KING’S HEALTH PARTNERS PROSTATE CANCER BIOBANK: A UNIQUE BIOBANK CAPTURING THE ETHNIC DIVERSITY OF LONDON

King’s Health Partners

Our partners: King's College London, Guy's and St Thomas', King's College Hospital and South London and Maudsley NHS Foundation Trusts.

>2 million patient contacts/year:
  • 790,000 in community services
  • 168,300 inpatients
  • 956,000 outpatients
  • 176,000 A&E attendances
  • 6,800 babies born

The KHP Cancer Biobank is embedded within King's Health Partners Comprehensive Cancer Centre
KHP Prostate Cancer Services

• Our Prostate Cancer Service is amongst the busiest in the world with around 700 newly diagnosed cases a year.

• Our population has a wide ethnic and socio-economic diversity.

• Prostate cancer programme – multidisciplinary team of researchers and clinicians in one place

• Our studies involve significant numbers of African and Afro-Caribbean men, who are at high risk of prostate cancer, such as the Duffy antigen study.

• Our ultimate mission is to improve patient outcomes by integrating world-class research, clinical care, training and education.
Prostate Cancer Biobank

- Prostate cancer affects approximately 1.1 million men worldwide, yet much remains unknown about this complex disease.

- Our Biobank was established in 2013, and is an ongoing collection. It is licensed by the Human Tissue Authority (licence number 12121).

- To collect **surplus tissue, blood and data** from all prostate cancer patients seen at Guy’s & St Thomas’ Hospital that have a diagnosis or possible diagnosis of cancer.

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**KHP PCaBB 2013 - 2015**

<table>
<thead>
<tr>
<th>Tissue</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>549 PCa Patients</td>
<td>Clinical</td>
</tr>
<tr>
<td>489 bloods</td>
<td>Demographics</td>
</tr>
<tr>
<td>120 frozen samples</td>
<td>Primary Diagnosis</td>
</tr>
<tr>
<td>1064 FFPE Ralp samples</td>
<td>Treatment</td>
</tr>
<tr>
<td>20 FFPE biopsies</td>
<td>Outcomes</td>
</tr>
<tr>
<td></td>
<td>Pathological</td>
</tr>
<tr>
<td></td>
<td>Histological</td>
</tr>
<tr>
<td></td>
<td>Macroscopic</td>
</tr>
<tr>
<td></td>
<td>Staging</td>
</tr>
</tbody>
</table>

Schematic description of the data and tissue collected in King’s Health Partners Prostate Cancer Biobank (KHP PCaBB) from 2013 to March 2015.
Rationale of current audit

To provide a clinical assessment of the KHP prostate cancer biobank by:

• Describing the population of all prostate cancer patients at GSTT, including those who have given consent for biobanking

• Ensure that it is clinically and demographically diverse and representative of the total population of prostate cancer patients at GSTT
Methodology

**Study Population**
- Total of 1,257 prostate cancer patients with decision to treat between January 2013-March 2015

**Data Collection**
- Consent information obtained from KHPCBB Database
- Demographic and clinical information obtained from Hospital Information Systems

**Statistical Analysis**
- Patients stratified based on risk categories (Gleason Score, PSA levels and TNM stage)
- Descriptive statistics comparing ALL patients with those patients who gave consent for the Biobank
Results

During the audit period from January 2013 until March 2015, 1/3 of all newly diagnosed patients (32%) have given consent for biobanking.

Age, ethnicity, and socioeconomic status are comparable – with slightly less elderly men in the consented group.

<table>
<thead>
<tr>
<th>Demographic Variable</th>
<th>All Patients (n=1257)</th>
<th>Consented (n=402)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at diagnosis (years)</td>
<td>65.434 (±9.5804)</td>
<td>62.570 (±8.0228)</td>
</tr>
<tr>
<td>&lt;50</td>
<td>61 (4.9)</td>
<td>27 (6.7)</td>
</tr>
<tr>
<td>50-59</td>
<td>295 (23.5)</td>
<td>112 (27.9)</td>
</tr>
<tr>
<td>60-69</td>
<td>510 (40.6)</td>
<td>194 (48.3)</td>
</tr>
<tr>
<td>70-79</td>
<td>287 (22.8)</td>
<td>60 (14.9)</td>
</tr>
<tr>
<td>80-89</td>
<td>92 (7.3)</td>
<td>7 (1.7)</td>
</tr>
<tr>
<td>&gt;90</td>
<td>10 (0.8)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Unrecorded</td>
<td>2 (0.2)</td>
<td>2 (0.5)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>All Patients</th>
<th>Consented</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>590 (46.9)</td>
<td>202 (50.2)</td>
</tr>
<tr>
<td>Black</td>
<td>225 (17.9)</td>
<td>62 (15.4)</td>
</tr>
<tr>
<td>Asian</td>
<td>31 (2.5)</td>
<td>6 (1.5)</td>
</tr>
<tr>
<td>Mixed</td>
<td>14 (1.1)</td>
<td>4 (1.0)</td>
</tr>
<tr>
<td>Other</td>
<td>12 (1.0)</td>
<td>3 (0.7)</td>
</tr>
<tr>
<td>Unrecorded</td>
<td>385 (30.6)</td>
<td>125 (31.1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Socioeconomic background</th>
<th>All Patients</th>
<th>Consented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>1088 (86.6)</td>
<td>337 (83.8)</td>
</tr>
<tr>
<td>Middle</td>
<td>31 (2.5)</td>
<td>13 (3.2)</td>
</tr>
<tr>
<td>High</td>
<td>93 (7.4)</td>
<td>41 (10.2)</td>
</tr>
<tr>
<td>Missing</td>
<td>45 (3.6)</td>
<td>11 (2.7)</td>
</tr>
</tbody>
</table>

Number of total and consented patients per year

Demographic information on GSTT PCa patients
Results

• More men on curative treatment gave consent for the biobank

• Disease severity and comorbidity was comparable between those who gave consent and the total group of patients

→ Differences in treatment might be explained by the practicalities of the consent process. Men scheduled for a radical prostatectomy attend an education seminar at which time they are also offered an opportunity to consent for the biobank

<table>
<thead>
<tr>
<th>Clinical Variable</th>
<th>All Patients (n=1257)</th>
<th>Consented (n=402)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgery</td>
<td>427 (34.0)</td>
<td>230 (57.2)</td>
</tr>
<tr>
<td>Active Monitoring</td>
<td>395 (31.4)</td>
<td>70 (17.4)</td>
</tr>
<tr>
<td>Hormone Therapy</td>
<td>362 (28.8)</td>
<td>85 (21.1)</td>
</tr>
<tr>
<td>Cytotoxic Chemotherapy</td>
<td>2 (0.2)</td>
<td>1 (0.2)</td>
</tr>
<tr>
<td>Brachytherapy</td>
<td>56 (4.5)</td>
<td>16 (4.0)</td>
</tr>
<tr>
<td>Teletherapy</td>
<td>14 (1.1)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Specialist palliative care</td>
<td>1 (0.1)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Risk Category</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low risk</td>
<td>145 (11.5)</td>
<td>38 (9.5)</td>
</tr>
<tr>
<td>Intermediate risk</td>
<td>507 (40.3)</td>
<td>173 (43.0)</td>
</tr>
<tr>
<td>High Risk</td>
<td>298 (23.7)</td>
<td>120 (29.9)</td>
</tr>
<tr>
<td>Regionally metastatic/ Locally advanced</td>
<td>73 (5.8)</td>
<td>14 (3.5)</td>
</tr>
<tr>
<td>Distant metastasis</td>
<td>85 (6.8)</td>
<td>21 (5.2)</td>
</tr>
<tr>
<td>Unrecorded</td>
<td>149 (11.9)</td>
<td>36 (9.0)</td>
</tr>
<tr>
<td>Total comorbidities</td>
<td>2.201 (±2.3672)</td>
<td>1.928 (±2.1750)</td>
</tr>
<tr>
<td>Medication</td>
<td>2.43 (±3.0846)</td>
<td>2.172 (±2.61)</td>
</tr>
</tbody>
</table>
Current biobank metrics

Whole Blood
- Venipuncture
- Centrifugation Start
- Freezing Time
- Storage Location & Temperature

Tissue
- Ischaemic Time
- Fresh
- Fresh Frozen
- FFPE
- Fixation time
- Storage Location & Temperature

Plasma
- WBC
- RBC
- Serum
- PBMC

Concentration
- 260/280
- 260/230
- DIN
- RIN
- Ct-Q-PCR

% Tumour
% Necrosis
Preservation

DNA
RNA
TMA
Current biobank metrics

Collection from 2013 to 2016

Numbers on Biobank

- Patients Consented: numbers, 2147
- Surplus material: numbers, 1535
- Fresh Frozen tissue
- Research Only: numbers, 128
- Whole blood
- Derivatives

Resources Available

Numbers Available: 7606
Current biobank metrics

Collection from 2013 to 2016

Numbers on Biobank

- PBMC
- Plasma
- Serum
- WBC
- RBC
- Fresh Frozen Tissue
- FFPE Tumour

Resources Available

- numbers, 3678
- numbers, 1552
- numbers, 1209
- numbers, 780
- numbers, 1114
- [NOM DE CATÉGORIE], 596
- numbers, 1478

0 500 1000 1500 2000 2500 3000 3500 4000

Numbers on Biobank
Current biobank metrics: Access to the Biobank

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requests</td>
<td>3</td>
<td>4</td>
<td>7</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Request approved</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Mean approval time (days)</td>
<td>23</td>
<td>50</td>
<td>67</td>
<td>146</td>
<td>73</td>
</tr>
</tbody>
</table>
Current biobank metrics

Grant Income that Utilised Prostate Biobank

2017  Graham and Dianne Roberts Charitable Settlement “King’s Health Partners Bladder Cancer Biobank”,  
       £1,790,000
2017  Health Innovation Network “Using volunteers to seek consent for biobanking”, £9,126
2015  Prostate Cancer UK PhD studentship “Genomic scars to predict upgrading in men on active surveillance”,  
       £99,100
2014  Moulton Foundation “Therapeutic use of metformin in preventing prostate cancer progression”, £245,513
2014  Population Sciences Cluster – NIHR Biomedical Research Centre, Guy’s Hospital “Breast and Prostate  
       Cancer Clinical Database”, £5,700
2014  Prostate Cancer UK Pilot Award “Mutation of Duffy Antigen Receptor for Chemokines (DARC) as an  
       indicator of prostate cancer severity in Afro-Caribbean men”, £49,787.
2013  King’s Health Partners R&D Challenge Fund “The Lymphoid Stress Surveillance to predict prostate  
       cancer prognosis”, £99,964
2013  Biomedical Research Centre Clinical Development Group “Prostate Cancer Research Network”,  
       £9,700
2013  Prostate Cancer UK PhD studentship “The FAS/AMPK axis as a determinant of prostate cancer  
       progression”, £99,710
2013  World Cancer Research Fund “Evasion of immune editing by circulating tumour cells is an exercise-  
       modifiable mechanism underlying aggressive behaviour in obese men with prostate cancer”, £249,994.
2013  Pathological Society of GB&NI “Volunteer Training - discuss and take consent research biobanking”,  
       £8,584
Current biobank metrics

Publications


Posters


Thesis

• 2013-2016 King’s Health Partners R&D Challenge Fund, (PhD: Deborah Enting), “The Lymphoid Stress Surveillance to predict prostate cancer prognosis”
• 2013-2016 Prostate Cancer UK PhD studentship (PhD: Mario De Piano), “The FAS/AMPK axis as a determinant of prostate cancer progression”
• 2015-2018 Prostate Cancer UK PhD studentship (PhD: Salpie Nowinski), “Genomic scars to predict upgrading in men on active surveillance”
Discussion

- Our Prostate Cancer Biobank is demographically representative of the total prostate cancer patient population seen in terms of age, ethnicity and socioeconomic background.

- Differences in treatment types might be due to the pathways used to approach patients for consent.
Conclusion

King’s Health Partners’ Prostate Cancer Biobank is amassing a data and tissue repository that is largely reflective of the demographic and clinical diversity within the South East London prostate cancer patient population. It is becoming an ideal platform for prostate cancer research.
Q&A and Acknowledgments

For more information, please email:

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- Aida Santaolalla  aida.santaolalla@kcl.ac.uk

Thank you!

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