

Make A Wish<sup>®</sup> International:  
“**WISH – SURVIVAL – STUDY**”

A quantitative study about the effects of a granted wish  
on the survival of children suffering from  
Leukaemia or brain tumors





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## 1 INTRODUCTION

The Make-A-Wish® Foundation is a global organisation with the purpose of granting the wishes of children with life-threatening medical conditions. Originally founded in 1980 in Phoenix / USA the idea of wish-granting beyond the borders of the United States was developed. In 1993 the Make-A-Wish Foundation® International was officially formed with the purpose of serving children outside the USA. Today Make-A-Wish International® is working in 47 countries on five continents through 36 affiliates and is one of the world's most well-known charities. Within the United States the Make-A-Wish Foundation® of America is organised in 62 chapters to grant the wishes of American kids. With the help of more than 30 000 volunteers and generous donors the Foundation has collectively already granted about 300.000 wishes throughout the world since 1980.<sup>1</sup>

The experience of the Foundation's staff is, that granting a wish brings not only joy to the children, but also has a greater impact on the lives and well-being of these children. The daily life of children with life-threatening illnesses, especially with the diagnoses cancer, is affected by insecurity, dejectedness, fear and hopelessness. Also for the family the grave illness of a child accompanies huge mental and physical burden, separation and ambiguity. In addition to much happiness after the event of wish-granting, other effects like bravery, more hope and a higher will to live are reported by the volunteers and staff of the organisation with regard to the wish-children (Make-A-Wish® kids). These effects are often also observed in family members.. As such, one very important question is, how the quality of life of children with life threatening conditions, can be improved through granting a wish.

There are also reports from affiliates about special experiences with several wish children. In addition to the described mental influences of wish-granting on the wish child, there was also positive impact observed, such as improvement of results of blood samples right after the wish granting. Sometimes the physical condition of a child is noticed to be considerably better than before the wish. So far, there have been no scientific studies to address these subjective experiences and observations.

There is only one previous study about the impact of the wish fulfilment in the USA.<sup>2</sup> and this was conducted by the Make-A-Wish Foundation® of America. This study involved interviews with parents of wish children and volunteers of Make-A-Wish® America. The main results were that the children changed their attitude after the wish-granting in a positive way, i.e. there was a greater will to get better, higher compliance to treatment, more physical and mental strength, mobility and energy. For the parents the main impact of the wish-granting was increased emotional well-being (hope, positive outlook, less fear, etc.), i.e. more social well-being, lasting positive memories and higher resilience. For the siblings the study showed that there was a reduced level of anxiety. These results of increased quality of life

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<sup>1</sup> cp. <http://www.worldwish.org>

<sup>2</sup> cp. Make-A-Wish Foundation® America: Wish impact study results. Initial phases: jan-dec 2010, March 9, 2011.- download: <http://cstx.wish.org/wp-content/blogs/115/uploads/full.PDF> (status: 21.5.2012)

for the wish-children and their families have also been observed and reported in other countries.

However, until now there has been no scientific research into the impact of wish-granting on the physical condition of the wish-child. This study shall provide a first insight into the impact of wish-granting on the survival rate of children diagnosed with leukaemia or a brain tumors, through cross-national research involving three countries in the Make-A-Wish International network of Affiliates. The main focus of the study is on the impact of granting a wish on physical and not the mental condition of the children. i.e. 5-year survival time after the wish granting event.

The main question of the research is:

**Is there a difference in the length of survival of children with leukaemia or brain tumors who have had their wish granted through the Make-A-Wish Foundation<sup>®</sup> compared to those without a wish granted ?**

The intention of the study is to provide scientific evidence on an issue, which is presently estimated subjectively by Make-A-Wish<sup>®</sup> staff and volunteers. The results of this study therefore cannot provide a broad overview of the impact of wish-granting, for it only looks at one aspect, i.e. survival time. This however, can be a starting point for more research in the field of the effects of wish-granting on children living with life threatening conditions.

## **1.1 Study design and methods**

The study is planned as an international project, to compare the results between different regions of the world, to answer the question and to see if there are similar results. The Make-A-Wish<sup>®</sup> affiliate chapters which took part in the project were Argentina, Singapore and Austria.

The research project was a retrospective study, analysing the five-year survival rate of children with a wish-granting experience, between years 2003 and 2007. A limitation of the research period was necessary, so that it would be possible to look at the five-year-survival rate after the wish was granted.

Since the number of Make-A-Wish<sup>®</sup> kids and the variety of different diagnoses is very high, two specific groups of children were chosen, namely children with the diagnoses leukaemia or cerebral/brain tumour. These two groups have been chosen, because these two types of live threatening conditions are the most frequent diagnoses.

The raw data was collected by the local staff/volunteers of the participating Make-A-Wish® affiliates and forwarded to the Department of nursing science in Vienna, where the “questionnaire”<sup>3</sup> was developed and the data analysis took place. The data consisted of the essential information of Make-A-Wish® kids in the years 2003 to 2007 with the selected illnesses (see Figure 11 in the appendix). Permission to look up the medical report data of the Make-A-Wish® kids who belong to the sample of the project, was given by their parents before the wish-granting-process started and had been collected by the volunteers of the participating affiliates. The Foundation obtained consent to collect general data of the children but also to take a look at the patient reports at/from the hospital. Furthermore personal data of particular children would not be shown in the research results, but rather general results of all children. Therefore there were no ethical concerns about data privacy protection.

The following variables were asked in the questionnaire:

- |                        |  |
|------------------------|--|
| ⇒ sex                  | ⇒ Date of diagnosis                                    |
| ⇒ Age at wish-granting | ⇒ First contact with the Foundation – wish- collection |
| ⇒ Family configuration | ⇒ Date of wish-granting                                |
| ⇒ Number of siblings   | ⇒ Type of wish   |
| ⇒ Cancer type          | ⇒ Date of death  |

It was also the duty of the local project team to investigate the average national survival rate for children suffering from leukaemia or cerebral/brain tumors in each affiliate of the participating countries (Argentina, Austria, Singapore). This data enabled the comparison between Make-A-Wish® kids and other children who did not receive a wish.. However it has to be pointed out, that the direct comparison between the “wish-kids” data and the data from the national statistics has to be interpreted with outmost caution, because both groups are overlapping (the wish-kids are part of the entity) and on the wish-kids represent a very specific group.

After collecting the data in each participating country (Affiliate) and forwarding the results to the study group, data preparation, data control and the statistical data analysis took place at Department of nursing science in Vienna. Besides descriptive analysis of the data material, the following statistical tests were deployed:

#### ⇒ Chi-Square-Test

This statistical test was used to find out, if there are significant differences between the affiliates regarding the requested characteristics of the children like sex or age. The test is suitable for categorical items, so crosstables as basis of the tests can be calculated. In addition the Cramer's V coefficient was calculated to measure the strength of the differences between the affiliates.

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<sup>3</sup> This questionnaire can also be used after the end of this research project to document the data of the Make-A-Wish® children. So the basis for data collection for future scientific projects will be provided.

⇒ U-Test / Kruskal-Wallis-Test

Both tests were used to find significant differences in time lapses between the affiliates. The choice of these tests can be justified by the metric data level and the small sample size. With the Mann-Whitney-U-Test significant differences in time between two groups can be tested, the Kruskal-Wallis-Test is suitable for more than two groups.

⇒ One Sample Chi-Square-Test

To answer the main question of this project one sample Chi-Square-Test were calculated. This test is intended to compare a frequency distribution of a sample with the distribution within the population. So the frequencies of the average survival rate of wish kids of a country were compared.

## 1.2 Sample Description

For this study a direct selection for the included group of children was performed. The present sample, which was the basis for the statistical analysis, included the following intentional selection of wish-kids:

- Children from Singapore, Argentina or Austria
- Children who had a wish experience through the Make-A-Wish® Foundation of one of the particular Make-A-Wish® Foundations of the above mentioned countries in the years 2003 to 2007
- Children suffering from the following illnesses: Leukaemia or Brain tumor

The data collection was performed in three different Affiliates of Make-A-Wish International®. Data of 423 Wish Kids of different ages between 3 years and 18 years was collected. Because of the size of the participating countries, and the type of wishes which will be described later, the data is not divided equally in the different countries (diagram below). The data from Argentina comprises 203 cases (48% of the sample). The second largest content was collected in Austria, with 131 cases (31%), while Singapore had the smallest sample with 89 cases.

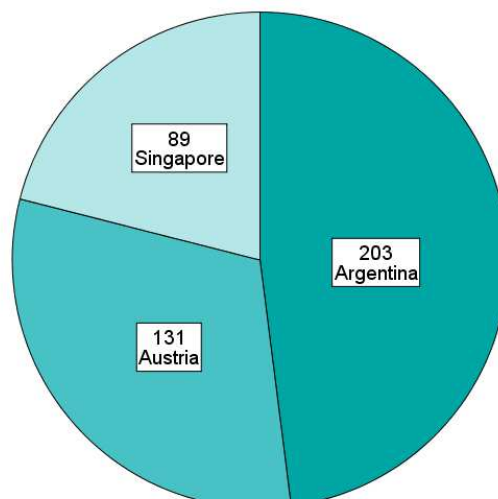


Figure 1: samples per country

It must be mentioned that the assignment of the collected data within the 5 years chosen for the investigation, was not sampled out equally. The reason was that the Singapore and Argentina Affiliates had been established only in the year 2003, thus accounting for the low number of wish kids in the early years. In comparison, the Austria affiliate was established in 1997, so the number of wish kids was relatively constant during the investigation period from 2003-2007.

		country			
		Argentina	Austria	Singapore	TOTAL
year	2003	21	24	5	50
	2004	35	24	10	69
	2005	45	27	17	89
	2006	43	32	30	105
	2007	59	24	25	108
TOTAL		203	131	87	421

Table 1: sample sizes by year and country

The following table shows a summary of missing information within the data of the three Affiliates. For a variety of reasons, including poor or inadequate documentation and follow-up, it was not possible to get a complete collection of data which would have been beneficial for the statistical analysis.

For example, the start of the Affiliates in Argentina and Singapore coincided with the start of the study period, i.e. 2003, and the data documentation was inadequate at that time. Another explanation was that some of the data was collected retrospectively. For example the documentation of the wish kids age was not done at the beginning in Singapore. Other data, for example the date of the medical diagnoses was not collected generally. In Austria, it was documented sporadically. Furthermore, there were instances of inadequate follow-up. For example, the status of 32 children from Austria five years after the wish experience, could not be provided. Hence the data of these children had to be excluded from the analysis.



	country			
	Argentina	Austria	Singapore	TOTAL
	missing	missing	missing	missing
Age at time of wish-granting	0	0	25	25
Sex	0	0	0	0
v1 number of siblings	5	2	6	13
v2 family configuration	1	0	0	1
v3 cancer type	0	0	0	0
v4 date of diagnosis	21	131	51	203
v5 first contact with the foundation - wish collection	4	1	28	33
v6 date of wish-granting	0	2	2	4
v7 type of wish	0	0	0	0
v8 status of illness	0	75	38	113
v9 status of the child 5 years after wish granting	0	32	4	36
v10 date of death	3	38	10	51
v11 explanatory notes	0	0	0	0

Table 2: missing values

According to the data review above, we consider the Quality of data to be suboptimal. This has always to be considered when interpreting the statistical analysis.

Our analysis indicates that there are clear differences in various aspects of the data from the three countries, in terms of completeness of data collection, so a random sample could not be used. This heterogenous data implies a lack of uniformity and the data of the three countries had to be interpreted separately.

As such, the results have to be interpreted carefully in making conclusions for wish-kids in general. Even conclusions for the wish kids in the three study countries are only possible with limitations.

## 2 RESULTS

### 2.1 Characterization of „Wish-Kids“

In the following chapter a precise description of those children who had experienced wish-granting through the Make-A-Wish® Foundation in the years 2003 till 2007 will be found.

The heterogeneity of the three Affiliates in terms of different sample characteristics and the different working strategies of the organisations is pointed out and provides the basis for later statistical calculations of the discrepancy of survival rates concerning Wish-Kids and all children suffering from Leukaemia and brain tumors of one country.

#### 2.1.1 Sex

In regard of the Sex of the wish-kids it is noticeable that the male percentage of kids (56%) by trend is higher than the female percentage (44%). This fact is seen in all three participating countries similarly, although the female percentage in Austria was the least (41%). Overall there is no significant gender difference in wish-kids between the three participating countries (Sig: 0,762 see Table 16 in the appendix).

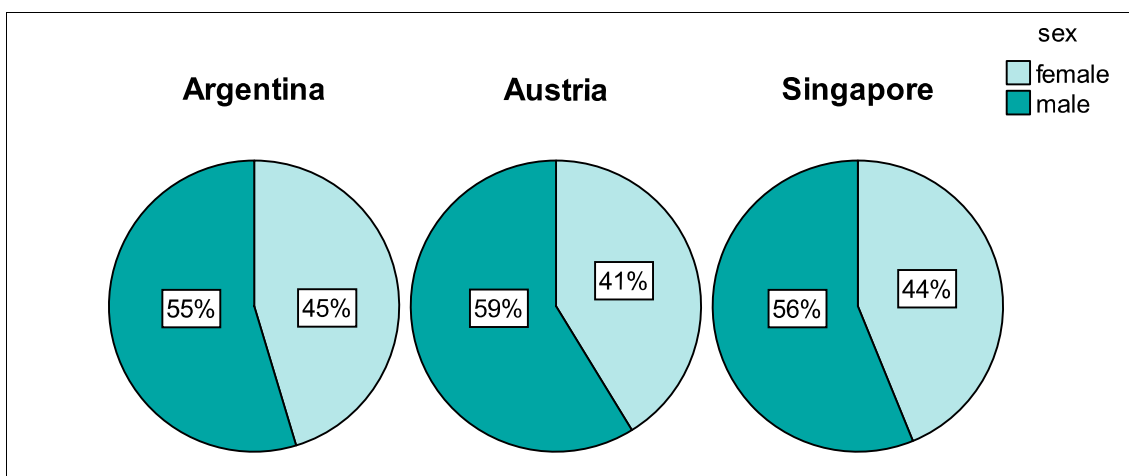


Figure 2: Sex by country

#### 2.1.2 Age

The age of wish-kids started at three years in all three countries. In Austria and Singapore the oldest age of a wish-kid was 18 years and in Argentina the oldest wish-kid was 17 years. Overall, the range of age correlated with the set definition of the Foundation. The average age of kids at the point of wish granting was found to be 8,6 years in Argentina, 8,9 years in Singapore, while in Austria, the average age was clearly older, 10.4 years.

This discrepancy is clearly visible when looking on the charts below. It is shown that the age-groups in Argentina and Singapore are divided similarly, while in Austria, there is a clear difference in the age group distribution. Predominantly the group of kids under the age of 6 years in Austria is more than 10% smaller than in Argentina and Singapore, but on the other

hand the group of wish kids between 15 and 18 years is more than 10% larger than in the other two countries. Also the group of wish-kids over 11 years is larger in Austria than in Argentina and Singapore.

In summary, it appears that the age group of wish-kids under 6 years is larger in Singapore and Argentina, while the group of adolescent children age 11 till 18 years is larger in Austria.

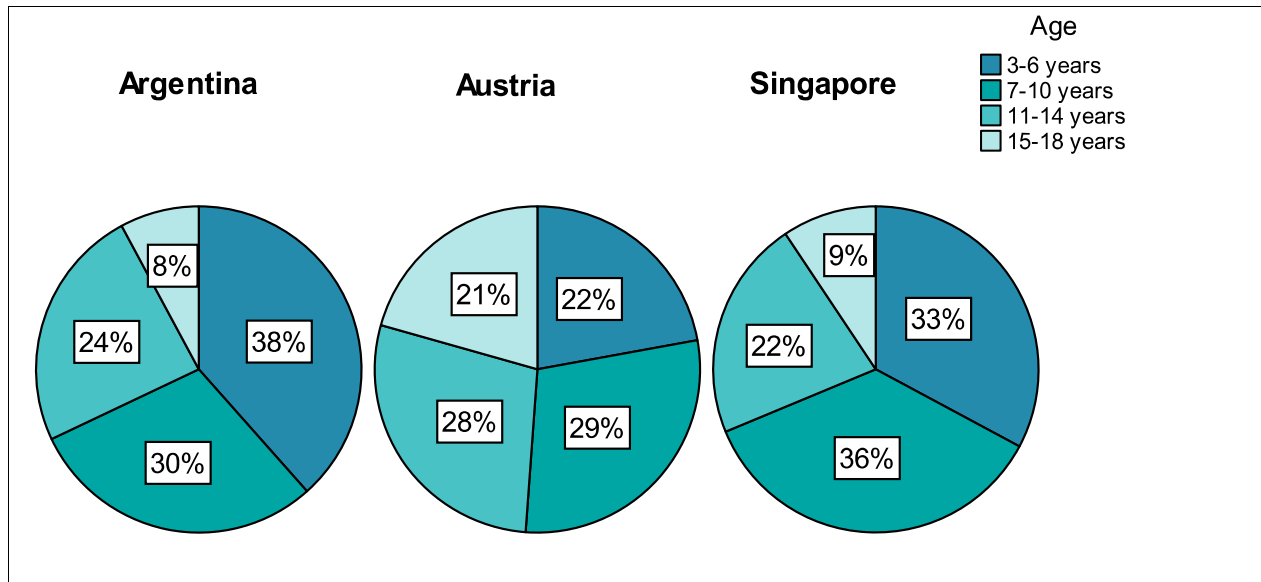


Figure 3: age by country

The calculation of chi-square test shows a highly significant age difference in wish-kids (sig: 0,004; see table 16 in the appendix), although this difference is basically found between Austria and the two other countries. The age difference between Argentina and Singapore is not significant.

This indicates that there is only a slight difference in the sample of study subjects between the countries, in terms of the age

### 2.1.3 Family Constellation

The family surrounding the wish-kids is in the main focus during the wish-granting process for all Affiliates of the Make-A-Wish® Foundation. Therefore the family constellations had to be considered.

In all three participating countries the classic form of family, with two parents, occurred most commonly. Especially in Singapore, 98% of the wish-families are composed of two parents and their children, and only 2% of the wish-kids are living with only one parent. In Argentina 80% of wish families consist of two parents, 13% of the wish kids live with one parent and 7% in „other“ family constellations. In Austria, a clear difference in the fragmentation of family constellations is found. Only 69% of the wish-kids live in a two parent family, while 27% can be found in a single parent family constellation.

Therefore the chi-square test shows a slight highly significant difference in family constelations between the three countries (sig.: 0,000; see table 16 in the appendix)

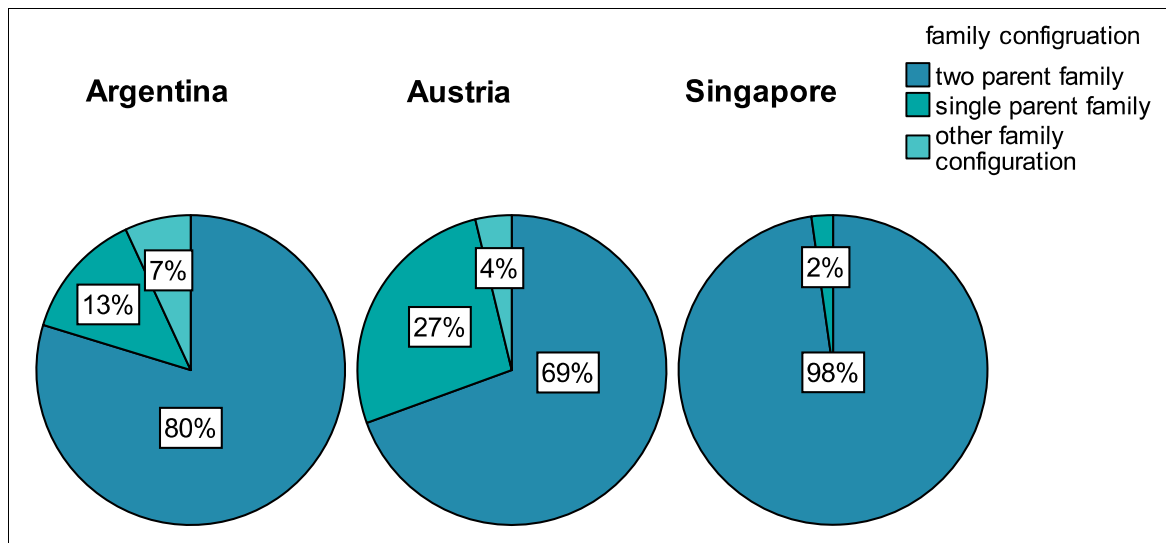


Figure 4: family configuration by country

The above picture, which outlines the differences in family constellations between the three countries, will be clearer if the number of siblings of wish-kids is considered.

In Argentina, it is noticeable that only 10% of the wish-kids live in a „only child“ family, meanwhile 50% of the wish-kids have one to two siblings and 40% live together with more than two siblings. The average number of siblings in Argentina therefore is found at 2,4 children, which indicates a family with many children.

On the other hand, in Singapore, the number of children per family is found to be 1,2 siblings per wish-kid on average. Almost two thirds of the wish-kids live in families with two to three children in total, which means with one or two siblings. This is consistent with the above-mentioned classic family constellation.

In Austria, single child families comprise 40% of cases, which is very high. However 54% of the wish-kids live in a family setting with two to three kids in total (one to two siblings). The average number of siblings in Austria therefore is 0,9 siblings.

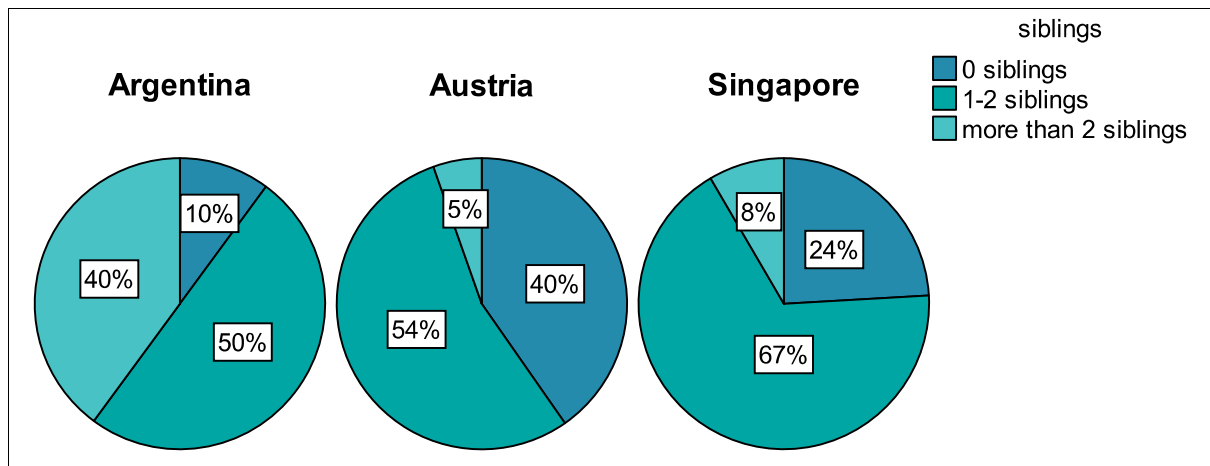


Figure 5: siblings by country

Using the chi-square test, a highly significant and medium strong difference concerning the average number of siblings can be determined between the three countries. (sig.: 0,000, see Table 16 in the appendix).

#### 2.1.4 Cancer Type

In this study the focus was on children suffering from leukaemia or brain tumors, because these two illnesses are the two most common medical conditions in wish-kids.

While the data samples for both illnesses have been found to be roughly equal in Austria, (Leukaemia 58%, Brain tumors 42%), there was major deviation especially in the incidence for children suffering from Leukaemia both in Argentina (87%) and Singapore (80%). The occurrence for Brain tumors in wish children had been found with 20% in Singapore and only 13% in Argentina.

These findings can be classified as highly significant and low to middlestrong, based on the results of the chi-square test. (sig.: 0,000; see Table 16 in the appendix)

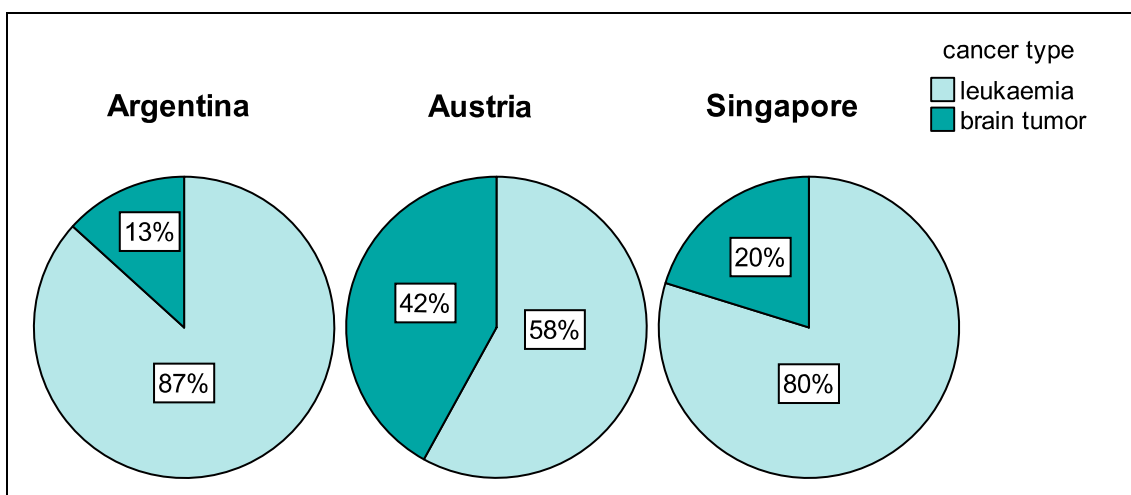


Figure 6: Cancer Type by country

An attempt was made during data collection to determine at which stage of the illness that the wish was granted. This information could only be provided completely in data from Argentina. From Austria, this specific data was not provided in 57% (75 out of 131) of the wish-kids and in Singapore the specific information was missing in 43% (38 out of 89) of the wish-kids. The following percentage quotation according to this has to be interpreted with utmost carefulness.

In Argentina, where the information according to this topic was complete, almost all wish-kids had their wish experience during therapy. Only less than 1% had a different status of illness.

Also in Austria the largest number of wish-kids could be allocated to the group „during therapy“ (77%) when having their wishes granted. Only 14% of the Austrian wish-kids had wishes granted during remission and 9% had been rated „other status“.

A different situation has been found in Singapore, where the status of almost half of the wish kids had been captured. 43% of the wishes had been granted during therapy and 55% during remission“.

This obvious difference between the three countries can be classified highly significant and middle strong accordingly to the results of the chi-square test (sig.: 0,000; see Table 16 in the appendix).

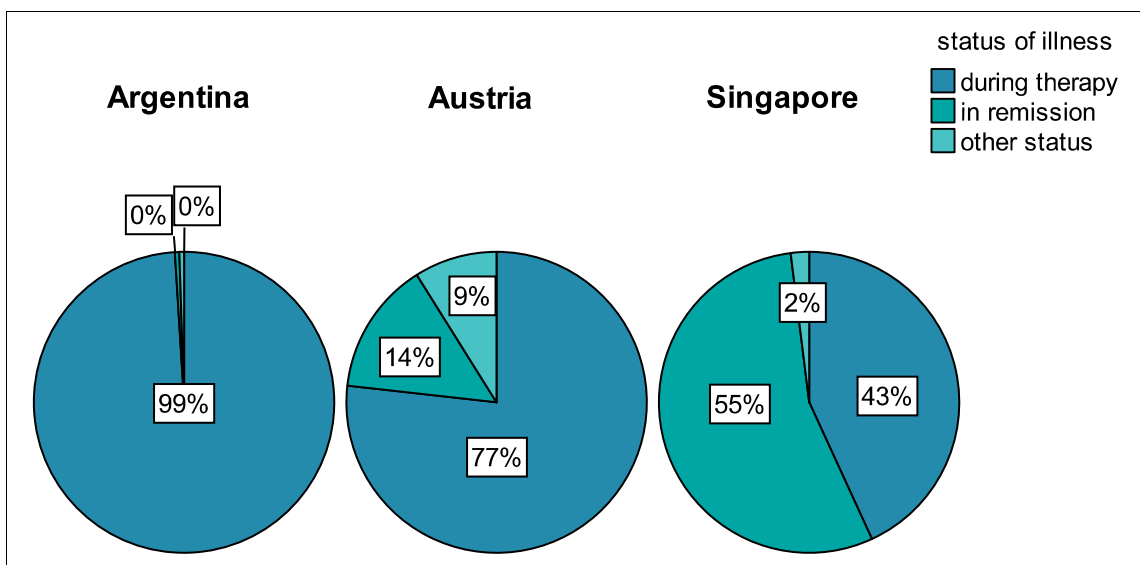


Figure 7: status of illness by country

### 2.1.5 Time lapse between events

To provide a better understandability of the wish granting process, but also to have a solid basis for the calculations of the statistical differences in the survival rates, in the context of the data collection, it has been determined, when specific incidents took place.

Based on date specifications of diagnosis, first contact with the Foundation, date of wish granting and date of death of the wish-kids an average timespan in years could be calculated, which can be seen in the following chart. Thereby not all data could be provided by the Affiliates likewise, apparent gaps can be determined in this chart. Mainly the date of the diagnosis had not been documented consistently.

		mean report				
country		diagnosis_	diagnosis_	diagnosis_	contact	wish_
		_wish	contact	death	_wish	death
Argentina	mean	1,31	1,06	2,89	,21	1,53
	N	137	135	31	198	47
Austria	mean				,50	1,12
	N				126	7
Singapore	mean	1,93	1,51		,41	,62
	N	7	7		61	16
TOTAL	mean	1,34	1,08	2,89	,34	1,28
	N	144	142	31	385	70

Table 3: mean time lapse between events

Between the cancer diagnosis of the children and the first contact with the Make-A-Wish® Foundation an average time span of approximately one year could be found in Argentina. In Singapore this time span was approximately 1,5 years, which does not lead to a significant difference between these two countries. (sig.: 0,627; see Table 16 in the appendix).

However the standard deviation is with 1,4 years (Argentina) and 2.9 years (Singapore) very high, which refers to a broad spectrum in terms of time flow. This time span is important with regard to the overall survival rate, because it indicates the different initial position of the two groups.

In Austria it was not possible to calculate this time span because of missing data in the diagnosis date.

The lapse of time between the first contact with the Organization and the time of wish granting differs significantly between the three countries. While in Argentina the realization of the wish granting event only takes an average time of 2,5 months (0,21 years), the time span between „wish collection“ and „wish granting“ in Singapore (average time 5 months = 0,41 years) and in Austria (average time 6 months = 0,5 years) is highly significant. Using the Kruskal-Wallis-Test to analyze these data it also shows a high significant difference between Argentina and the other two countries (sign.: 0,000; see Table 16 in the appendix)

This difference may be explained because of the diverse lavishness of the wishes, which will be specified in the next chapter.

A highly significant difference between all three countries is also determined, when looking at the time span between „wish granting“ and the passing away of the children (sign.: 0,007;

see Table 15 in the appendix). This may be explained by the different stages of cancer, described before, in which the children were at the time of their „wish granting experience“. Also the number of cases here is rather low, which may result in the fact that only a part of the wish kids died after the „wish granting“. The average time span between the wish granting and the death of the children in Argentina was found with 1,5 years, in Austria with a little more than 1 year and in Singapore about 7 months (0,62 years).

### 2.1.6 Types of wishes

During data collection, the type of wishes which had been granted through the Make-A-Wish Foundation® was analysed. These wishes were variable, for which reason it was necessary to merge the wishes into categories as follows:

- ⇒ **electronic device:** (computer / laptop, computer game, digital camera / video camera, music player / CDs, TV, DVD, Video, etc)
- ⇒ **Journeys, excursions:** Holidays, journeys, trips to special places like swimming with dolphins, visiting a sports event, Disneyland, etc.
- ⇒ **Toys:** Barbies, dolls, cuddly toys, e-cars, motorcycles, etc.
- ⇒ **Models, celebrities:** Meeting a star/celebrity, to be someone special for one day, special clothes
- ⇒ **Sports equipment:** Bicycle, tennis racket, etc.
- ⇒ **Something else:** Musical instruments, special furniture, special partys, shopping spree, etc.

The following chart shows that there is a clear difference between the kind of wishes within the three countries, which was highly significant using the Chi-Square-Test (sign.: 0,000; see Table 16 in the appendix).

In Argentina the majority of granted wishes (52%) were in the category “electronic devices” like Musicplayers, TV-sets or DVD-players. Also in Singapore (45%) and Austria (29%) a great ammount of wishes could be fit into this category. Looking deeper into that data it shows clearly that in those two countries mainly computers/laptops had been wished for.

Furthermore „travel-wishes“ took a great role Singapore (31%) and Austria (34%), while those kind of wishes are found very rarely in Argentina. Wish children in Argentina mostly wished for „simple“ toys like Barbies, Toy cars or stuffed animals, while in Singapore and Austria these kind of toys seem to be part of the normal environment in the nursery at home. A similarity in the appearance of wishes like: „meeting someone special“, getting sport equipment, or a variety of other things like music instruments or Nurseryfurniture, was found in all three countries



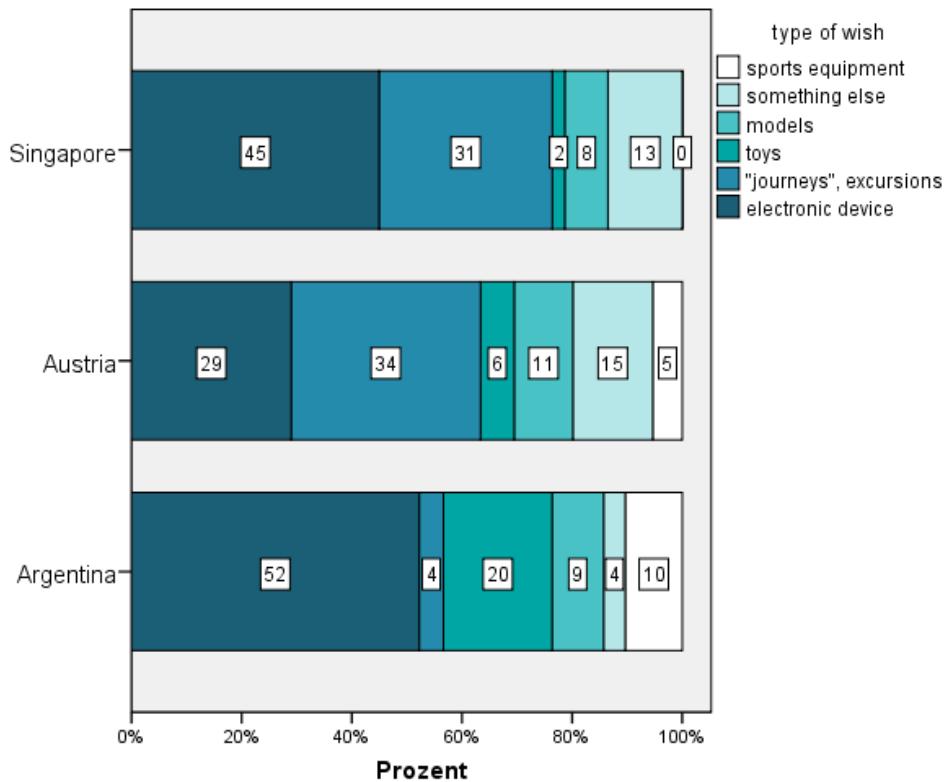


Figure 8: types of wishes by country

## 2.2 Survival Rate

In Austria, the overall survival rate of wish kids after 5 years is 83%, which is higher than Argentina and Singapore. However, it should be noted that in 24% of wish kids, the child's exact status after 5 years could not be determined, while this data in Argentina and Singapore is almost completely available.

In Argentina, 73% of the wish-kids were alive at least 5 years after the wish-granting experience, while the survival rate of 68% in Singapore was a little lower. In both countries the survival rate was hence lower than in Austria. This difference between the three countries was with a probability of error of 6% (see Table 16 in the appendix). However this was not significant.

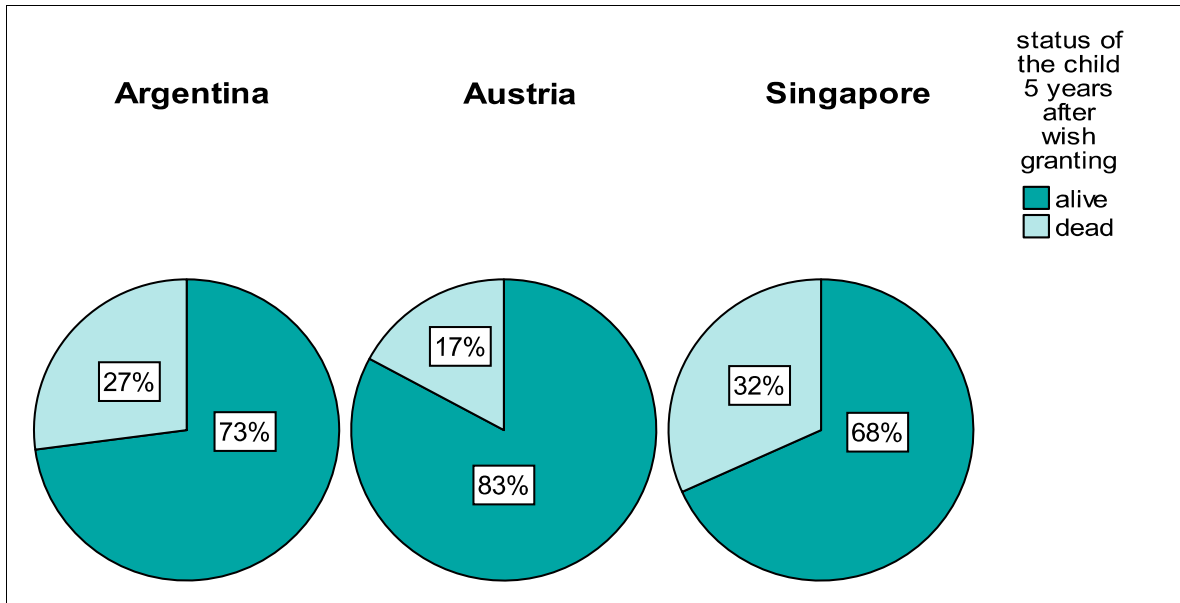


Figure 9: survival rate by country

On closer analysis of the survival rate of wish-kids in the two medical groups, the differences between the countries show up in more detail. For children with Leukaemia, the survival rate in Austria is 92%, five years after the wish-granting experience compared to 81% in Singapore and 77% in Argentina. This difference is considered as slight, but significant with a probability of error of 4,1%.

For children with brain tumours, a distinct difference can be seen. It should be noted however, that the number of cases in this group is very small, i.e. in Argentina (n=27) and Singapore (n=18). In Austria, the 5-year survival rate after wish-granting is 69% compared to Argentina, 48% and Singapore, 22%. This differences can be classified as highly significant (moderate intensity) using the Chi-Square-Test.

Using the One Sample Chi-Square-Test it is possible to compare and match a frequency distribution of a sample with the distribution within the population. Nevertheless this comparison has to be done with utmost caution. This is because the Wish-Kids define a very special group, which is distinct from the total population of children suffering from Leukaemia or brain tumors. For example the average time span between diagnosis and first contact with the Make-A-Wish® Foundation, is on average, one year. However, a number of children in the general population, cannot become Wish-Kids because they would have already passed away soon after being diagnosed. The number of these children influences the overall survival rate of a country. Furthermore it must be recognised that the Wish-Kids' survival rate is also included in the overall national survival rate and does have some influence on it.

As such, the interpretation of the data has to be done very carefully and general conclusions of the impact of wish-granting must be cautiously made

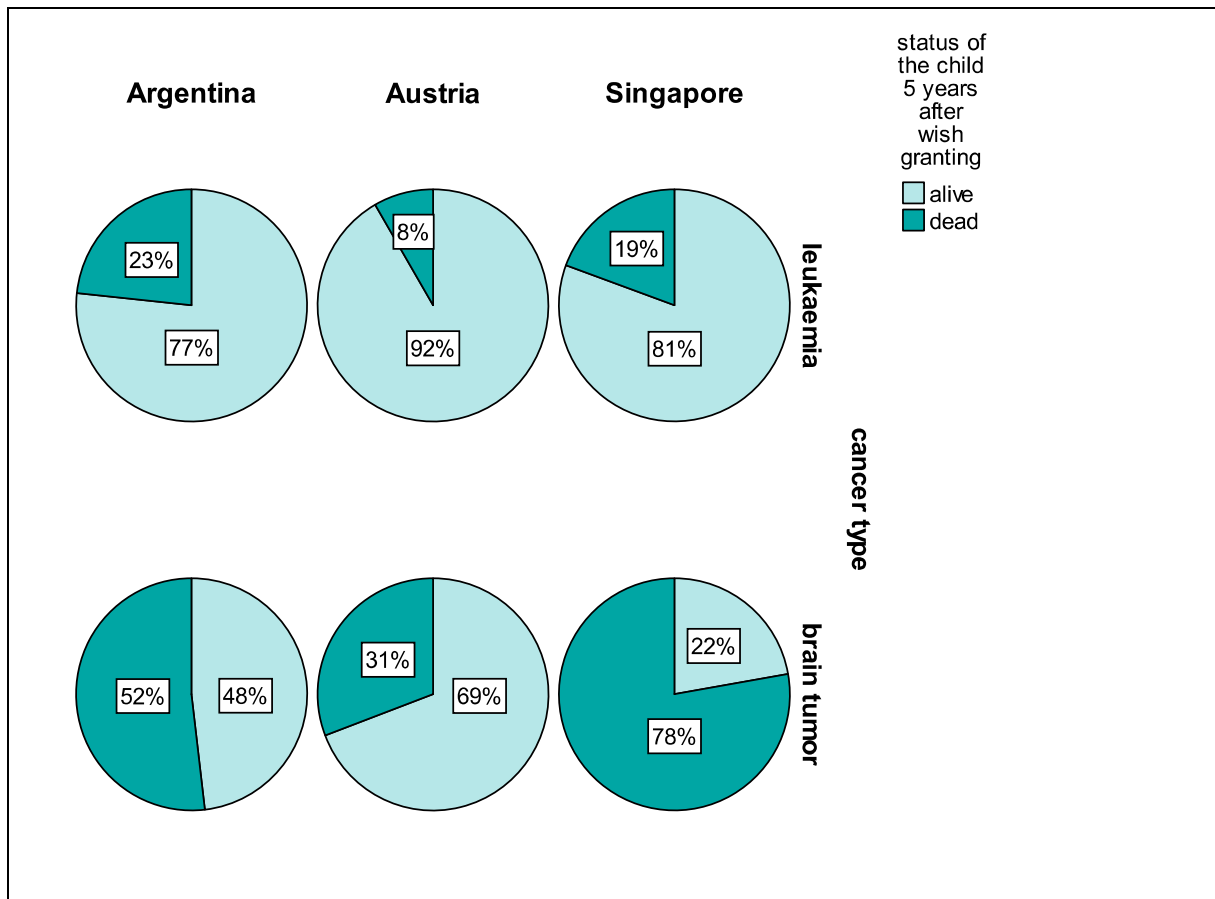


Figure 10: survival rate by cancer type and country

### 2.2.1 Leukaemia

The difference in the survival rate between Wish-Kids with leukemia and the general survival rate of all children with Leukaemia in each country was analysed:

LEUKAEMIA		Argentina	Austria	Singapore
sample	size	176	60	67
	Survival Rate	77%	92%	81%
population	Survival Rate	63%	81%	66%
	source	Registro Oncopediatrico Hospitalario Argentino	Statistik Austria: survival rate after 5-6 years	Academy of Medicine Singapore: long term survival (min. 2 years)
significance levels		0,000	0,031	0,010

Table 4: One sample Chi-Square-Test Leukaemia

⇒ Argentina:

In Argentina the five year survival rate of Wish-Kids suffering from Leukaemia was found to be 77%. In comparison, data from the „Registro Oncopediatrico Hospitalario Argentino“ indicated that the national survival rate in the years 2003-2007 was 63%. In this statistical data, three time spans had been captured, i.e. „death within the first 30 days“, „death within the first year“ and „death after one year“. Therefore an exact five year survival rate could not be compared. This difference between the sample and the general data was determined, using the One Sample Chi-Square-Test, as significant. However, it must be pointed out the national statistics indicate that 25% of the total number of children who are diagnosed with Leukaemia, pass away within the first year after the diagnosis and only 17% die later. Based on this, there is possibly a large bias in the interpretation of the results, as the statistical data is too imprecise

⇒ Austria

In Austria the survival rate of Wish-Kids was found to be 92%. According to the „Statistik Austria“ the survival rate after 5-6 years is found at 81%. Here it is justifiable to use the survival rate after 5-6 years, if one bears in mind that the first contact with the Make-A-Wish Foundation Austria was made on average one year after diagnosis. As in Argentina, there is a significant difference in the survival rate between Wish-Kids and the common survival rate through statistical calculation. However, in Austria, it should be noted that 9% of the children pass away within the first year after diagnosis. If these numbers were included, which seems to be statistically impractical because of the poor quality of data, the survival rates would probably approximately equal.

⇒ Singapore

The survival rate of wish kids is found to be 81%, while the general statistic calculation specifies a rate of 66%, of which a survival rate of at least 2 years after diagnoses is supposed. This difference can be identified as significant, similar to the findings in Austria and Argentina. Unfortunately a further interpretation of the Singapore data is not possible because of the less detailed general statistic data from that country.

Overall it can be said that there is a significant difference in the survival rate of children suffering from Leukaemia, who had experienced wish-granting through the Make-A-Wish® Foundation and the general survival rate of children suffering from Leukaemia. The Wish-Kids suffering from Leukaemia show a significant higher survival rate, than the general survival rate specified in those three countries.

Again, this finding has to be understood with caution, as already mentioned, because the comparability of the provided statistical data from those countries with the sample data has to be considered limited. It is recommended to regard this result only as a trend.

## 2.2.2 Brain Tumor

The survival rate of children suffering from brain tumors was examined carefully. In general it has to be recorded that the number of cases in this group in all three countries was very small, which makes statistical analysis difficult. In addition the type of brain tumor was heterogenous.

BRAIN TUMOR		Argentina	Austria	Singapore
sample	size	27	39	18
	Survival Rate	48%	69%	22%
population	Survival Rate	61%	61%	44%
	source	Registro Oncopediatrico Hospitalario Argentino	Statistik Austria: after 5-6 years	Academy of Medicine Singapore: long termin survival (min. 2 years)
significance levels		0,171	0,292	0,060

Table 5: One sample Chi-Square-Test brain tumor

### ⇒ Argentina

The 5-year survival rate of wish-kids in Argentina was 48%, while the general survival rate, determined through the „Registro Oncopediatrico Hospitalario Argentio“ was higher at 61%. This difference cannot be considered significant because of the very small sample size (n= 27).

Also with this illness almost 25% of the children pass away within the first year after diagnosis which would implicate a much higher difference compared to the Wish-Kids, assuming that the time span between the first contact of the Foundation with the wish kids and the date of diagnosis is almost one year.

### ⇒ Austria

In Austria the general 5-6 year survival rate of children diagnosed with brain tumors is found at 61% in accordance to Statistik Austria, while in the group of Wish-Kids the 5-6year survival rate is found at 69%. There is no statistically significant difference between the two groups. If one were to include the 17% of children who pass away within the first year after diagnosis, the survival rate of the Wish-Kids would also be lower than the genereal survival rate comparable with the findings in Argentina

### ⇒ Singapore

The 5-year survival rate of Wish-Kids suffering from brain tumors at the time of diagnosis was only 22%, while the national survival rate was 44%. Again, there was no statistically significant difference between Wish-Kids and the findings in the general statistics.

Overall, there was no significant difference in 5-year survival between the two groups of children suffering from brain tumours within the three countries. The data in this group of children cannot be adequately analysed and interpreted because of the small sample size and the heterogeneous nature of the different types of brain tumours.

### 3 SUMMARY AND CONCLUSION

This study shows that Wish-Kids in these three countries, Argentina, Austria and Singapore, are clearly different. While the distribution between the sexes are mainly similar, the age structure is significantly different. In Austria the Wish-kids are on average, older than in Argentina and Singapore.

With respect to the family constellation in which Wish-Kids live, this analysis reflects differences in the characteristic of „Family“. In Argentina, a two parent family with 3-4 children prevails, while in Singapore, the classic family constellation of two parent and two children is found. In Austria, the family constelations are mainly either single parent with one or two children or two-parent families with only one child.

In terms of the wish granting process, it seems that most of the wishes are granted while the children are undergoing therapy. A clear difference between the participating countries can be identified. While this statement applies to almost all (99%) of the Wish-Kids in Argentina and to a little more than three quarters (77%) of the Wish-Kids in Austria, in Singapore, the percentage of Wish-Kids in remission is 55%. The first contact through the Make-A-Wish® Foundation appears in average between 6 months and 1 year after diagnosis, but the variance here is rather large. In Argentina, time between first contact and the wish-granting is 2,5 to 6 months, shorter than Austria and Singapore. This can be explained by the kind of wishes that are granted in these three countries. Wish-Kids in Argentina wish mainly for music players, DVD players, Computergames or Toys, while in Singapore and Austria wishes like Laptop Computers and Trips/Traveling are favored by the Wish-Kids.

**In terms of overall 5-year survival rates, there is a significant difference between the survival rate of Wish-Kids suffering from Leukaemia as compared to all children with leukemia in the three countries (Argentina, Singapore and Austria) for the study years 2003-2007. Wish-Kids show a significantly higher 5-year survival rate than the average national survival rate.**

**For children suffering from brain tumors, no statistically significant difference in 5-year survival rates was found.**

The following conclusions, based on the present results can be recorded. These results should be conducted to support the further work of the Make-A-Wish® Foundation, but also line out the basis to following research projects in this field.

- ⇒ Apparently the wish granting through the Make-A-Wish® Foundation has only influence on the five year survival rate of children suffering from Leukaemia. Certainly it has to be considered that the results should not be overestimated because the comparison between Wish-Kids and the overall statistical data in behalf of children suffering from Leukaemia and brain tumors is only very circumscribed possible:
- Wish-Kids are part of the overall national statistic, therefore influence also the overall results. For a methodological entirely correct comparison, the Wish-Kids should only be compared with those severely ill children who had not have granted their wish, ergo didn't have experienced a wish granting
  - Wish-Kids describe a specific group. The average moment of the first contact with the Make-A-Wish® Foundation can be determined at one year after being diagnosed (in accordance with the data from Argentina and Singapore). Regarding the survival rate of children with the determined illnesses (Leukaemia and brain tumors) it is apparent that exactly in that first year after diagnosis a certain percentage of the children already pass away. These children are included in the overall national statistic but by trend rather excluded in the group of Wish-Kids.
  - For the present study only three countries had been selected in which the Make-A-Wish® Foundation is operating. Therefore it is not applicable to draw conclusions from the available results that have international validity. It is thus not possible to make universal conclusions about the impact of a wish granting, but only regional constricted tendencies to be identified.
- ⇒ The dataquality in the present study can be denominated as „not ideal“, what is exemplified through the large accumulation of missing data in particular questions. For further scientific research projects on the issue of the „impact of a wish granting experience“ it is hence recommended to pursue an international consistent documentation of Wish-Kids data and their wish-granting-experience, to enhance and improve dataquality and data recording. To this a discussion which aspects have to be documented could be a first step. As a consequence a standardized documentation system, respectively a database would be beneficial, whereby in each country necessary data could be ensured. Such a system could not only simplify the data processing for statistical analysis in the context of scientific research activities, but also be a part of quality assurance for the Make-A-Wish® Foundation, because data comparison between different countries/affiliates could be conducted more easily.



Furthermore, in behalf of data quality it has to be mentioned, that the general national statistical data is conditioned diverse in-depth. This factor has also to be considered for future research.

⇒ In conclusion it has to be mentioned, that the here covered issue can only provide a first insight in the impact of a wish-granting, because the five year survival rate provides only a small part of possible consequences of a wish-granting-experience. Further scientific studies could provide a broader insight in the importance of the work of the Make-A-Wish® Foundation for severely ill children and their families. For this reason a proposal for as possible further research project is introduced in the next chapter.

#### 4 CONCEPTION FOR A FURTHER RESEARCHPROJECT

In the present study the five year survival rate of children who had experienced a wish-granting through the Make-A-Wish® Foundation and the general national survival rate of all children suffering from the same illnesses had been compared. Nonetheless a tendency for a higher survival rate of Wish-Kids suffering from Leucaemia appears, this can only be outlined as one aspect of the impact of a wish-granting-experience. Such an experience seems to be a short occurrence at first sight. If there is a closer look put on that occurrence it becomes clear that for a severely ill child and his family this is a matter of complex intervention. Alike this complex intervention, also the effects of such an occurrence can have impact on the further etiopathology and the handling of the illness. Hence the present study can only be the first step to outline the capability of changes and impacts of a wish-granting for severely ill children and their families.

It can be recorded that the mission of Make A Wish® is to help severely ill children with a wish-granting-experience, ergo a entirely extraordinary experience, to forget their illness at least for a short time. This shall help those children, in accordance to the philosophy of the foundation, to enhance optimism, hope and strength concerning their illness and help them to think more positively, add joy and more well-being to their lives. Also the daily experiences of many volunteers show, in accordance of statements of the Foundation, that these assets are reached in multiple points. The goal of the Foundation corresponds with the motto „We cannot add days to their lives, but we can add life to their days!“, that shows again how important, next to the aspect of the survival rate, a further step in behalf of a scientific debate about the impact of a wish-granting is, to concentrate on the concrete changes in the subjective experienced living quality of Wish-Kids and their families.

The aim of a potential research project should therefore be, to scientifically investigate the experiences in the daily routine of wish-granters and to find answers if and how the health related quality of life of severely ill children and their families is affected through a wish-granting experience. The concept of „quality of life“ can be understood quite differently and embraces a lot of dimensions, that are related to the physical and mental well-being. A essential part at the begin of a project must be to specify „quality of life“ in behalf of Wish-Kids respectively which characteristics of „quality of life“ plays an essential role on that topic.

In general it has to be mentioned that a central aspect for a scientific study about qualitative changes in the lives of severely ill children after a wish-granting experience, has to be the embedding of theoretical approaches according to this topic. A scientific background has to be established through an intensiv inquiry and the topic has to be embedded into existing theoretical approaches. Therefore concepts or empiric studies from the psychological field could be used, that focuse on the importance of specific occurrences of severely ill children. On such a base a study could be constructed that is engaged with Wish-Kids.

In a second step appropriate measurement instruments for the empiric work should be selected. Nursing science offers a broad spectrum of empiric tested measurement instruments that are valid, that are adequate to measure health related quality of life with different approaches and in behalf of different aspects (for example optimism, positiv thinking, well beeing, courage). These instruments exists a great deal, also specifically for the empiric collaboration with children and adolescents. Following a small selection of such Measurementinstruments is provided:

- KIDSCREEN-52 quality-of-life measure for children and adolescents<sup>4</sup>
- KINDL<sup>R</sup> instrument for assessing Health-Related Quality of Life (HRQoL)<sup>5</sup>
- youth life orientation test – measure of children's optimism and pessimism<sup>6</sup>
- Connor Davidson Resilience Scale (CD-RISC)<sup>7</sup>

Methodological it is recommended to devide the study into two modules, which reflect the concept of the Make-A-Wish<sup>®</sup> Foundation, as on one hand to look at the Wish-Kids and on the other side to include their familial sorrounding. Thereby both qualitative and quantitative research methods will be applied, that fit the particular research question of the module

#### **MODULE 1 – CHANGE OF QUALITY OF LIFE OF MAKE–A-WISH<sup>®</sup>-KIDS**

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The aim of module 1 should be to explore the subjective changes of health related quality of life and the therwith coherent dimensions of Make-A-Wish<sup>®</sup> – Kids. A quantitative questionnaire seems to be suitable for such an investigation. Accordingly to this research method an age cohort (for example children between 10 and 18 years), for whom it seems appropriate to answer those questions should be choosen. A consistent questionnaire with the topic „quality of life“ should ideally be answered at two specified dates –before and after the wish-granting, to explore the impact and/or the changes through the wish-granting.

#### **MODULE 2 – CHANGES IN THE FAMILIES OF MAKE-A- WISH<sup>®</sup> -KIDS**

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Every action set through Make-A-Wish<sup>®</sup> also impacts the familial context, because every Wish-Kid is always a part of a family that is deeply involved in the etiopathology of a severe illness. Looking at the philosophy of Make-A-Wish<sup>®</sup> it is very important, that the Wish-Kid is not only seen alone but the wish-granting also should be organised as a special event for the whole family. This is one fact that clearly distinguishes Make-A-Wish<sup>®</sup> from other wish-granting organisations.

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<sup>4</sup> U. Ravens-Sieberer, A. Gosch, L. Rajmil, M. Erhart, J. Bruil, W. Duer, P. Auquier, M. Power, T. Abel, L. Czemy, J. Mazur, A. Czimbalmos, Y. Tountas, C. Hagquist, J. Kilroe, and European KIDSCREEN Group: Expert Review of Pharmacoeconomics & Outcomes Research, Jun 2005, Vol. 5, No. 3 , Pages 353-364; [www.kidscreen.org/english](http://www.kidscreen.org/english) (3.9.2013)

<sup>5</sup> [www.child-public-health.org/english/research/kindl-cat-screen](http://www.child-public-health.org/english/research/kindl-cat-screen) (3.9.2013)

<sup>6</sup> Ey S, Hadley W, Allen DN, Palmer S, Klosky J, Deptula D, Thomas J, Cohen R.: A new measure of children's optimism and pessimism: the youth life orientation test.- J Child Psychol Psychiatry. 2005 May;46(5):548-58.

<sup>7</sup> [www.connordavidson-resiliencescale.com](http://www.connordavidson-resiliencescale.com) (3.9.2013)

The aim of the second module should be to describe the impact of a wish-granting experience on the familial surrounding. What does it mean for the whole family if the wish of a severely ill child is fulfilled? How does the family experience the wish-granting event, respectively the time before and after this happening? Which positive influences can be identified, eventually also negative consequences that may be determined (for example the ill child again is in the focus). Following these answers, also it could be determined which focus Make-A-Wish® should add on the families of Wish-Kids, respectively what meaning the inclusion of the family in the wish-granting-experience has or could have.

To answer those questions a qualitative approach is recommended. With a very open modus operandi the experience of family members and dependants of Wish-Kids should be recorded. Therefore incentive questions could be answered in writing, a wish-report or a wish-diary could be composed. In addition to that some qualitative interviews could amend data and information.

At the end of the project the results of both modules could be linked to highlight the phenomenon of the changes in the dimension of „quality of life“ of Make-A-Wish® -Kids and their familial surrounding.

## 5 APPENDIX

### 5.1 Tables of the sample

		country							
		Argentina		Austria		Singapore		TOTAL	
		count	%	count	%	count	%	count	%
sex	female	92	45,3%	54	41,2%	39	43,8%	185	43,7%
	male	111	54,7%	77	58,8%	50	56,2%	238	56,3%
	TOTAL	203	100,0%	131	100,0%	89	100,0%	423	100,0%

Table 6: Sex by country

		country							
		Argentina		Austria		Singapore		TOTAL	
		count	%	count	%	count	%	count	%
Age	3-6 years	78	38,4%	29	22,1%	21	32,8%	128	32,2%
	7-10 years	60	29,6%	38	29,0%	23	35,9%	121	30,4%
	11-14 years	49	24,1%	37	28,2%	14	21,9%	100	25,1%
	15-18 years	16	7,9%	27	20,6%	6	9,4%	49	12,3%
	TOTAL	203	100,0%	131	100,0%	64	100,0%	398	100,0%

Table 7: age by country

		country							
		Argentina		Austria		Singapore		TOTAL	
		count	%	count	%	count	%	count	%
family	two parent family	161	79,7%	91	69,5%	87	97,8%	339	80,3%
configuaton	single parent family (mother)	25	12,4%	32	24,4%	0	,0%	57	13,5%
	single parent family (father)	2	1,0%	3	2,3%	2	2,2%	7	1,7%
	other family configuration	14	6,9%	5	3,8%	0	,0%	19	4,5%
	TOTAL	202	100%	131	100,0%	89	100,0%	422	100,0%

Table 8: family configuration by country

		country							
		Argentina		Austria		Singapore		TOTAL	
		count	%	count	%	count	%	count	%
siblings	0 siblings	20	10,1%	52	40,3%	20	24,1%	92	22,4%
	1-2 siblings	99	50,0%	70	54,3%	56	67,5%	225	54,9%
	3-4 siblings	58	29,3%	7	5,4%	7	8,4%	72	17,6%
	5-6 siglings	16	8,1%	0	,0%	0	,0%	16	3,9%
	more than 6 siblings	5	2,5%	0	,0%	0	,0%	5	1,2%
TOTAL		198	100%	129	100,0%	83	100,0%	410	100%

Table 9: siblings by country

		country							
		Argentina		Austria		Singapore		TOTAL	
		count	%	count	%	count	%	count	%
cancer type	leukaemia	176	86,7%	76	58,0%	71	79,8%	323	76,4%
	brain tumor	27	13,3%	55	42,0%	18	20,2%	100	23,6%
	TOTAL	203	100,0%	131	100,0%	89	100,0%	423	100,0%

Table 10: cancer type by country

		country							
		Argentina		Austria		Singapore		TOTAL	
		count	%	count	%	count	%	count	%
status of illness	during therapy	201	99,0%	43	76,8%	22	43,1%	266	85,8%
	in remission	1	,5%	8	14,3%	28	54,9%	37	11,9%
	other status	1	,5%	5	8,9%	1	2,0%	7	2,3%
	TOTAL	203	100,0%	56	100,0%	51	100,0%	310	100,0%

Table 11: status of illness by country

		country							
		Argentina		Austria		Singapore		Gesamt	
		count	%	count	%	count	%	count	%
type of wish	electronic device	106	52,2%	38	29,0%	40	44,9%	184	43,5%
	journeys, excursions	9	4,4%	45	34,4%	28	31,5%	82	19,4%
	toys	40	19,7%	8	6,1%	2	2,2%	50	11,8%
	sports equipment	21	10,3%	7	5,3%	0	,0%	28	6,6%
	models, stars	19	9,4%	14	10,7%	7	7,9%	40	9,5%
	something else	8	3,9%	19	14,5%	12	13,5%	39	9,2%
	Gesamt	203	100,0%	131	100,0%	89	100,0%	423	100,0%

Table 12: type of wish by country

		Argentina	Austria	Singapore	Total
electronic device	computer / laptop	24	30	25	79
	computer game	39	3	9	51
	digital camera / video camera	8	2	2	12
	music player / CDs	24	1	0	25
	TV, DVD, Video, etc	11	2	4	17
"journeys", excursion	journey / holiday	0	16	14	30
	trip to a special place	1	8	2	11
	visiting a sports event	8	1	0	9
	disneyland	0	20	12	32
toys	Barbie / doll / cuddly toy	15	1	0	16
	toys	14	2	2	18
	e-car / motorcycle for kids / tractor	11	5	0	16
sports	sports equipment	6	4	0	10
	bicycle	15	3	0	18
models	meeting a star	16	10	6	32
	to be someone special	0	2	1	3
	special clothes	3	2	0	5
musical instrument		4	3	4	11
special furniture		2	7	2	11
something else		2	9	6	17
<b>GESAMT</b>		<b>203</b>	<b>131</b>	<b>89</b>	<b>423</b>

Table 13: types of wishes by country

		country							
		Argentina		Austria		Singapore		TOTAL	
		count	%	count	%	count	%	count	%
status of the child 5 years after wish granting	alive	148	72,9%	82	82,8%	58	68,2%	288	74,4%
	dead	55	27,1%	17	17,2%	27	31,8%	99	25,6%
	TOTAL	203	100,0%	99	100,0%	85	100%	387	100,0%

Table 14: status 5 years after wish granting by country

			country					
			Argentina		Austria		Singapore	
			count	%	count	%	count	%
status of the child 5 years after wish granting	leukaemia	alive	135	76,7%	55	91,7%	54	80,6%
		dead	41	23,3%	5	8,3%	13	19,4%
	brain tumor	alive	13	48,1%	27	69,2%	4	22,2%
		dead	14	51,9%	12	30,8%	14	77,8%

Table 15: status 5 years after wish granting by cancer type and country

<b>CHI<sup>2</sup>-TEST BY COUNTRY</b>		<b>SIGNIFICANCE</b>	<b>CRAMER'S V COEFFICIENT</b>
sex		0,762	0,036
age		0,004	0,155
family configuration		0,000	0,200
siblings		0,000	0,327
cancer type		0,000	0,296
status of illness		0,000	0,459
types of wishes		0,000	0,342
status five years after wish granting		0,060	0,121
<b>U-TEST / KRUSKAL WALLIS TEST</b>		<b>SIGNIFICANCE</b>	
	diagnosis – wish (Argentina, Singapore)	0,731	
time lapse	diagnosis – contact (Argentina, Singapore)	0,627	
	first contact - wish	0,000	
	wish - death	0,007	

Table 16: significances by country



## 5.2 Matrix for the data collection

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	<b>ID</b>	<b>Sex</b>	<b>Age at time of wish-granting</b>	<b>number of siblings</b>	<b>family configuration</b>	<b>cancer type</b>	<b>date of diagnosis</b>	<b>first contact with the foundation - wish collection</b>	<b>date of wish-granting</b>	<b>type of wish</b>	<b>status of illness</b>	<b>status of the child 5 years after wish granting</b>	<b>date of death</b>	<b>explanatory notes</b>
2	Please chose some identification (ID), so you can distinguish the children.	Please insert the sex of the child here.	How old was the child, when the wish-granting took place?	How many siblings does the child have?	In which family configuration did the child life?	Which type of cancer was the child suffering from?	When did the diagnosis take place? (Please insert day, month and year)	When was the first contact with the foundation? (Please insert the day, month and year of wish collection)	When did the wish granting take place? (Please insert day, month and year of wish-granting )	Please give a short summarise of the type of wish here!	Please insert the status of illness of the child at the time of wish granting here.	Please insert the status of the child five years after wish granting here.	If the child past away after wish-granting, please insert the date here (day, month and year)	If there is anything noteworthy, please here.
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Figure 11: Matrix for the data collection

### 5.3 Data collection national survival rates

#### 5.3.1 Argentina

The *Registro Oncopediátrico Hospitalario Argentino* (ROHA) aims to determine the incidence of childhood cancer in Argentina. The systematic clinical data recopilation of patients with clinical and pathological details of tumors, are provided by a network of inter-hospital communication, which allows obtaining epidemiological data. Currently ROHA has 91 sources informants, 12 Tumor Population registers and two cooperative medical groups.

The *Registro Oncopediátrico Hospitalario Argentino* is supported by the Ministry of Health and Environment, File No. 2002-14950/03-8. In 2004, there was the first publication that contains the results 2000-2001-2002, with a total of 3438 registered cases for children under 15. In 2007 was published the 2nd book by the *Registro Oncopediátrico Hospitalario Argentino* (ROHA) that contains the results from 2000 to 2005. In 2010 was published the 3rd book by *Registro Oncopediátrico Hospitalario Argentino* (ROHA) that contains the results from 2000 to 2008. ROHA far registered 11,445 cases. From the current year patients between 15 and 19 years will be included in the register data. In 2011 the Foundation Kaleidos signed a partnership agreement and obtained a grant from the Ministry of Health and the National Cancer Institute to jointly develop ROHA, which team is under the direction of PhD. Florencia Moreno. We extracted from the Register the cases of leukaemia and brain tumor in patients between the ages 0 to 15 who live in Argentina, and were diagnosed from year 2000 to 2008.

LEUKAEMIA Total cases: 4205

LEUKAEMIA	2003	2004	2005	2006	2007	average
Death before 30 days	7%	7%	7%	6%	5%	6%
Death during the 1st year	20%	20%	19%	18%	17%	19%
Death after the 1st year	17%	15%	12%	12%	5%	12%
Total Survival Rate	56%	58%	62%	64%	73%	63%

BRAIN TUMOR Total cases: 1877

BRAIN TUMOR		%
Death before 30 days	100	5,3%
Death during the 1st year	361	19,2%
Death after the 1st year	272	14,5%
Total	733	39,0%

### 5.3.2 Austria

Survival rate of children age 3-18years, in the years 2001-2007 diagnosed with brain tumor or leukaemia.

year	Cancer type	Age	Interval	Cumulated relative survival rate
2001-2007	C70-C72, Brain	3-18	0,0 - 1,0	0.830
2001-2007	C70-C72, Brain	3-18	1,0 - 2,0	0.724
2001-2007	C70-C72, Brain	3-18	2,0 - 3,0	0.668
2001-2007	C70-C72, Brain	3-18	3,0 - 4,0	0.645
2001-2007	C70-C72, Brain	3-18	4,0 - 5,0	0.628
2001-2007	C70-C72, Brain	3-18	5,0 - 6,0	0.614
2001-2007	C70-C72, Brain	3-18	6,0 - 7,0	0.602
2001-2007	C70-C72, Brain	3-18	7,0 - 8,0	0.595
2001-2007	C70-C72, Brain	3-18	8,0 - 9,0	0.595
2001-2007	C70-C72, Brain	3-18	9,0 - 10,0	0.577
2001-2007	C70-C72, Brain	3-18	10,0 - 11,0	0.577
2001-2007	C91-C95, Leukaemia	3-18	0,0 - 1,0	0.913
2001-2007	C91-C95, Leukaemia	3-18	1,0 - 2,0	0.870
2001-2007	C91-C95, Leukaemia	3-18	2,0 - 3,0	0.847
2001-2007	C91-C95, Leukaemia	3-18	3,0 - 4,0	0.824
2001-2007	C91-C95, Leukaemia	3-18	4,0 - 5,0	0.810
2001-2007	C91-C95, Leukaemia	3-18	5,0 - 6,0	0.807
2001-2007	C91-C95, Leukaemia	3-18	6,0 - 7,0	0.791
2001-2007	C91-C95, Leukaemia	3-18	7,0 - 8,0	0.781
2001-2007	C91-C95, Leukaemia	3-18	8,0 - 9,0	0.782
2001-2007	C91-C95, Leukaemia	3-18	9,0 - 10,0	0.782
2001-2007	C91-C95, Leukaemia	3-18	10,0 - 11,0	0.782

Q: STATISTIK AUSTRIA, Österreichisches Krebsregister (Stand 24.09.2012). Erstellt am: 15.07.2013.

### 5.3.3 Singapore

The Singapore data is based on information from this study :- Annals Academy of Medicine Singapore 2009;8:684-9.

*Long term survival, i.e. minimum 2 years, or more, for*

(1) *Leukemias : 65.6% (ALL 73.4%)*

(2) *Brain tumours : 44.2%*

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