

A survey of the provision of orthodontics in Ireland 2018

Précis

A survey of current orthodontic workforce levels in Ireland, showing stable practitioner to populations ratios since 2007.

Abstract

Workforce planning is important in all aspects of healthcare; in orthodontics, this must take into account several issues including the need for orthodontic treatment, the number of specialist personnel available to provide treatment and the role of orthodontic auxiliaries.

The aim of this study was to collect information on the orthodontic workforce in Ireland and to compare this information with previous studies (2001, 2007) in order to determine longitudinal trends in the orthodontic workforce in Ireland.

The study was carried out in the form of a survey. The survey included orthodontic specialists practising in the Republic of Ireland. A list of these practitioners was obtained via the Orthodontic Society of Ireland (OSI) and the orthodontic specialist register of the Dental Council of Ireland.

The study was circulated both via email and post for completion by March 31, 2018. The electronic version used SurveyMonkey software, which provides a user-friendly interface between the operator and the target population. Data was then collated using both hard copy and online survey responses.

The survey showed that the number of orthodontists in Ireland has increased since 2007, with the practitioner ratio to the number of 12-year-olds remaining stable. It also highlights the increasing role for orthodontic auxiliaries, which may affect future workforce levels.

Workforce planning must consider current specialist practitioner numbers, population growth and the increasing role of auxiliaries in orthodontic practice, along with the older age profile of practising orthodontists.

Journal of the Irish Dental Association June/July 2019; 65 (3): 145-150

Introduction

Quantifying the number of health workers is an important aspect of healthcare planning. Predicting orthodontic workforce requirements is complex and must take into account the demand for treatment as well as the changing trends in how orthodontic treatment is provided. There is an increasing trend towards

the role of orthodontic auxiliaries and general dental practitioners (GDPs) in the provision of orthodontic treatment. In addition, geographic factors and access to orthodontic services must be taken into consideration. The levels of orthodontic specialist practitioners in Ireland were previously recorded in 2001 and 2007.^{1,2} Knowledge of longitudinal trends in workforce levels will help to



Dr Emily Higgins
BDentSc MFDS RCPS(Glasg)
Postgraduate Student in
Orthodontics,
Dublin Dental University
Hospital,
Trinity College Dublin

Dr Niall McGuinness
PhD DDS MScD BA BDS FDS(Orth)
RCPS Glasg MOrth RCSEdin
Consultant Orthodontist/
Senior Lecturer,
Edinburgh Dental Institute

Dr Lorna Dobbyn
BA BDentSc MFDS MOrth MSc
FDS(Orth) PGCert (MedEd) FHEA
Consultant Orthodontist,
Orthodontic Department
Unit 9 Merlin Park University Hospital,
Dublin Road, Galway

Corresponding author: Dr Lorna Dobbyn E: lorna.dobbyn@hse.ie T: 091-775 621

Table 1: Distribution of orthodontists by age range and place of work

Place of work	AGE RANGES				Total
	31-40	41-50	51-60	60+	
Private practice	14	25	16	6	61
HSE	5	25	7	2	39
Total	19	50	23	8	100

Chi-square = 5.196, df = 3, p = 0.158 (ns); 100 of 101 dentists responded

plan for current and future population treatment needs. The aim of this study was to establish the numbers of orthodontic practitioners (orthodontic specialists and orthodontic therapists) working in Ireland in 2017/18. Secondary aims included highlighting the working practices of orthodontists working in Ireland.

Aims

The aims of this study were to:

- collect information on the orthodontic workforce in Ireland;
- compare results with previous workforce studies (2001, 2007) in order to determine longitudinal trends in the Irish orthodontic workforce;
- determine the ratio of orthodontists to the 12-year-old child population;
- highlight the working practices of orthodontists working in Ireland; and,
- determine the number of orthodontic therapists currently working in Ireland.

Materials and methods

Practitioners with orthodontic specialist qualifications living in Ireland were identified from the specialist register of orthodontists of the Dental Council of Ireland, as well as the membership list of the Orthodontic Society of Ireland (OSI). This information was obtained via the Dental Council, where it is freely available. Those with overseas addresses were omitted as it was assumed that these practitioners were not working in the country at this time. A total of 163 practitioners were identified, of which 20 lived overseas. Thus 143 orthodontic specialists were included in the survey. Questionnaires were distributed via an online survey (SurveyMonkey), as well as a paper survey, between November 2017 and March 2018.³ These questionnaires were based closely on the questionnaires circulated in previous studies.^{1,2} Those who failed to respond after the initial circulation received three further emails and postal reminders, followed by direct telephone contact. Questions asked included age range, sex, type of practice (public/private), percentage of adult patients, percentage of clear aligner use, percentage of extraction cases, number of orthodontic therapists, as well as the estimated age of retirement. Chi-square tests were used to assess the significance of difference between different groups. For the purpose of this study, those who spent over 50% of their working time in private practice were considered as "private practitioners", and those who spent 50% or more time in hospital were considered to be "hospital practitioners".

The population figures were obtained from the Central Statistics Office (CSO) website.⁴ Twelve years of age was taken as the average age of orthodontic treatment in line with previous studies.^{1,2} For the purpose of this study, the number of live births in 2006 (64,426) was used to estimate the number of 12-

year-olds in 2018. To calculate the number of 12-year-olds requiring orthodontic treatment, figures from the North-South Survey of Children's Dental Health in Ireland (2002) were used. This survey found that 36% of 12-year-olds had a definite need for orthodontic treatment according to the Index of Orthodontic Treatment Need (IOTN).⁵

Results

Of the 143 questionnaires circulated, replies were received from 101 respondents giving a response rate of 71%. A total of 90% of the questionnaires were completed in full.

Gender and training location

Of the respondents, 49% were female (n=50) and 51% were male (n=51). This shows an increase in the numbers and proportion of female practitioners in comparison to previous studies. In all, 56% of hospital practitioners were female (n=22), while 53% of practitioners in private practice were male (n=33). In total, 68% of respondents trained in the UK, 27% trained in Ireland and 5% trained in the USA or EU.

Practice type

A total of 31% of practitioners worked in both private practice and hospitals (n=31), 25% of practitioners worked exclusively in hospital practice (n=25), and 44% worked exclusively in private practice (n=45).

Age profile

Half of the respondents were in the 41-50 age group and 23% were in the 51-60 age group. There was no significant difference (p=0.158) in the distribution of Irish orthodontists by age range and work in either private or hospital practice. Statistical analysis is outlined in **Table 1**.

Hours of work

The mean working week was 35.1 hours (SD=7.7). Females worked an average of 33.2 hours per week (SD=6.6) over a 4.3-day working week (SD=0.83). Males worked 37.5 hours per week (SD=8.1) over an average of five days (SD=1.3).

Adult cases (18+)

The mean reported percentage of adult cases treated was 23.6% (SD=15.6). For those in hospital practice, the average was 15.9% (SD=14.0). The percentage of adult patients in private practice was predictably higher at 28.5% (SD=14.7).

Surgical cases

The average percentage of cases treated with a combined surgical and orthodontic approach was 7% in private practice (SD=6.17). Approximately 80% of these were dentoalveolar and the remaining 20% were orthognathic. In hospital practice, an average of 21.8% of cases were treated with a combined orthodontic and surgical approach (SD=16.5); 64% of these were dentoalveolar and the remaining 36% were orthognathic.

Aligner use

The total average percentage of aligner use was reported to be 6% (SD = 9.6). The average in private practice was 9% (SD=10.8).

Table 2a: Brands of the more commonly used systems and technologies used by practitioners

Technology used	Brand
Self-ligating brackets	Damon, Empower (AO), In-Ovation (GAC)
Edgewise brackets	Victory MBT, Roth, Sprint (Forestadent)
Ceramic brackets	Inspire ICE, Clarity (3M), Radiance (AO)
Aesthetic wires	Euroform (Ortho-Care), Sentalloy (Dentsply GAC)
Lingual braces	Incognito, WIN
TADS	AbsoAnchor, Forestadent, Spider Screws, Infinitas, VectorTAS, Benefit
Functional appliances	TBA, MOA, Bionator, Reverse TB, Frankel, Andreasen, Herbst
CAD-CAM	Cerec
Digital radiographs	Planmeca, Sidexis, Siemens, Gendex
IO cameras	Carestream, Canon Kodak
CBCT	Planmeca, iCAT
3D models	3Shape TRIOS

Table 2b: Percentage and number of orthodontists using each bracket brand.

Bracket brand	Percentage and number of orthodontists using the following bracket brands	
Victory MBT	30%	(n=38)
Damon	29%	(n=37)
Clarity	20%	(n=26)
Empower	19%	(n=24)
In-Ovation	15%	(n=19)
Radiance	8%	(n=10)
WIN	5%	(n=6)
Inspire ICE	4%	(n=5)
Incognito	4%	(n=5)
Roth	2%	(n=3)
Sprint	1.5%	(n=2)

Latex-free practice

In private practice, only 15% of respondents had a latex-free clinical practice. This figure was much higher in the hospital practice, where 37% of respondents had a latex-free clinical practice.

Technology used

Table 2a illustrates the various systems and technologies used by practitioners. It was noted that those in hospital practice used CBCT more often than those in private practice (possibly due to the complexity of cases treated in these settings). Twin block appliances and medium opening activators were the most commonly used functional appliances. Damon brackets were the most popular self-ligating brackets. Victory and MBT were among the most popular edgewise appliances used (**Table 2b**).

A reported 55% of practices were fully computerised, with a further 35% of practices partially computerised. Some 81% of the fully computerised practices were private. A total of 64% of partially computerised practices were hospital based. Software types are listed in **Table 3**, with CS Orthotrac (Carestream Dental) highlighted as the most commonly used software.



FIGURE 1: Number of orthodontic therapists and location where they trained.

Therapists

A total of 77% of respondents (n=78) did not utilise orthodontic therapists. Some 23 practitioners had at least one therapist in their practice. Data was available for 27 therapists' training location, with 19 having completed their training in Dublin (**Figure 1**). Four therapists completed their training in Bristol, and two each completed their training in Manchester and Swansea. Interestingly, 42% of respondents (n=42) intended to train or employ therapists in the future.

Referral pathways

In all, 76% (n=77) of respondents had access to publicly funded oral and maxillofacial surgery services; however, the waiting time for treatment was on average 13.5 months (SD=10). Some 65% of respondents (n=66) reported not having access to publicly funded prosthodontic or restorative services.

HSE tendering and cross-border directive

The majority of those who had taken part in the HSE tendering process were reportedly not satisfied with this process. Dissatisfaction largely stemmed from lack of payment for work carried out. Other respondents highlighted a lack of contact from the HSE regarding the process. Those respondents who took part in the cross-border directive mainly provided an advisory role to patients applying for the directive. Others used the facility to refer surgical cases for treatment with a shorter waiting time.

Change of practice

In total, 79% of practitioners reported having no intention of changing their practice in the future (n=80). Some 13% (n = 3) of those in a hospital-based setting were planning to change their practice to either full private practice or part-time private practice. Just 3% (n = 1) of those in private practice were planning to change to hospital-based practice in the future. This has implications for future workforce planning in the public orthodontic services.

Discussion

Workforce planning

The workforce situation in Ireland has altered dramatically in the last 25 years, with the number of orthodontists over four times that of 1992.⁶ The current

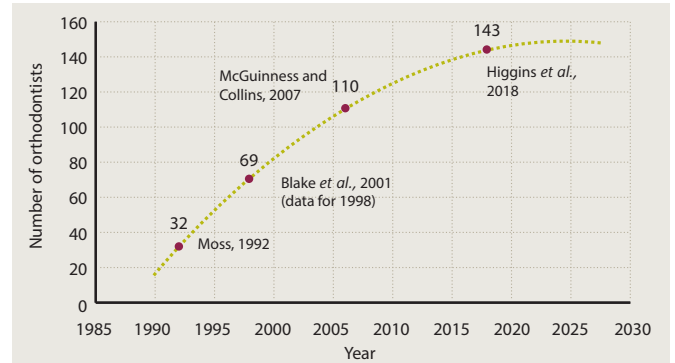
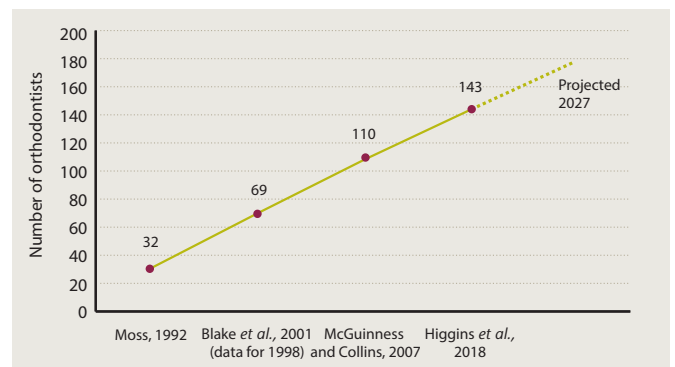
Table 3: Number of practitioners using each type of orthodontic software

Software	Number of orthodontists using
Orthotrac	39
topsOrtho	20
Orthochart	3
Aerona	2
Bridge-IT	2
Exact	2
iPMS	2
Panara	1
Dentally	1
CoinciDental	1
Medicom/DGL Ltd	1

number of orthodontic specialists working in Ireland is 143, with 38 orthodontic therapists.⁷ The number of specialists follows previous predictions by McGuinness and Collins in 2007² and is outlined in **Figure 2**. There has been an increase in the proportion of female orthodontists (49%) in comparison to previous studies.^{1,2,6} The percentage of females in orthodontic practice in 1998 and 2007 was 26% and 33%, respectively. This shows a gradual increase in the number of female orthodontists practising in the Republic of Ireland. In comparison, 50% of practicing orthodontists in the UK were female in 2017.⁸

Figure 2 shows that the projected increase in numbers of orthodontic specialists to date follows a polynomial pattern, and this suggests that the number of orthodontic specialists in Ireland is levelling out and may not increase much in the next 10 years. If, however, a linear model is assumed (**Figure 3**), and using this as a guide, it would suggest that the number of orthodontists in Ireland in 2027 would be approximately 178. **Figures 4a** and **4b** show the number of births from 2006–2017 and the resulting number of 12-year-olds requiring treatment from 2018–2029. Using the CSO predictions of births in 2015 as a prediction of 12-year-olds in 2027 (65,536), the ratio of orthodontists to 12-year-olds at that time will be increased at 1:368. This would suggest an excess of orthodontists per 12-year-old. However, the older age profile of the majority of practitioners may indicate a future need for recruitment to replace this workforce as these practitioners come to the retirement age in approximately 15–20 years' time, assuming the age of retirement is approximately 65 years of age. The current ratio of orthodontists to 12-year-olds is 1:449. This is much the same as that in 2007, which was 1:435.² The ratio of orthodontists to 12-year-olds in 1980 was 1:2,773. These ratios are illustrated in **Figure 5**.

Todd and Dodd (1983, 1990) identified that 64% of children were in need of orthodontic treatment in the Child Dental Health Surveys of 1983 and 1990,^{9,10} but their method of assessment did not use the IOTN. The North-South Survey of Children's Oral Health in Ireland (2002)⁵ found that 36% of 12-year-olds and 29.2% of 15-year-olds had a definite need for orthodontic treatment using the IOTN.¹¹ The percentage of 15-year-olds who had undergone or were undergoing orthodontic treatment at the time of the survey increased from 13.9% in 1984 to 23.4% in 2002.⁵ A planned level of 480 UK specialist practitioners was outlined in the Task Group for Orthodontics Report in 1998; however, this took into account the preservation of numbers in the Hospital Dental Service and Community Dental Service.¹² It also took into consideration the creation of orthodontic auxiliaries.

**FIGURE 2: Numbers of orthodontic specialists in Ireland to date.****FIGURE 3: Future predictions of orthodontic workforce (using a linear model).**

Using the figure quoted for the 12-year-old population earlier, along with the data from the North-South survey, a figure of 23,553 can be deduced as the estimated number of patients requiring treatment in the Republic of Ireland at the present time. This figure has been reached by using the number of 12-year-olds according to the CSO (65,425) divided by the percentage of 12-year-olds requiring treatment according to the North-South survey (36%). However, this does not take account of any changes in the number of 12-year-olds that may present in the future. According to the Irish Consultant Orthodontists' Group report to the Oireachtas Committee on Health and Children in 2002, a safe caseload for a specialist in full-time practice is 400 patients.¹³ Patients are generally treated over a time period of 18–24 months. This equates to approximately 200 patients completing treatment in one year. Dividing the current number of 12-year-olds of 23,553 by 200 results in a figure of 118. This means that 118 full-time specialists would be required to treat the one-third of the 12-year-old population requiring treatment. This does not consider those that wish to undergo treatment for purely aesthetic reasons, those that fall within grades 1–3 of the IOTN, or adults undertaking orthodontic treatment. It also excludes patients who may not have been able to access treatment as children. We must also consider changes in the workforce with the introduction of orthodontic therapists.

The impact of Brexit on the workforce in Ireland may be significant. A total of 67% of respondents to this survey trained in the UK. Irish students may be considered international students after Brexit and may have to pay international fees as a result. This is likely to reduce the number of Irish applicants to UK training programmes. The Irish Consultant Orthodontists'

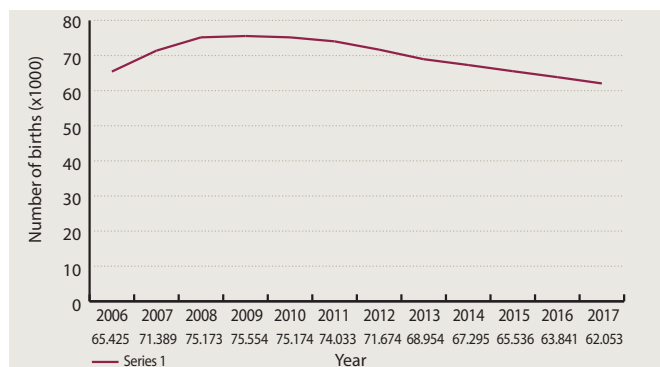


FIGURE 4a: Number of births in Ireland (x1000) from 2006-2017.

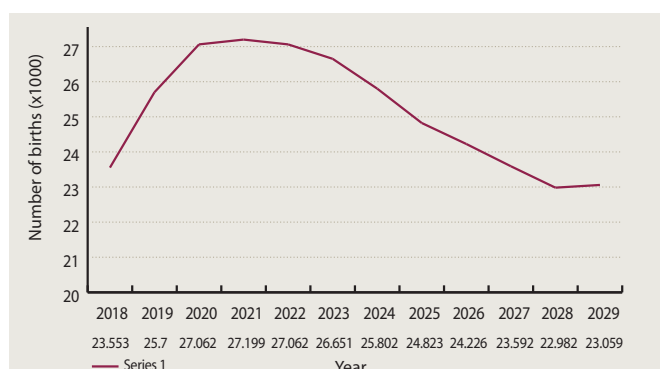


FIGURE 4b: Projected number of 12-year-olds requiring treatment.

Group report to the Oireachtas Committee on Health and Children in 2002 suggested that more training positions be made available in Ireland and consideration be given to sponsorship of training positions in other EU countries.¹³

Development of the therapist grade

Orthodontic therapists are relatively new members of the orthodontic auxiliary team. Until 2014 there had been no training programme available to orthodontic therapists in Ireland and so allowances were made by the Dental Council of Ireland to recognise orthodontic therapists who trained in the UK and carried out their placement in Ireland. More recently, the Dublin Dental University Hospital has started its Diploma in Orthodontic Therapy, with the first cohort graduating in 2015. This is reflected in the results of this survey, with 77% of orthodontic specialists without orthodontic therapists currently. However, 42% of orthodontists plan to employ or train orthodontic therapists in the future. O'Brien *et al.* (1988) suggested that increases in productivity ranged between 40% and 130% when dental auxiliaries were employed in various practice settings.¹⁴ Feedback from patients suggested a high standard of satisfaction with the treatment delivered by the therapists, comparable to that delivered by the dentist. According to the Dental Council of Ireland register, there are currently 38 orthodontic therapists registered to work in the Republic of Ireland.⁷ This number is likely to increase. This may increase the efficiency of orthodontic treatment provision in the future; however, the effect of this on workforce planning is difficult to predict.

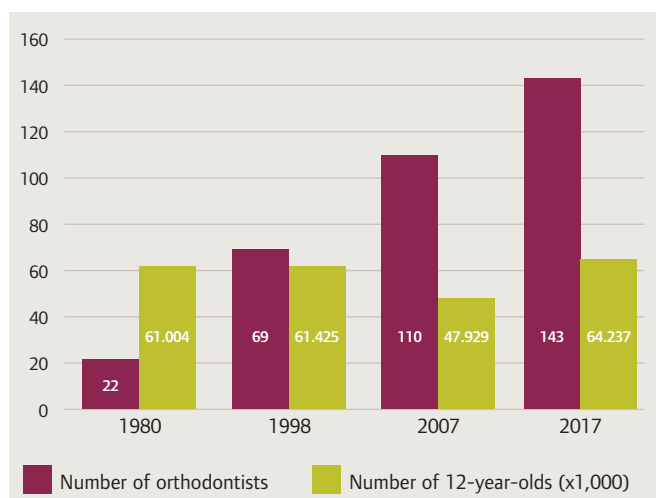


FIGURE 5: Ratios of orthodontists to 12-year-old population.

Aligner treatment and adult cases

The percentage of cases treated with aligners by orthodontic specialists is self estimated by clinicians at around 6%. This appears to be a small proportion of respondents' caseload. McMorow and Millett reported that only 19% of orthodontists in Ireland use clear aligners, often in adult cases.¹⁵ This is not a percentage of cases treated by aligners but a percentage of orthodontic practitioners who describe their use of them in adult cases as "often". The low numbers of aligner use in practice is mostly due to the nature of cases being completed and a reflection of the age profile of the orthodontists in Ireland currently. It could also be attributed to the more prevalent use of aligners by general dental practitioners (GDPs), although there is currently no reliable information outlining the use of such aligners among GDPs. Aligner use in hospital practice was difficult to determine in this study as many respondents who worked primarily in hospital also worked in private practice where they used aligners. Fixed and functional appliance use varied greatly among practitioners. The mean reported percentage of adult cases treated was 24%. We could assume that the high percentage of adults being treated in the HSE is most likely due to the long waiting lists and older age in treatment as a result, as well as the number of orthognathic cases completed in this setting.

Technology used

The survey showed that a wide range of technologies were used. In some cases where practitioners worked in both private and hospital practice it was difficult to discern where certain technologies were primarily used. The majority of hospital-based practices were non-computerised; however, this is likely to change in future as computerisation of all remaining HSE units is planned.

Study limitations

To enable comparisons to previous studies we have used the orthodontist:12-year-old population ratio.^{1,2} This does not take into account the increasing demand for aesthetic treatment from children and adults. The demographics of people seeking treatment has changed over time.

In reality, very little workforce planning is done in Ireland outside a limited amount done by the public health service. Private practitioners open a practice depending on their own interpretation of the market in a given area. In orthodontics in Ireland a number of workforce surveys have been completed over

the years by interested practitioners in collaboration with the OSI. Practitioners were grouped into private or hospital-based clinicians based on their majority workload. In future studies it would be worthwhile dividing practitioners into three groups: private; hospital-based; and, mixed private/hospital-based.

As a survey this one has inherent biases including response bias. Our response rate of 70% is lower than that of previous surveys and may have been increased by anonymising the survey further or providing incentives, which have been shown to increase response rates by Dillman in 2017.¹⁶ It is possible that those who did not respond are different to those who did. Increased awareness of data protection, along with the concurrent introduction of the General Data Protection Regulation (GDPR) in 2018, meant that enthusiasm for data sharing was reduced and this made collecting data both over the phone and via survey difficult.

Future projections are speculative and the effects of Brexit and changes in the NHS in the UK may be substantial. A large number of HSE orthodontists were trained in the UK between 2000 and 2010 when the numbers in the service grew substantially. This cohort will be retiring in approximately 20 years' time and this will need to be anticipated to ensure succession planning and avoid gaps in service.

This study has provided information on the current orthodontic workforce in Ireland and can be used for future national and Europe-wide study comparison.

Conclusion

The estimation of future workforce requirements is complex. The well-established IOTN is used to estimate treatment need, but it does not necessarily consider the demand for treatment, which is potentially limitless. The number of orthodontic specialists and the changing role of orthodontic auxiliaries will have an impact on provision of orthodontic treatment. Any workforce planning should also take into account the older age profile of orthodontists currently in practice. McGuinness and Collins (2007) suggested that 66% were less than 45 years old at the time of this particular survey, while in this study, 71% are now over 45. The overall gender distribution of orthodontists was almost equal, compared to a 1:2 female:male ratio in 2007. This study showed that aligners are used in only 6% of cases and that there was great variation in appliance types, both fixed and functional, used in practice.

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CPD questions

To claim CPD points, go to the MEMBERS' SECTION of www.dentist.ie and answer the following questions:



1. Which one of the following best outlines the influencing factors in manpower planning?

- ☐ A: Age of the workforce, years in practice, technologies used, and gender of the workforce.
- ☐ B: Need and demand for treatment, number of practitioners, deployment of auxiliaries, and financial considerations.
- ☐ C: Global manpower levels, medico-legal changes, and age of retirement.

2. In Ireland, older clinicians are more likely to work in private practice:

- ☐ A: True
- ☐ B: False

3. Which of these statements most accurately describes current manpower levels?

- ☐ A: Manpower levels are lower than previous studies and the age profile of the workforce is younger than in previous years.
- ☐ B: Manpower levels are similar to previous studies, and are likely to increase in the coming years with the introduction of orthodontic auxiliaries.
- ☐ C: Manpower levels are similar to previous studies, and are likely to decrease in the coming years due to the older age profile of current practitioners.