

# RISK DETERMINANTS OF SOLID ORGAN CANCER AFTER KIDNEY TRANSPLANTATION

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## Background

Kidney transplantation (KT) is the preferred treatment for end-stage kidney disease because of improved patient survival, quality of life and lower treatment costs compared with dialysis.

In this population, an increase in the incidence of cancer has been reported, which implies a worse prognosis than in general population.

In fact, cancer after KT is the only cause of death that is increasing.

## Materials and methods

Retrospective cohort study using clinical and epidemiological information collected among 942 KT recipients who, between 1979 and 2014, underwent KT in our center (followed-up until April-2016).

Patients with a follow-up shorter than 90 days after KT were excluded from the analysis.

Solid organ tumors and lymphomas were analysed, excluding skin tumors.

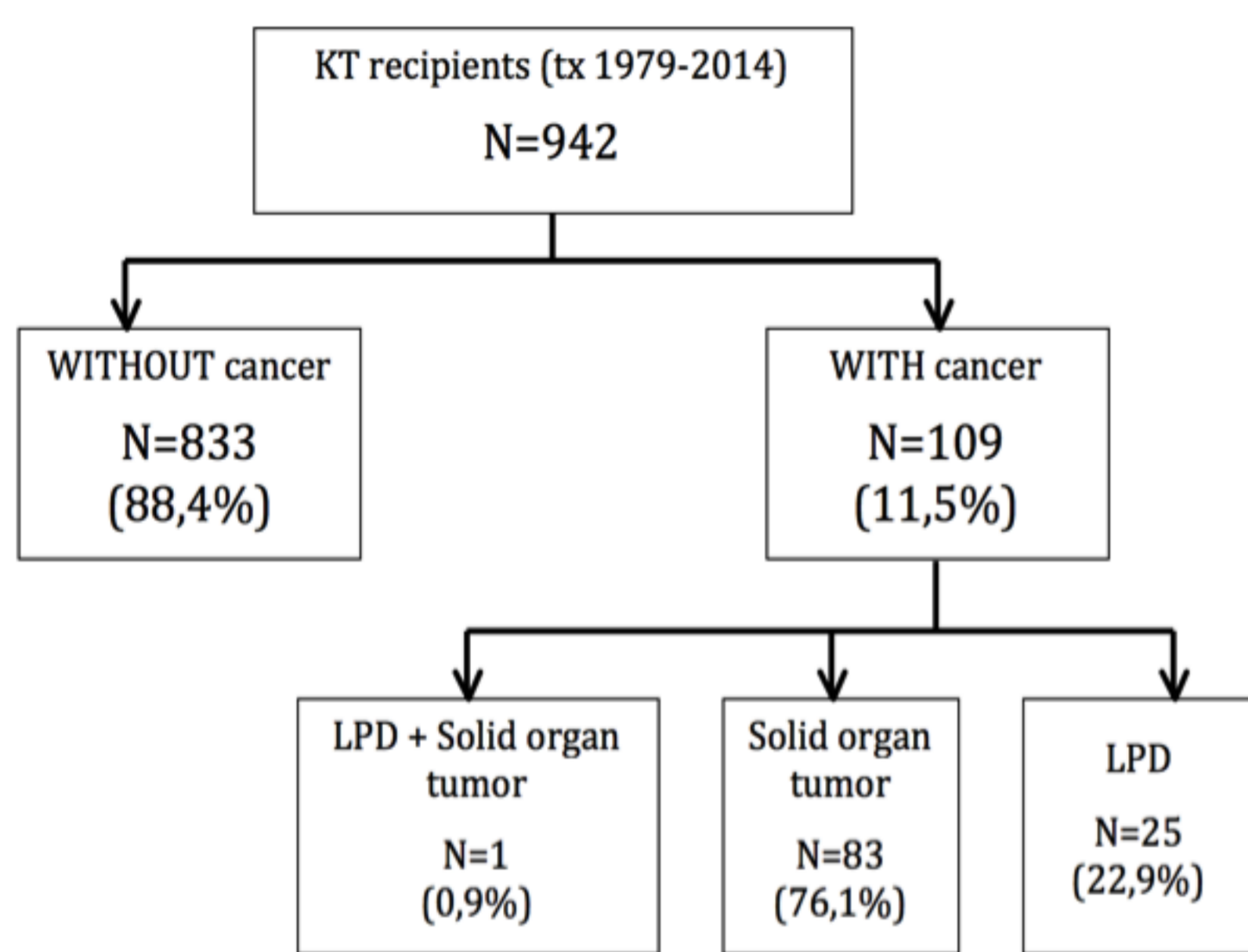
The aim of our study was to analyse:

- ❖ Incidence of cancer in our cohort of KT recipients and to compare it with the general population.
- ❖ Characteristics of postKT solid cancer in our cohort.
- ❖ Risk factors associated in its development.

## Results

### INCIDENCE

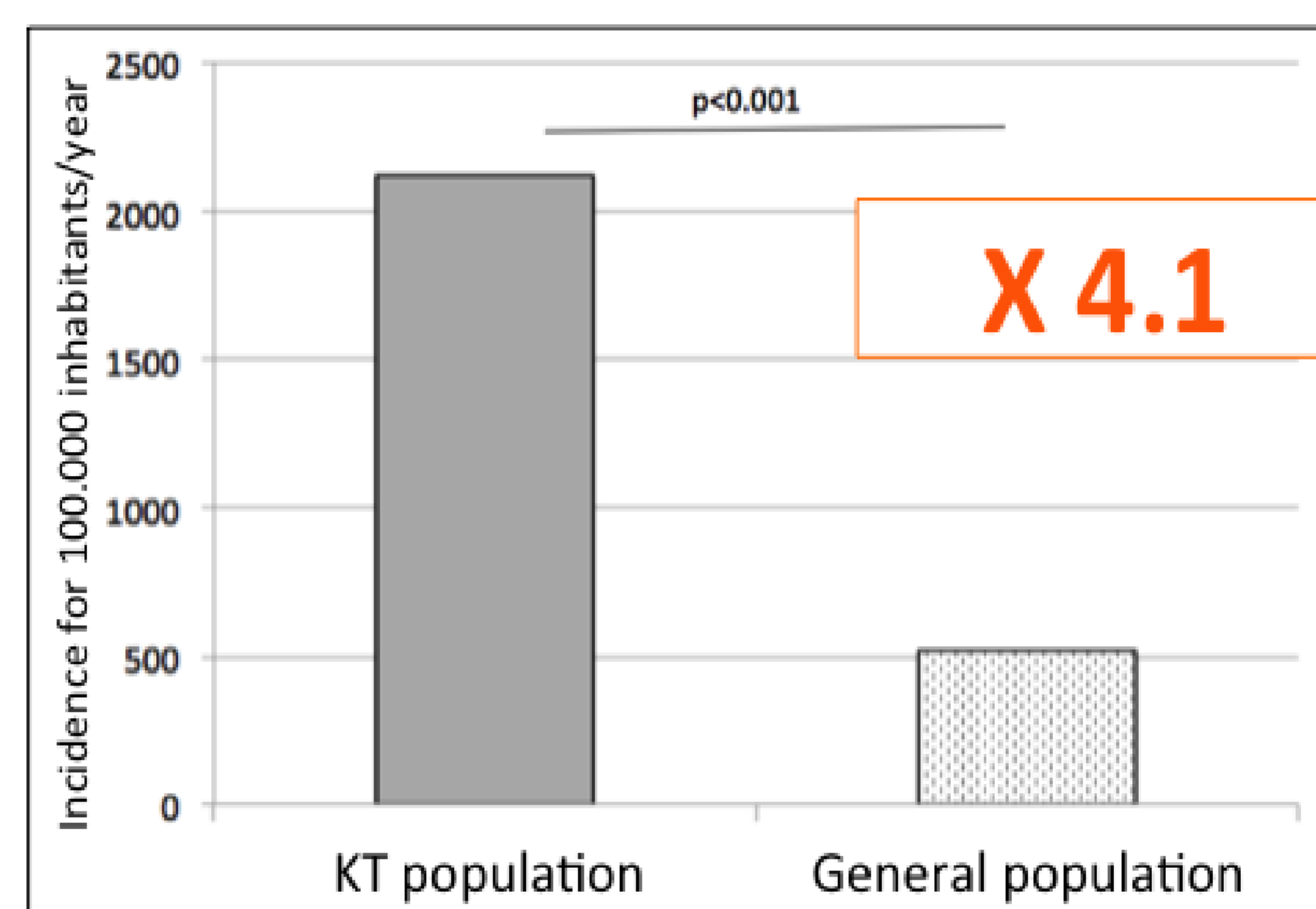
From 942 KT recipients included, 109 (11.5%) developed cancer:



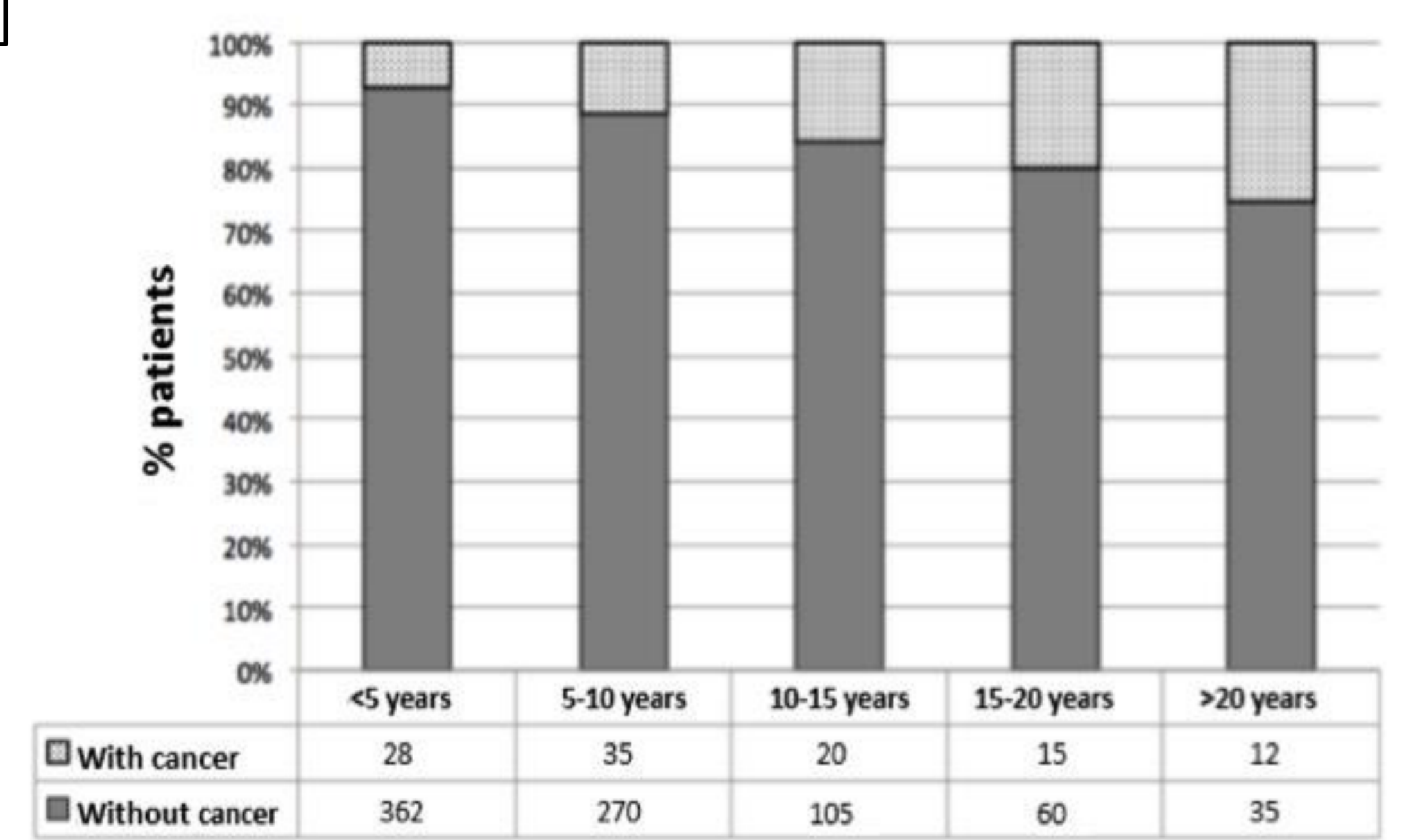
>> Median follow-up to diagnosis: 6 years (IQR 3,1-10,7).

### ESTIMATED INCIDENCE CANCER KT vs GENERAL POPULATION

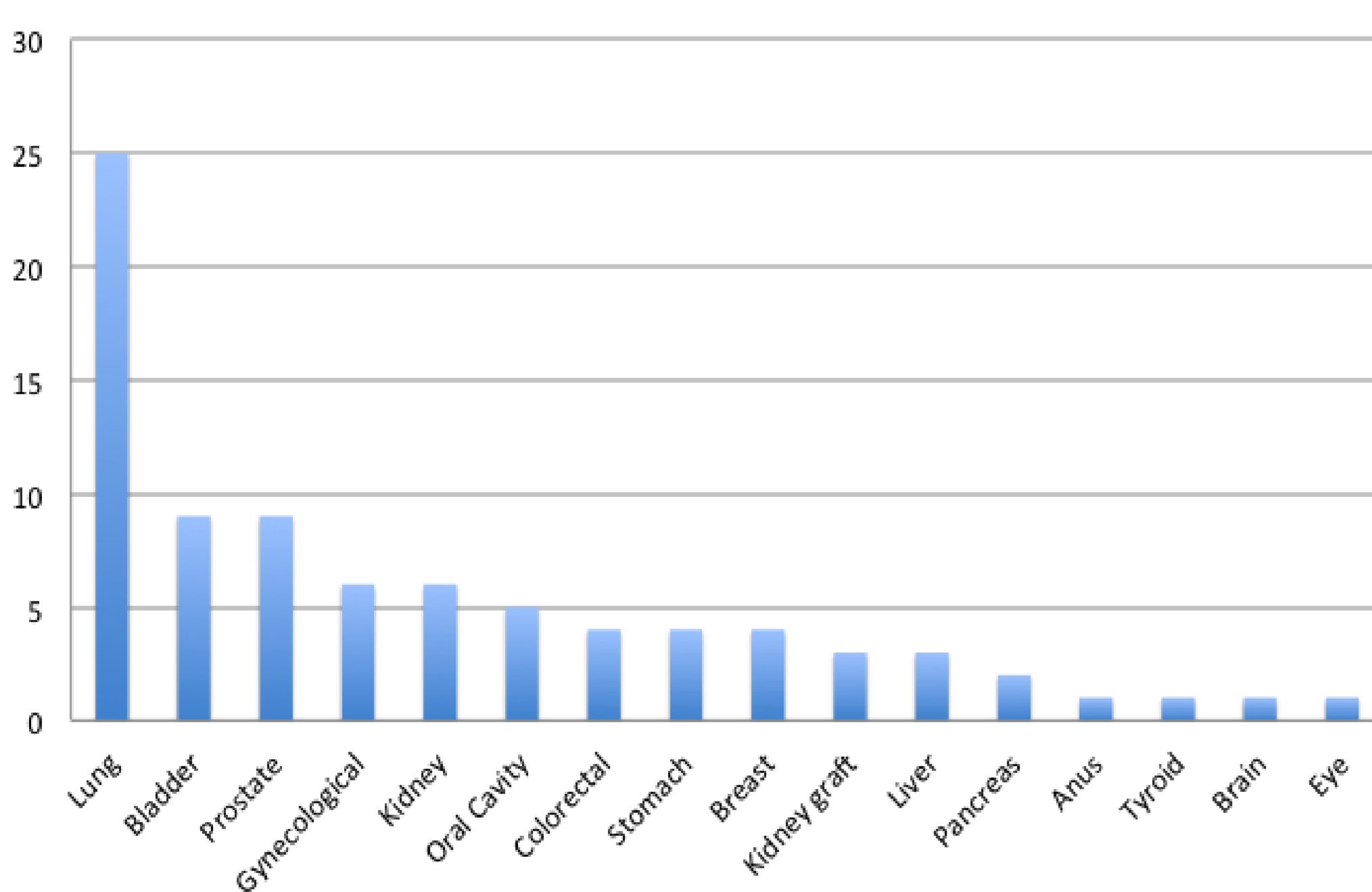
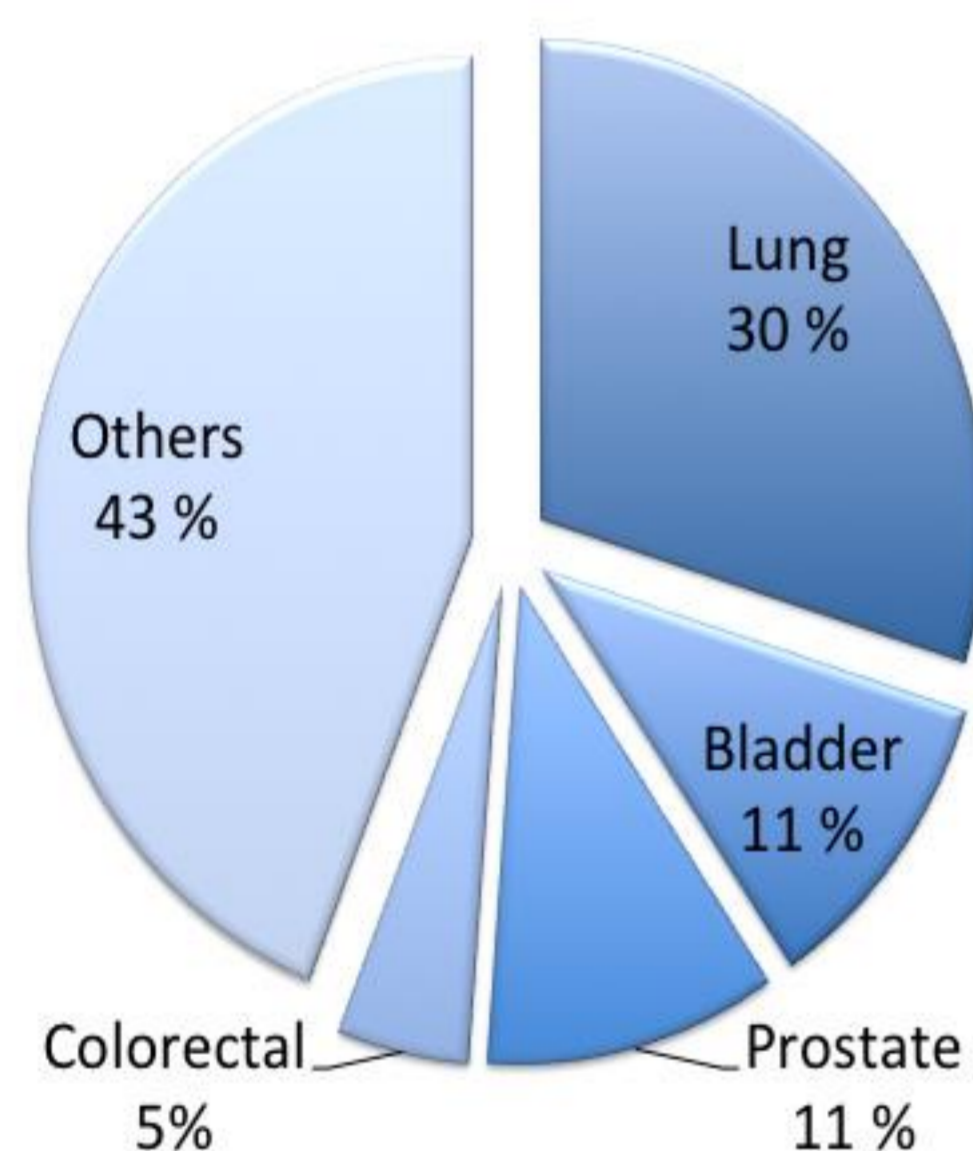
- KT population: **2121** cases/100.000 inhab/year [18.3 cases/year]
- General population (Catalonia): **520**/100.000 inhab/year.



### Post-KT SOLID CANCER INCIDENCE



### SOLID ORGANS AFFECTED



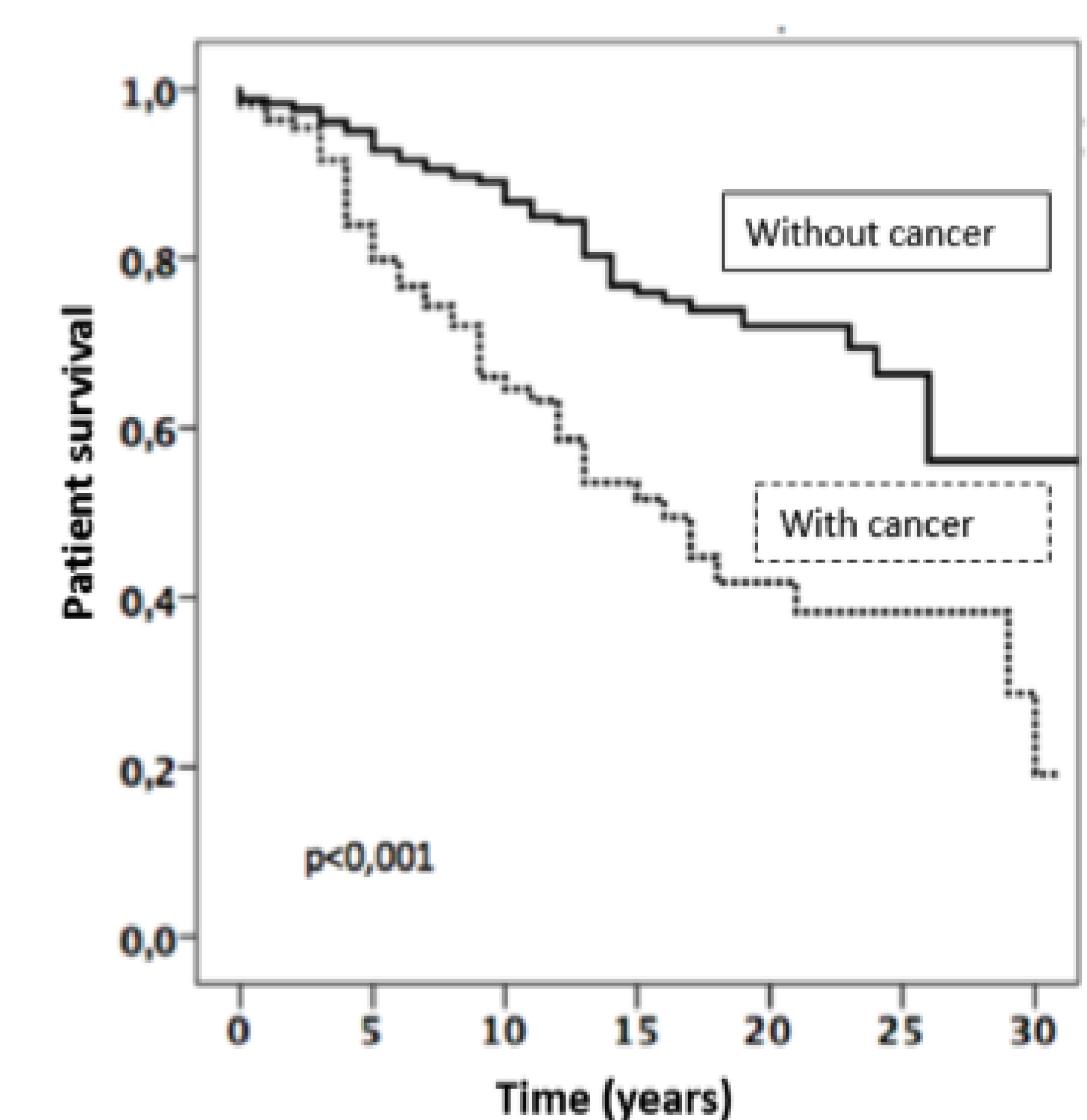
### UNIVARIATE ANALYSIS

|   | ALL (942)      | WITHOUT cancer (n=833) | WITH cancer (n=109) | p-Value |
|---|----------------|------------------------|---------------------|---------|
| <b>Basal characteristics</b>                  |                |                        |                     |         |
| Recipient age (years, mean ± SD)              | 47,65 ± 14,371 | 47,56 ± 14,546         | 48,40 ± 12,996      | 0,094   |
| Sex Female (n, %)                             | 349 (37)       | 312 (37,5)             | 37 (33,9)           | 0,721   |
| Primary kidney disease: PKD vs. others (n, %) | 121 (15)       | 100 (14,1)             | 21 (21)             | 0,071   |
| Pre-KT cancer (n, %)                          | 42 (4,5)       | 36 (4,3)               | 6 (5,5)             | 0,577   |
| Pre-emptive transplant (n, %)                 | 133 (14,1)     | 119 (14,3)             | 14 (12,8)           | 0,678   |
| Donor age (years, mean ± SD)                  | 46,67 ± 16,363 | 47,07 ± 16,338         | 43,66 ± 16,315      | 0,741   |
| <b>Initial immunosuppression</b>              |                |                        |                     |         |
| Thymoglobulin induction (n, %)                | 188 (22,8)     | 155 (21,3)             | 33 (33,7)           | 0,006   |
| Calcineurin inhibitor (n, %)                  | 801 (94)       | 707 (94,4)             | 94 (94)             | 0,873   |
| Tacrolimus vs. CsA (n, %)                     | 478 (59,7)     | 436 (61,7)             | 42 (44,7)           | 0,002   |
| Mycophenolate (n, %)                          | 596 (63,9)     | 536 (64,8)             | 61 (56,5)           | 0,089   |
| mTOR inhibitor (n, %)                         | 21 (2,3)       | 20 (2,4)               | 1 (0,9)             | 0,324   |
| <b>1 year afterKT immunosuppression</b>       |                |                        |                     |         |
| Calcineurin inhibitor (n, %)                  | 788 (91,7)     | 691 (91,6)             | 97 (92,4)           | 0,797   |
| Tacrolimus vs. CsA (n, %)                     | 475 (60,3)     | 426 (61,6)             | 49 (50,5)           | 0,036   |
| Mycophenolate (n, %)                          | 508 (59,3)     | 455 (60,5)             | 53 (50,5)           | 0,050   |
| mTOR inhibitor (n, %)                         | 54 (6,3)       | 51 (6,8)               | 3 (2,9)             | 0,122   |
| <b>Follow-up</b>                              |                |                        |                     |         |
| Biopsy proven acute rejection (n, %)          | 111 (24,6)     | 102 (22,3)             | 9 (15,8)            | 0,259   |
| CMV infection (n, %)                          | 127 (13,8)     | 110 (13,5)             | 17 (15,9)           | 0,503   |
| BK virus (n, %)                               | 8 (1)          | 8 (1,2)                | 0 (0)               | 0,316   |
| Death-censored graft loss (n, %)              | 308 (32,7)     | 285 (34,2)             | 23 (21,1)           | 0,005   |
| Uncensored graft loss (n, %)                  | 447 (47,5)     | 371 (44,5)             | 76 (69,7)           | <0,001  |
| All-cause mortality (n, %)                    | 139 (14,8)     | 86 (10,7)              | 53 (48,6)           | <0,001  |

### MULTIVARIATE ANALYSIS: risk factors

|                                       | Odds ratio | 95% Confidence intervals | p-Value |
|---------------------------------------|------------|--------------------------|---------|
| Recipient age                         | 1,00       | 0,985-1,016              | 0,990   |
| Thymoglobulin induction               | 1,746      | 1,069-2,851              | 0,026   |
| Calcineurin inhibitor 1 year after KT | 1,032      | 0,609-1,749              | 0,906   |
| Time after KT (months)                | 1,005      | 1,001-1,008              | 0,006   |

### PATIENT SURVIVAL WITH vs WITHOUT CANCER AFTER KT



## CONCLUSIONS

The global incidence of non-skin cancer after KT in our cohort is 11.5%, four times higher than in general population.

Lung is the most common solid organ affected. It accounts for 30% of all solid organ cancers in our cohort.

The incidence in KT patients followed for longer time is high (25.5% in patients with more than 20 years postKT).

Thymoglobulin induction could be a modifiable risk factor.

