

Lumos highlights and insights

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You cannot change what you do not
measure, and you should not
measure what you will not change
Peterson, 2004



Overview

- Lumos highlights
- Insights
- Future directions



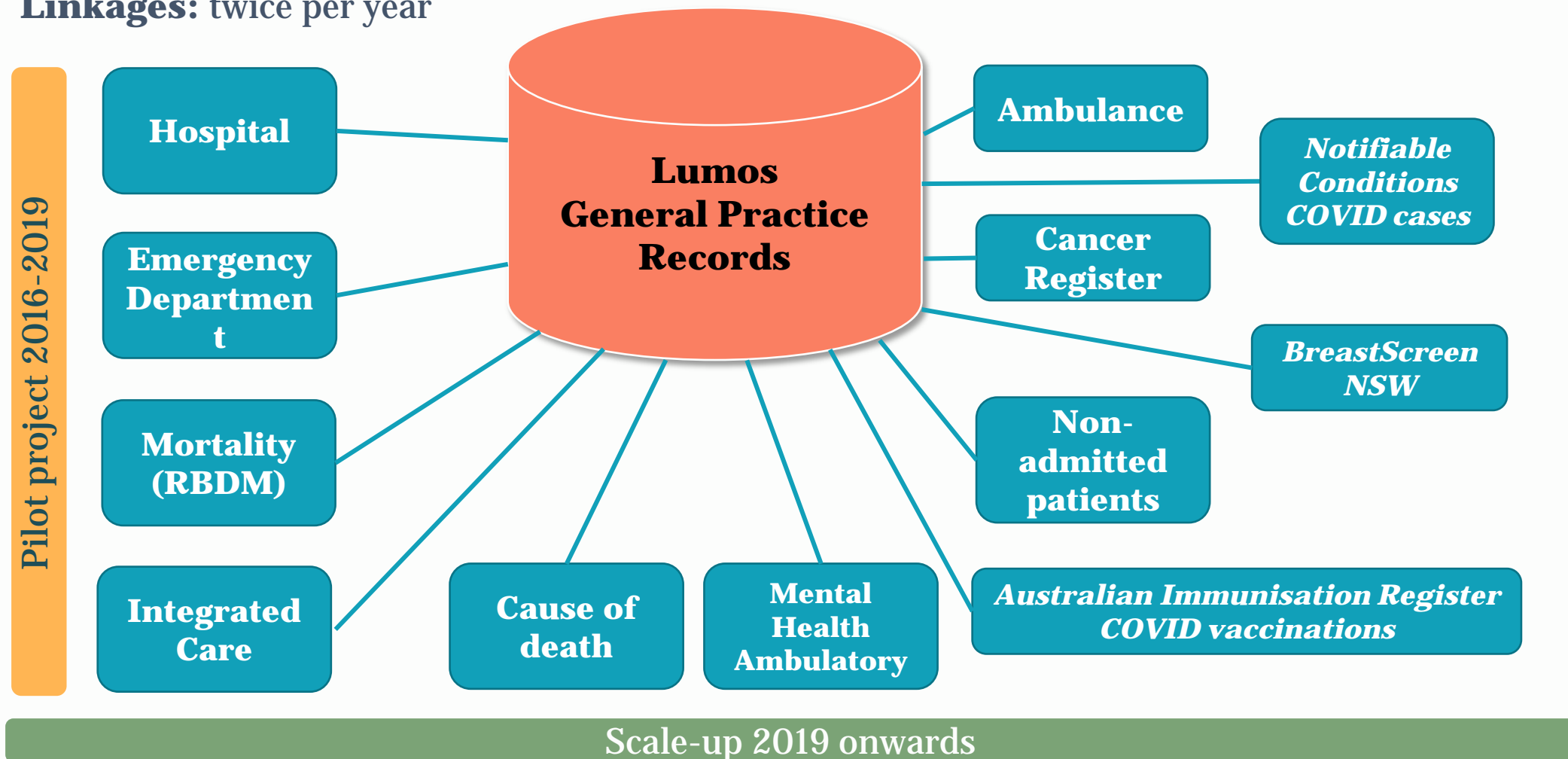
Lumos highlights



What is Lumos?

Cohort: patients who have visited participating general practices from 2010 onwards

Linkages: twice per year



General practice data

- Service dates
- Demographics
- Diagnoses
- Provider type
- Medications
- Immunisations
- Test results
- Lifestyle factors
- Billing information



Secure Analytics Primary Health Environment

- Cloud-based data safe
- A single point of data access and analysis for Lumos collaborators
- Meets privacy, security and legal requirements of NSW Health
- Live since October 2020
- Users from PHNs, LHDs, MoH and consultants



Successes so far

Today we have:

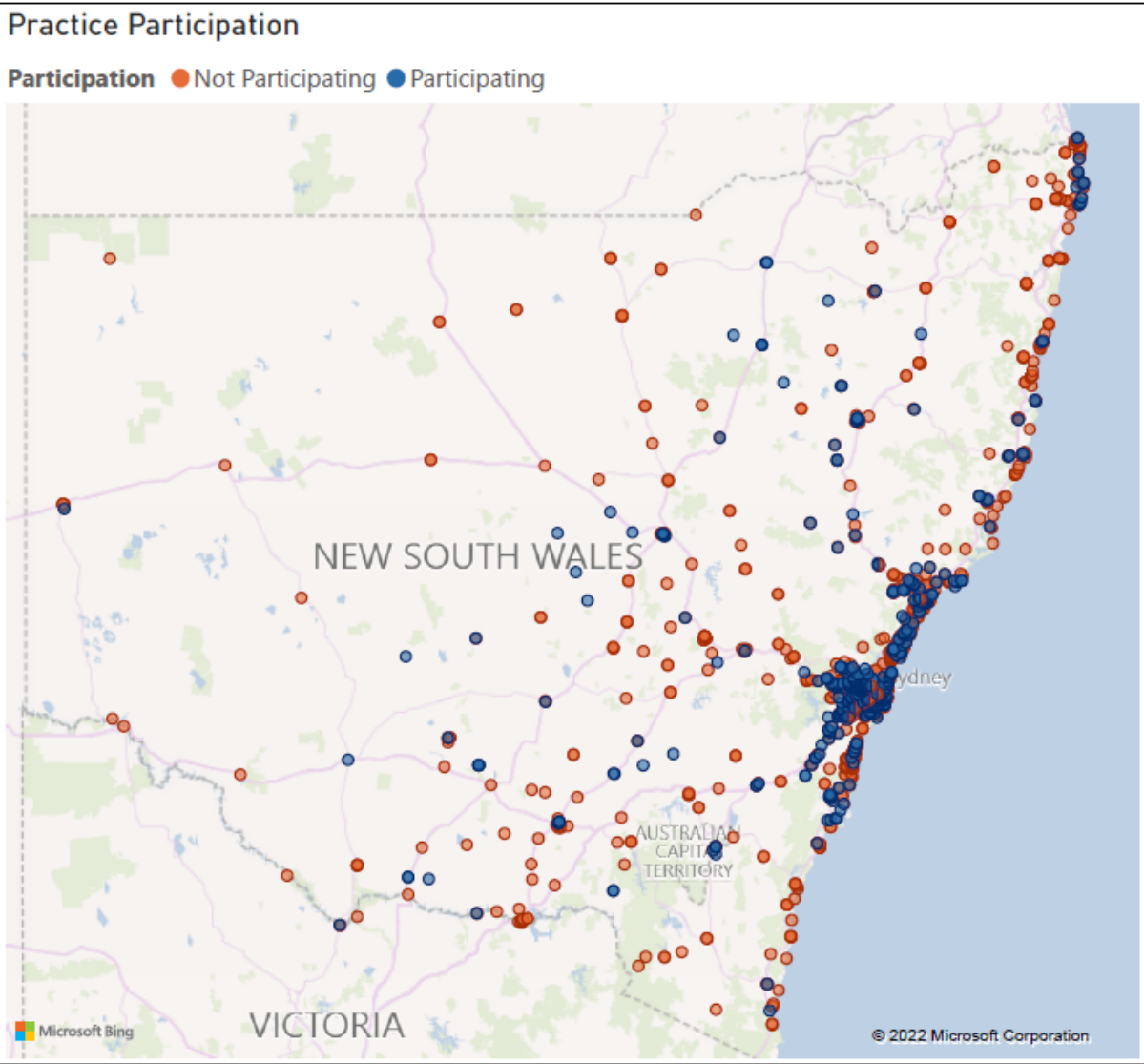
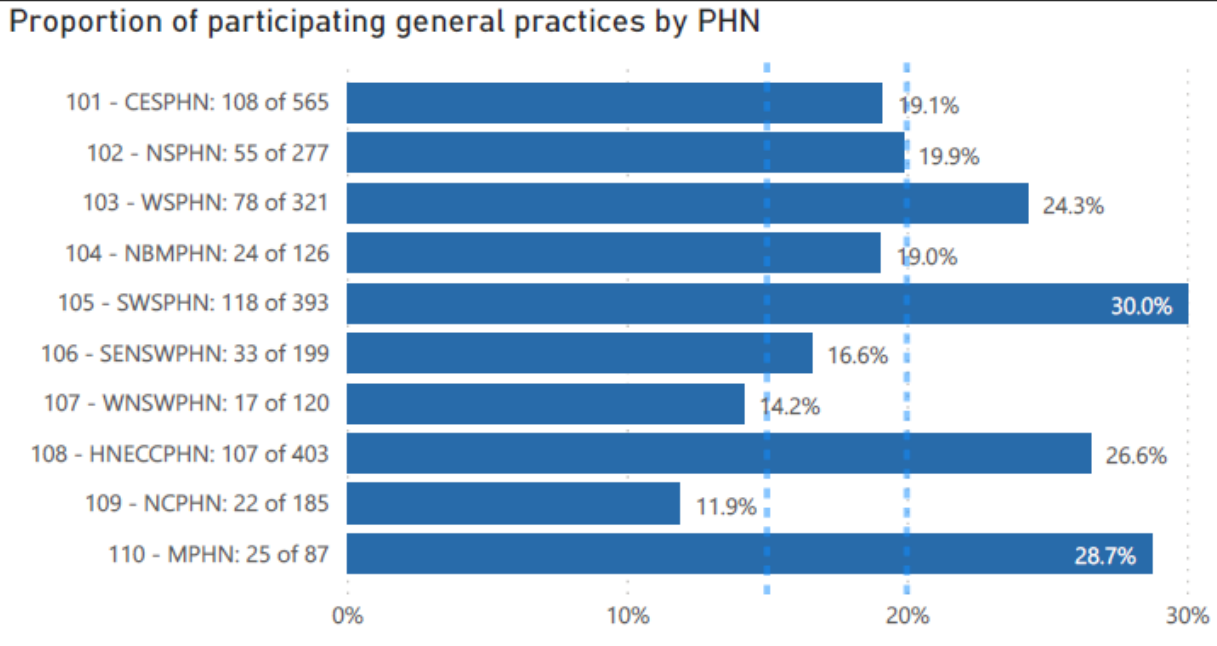
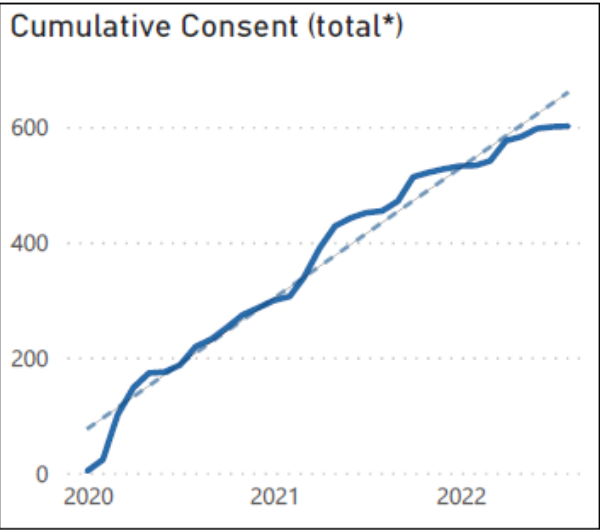
- Nearly 600 NSW general practices enrolled
- Participation from all 10 Primary Health Networks (PHNs)
- Approximately 4 million unique patient journeys
- Active SAPHE community of practice with over 50 users on the SAPHE



Lumos Practice Participation



There are: 587 general practices participating in Lumos as of 05/07/2022. This represents 21.8% of 2689 practices in NSW.



* There are 14 general practices that either can't participate, have closed or withdrawn from Lumos.

Representativeness – NSW – April 2020

Coverage

Number of practices: 156

Proportion of practices: 5.7%

Persons: 1 484 384

Proportion of population: 17%

Distribution similarity*

Socioeconomic status: 95%

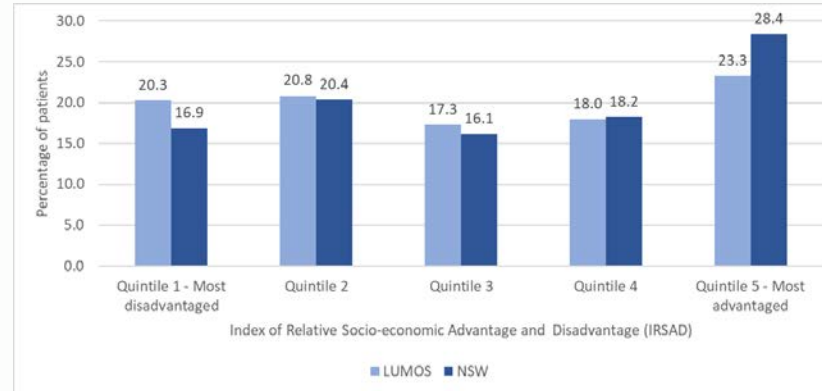
Remoteness: 97%

Age (females): 95%

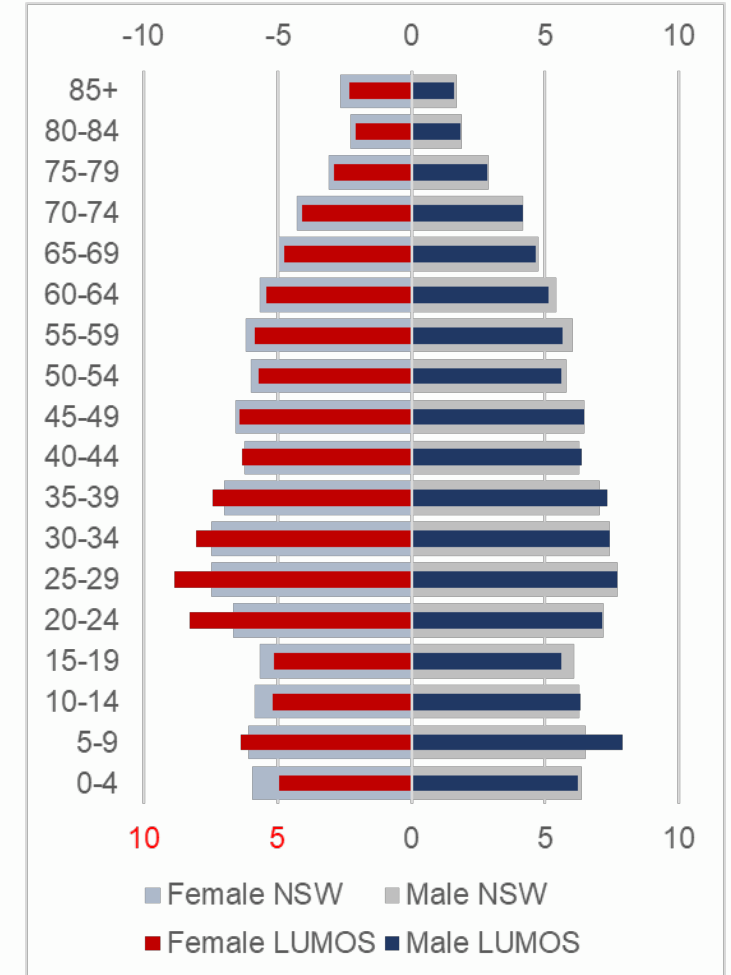
Age (males): 97%

* Evaluated using histogram intercept measure of similarity, Lumos data April 2020 and Australian Census 2016

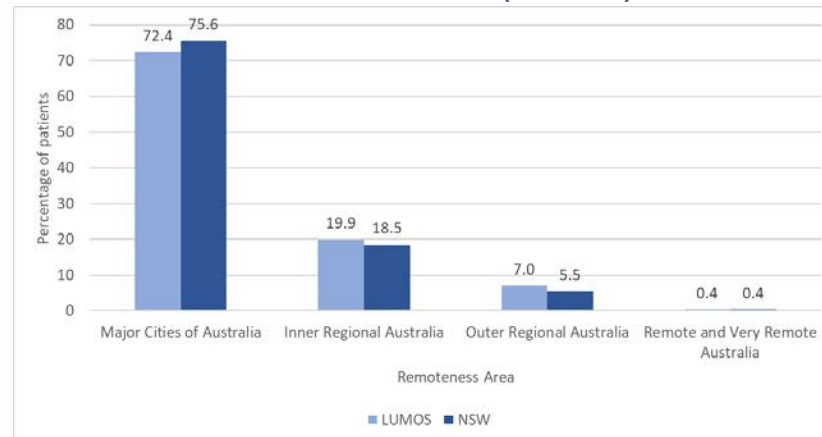
Socioeconomic status (IRSAD)



Age and sex



Remoteness (ARIA)



Open access

Original research

Integrated Healthcare
Journal

Lumos: a statewide linkage programme in Australia integrating general practice data to guide system redesign

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Correll and Feyer et al, BMJ
Integrated Healthcare
Journal
<https://ihj.bmj.com/content/3/1/e000074>

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ABSTRACT

Objective With ageing of the Australian population, more people are living longer and experiencing chronic or complex health conditions. The challenge is to have information that supports the integration of services across the continuum of settings and providers, to deliver person-centred, seamless, efficient and effective healthcare. However, in Australia, data are typically siloed within health

Significance of this study

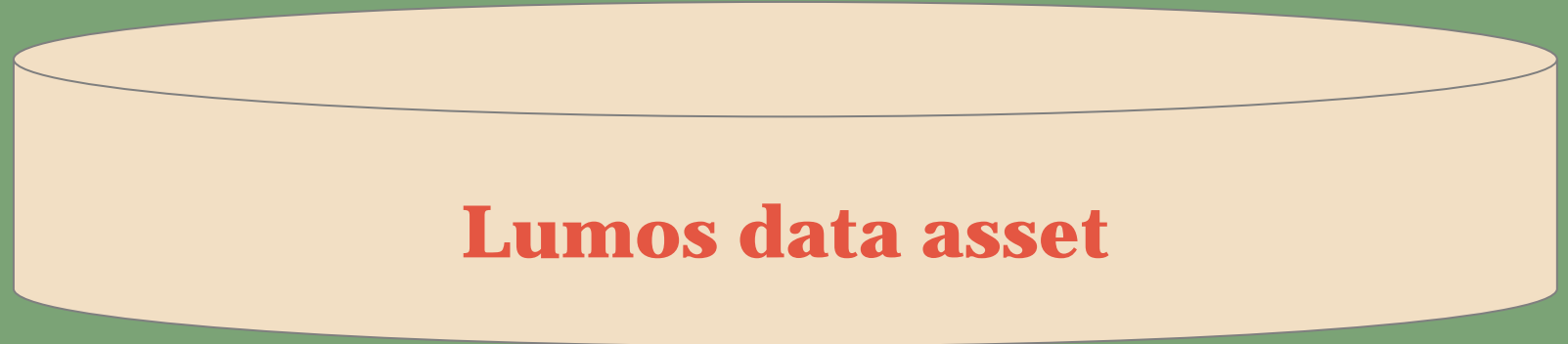
What is already known about this subject?

- ▶ Integrating healthcare depends on understanding what patients need, where and when.
- ▶ To be effective in the delivery of coordinated, patient-centred health, data must also be integrated across healthcare settings.

Integ Health J: first published as 10.1136/ihj-2021-000074



Insights



Analysis

- ▶ GP characteristics
- ▶ Socio-demographic
- ▶ Chronic conditions
- ▶ Patient risk factors
- ▶ Other clinical

- ▶ Patient journey modelling
- ▶ Statistical and causal modelling
- ▶ Dynamic simulation modelling
- ▶ Data mining
- ▶ Propensity score matching



 **GP activity affects hospital activity**

**Targeted appropriate levels of
GP Services affect patient
outcomes in acute care**



High connectivity practices

>30% of patients visited at least 12 times in 2 years

Roughly aligns to:

- 75th percentile and
- national average GP visits per year.



High-connectivity practices (%)	Low-connectivity practices (%)	Total
43 (21.7%)	155 (78.3%)	198



Outcomes

Unplanned acute health service use:

Binary outcome

➤ Emergency department presentation;

OR

➤ Unplanned hospital admission

2018-2019



General practice activity can affect hospital visits

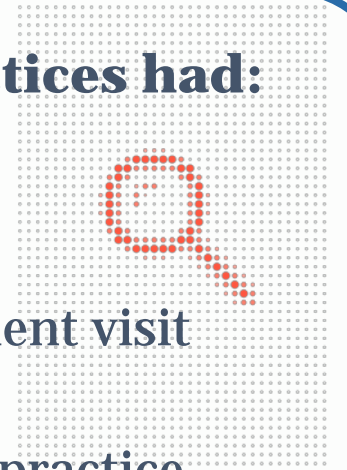


Patients that went to high-connectivity practices had:

- **10% fewer ED presentations**
- **12% fewer unplanned hospitalisations**

than patients that went to practices with lower patient visit rates.

- This was seen in both patients who attended the practice frequently and those who attended less often..



***Higher connectivity practices** = >30% of patients visited at least 12 times in 2 years.

Practice characteristics

- located outside of major cities
- smaller (patient population)

Patient characteristics

- older
- More disadvantaged
- more chronic conditions



GP activity affects hospital activity

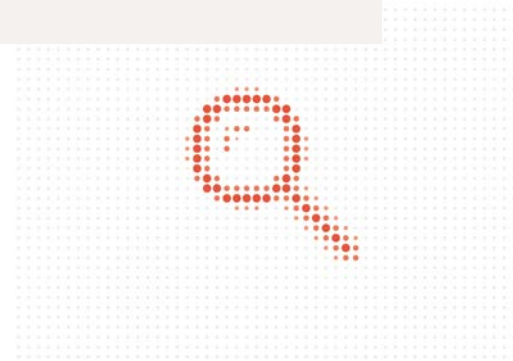
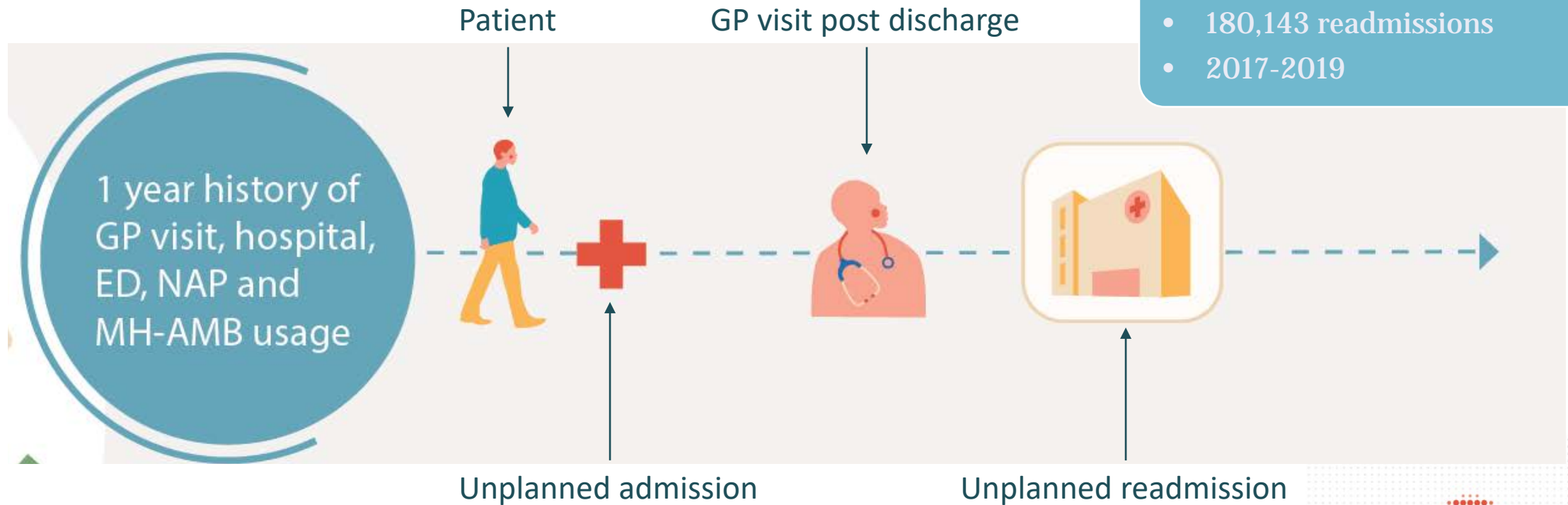
Patients that have prompt GP care after hospital admissions have fewer readmissions



GP follow-up post discharge: Study design



- 344 practices
- 2.9 million patients
- 543,936 unplanned admissions
- 180,143 readmissions
- 2017-2019



Prompt GP follow up is associated with less readmissions

GP visit post discharge	Unplanned hospital readmission	Odds ratio Unplanned hospital readmission when there is a GP visit post discharge	P value
Days 0-1	Days 2-7	0.67	<0.001
Days 0-7	Days 8-28	0.85	<0.001

After adjusting for a range of potentially confounding factors, visiting a GP in the first two days after discharge from an unplanned hospital admission was associated with **one third fewer** unplanned readmissions in the first week



Practice Insights

GP encounters around the time of hospitalisation



Sample General Practice
Sample PHN Primary Health Network

Lumos
Sample General Practice
Sample report for period FY19-20

Unplanned hospitalisation

	Days since GP encounter prior to hospitalisation					Days until GP encounter after hospitalisation			
This practice	11.9	9.9	17.9	21.2		16.6	31.1	17.9	11.3
This PHN	10.1	8.8	11.1	20.5		18.0	25.5	11.1	8.5
All PHNs	9.3	7.8	10.0	22.9		19.2	23.0	9.5	8.4
	15-28	8-14	3-7	0-2		0-2	3-7	8-14	15-28

Days since GP encounter prior to hospitalisation

Days until GP encounter after hospitalisation





What the GP knows, matters

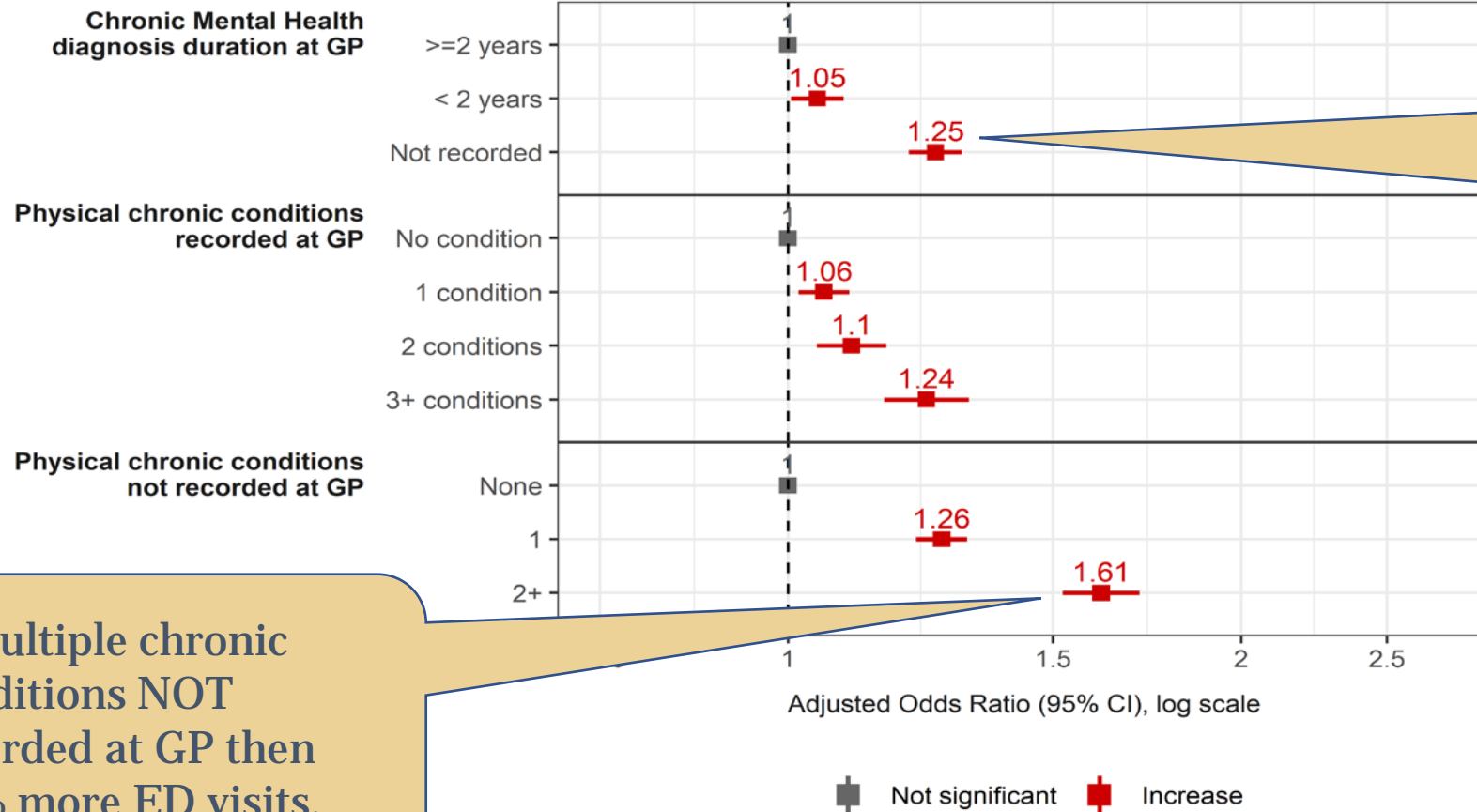
When diagnoses are NOT recorded at the GP, patients' outcomes are worse.



What the GP knows, matters

People with Chronic Mental Health Conditions

At least 1 ED visit in next 12 months



If MH diagnosis NOT recorded at GP: 25% more ED than people diagnosed at GP more than 2 years

Comparing diagnoses in GP and hospital records to find out what happens when a diagnosis is only recorded in one data source and not the other.

Logistic regression model adjusts for demographic and clinical characteristics

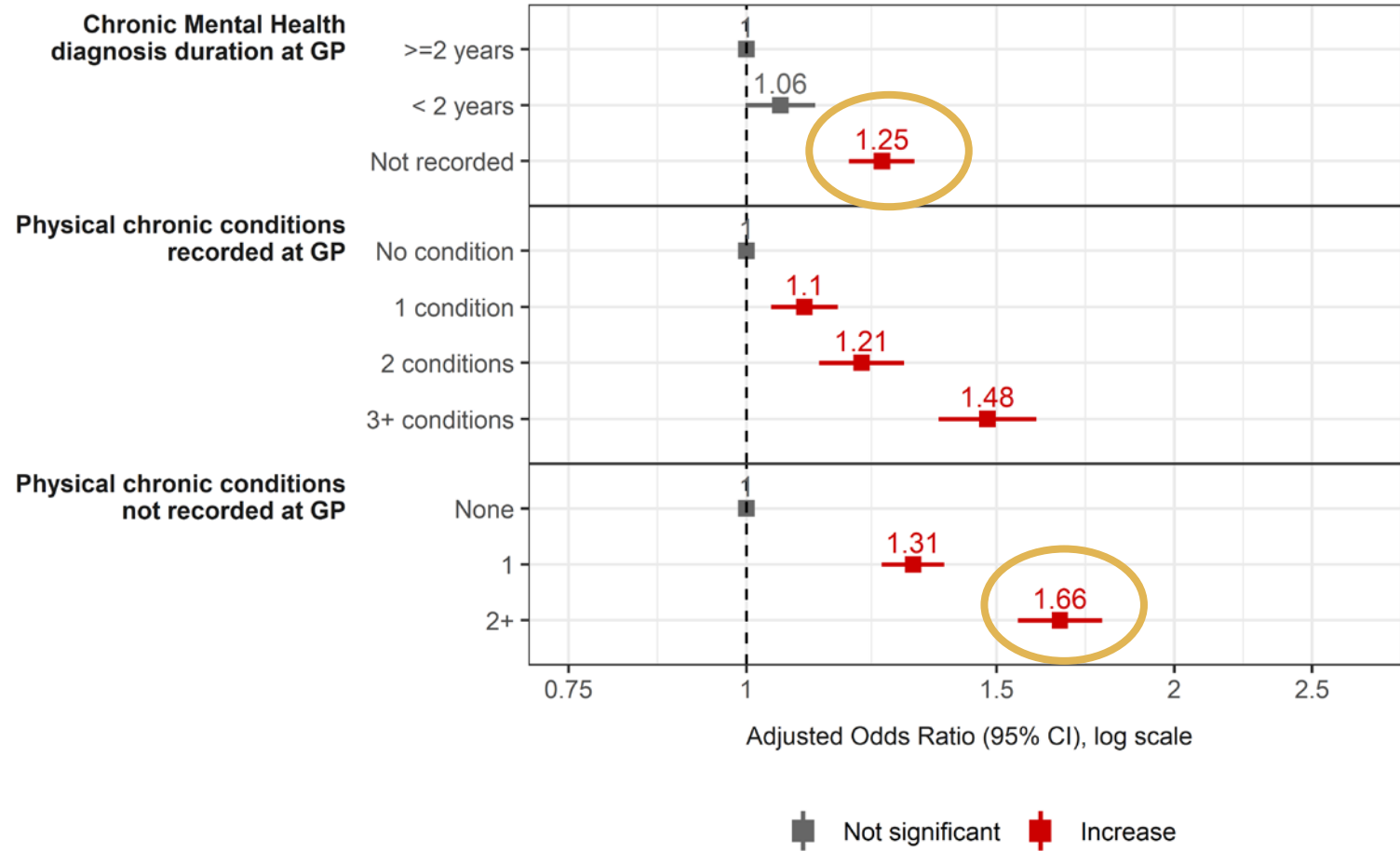
If multiple chronic conditions NOT recorded at GP then 60% more ED visits.



What the GP knows, matters

People with Chronic Mental Health Conditions

At least 1 unplanned admission in next 12 months



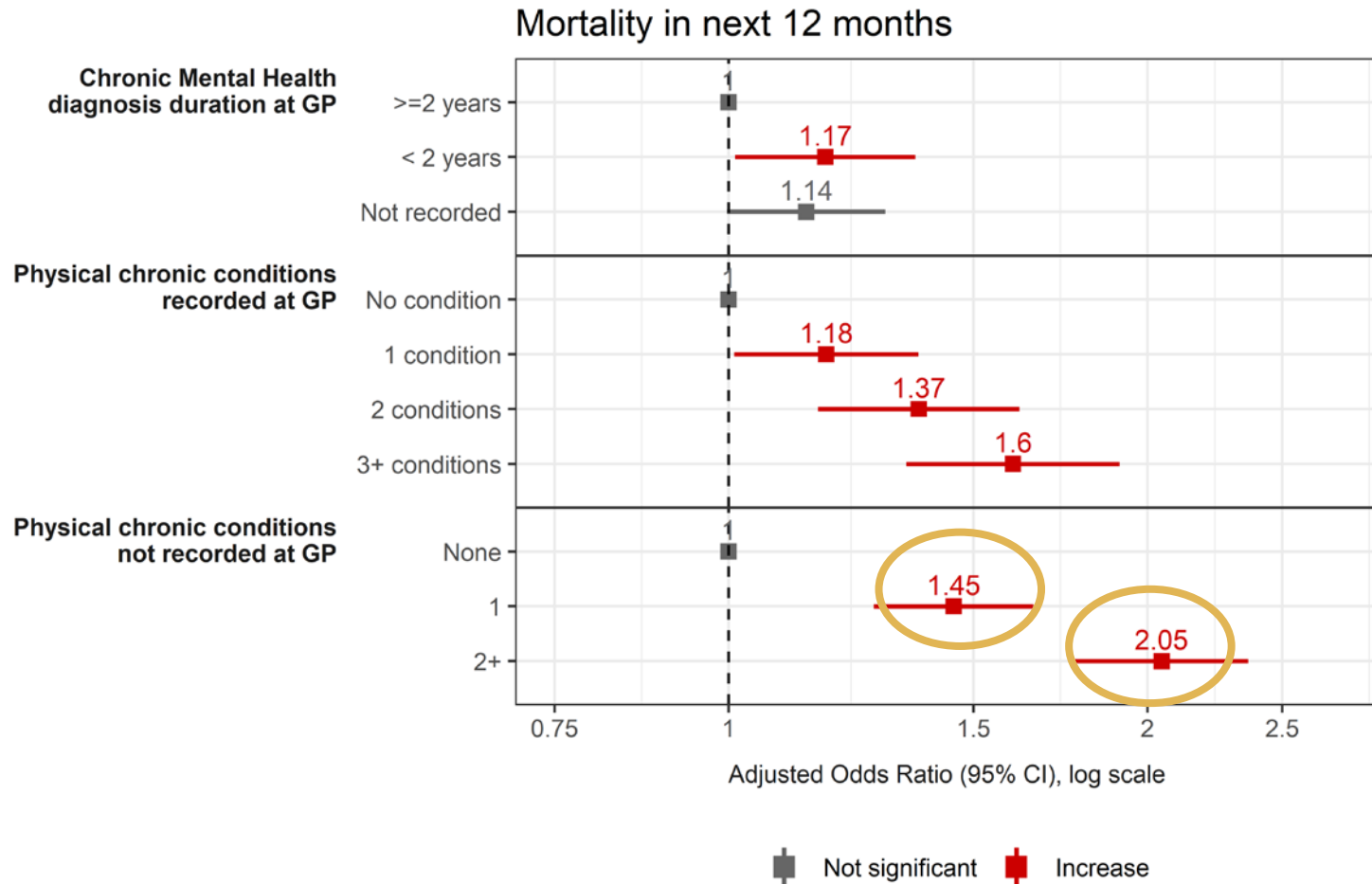
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What the GP knows, matters

People with Chronic Mental Health Conditions



Possible Interpretation
When health needs are not recognised and managed in general practice, outcomes are worse.

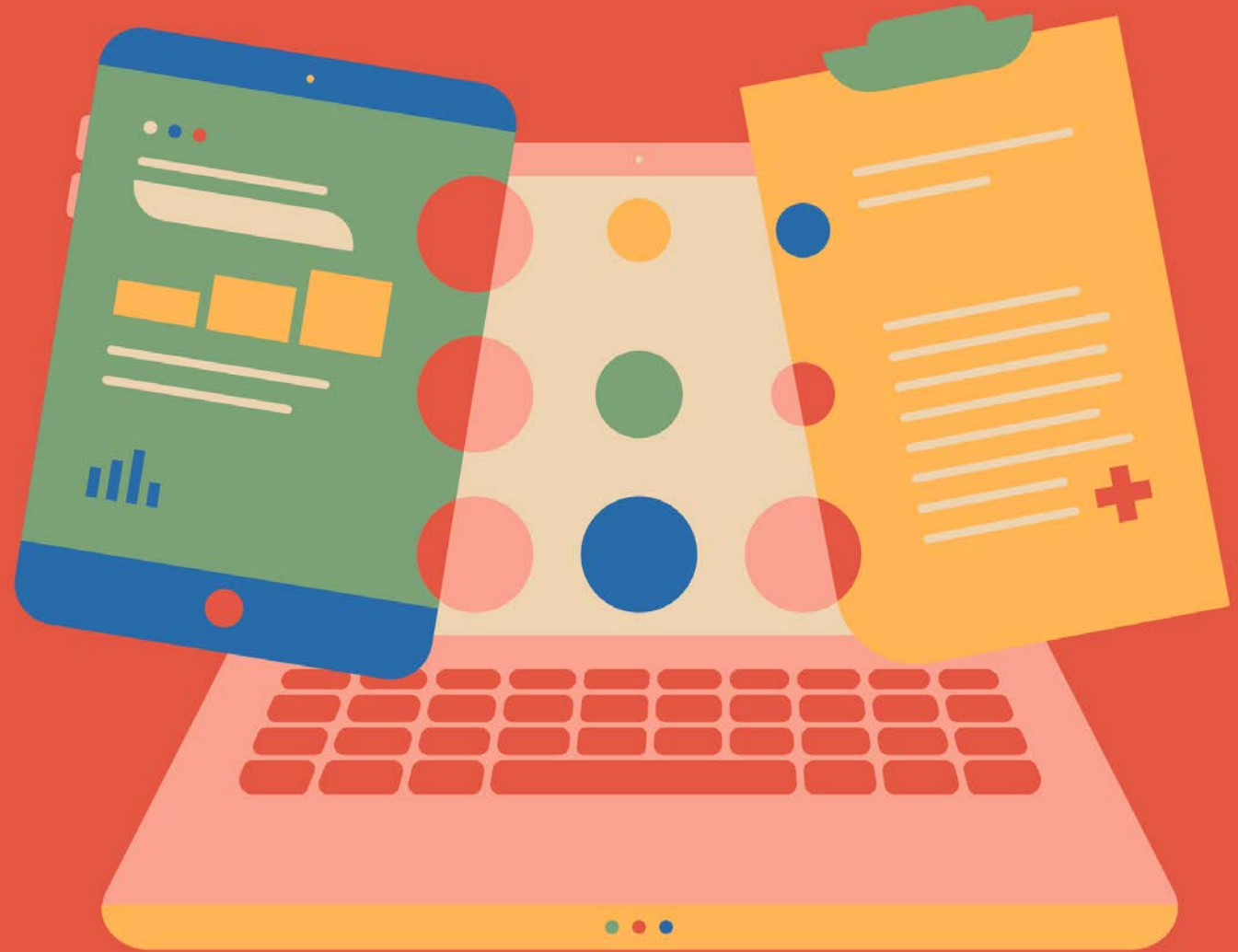
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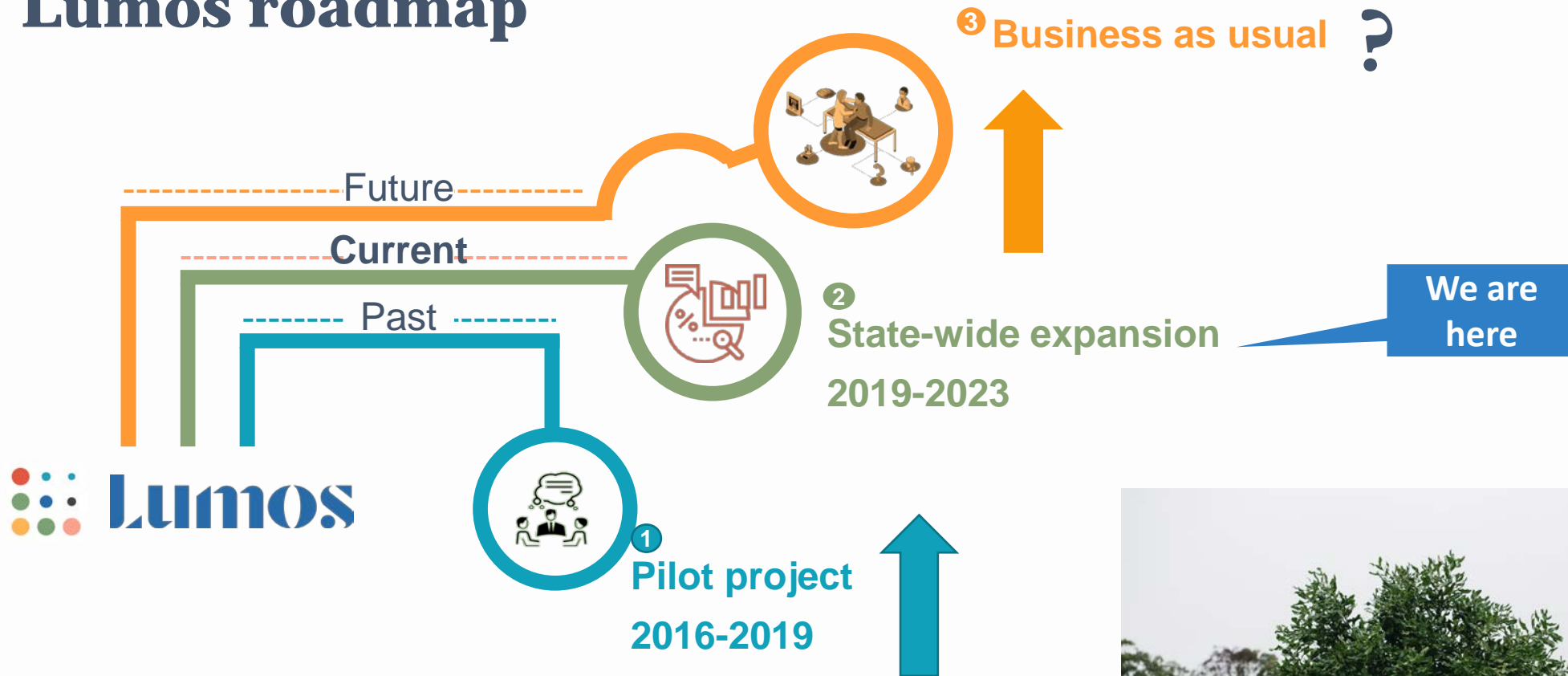


Further work

- Cost-benefit analyses
- Repeat analyses as Lumos coverage grows
- Dynamic simulation modelling
- Linkage to MBS data
- Synthetic data



Lumos roadmap



“The macadamia does not begin to produce commercial quantities of seeds until it is 7 to 10 years old, but once established, may continue bearing for over 100 years.”



Questions and discussion



Working collaboratively



State of the art record linkage to many data sources



Expand reach



Safeguarding patient privacy



Descriptive statistics



State of the art data analytics



Automated processes



Cloud based data integration platform



Following patient journeys



Better population health