

Cancer-Related Outcomes In Kidney Allograft Recipients In England Versus New York State: A Comparative Population-Cohort Analysis Between 2003 and 2013.

Francesca Jackson-Spence¹, Holly Gillott¹, Sanna Tahir¹, Felicity Evison², Jay Nath³ and Adnan Sharif³

¹University of Birmingham Medical School. ²Department of Medical Informatics, Queen Elizabeth Hospital Birmingham. ³Department of Nephrology and Transplantation, Queen Elizabeth Hospital Birmingham.

Introduction:

Global studies have confirmed higher cancer-related incidence and mortality for kidney allograft recipients versus the general population.^{1,2,3,4,5} However, no study has compared cancer-related epidemiology between different population cohorts and it is unclear whether country-specific data is translatable across countries. In this population-cohort study, we compared cancer-related incidence and mortality in kidney allograft recipients in England versus New York State.

Aims:

- To compare cancer epidemiology between two contemporaneous populations, England vs. New York State, with the aim of comparing demographics and outcomes
- To demonstrate whether cancer-related epidemiology is translatable between different countries.

Methods:

Data extraction:

- Data was obtained for every kidney-alone transplant procedure performed in England and New York State between **2003 and 2013**

- **England**, n= **18,493** (Data from **HES**)⁶
- **New York State**, n= **12,373** (Data from **SPARCS**)⁷

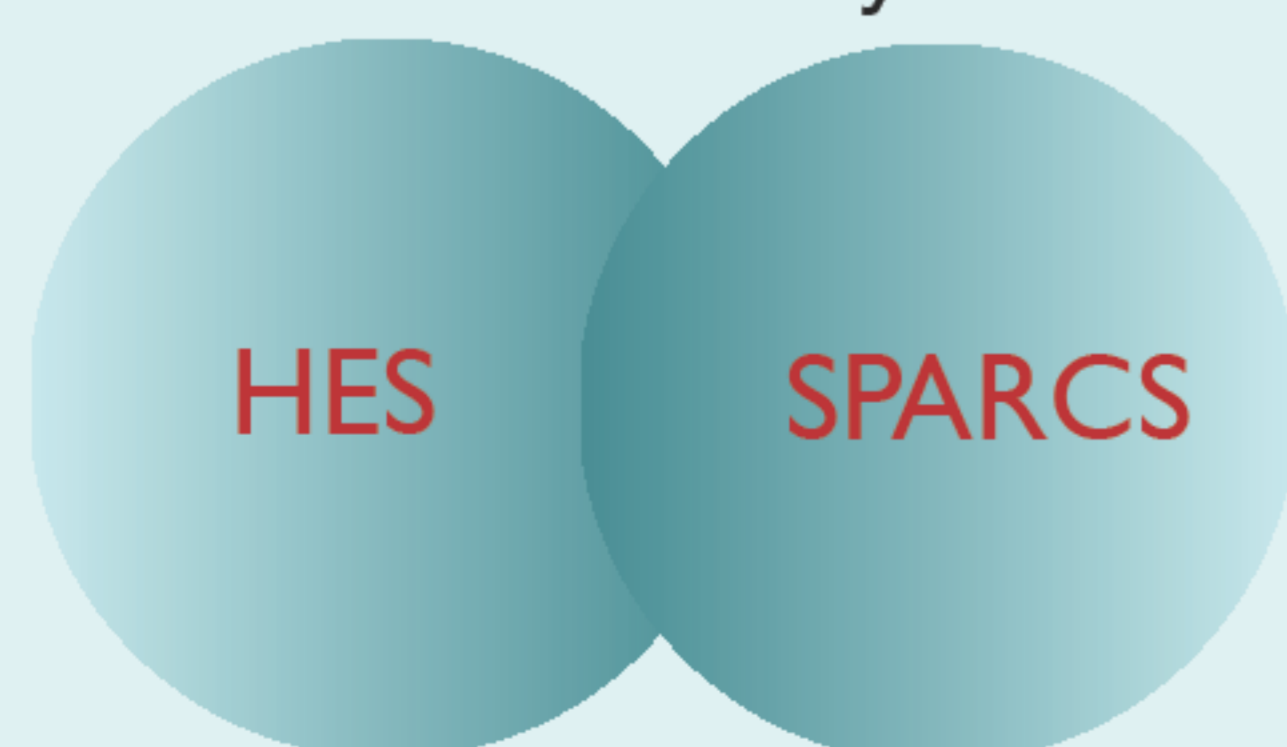
- Median follow-up 5.08 years

Comparison: (at baseline and after transplant)

- Patient demographics include: **age, gender, donor type** (living or deceased), **transplant year, medical co-morbidities and ethnicity**.
- Cancer data was derived from ICD-10 and ICD-9 codes⁸ from cohorts in England and New York State respectively.
- Mortality data: Linkage of HES data for England to the Office for National Statistics for mortality data

Statistical Analysis:

- Baseline demographics**
- Outcomes**: post-transplant cancer, in hospital deaths, 30-day mortality, 12-month mortality and number of emergency readmissions.
- Univariate analysis**:
 - Categorical variables: Chi² test
 - Continuous variables: Student's t-test/Wilcoxon rank sum test
- Multivariate analysis**: Logistic regression for mortality
Variables: age, gender, ethnicity, admission method, number of readmissions and cancer within one year after transplantation.
 - Further model with country as a variable



Results: England vs. NYS

1. Pre-transplant cancer:

- Recipients in England were more likely to have a **prior history of cancer** pre-transplant vs NYS (5.59% vs 3.52%, p<0.001)

2. Post transplant cancer (admission to hospital)

- More common in England versus NYS (10.63% vs. 7.29%, p<0.001).

3. Cancer-incidence

- Disparate between the two different cohorts
- Recipients in England compared to NYS patients were more likely to develop cancers of:
 - **Skin** (4.59% vs. 0.46%, p<0.001)
 - **Breast** (0.46% vs. 0.26%, p=0.001)
 - **Bladder** (0.28% vs. 0.24%, p=0.01)
 - **Post-transplant lymphoproliferative disease** (1.42% vs. 1.34%, p=0.001)
- England vs NYS were less likely to get cancer of the **lung** (0.39% vs. 0.93%, p<0.001).

- In both countries, admission with cancer within the first year post-kidney transplantation is associated with **increased risk of mortality**.

- Despite higher rates of post-transplant malignancy in England, **all-cause mortality at one-year post-transplantation** was lower amongst kidney allograft recipients in **England** compared to their NYS counterparts (3.03% vs. 5.08%, p<0.001).

Outcomes	HES	NYS	P=Value
Pre Transplant Cancer	1033 (5.59%)	408(3.52%)	<0.001***
Admission with cancer diagnosis post-transplant	1965 (10.63%)	846 (7.29%)	<0.001**
Melanoma/ other skin malignancy incidence	848 (4.59%)	53 (0.46%)	<0.001
Breast cancer incidence	85 (0.46%)	30 (0.26%)	0.001
Bladder cancer incidence	51 (0.28%)	28 (0.24%)	0.01
PTLD	262 (1.42%)	156 (1.34%)	0.001
12 month mortality	561 (3.03%)	589 (5.08%)	<0.001**

Discussion:

- Comparison between the two contemporaneous populations demonstrates kidney allograft recipients in England compared to NYS have different cancer-related epidemiology and outcomes.
- Possible reasons for these differences include: patient demographics, ethnicity, immunosuppression used, healthcare systems and financial coverage differ in the two populations, although we are limited by lack of immunosuppression data.
- We suggest that the outcomes differ between England and NYS is due to differences in transplantation practice.
- Although most of the available information on cancer post-kidney transplantation is based outside of the UK, our data suggests caution in translating post-transplant cancer-related epidemiology between different countries.

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