

## Distribution of PSU Scores for Dentistry Schools in Chile during 2012-2014.

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**Abstract:** To describe distribution of applicants' scores in the University Selection Test (Prueba de Selección Universitaria, PSU) for dentistry in Chilean universities associated with the PSU test between 2012 and 2014. **Methodology:** A retrospective study based on the applicants' records to dentistry in universities associated with the PSU admission process from 2012 to 2014. **Results:** There were twenty careers, representing sixteen universities associated with the PSU process. From them, ten were private and ten traditional. Overall, 19,469 students applied and 6,105 were summoned to fill 4,828 vacancies during the period under study. There was a drop in the number of applicants per vacancy from 5.30 to 3.11 and the selection per quota rose from 1.23 to 1.32, varying mostly in private universities. The weighted average score was  $662.78 \pm 44.73$  with a steady decline without differences regarding sex mostly in private universities. **Conclusions:** During 2012-2014, there were fewer candidates for dentistry, as well as lower scores primarily affecting private schools. **Keywords:** "Students, Dental" [MeSH], Chile, "Career Choice" [MeSH], "School Admission criteria" [MeSH].

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## Distribución de los puntajes PSU en la carrera de Odontología en Chile durante 2012-2014.

**Resumen:** Describir la distribución de los puntajes PSU de los postulantes a odontología en las universidades chilenas adscritas al proceso PSU durante los años 2012 a 2014. **Metodología:** Estudio retrospectivo a partir de los registros de postulantes a las carreras de odontología en universidades adscritas al proceso PSU en las admisiones 2012 a 2014. **Resultados:** Se incluyeron 20 carreras, que representan a 16 universidades adscritas al proceso PSU, 10 de ellas privadas y 10 tradicionales. En términos globales durante el período en estudio postularon 1.9469 personas, siendo 6.105 seleccionados en primer llamado para un total 4.828 cupos disponibles; se observa una disminución de los postulantes por cupo desde 5,30 a 3,11 y los llamados por cupo disponible subieron desde 1,23 a 1,32, variando mayormente en universidades privadas; el puntaje ponderado promedio fue  $662,78 \pm 44,73$  con una baja sostenida, mayor en universidades privadas y sin diferencias por sexo. **Conclusiones:** Durante el período 2012-2014 hubo menos postulantes a odontología, así como una baja de los puntajes que afecta principalmente a planteles privados. **Palabras clave:** Estudiantes de odontología, Chile, elección de carrera, admisión universitaria.

### Introduction.

Dentistry is internationally considered a traditional career with high social prestige. Among other reasons, this has been associated to the graduates' living standard (mainly, economic income and personal time management). At the same time, it has had an impact on enrollment of new applicants with high academic level, which has built up its social prestige<sup>1-3</sup>.

During the last decades, higher education institutions have burst both in Chile<sup>4</sup>, as in Latin America, and the rest of the world<sup>5</sup>. This has had varied impacts. From a positive point of view, access to higher education has been improved. On the other hand, it has also been associated with high costs and many institutions with questionable quality<sup>6</sup>. In dentistry, it can be seen this expansion of educational opportunities has been associated with negative impacts for the dental professional, such as a low employability and income<sup>7-8</sup>, as well as little or no contribution to the improvement of

the oral health conditions in the population<sup>7</sup> in Chile and other Latin American countries. This strengthens the interpretation of the absence of planning regarding health professionals' training<sup>7</sup> which has been entrusted to the principles of the market operating under the logic of information asymmetry<sup>9</sup>.

In addition to the above, enrollment in dentistry grew seven times with a sustained decrease in entry scores during 1997-2011 in Chile<sup>8</sup>. These data would provide reason to hypothesize a low social prestige for dentistry schools, which would cause a minor interest from higher education applicants to enter the dental profession, affecting PSU scores and the number of applications. However, there are no research publications regarding this possible impact in indexed journals so far.

The objective of this research is to describe the distribution of the PSU applicants' scores for dentistry in Chilean universities requiring PSU test during 2012- 2014.

### Materials and methods.

A retrospective study based on the applicants' records for dentistry programs in universities with PSU admission process for 2012, 2013 and 2014 was carried out.

First, a general analysis, which consisted of two stages, was made at national level. In the first stage, all the applicants without exclusion criteria were included to analyze the following variables:

- Total applicants (TA): total number of all the programs.
- Quantity of quotas (QQ): offered vacancies for each program.
- First selection quotas (S1): number of successful applicants.
- First selection offset (O1): quotient between S1 and QQ.
- Applicants per quota (AQ): quotient between TA and QQ.
- Type of university: Traditional or private. The first ones were created before 1981 and the second ones later<sup>8</sup>.
- Year: corresponding to the admission process, not for taking the PSU test.
- The second stage included only S1 candidates. Those who were not chosen in the first selection

were excluded. These variables were analyzed:

- Type of university: Traditional or Private.
- Year: corresponding to the admission process, not for PSU taking.
- Nomination scores (NS): The weighted score of each application.
- Sex: according to the first two names.

The data were tabulated using a form in MS Excel 2003 (Microsoft Corp., Redmond, USA) and analyzed using STATA 10/ (STATA Corp., Texas, USA). Descriptive statistical analysis was carried out calculating averages with standard deviations and percentiles (p10, p25, p50, p75 and p90) by sex, year and type of university. A non-normal distribution was found using Shapiro-Wilk test, so statistical differences were determined with Kruskal-Wallis test, with a significance level of  $p < 0.05$ .

### Results.

There were twenty careers, representing sixteen universities associated with the PSU process. From them, 10 were private and 10 traditional (Table 1). Figure 1 shows the evolution of TA, QQ, and S1 between 2012 and 2014 by type of university. Overall, there were 19.469 applicants, from which 6.105 were summoned for a total of 4.828 available quotas during the period under study.

Between 2012 and 2014 there was a decrease in AQ from 5.30 to 3.11 applicants per quota, while O1 increased from 1.23 to 1.32 in the summons per each available quota. Evolution according to the type of university is shown in Figure 2.

For the period under study, the weighted average scores for the first summon were  $662.78 \pm 44.73$ . Average numbers according to year, sex and type of university are shown in Table 2. There was a statistically difference for year and type of university ( $p=0.0001$ ), but not for sex ( $p=0.6593$ ).

Figure 3 and 4 show weighted score distribution according to the type of university and sex respectively.

University	Career Code	Region	Type
U. de Chile	11095	13	Traditional
Pontificia U. Católica de Chile	12056	13	Traditional
U. de Concepción	1309	8	Traditional
U. Austral de Chile	17089	14	Traditional
U. de Valparaíso	19050	5	Traditional
U. Arturo Prat	23077	1	Traditional
U. de Antofagasta	24048	2	Traditional
U. de La Serena	25036	4	Traditional
U. de La Frontera	30033	9	Traditional
U. de Talca	34023	7	Traditional
U. Diego Portales	38171	13	Private
U. Mayor (Santiago)	39122	13	Private
U. Mayor (Temuco)	39415	9	Private
U. Finis Terrae	40080	13	Private
U. Andrés Bello (Santiago)	41060	13	Private
U. Andrés Bello (Viña del Mar)	41099	5	Private
U. Andrés Bello (Concepción)	41127	8	Private
U. de Los Andes	43018	13	Private
U. del Desarrollo (Santiago)	44021	13	Private
U. del Desarrollo (Concepción)	44036	8	Private

Table 1. Universities offering Dentistry and requiring PSU test, Chile, 2012-2014.

	Year			
	2012	2013	2014	General
Female	670.04 ±40.29	660.46 ±44.51	657.85 ±49.21	662.60 ±45.27
Male	666.79 ±38.30	662.57 ±42.82	659.94 ±49.32	663.08 ±43.81
Traditional	701.00 ±25.47	698.23 ±29.10	696.15 ±37.15	698.40 ±31.17
Private	649.07 ±33.23	638.72 ±35.22	635.55 ±40.87	640.96 ±37.12
General	668.82 ±39.58	661.27 ±43.87	658.59 ±49.25	662.78 ±44.73

Table 2. Weighted average scores according to year, sex and type of university.

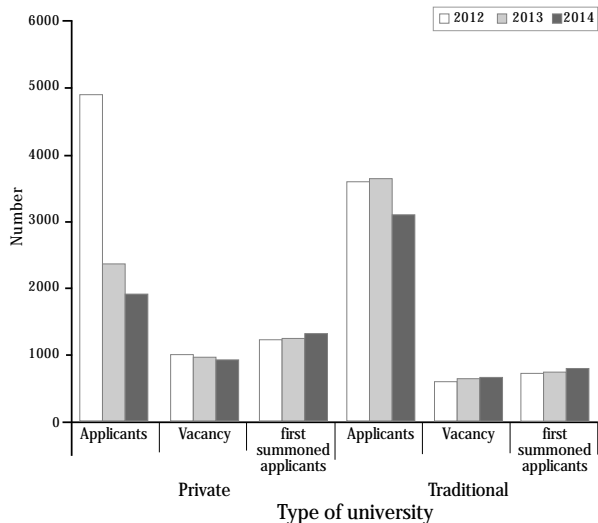


Figure 1. Evolution of number of applicants and quota for dentistry, Chile. 2012-2014.

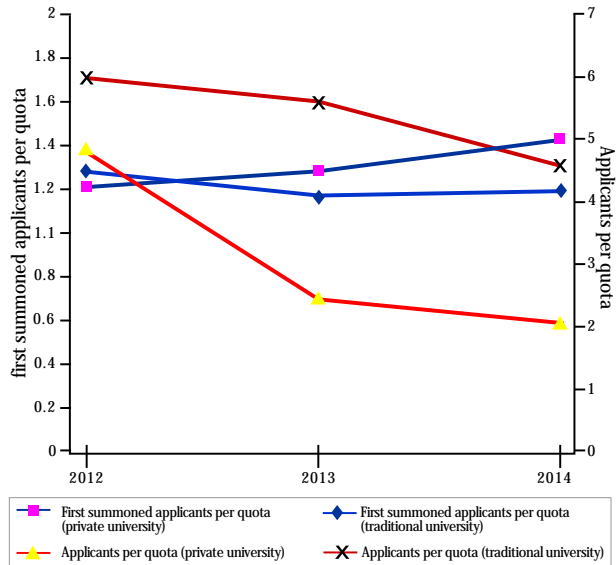
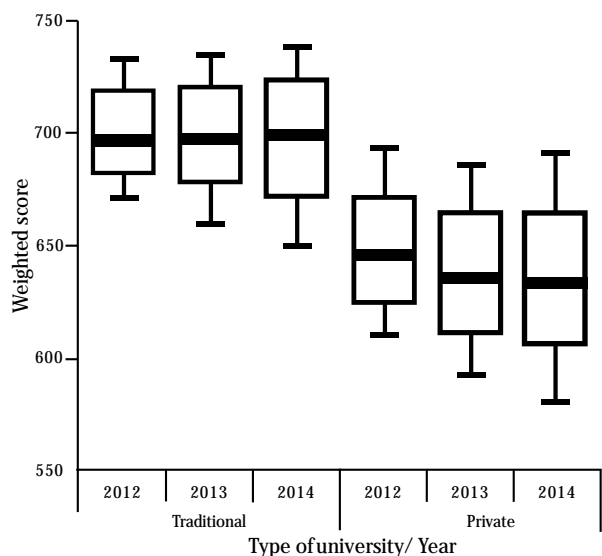
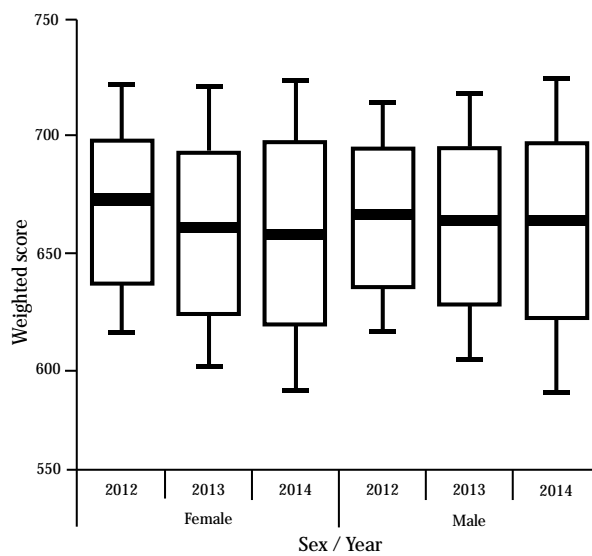


Figure 2. Evolution of application and accepted applicants per quota for dentistry, Chile. 2012-2014



Box (p25, p50 y p75) Whiskers (p10 y p90)

Figure 3. Distribution of weighted scores according to the type of university, Chile.



Box (p25, p50 y p75) Whiskers (p10 y p90)

Figure 4. Distribution of weighted scores according to sex, Chile. 2012-2014.

### Discussion.

The results of the present study show that the numbers of applicants for each available quota for dentistry and the mean admission scores have decreased. These results would account for the loss of interest in the career among applicants to the Chilean universities during the last three years.

However, some limitations should be taken into

consideration when interpreting these results. The analyzed universities do not represent all the ones offering dentistry in Chile. There are two universities, with at least four schools in different regions of the country, which are not using the PSU process: San Sebastian and Pedro de Valdivia universities<sup>8</sup> and universities individually. In any case, this analysis included approximately four out of every five available

quotas to study dentistry in Chile<sup>8</sup>. On the other hand, 20% of the non-analyzed quotas are mathematically unlikely to completely change the already described trend, i.e., to increase the number of applicants per quota during the studied period.

A second limitation is the extension of the period under review. Three years were included. During this time, low scores and number of applicants were sustained, although with a greater reduction between 2012 and 2013 than between 2013 and 2014. However, records from previous years were not considered. Therefore, if the scores and number of applicants from 2010 or 2011 were similar to those of 2013 and 2014, the trend would change, hypothetically. In this case, it would have been 2012 when candidates and scores rose and then returned to the previous levels. Considering previously published results<sup>8</sup>, this scenario seems unlikely. In any case, it is necessary to further evaluate this process annually as it is done in other countries<sup>10</sup>.

The analysis of the differences according to the type of university (private or traditional) clearly display that traditional universities are the ones to generate more interest among applicants, as measured by the amount of applicants and their scores. In concrete terms, there are proportionately twice as many candidates interested in traditional universities, which also have average entry scores exceeding 60 points compared to the private ones. Considering this difference and the strong and growing presence of private schools since 2003 in Chile<sup>8</sup>, it is possible to hypothesize this trend is likely to extend over the next ten years.

A detailed study of the distribution of entry scores during these three years shows a situation which is masked by average numbers, which showed a slight drop in ten points, mostly in private universities than traditional ones. However, the analysis by percentiles displays two facts: the high middle (p50-p75) and high zones (p90) have shown only minor variations, upward and downwards for traditional private universities respectively. On the other hand, the average low (p50-p25) and low zones (p10) have presented a strong decrease, between ten and fifty points, in both types of institutions, higher in private than traditional universities. This means that while the average academic quality of the students entering dentistry has dropped only slightly, cut scores have done it more abruptly.

Currently, it is not possible to determine the impact the low academic quality could have on the quality of the qualified professionals who are admitted to dentistry. As there are no national assessment tests for dentistry students in the intervening years or graduated. There is not information with respect to the National Dental Test (NDT). In spite of this and considering the

research in other countries, it is possible to predict the academic/professional quality of the future graduates will also decrease, given the positive (but variable) correlation between scores for admission and performance throughout the career<sup>11-12</sup>. Another factor is the quality of the new campuses, most of which have accreditations with less than five years or simply do not have any<sup>8</sup>.

In Chile, recently published research enables mapping entry requirements and academic performance<sup>13-14</sup>, but only for the early years. Thus, it is not possible to conclude with respect to the impact on the final quality of the qualified professional. In any case, these investigations<sup>13-14</sup> have demonstrated that there is a poor correlation between the variables mentioned above. Therefore, appropriateness of the selection tools used to enter dentistry and the need for more comprehensive processes, including academic performance, manual dexterity, personality variables<sup>15</sup>, and possibly adding career vocation as in other countries, can be questioned<sup>16</sup>.

It is difficult to compare the present results with other countries, because the university selection processes are not the same. Despite this, a point of comparison with the United States can be made<sup>10-17</sup>. In this country, there are approximately five thousand quotas to study dentistry, one for each sixty thousand inhabitants<sup>10</sup>; Chile has ten times that proportion<sup>8</sup>. Over the last decade, the number of quotas has remained almost unchanged, only slightly enhanced by the opening of three programs in 2004<sup>17</sup>. Meanwhile, the quantity of applicants rose by almost 70% between 2000 and 2007, slightly going down then in 2008, around 12.000 applicants. This figure has remained constant in recent years<sup>10</sup>. On the other hand, entry scores, measured by GPA and DAT, have steadily risen since 2000<sup>10-17</sup>. Additionally, attention has been paid to the entry of underrepresented minorities into the dental profession and strategies for their successful qualification<sup>18</sup>.

While this study presents an overview of the entry process to dentistry programs and the differences by sex and type of university, it is necessary to carry out more specific analyzes designed to determine possible differences by geographic area and universities individually.

## Conclusions

The scores and number of applicants to dentistry at Chilean universities requiring PSU test have shown a decline between 2012 and 2014. This has mainly affected the private universities without differences by sex. It is necessary to further evaluate entrance to dentistry schools and to develop research to improve the suitability of the selection processes.

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