QSkin Sun and Health Study
Healthcare services for skin cancers

Bridie Thompson

Data Linkage Symposium,
15th November, 2017
QSkin

Investigators
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Adele Green
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Penny Webb

Team
Bridie Thompson
Nirmala Pandeya
Kyoko Miura
Chiho Muranushi
Jean Claude Dusingize
Padmini Subramanian
Rebekah Cicero
Lea Jackman
Types of skin cancers

- Melanoma
- Basal cell cancers
- Squamous cell cancers
BCC and SCC in Australia

- AIHW
  - Account for the largest number of cancers in Australia\(^1\)
  - Highest expenditure of any cancer\(^2\)
    - Total Medicare cost of $127.6 million in 2014\(^1\)
  - Mostly treated in GP & specialist practices\(^2\)
    - Make up 25% of all hospital admissions for cancer\(^3\)

1. AIHW 2016. Skin cancer in Australia. Cat. no. CAN 96. Canberra: AIHW.
AIMS

For melanoma and SCC and BCC, to

• define causal pathways
• measure absolute risks associated with sun exposure, phenotype, demography & genotype
• develop and validate risk prediction tools
• measure the health burden / costs
Study Aims

• Where are patients being treated for BCC & SCC?

• Which types of healthcare providers are providing the treatment?

• Who are the patients that require hospital admission for BCC & SCC?

• What are the associated costs?
Follow-up skin cancer events
# Medicare data

<table>
<thead>
<tr>
<th>Participant ID</th>
<th>Date of Service</th>
<th>Medicare Item Number</th>
<th>Item Description</th>
<th>Provider Charge</th>
<th>Schedule Fee</th>
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<td>PATHOLOGY</td>
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</table>
Data linkage – MBS/PBS

**QSKIN COHORT**
43,794

**CONSENTED to Medicare linkage**
40,438 (92.3%)

**People with primary excision BCC/SCC**
9,999 (24.7%)

**No consent**
3,356 (7.7%)

1\textsuperscript{st} linkage – to June 2012
2\textsuperscript{nd} linkage – to June 2013
3\textsuperscript{rd} linkage – to June 2014
4\textsuperscript{th} linkage – to June 2015
5\textsuperscript{th} linkage – to June 2016

Pathology service providers
National Death Index
Queensland Cancer Registry
How reliable is the linkage?

- Estimate missing 2% QHAPDC data (*hospital indicator*)
- 9% had “private” facility type (QHAPDC), but no Medicare data
Data sources

- Complete consent ➔ Link using identified patient information
- Medicare – patients treated privately (hospital & practices)
- What about patients treated in public (and private) hospitals?
  - Queensland Hospital Admitted Patients Data Collection (QHAPDC)
The linked data

**QSkin cohort**
N = 43,764 people

**QHAPDC**
Qld Public & Private hospitals
Diagnosis of cancer
2010 – 2015
N = 14,859 hospital episodes
N = 3,469 people

**Medicare (MBS)**
N = 4,636,766 MBS claims
N = 40,231 people

**Admissions for BCC/SCC**
(Diagnosis code/procedure + morph)
1 July 2011 – 30 June 2014
N = 1,610 hospital episodes
N = 1,121 people

**Claims for primary excision BCC/SCC**
1 July 2011 – 30 June 2014
N = 15,460 Medicare claims
N = 6,765 people

First incident of excision for BCC/SCC in QSkin follow up period
Treatment setting

QHAPDC
Admissions for BCC/SCC
N = 1,121 people

Medicare
Claims for primary excision BCC/SCC
N = 6,765 people

Merged on person
N = 7,002 people
Treatment setting

QHAPDC
Admissions for BCC/SCC
N = 1,121 people

Medicare
Claims for primary excision BCC/SCC
N = 6,765 people

Merged on person
N = 7,002 people

Records matched on the same day

Private hospital
N = 557 (8.0%)
Treatment setting

QHAPDC
Admissions for BCC/SCC
N = 1,121 people

Medicare
Claims for primary excision BCC/SCC
N = 6,765 people

Merged on person
N = 7,002 people

QHAPDC records only

Public hospital
N = 236 (3.4%)
Treatment setting

QHAPDC
Admissions for BCC/SCC
N = 1,121 people

Medicare
Claims for primary excision BCC/SCC
N = 6,765 people

Merged on person
N = 7,002 people

Medicare records only

Clinical rooms
N = 6,209 (88.7%)
Treatment setting

11% admitted to hospital

QHAPDC
Admissions for BCC/SCC
N = 1,121 people

Medicare
Claims for primary excision BCC/SCC
N = 6,765 people

Merged on person
N = 7,002 people

Public hospital
N = 236 (3.4%)

Private hospital
N = 557 (8.0%)

Clinical rooms
N = 6,209 (88.7%)
# Type of provider

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<th>Private practice rooms</th>
<th>Total</th>
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<tr>
<td><strong>Primary care provider</strong></td>
<td>N = 536*</td>
<td>N = 6 209</td>
<td>N = 6 745</td>
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<tr>
<td>Dermatologist</td>
<td>3 (0.6%)</td>
<td>3 799 (61.2%)</td>
<td>3 802 (56.6%)</td>
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<tr>
<td>Plastic surgeon</td>
<td>60 (11.4%)</td>
<td>391 (6.3%)</td>
<td>449 (6.7%)</td>
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<tr>
<td>General surgeon</td>
<td>400 (74.9%)</td>
<td>312 (5.0%)</td>
<td>697 (10.4%)</td>
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<tr>
<td>Other Specialist</td>
<td>49 (9.2%)</td>
<td>1 674 (27.0%)</td>
<td>1 714 (25.5%)</td>
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<td>22 (4.1%)</td>
<td>33 (0.5%)</td>
<td>51 (0.8%)</td>
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* Missing for 21 participants
### Which patients

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<td><strong>N</strong></td>
<td>236</td>
<td>557</td>
<td>6209</td>
<td>7002</td>
</tr>
<tr>
<td>Age - 55+ v &lt;55</td>
<td>186 (79%)</td>
<td>368 (66%)</td>
<td>4473 (72%)</td>
<td>5072 (74%)</td>
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<td>Male v female</td>
<td>142 (60%)</td>
<td>267 (48%)</td>
<td>3410 (55%)</td>
<td>3819 (45%)</td>
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<tr>
<td>Face, finger, genitals, lower leg v other</td>
<td>178 (75%)</td>
<td>426 (77%)</td>
<td>2711 (44%)</td>
<td>331 (47%)</td>
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<tr>
<td>11mm+ v &lt;11mm</td>
<td>N/A</td>
<td>225 (45%)</td>
<td>1728 (28%)</td>
<td>1953 (29%)</td>
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## Costs

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<th>Private hospital</th>
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<td><strong>Median (IQR)</strong></td>
<td>N = 206*</td>
<td>N = 557</td>
<td>N = 6 209</td>
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<tr>
<td>Total of charges (AU$)</td>
<td>0 (0, 5)</td>
<td>891 (572, 1 319)</td>
<td>299 (237, 400)</td>
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<tr>
<td></td>
<td>Min: 0 Max: 5 890</td>
<td>Min: 84 Max: 4 193</td>
<td>Min: 53 Max: 3 635</td>
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<tr>
<td>Total patient out of pocket (AU$)</td>
<td>0 (0, 0)</td>
<td>456 (248, 713)</td>
<td>0 (0, 38)</td>
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<td>Min: 0 Max: 4 419</td>
<td>Min: 0 Max: 2 840</td>
<td>Min: -52 Max: 2 430</td>
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* 30 participants did not consent to linkage with Medicare
Where to from here

- Casemix data for public hospital admissions costs
- Treatment pathway for subsequent diagnoses BCC/SCC
- Use the linked pathology datasets to look at the types of providers and treatment setting by BCC vs SCC
- Look at PBS items around time of excision
Medicare claims data reliably identify treatments for basal cell carcinoma and squamous cell carcinoma: a prospective cohort study

Bridie S. Thompson,¹ Catherine M. Olsen,¹ Padmini Subramaniam,¹ Rachel E. Neale,² David C. Whiteman¹

Abstract
Objective To investigate the accuracy of Medicare fee-for-service payments for topical treatments in Australia and their treatment incurs a higher

A Model to Predict the Risk of Keratinocyte Carcinomas
David C. Whiteman¹, Bridie S. Thompson¹, Aaron P. Thrift², Maria-Celia Hughes¹, Chiho Muranushi¹,³, Rachel E. Neale¹, Adele C. Green¹,² and Catherine M. Olsen¹, for the QSkin Study

A comparison of the direct medical costs for individuals with or without basal or squamous cell skin cancer: A study from Australia
David Rowell ¹, Louisia G. Gordon², Catherine M. Olsen³ and David C Whiteman³

Cigarette Smoking and the Risks of Basal Cell Carcinoma and Squamous Cell Carcinoma
Jean Claude Dusingize¹,², Catherine M. Olsen¹,², Nirmala P. Pandeya¹, Padmini Subramaniam¹,³, Bridie S. Thompson¹, Rachel E. Neale¹, Adele C. Green¹,² and David C. Whiteman¹,², for the QSkin Study

Sunlight is the principal environmental risk factor for keratinocyte carcinomas, but other carcinogens have also been implicated, including tobacco smoke. Findings have been conflicting however. We investigated associa
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<td>87 (57/608 = 9.4%)</td>
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<td>(30 no MC consent)</td>
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<td>(57 missing MC data)</td>
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<td>Public facility</td>
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<td>155</td>
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<td>(Priv pt in pub hosp)</td>
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<tr>
<td>Total</td>
<td>557</td>
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<td>793</td>
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