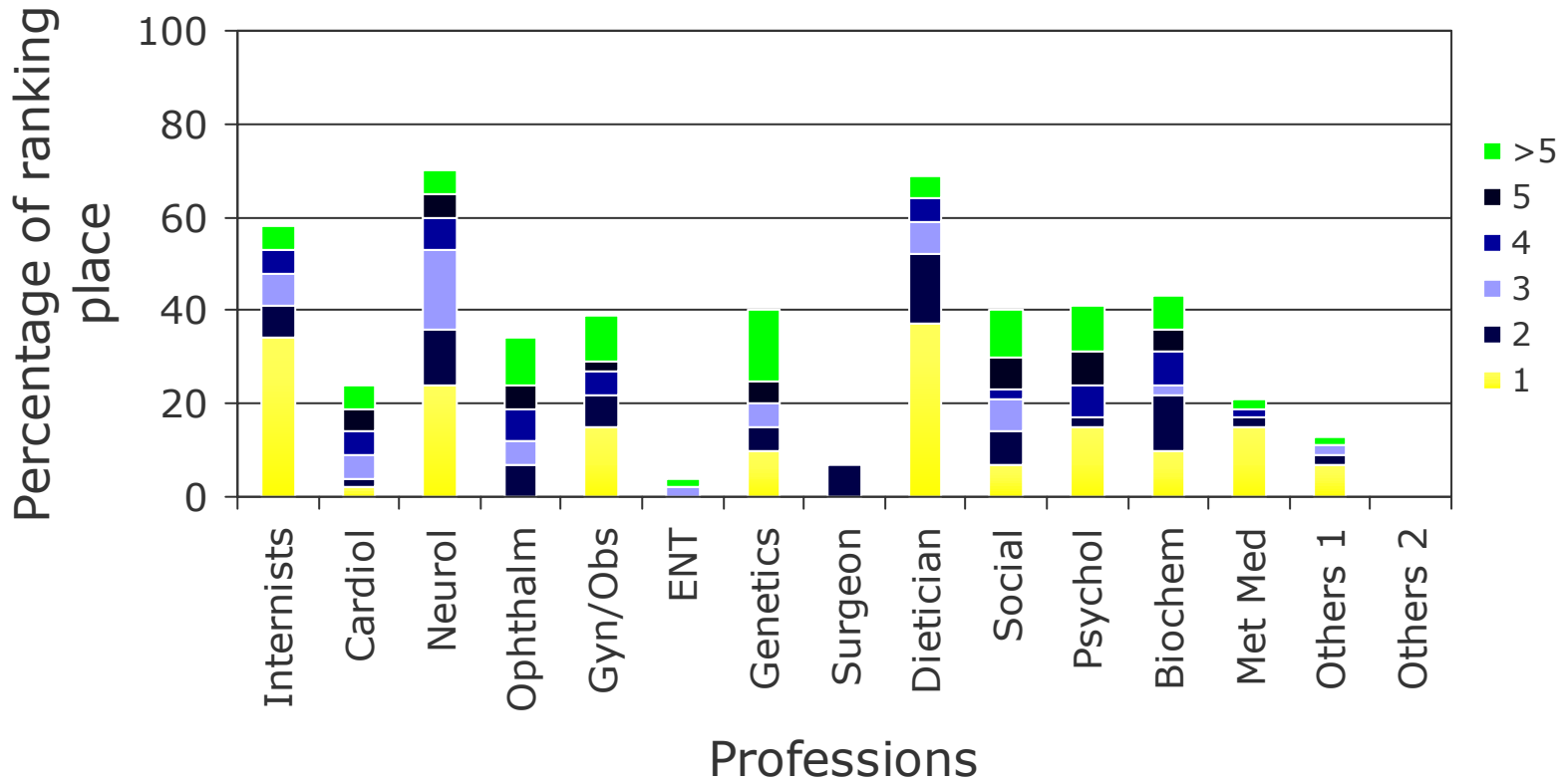




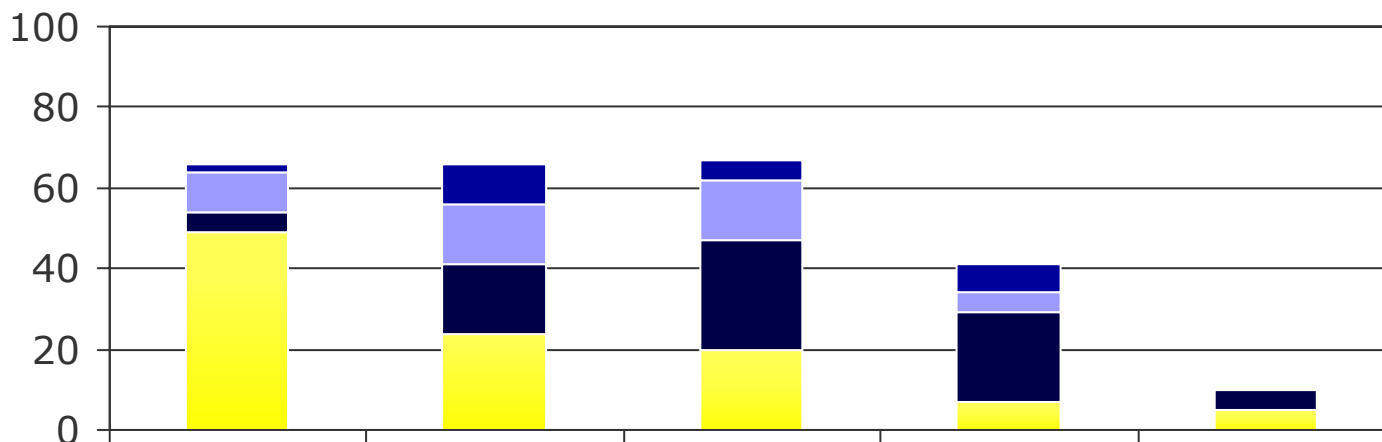








**Percentage of ranking place**



- 4
- 3
- 2
- 1

**Facilities**

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