

Insights Paper No.8

COVID-19 and Australian General Practice: The impact of vaccination programs

Date: 27th June 2021

**The 8th in a Series of insight papers prepared by Outcome Health
with the support of participating PHNs**

Central and Eastern Sydney Primary Health Network
Eastern Melbourne Primary Health Network
Gippsland Primary Health Network
South Eastern Melbourne Primary Health Network
South Western Sydney Primary Health Network

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Contents

Preamble..... 2

Key Learnings..... 2

Recommendations 3

Method..... 3

 Coding and Data notes..... 4

 Timing 4

Background..... 6

Vaccination..... 6

 Vaccination schedule..... 6

 Vaccine planning..... 7

 Vaccination..... 9

 Adverse events/Vaccine hesitancy 11

Influenza..... 12

Effects on General Practice as a whole..... 13

 Activity Impact 14

 Chronic Disease Management..... 16

Discussion..... 17

Conclusion..... 17

 Limitations to our data: 17

Next steps..... 18

Contacts for more information..... 18

The POLAR Program..... 19

Appendix 1 – COVID-19 Vaccination Program 20

Preamble

This is the 8th in a series of papers which considers the impact of COVID-19 on Australian General Practice and the broader healthcare community¹:

Paper 1 - Report into COVID-19 AND GENERAL PRACTICE, Insights from the first few weeks.

Paper 2 - COVID-19 and General Practice, Insights Paper no. 2 – A predictive impact model for the healthcare sector.

Paper 3 - COVID-19 and General Practice, insights paper no 3 - A preliminary analysis of changes due to telehealth use

Paper 4 - COVID-19 and General Practice, Insights paper no 4 - Medication prescribing impacts of the pandemic.

Paper 5 - COVID-19 and Australian General Practice: Mental Health Impacts of COVID-19.

Paper 6 - COVID-19 and Australian General Practice: Paediatric Care Impacts of COVID-19.

Paper 7 - Primary Care and SARS-CoV-2: The first 40 weeks of the pandemic year.

Through the COVID-19 outbreak, Outcome Health has been producing daily reports and dashboards via the POLAR GP tool for Primary Health Networks (PHNs) to allow direct planning and resource allocation through their respective practices. These insight reports are an initiative of the following PHNs: Central and Eastern Sydney, South Western Sydney, Gippsland, Eastern Melbourne and South Eastern Melbourne.

More information about POLAR can be found here polargp.org.au.

Key Learnings

When considering the vaccination picture emerging from primary care, we note that:

- General practice already achieves significant results in respect to immunisation in general;
- The COVID-19 vaccination program has introduced significant challenges, which by and large have been met by practices;
- Over 10% of GP activity at the moment is COVID-19 vaccinations, and this is likely to increase with second vaccinations, and as the Pfizer vaccine becomes available through practices;
- Increased vaccination activity has led to a 5% drop in general consultations, with community impacts on general care.

The headline information has been around practices responding to the need to vaccinate the population, but in this report we highlight how that has occurred in the context of a significant (and larger in overall numbers) vaccination program. The current COVID-19 vaccination program is unusual, in that practices are not responsible for their practice population, but for the community as a whole. This is a welcome recognition of the role of primary care as an integral part of the health system and whilst the vaccination program has been overwhelming it has

¹ The previous papers are available at <https://polargp.org.au/primary-health-networks/covid-19-data-insight-papers>

highlighted the recognition and role of primary care in particular general practice. The primary care role in emergent situations (i.e. pandemic, flood, bushfire, drought) is one that is integral for a sustainable healthcare system.

Recommendations

1. The role of general practice in vaccinations is more formally recognised and integrated into mass community vaccination programs:
 - a. This includes integration into state planning with appropriate data linkages.
2. General practices should be supported to be the primary providers of vaccination to the population. This may include:
 - a. Subsidies for infrastructure (vaccine fridges, etc) and
 - b. Item numbers to support vaccination (including numbers for extensive explanation for the vaccine hesitant).
3. The role of practice nurses in vaccination programs be formally recognised.
4. Increasing the recognition of general practice in disaster and crisis planning.

Method

Outcome Health provides Population Level Analysis and Reporting (POLAR) services to Primary Health Networks (PHNs), including for collaborative research in the AURORA Data Space. The current database includes over 10,000 contributing providers including GPs, practice nurses and other general practice staff in 1,300 individual practices. The basic programme (called POLAR GP) provides quality assurance and audit/feedback loops to GPs, to enhance care and improve data quality. Two PHNs are in NSW and extend from central Sydney (Central and Eastern Sydney) all the way down to Wingello and Bundanoon in rural NSW (South West Sydney). In Victoria three PHNs include a predominantly rural (Gippsland) and two urban (Eastern Melbourne and South East Melbourne), essentially including the Victorian population east of Craigieburn and Heidelberg in Melbourne, and the great dividing range in rural Victoria. The sample therefore covers about 30% of the Australian populace, with an urban and rural (but not remote) focus.

Our data management framework includes ethics approval for the program's data collection, granted by the Royal Australian College of General Practitioners National Research and Evaluation Ethics Committee, a Privacy Impact Assessment performed by external consultants, as well as regular external security testing. De-identified data is extracted daily and processed into coded schemas: SNOMED-CT_AU for diagnoses, Anatomic and Therapeutic Classification for medications, and other coding schemas for referrals, pathology etc. Further detail about the POLAR program (including technical, privacy and ethical aspects) has been published².

² Pearce C, McLeod A, Rinehart N, Ferrigi J, Shearer M. What does a comprehensive, integrated data strategy look like: The Population Level Analysis and Reporting (POLAR) program. *Stud Health Technol Inform.* 2019;264:303.

Coding and Data notes

Vaccinations are dealt with in many different ways in the GP Electronic Medical Records (EMRs), and therefore within the POLAR system. The COVID-19 program is underpinned by specific item numbers for vaccination, according to first or second vaccine doses, and urban or rural. These items are required to be direct billed, with no co-payment. For other vaccinations, we have drawn data from the practice recording of vaccinations in a specific immunisation section (which records type, batch number and site). In some sections we have used the SNOMED coded diagnoses for specific settings.

Timing

As these reports gather evidence based on a weekly analysis, interpretation of the figures often requires an understanding of the policy and practical happenings at the relevant time, to assess the impacts on vaccination. Below is a representation of the significant events since week 8, when the vaccination program began. Only significant events for NSW and Victoria are included, as our data comes from only those regions. The importance of the need to vaccinate the population was highlighted by the lockdowns occurring early in the year in NSW and Victoria. A timeline of relevant 2021 events is presented in Figure 1.

Figure 1 Vaccination Timeline in Australia



Background

In 2020 we released a series of reports describing the impacts of COVID-19 surges and the subsequent lockdowns and social/physical distancing measures. These reports examined the impacts on general practice and the subsequent flow-down to the health of the community as a whole. In summary, while impacts were marked in the first wave, through technical and workflow re-tooling of both process within practices and the types of care provided, general practice quickly recovered and subsequent lockdowns had lesser impacts. Telehealth has remained a significant part of the GP landscape, with the government extending initiatives until September 2021, with some changes.

The largest initiative in 2021 has been the commencement of the nationwide vaccination program being implemented as per the tiered approach (outlined below). The federal government took on management and distribution of vaccines and contracted providers to administer vaccinations to aged care, whilst states assumed responsibility for settings such as hospitals and high risk workers. At the same time, general practice was federally tasked with a mass immunisation program. This program recruited practices via an expression of interest - not all practices applied or were eligible, nevertheless a significant proportion of practices are now providing the COVID vaccination program in addition to the usual yearly influenza campaign. At the time of writing, there has been a further call for practices to enrol in the program.

We examine the impacts of the COVID-19 vaccine program, concentrating on COVID-9 vaccination in the context of overall GP vaccination programs, and the impact on regular GP activities above and beyond normal activity.

Vaccination

Vaccination schedule

The federal government developed a 5-tiered plan divided into three phases (detailed in Appendix 1). Briefly, these were:

- 1a:** Front line healthcare workers, aged care staff and residents, border staff,
- 1b:** Other healthcare workers, persons over 70 years of age, those people with a chronic condition, Critical workers (police, etc), ATSI people over 55 years of age,
- 2a:** Persons over 50 years of age, ATSI people 18-54, other critical workers,
- 2b:** The rest of the adult population,
- 3:** Those under 18 years of age (if indicated).

Individuals were able to determine their place in the rollout through a government provided planner accessed at <https://covid-vaccine.healthdirect.gov.au/eligibility>, which relied on self-reported responses to criteria. People were also able to book an appointment at registered sites through the website.

Responsibility for delivering the vaccination programs was to be jointly held between federal and state jurisdictional authorities. The federal government contracted providers to administer the aged care cohort and arranged for general practices to provide vaccinations to the population. State Health were responsible for the hospital workers, paramedics and others, before opening their hubs to the general population. All vaccinations were to be uploaded to the Australian Immunisation Record (AIR) which would act as a central record, and (with consent) to the My Health Record.

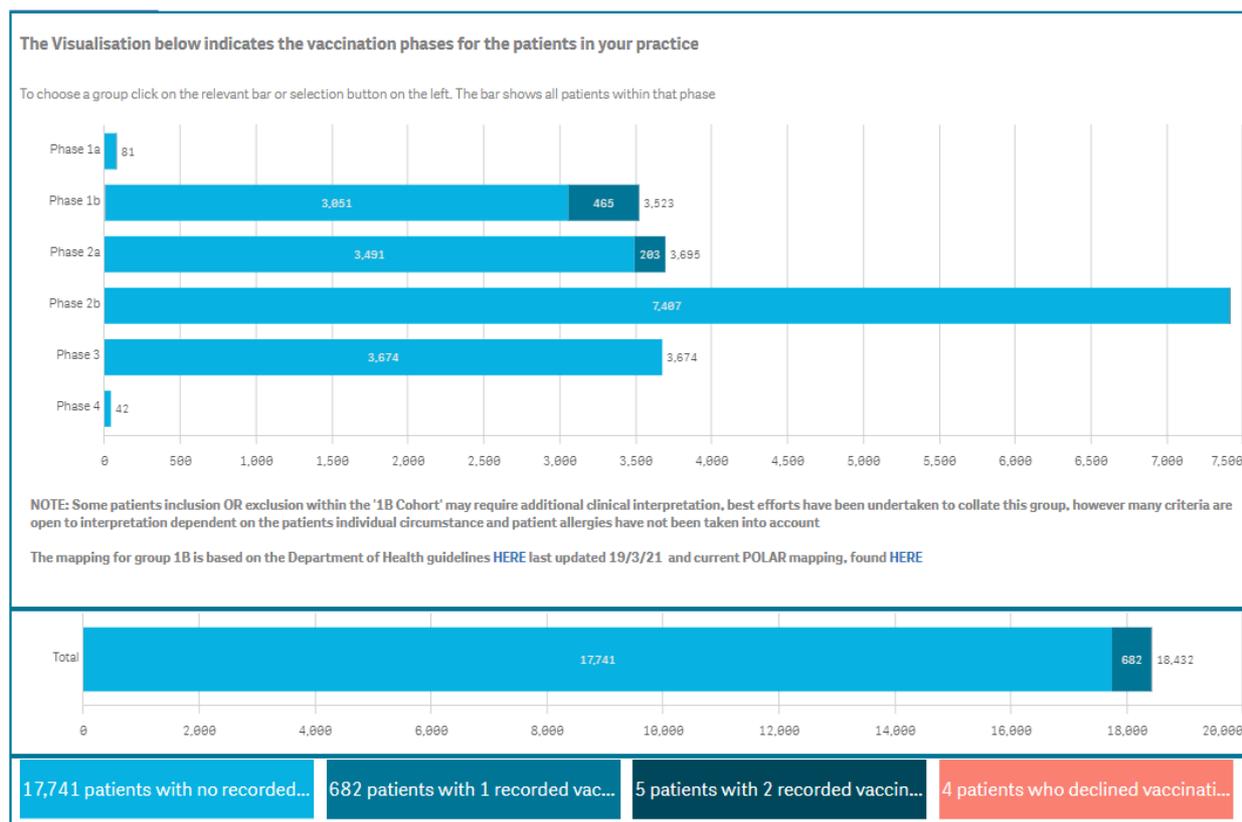
Only two vaccines are currently licenced for use in Australia: the Cominarty (Pfizer) mRNA vaccine and the Astra-Zeneca/Oxford (AZ) adenovirus vectored vaccine. Due to cold storage issues, only the AZ vaccine has been distributed through general practice (although distribution of the Pfizer vaccine to general practices has, at the time of writing, just been approved). Practices applied to participate in the vaccination rollout. Not all practices applied, or were approved. Therefore, unusually for the Australian health system, practices were used as vaccination hubs for the whole population, rather than a vaccine source for their own existing patient population (as compared to influenza, for instance).

Practices, on being notified of success, were required to bulk bill the vaccination encounters, and accept all comers. To date practices have been allocated a fixed weekly amount but had to apply for that amount each week. Initially, there were significant distribution and ordering issues, meaning most practices did not start until week 10 of 2021. Numbers varied, with practices being offered weekly amounts varying from around 50 to 400 per week dependant on size and location. In our practice cohort, 10% of practices do not offer COVID-19 vaccines, and 20% enrolled in the program after the initial rollout.

Vaccine planning

POLAR was able to develop and deploy a vaccination program planning tool for practices (Figure 2). Using criteria from the government information, we created a tool that used the practice data to allow practices to both understand and plan their demand, as well as track immunisation status at patient level.

Figure 2 Practice level vaccine planning tool



While criteria such as age were relatively easy to implement, for other categories there were limitations to the data. Occupation for instance, is not well recorded and relatively unreliable as it is free text where it is recorded.

Group 1b proved to be particularly problematic. While the criteria were being confirmed, there were frequent changes to the inclusion of specific diagnoses or medications. From a diagnostic and coding perspective, the list included diseases that are difficult to classify. For instance, mild/moderate asthma is specifically excluded and whilst asthma is well recorded in GP systems, the severity is not. Similarly, conditions such as 'severe mental illness' are very specific to individual conditions and often cyclical. As is often the case, the application of the criteria were up to individual GP discretion.

To quantify these into groupings, we used proxy indicators. For example, to meet the 'Severe Mental Illness' group criteria, we excluded anxiety or depression where the patient is taking only one mental health related medication. The appropriateness of this proxy indicator was difficult to ascertain. With no other indicator to guide this, we were clear to expose the way we mapped each group to the General Practice and added specific notes around imprecise criteria. **Clearer standardised terminology or criteria would have greatly benefited the sector in defining a clear set of groupings.** This could have been supported by matching clinical diagnoses with clinical terms. Nevertheless, the overall work we have done over the past 15 years means that practices were able to access up-to-date information about their patient cohort and have been using the reports for some time.

Vaccination

Using the specific item numbers for initial COVID-19 vaccination, we find significant numbers commence in week 12 and now across our practices, are running at 30,000+ per week. At the time of writing, our practices had delivered 232,000 first dose vaccinations and 1,000 second dose. Table 1 gives the week by week breakdown, starting in week 8. Initially rollout was slow, with supply chain issues and practices gearing up for the rapid throughput. The figures show a rapid ramping up of capacity within general practice to deliver the vaccines, levelling off at about 20,000+ per week across our practices until week 22, when it surges to 36,000+. We can also see the beginning of a rapid escalation of second doses as we hit the 12 week mark from the commencement of the program.

Table 1 Initial vaccination numbers, by week

Service Week	First Dose	Second dose
8	4	
9	6	
10	36	
11	24	
12	5,064	1
13	15,038	1
14	13,087	8
15	21,702	59
16	20,396	316
17	20,251	299
18	18,410	370
19	20,513	78
20	23,808	176
21	26,551	186
22	36,569	377
23	37,624	1,017
24	34,396	4,025

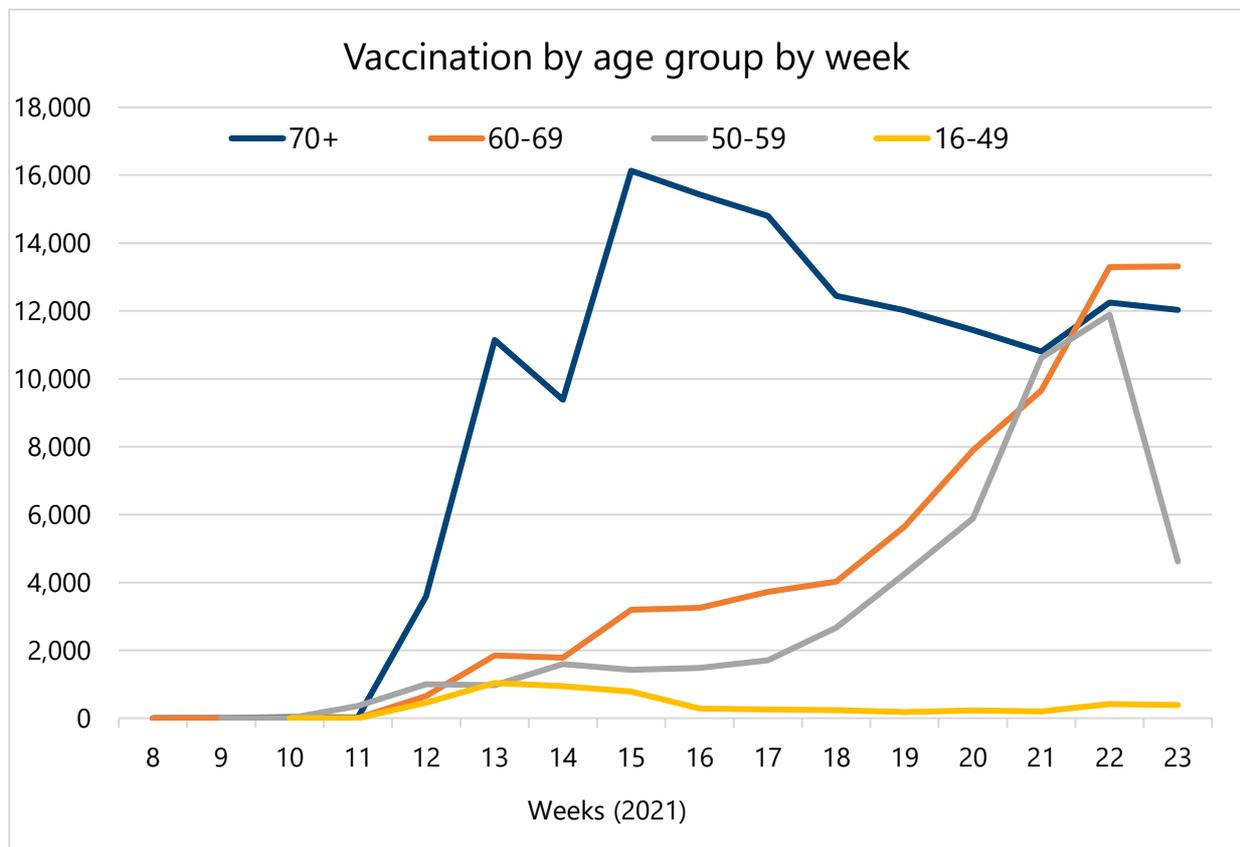
The roll out was heavily influenced by age limits. Figure 3 shows the breakdown by age group. General practice started to deliver significant numbers once phase 1b commenced – which in addition to a range of chronic disease and health care workers, specified the general community aged 70+.

Of note, the number of 70+ people seeking immunisation after an initial strong showing has fallen from week 14.

- This may be related to GPs recording immunisations in aged care facilities as much of this occurred in 1a under the federal government program;
- GPs may have initially targeted their over 70s populations;
- Conversely, week 14 was also the point where ATAGI recommended to government that the Pfizer vaccine should be offered to the under 50's, after publicity surrounding the incidence of Thrombosis with Thrombocytopenia Syndrome (TTS) in the preceding weeks. Practices reported considerable vaccine hesitancy around this time;
- On week 14, State health opened their hubs to the wider population, providing an alternative source of vaccination;
- We note the slight uptick from week 21, which is maintained.

The 60-69 and 50-59 groups do not show such a significant rise but are now increasing steadily. This slow start this may represent practices prioritising the older age 70+ cohort in the initial phase – as it predates the publicity surrounding the AZ vaccine. In keeping with the recommendations, general practice has not vaccinated significant numbers of the 16-49 age group. Vaccinations for the 15 and under group are negligible and likely represent data errors.

Figure 3 GP Vaccine first dose by age groups



The other element of the phase 1b vaccination program was for those aged 69 and under with a chronic medical condition³. These by and large were those with immunocompromise, cancer, chronic respiratory or cardiac disease (excepting simple hypertension), diabetes, and a list of other conditions. Given everyone aged over 70 was eligible for vaccine, those in that age group with chronic disease were not specifically targeted.

At the time of writing, our practices have vaccinated **283,497 people** of all ages, of which 65% have a chronic disease according to our interpretation of the 1b criteria. Of the age group 16-49, the vaccination figures are 48,474 overall of which 52% have a noted chronic disease in our system.

There are significant caveats to these figures, and they do not mean that half of the patients did not meet the criteria. It represents a significant undercount – and is reassuring that by and large, practices were vaccinating according to the schedule. The reasons for this were twofold – firstly practices will have been vaccinating essential workers (which we cannot identify) and data issues in determining chronic disease, including a mismatch between our criteria and the government's.

While we were able to develop a sophisticated tool at the practice level, repurposing the tool and associated systems to examine at this cohort at population level, required us to make some compromises and underpinning assumptions. POLAR already has existing chronic disease classifications that we examined to determine what the overall impact and numbers were. They are based on a list of conditions that must have been present in the record for six months or more. We selected the cardiac, respiratory, disability, cancer and chronic kidney disease classifications for the above analysis. This will undercount the numbers, and there will be some (such as hypertension) that will be included that aren't part of the government list. Similarly, we do not include BMI as a chronic disease, but it is a classification for eligibility for COVID-19 vaccination.

Adverse events/Vaccine hesitancy

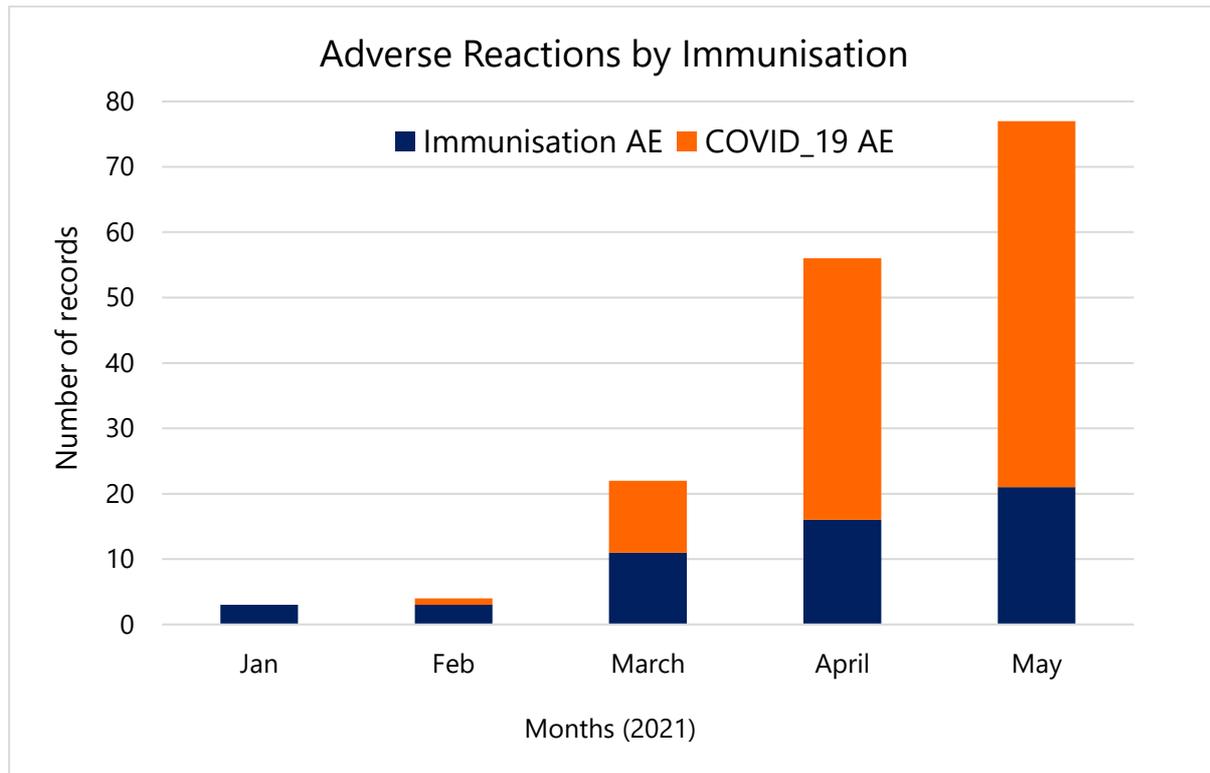
Previous work on our data has demonstrated that diagnosis/SNOMED codes alone are not adequately recorded as a specific event⁴, and that other mechanisms may be more effective as a vaccine safety signal. Similarly, the same applies for vaccine hesitancy. Despite significant anecdotal feedback around hesitancy (especially around the time of publicity surrounding AZ vaccine and TTS), there is no extractable code in the EMRs for POLAR to note vaccine hesitancy and therefore no recorded incidence in our data.

There are two SNOMED codes regarding vaccine complications – one regarding complications in general and one specific to COVID-19 vaccination. In Figure 4 we grouped the monthly figures for these two codes. Although the numbers are small, they represent a trend.

³ A full list can be accessed at: <https://www.health.gov.au/initiatives-and-programs/covid-19-vaccines/phase-1b>

⁴ Mesfin YM, Cheng AC, Enticott J, Lawrie J, Buttery J. Post-vaccination healthcare attendance rate as a proxy measure for syndromic surveillance of adverse events following immunisation. *Aust N Z J Public Health*. 2021;45(2):101-7

Figure 4 Adverse events according to SNOMED Codes

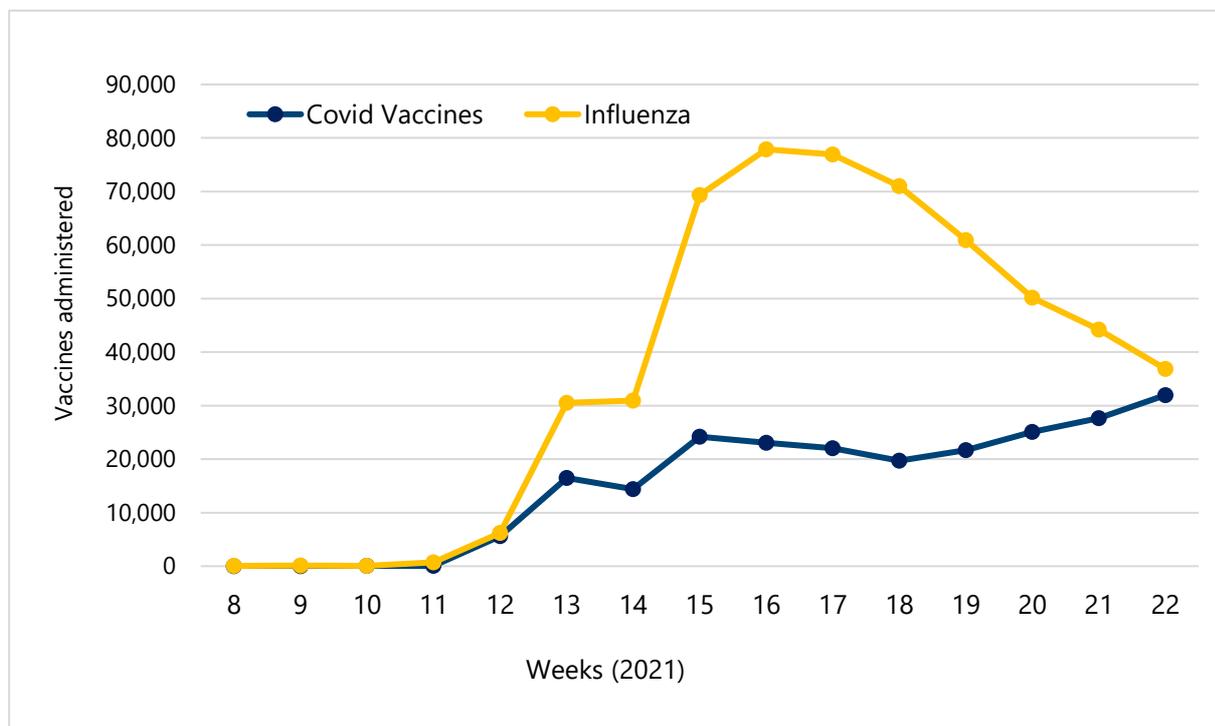


Influenza

Whilst the focus on vaccination has been on the COVID-19 vaccine program, general practice has at the same time been undertaking the usual activity associated with the seasonal influenza vaccine program. Comparing the two programs gives an interesting perspective on the COVID vaccine rollout. Influenza vaccination has been a key focus of general practice activity for years. Indeed, one rationale for using general practice for COVID-19 vaccination has been the effectiveness of the GP led program for influenza. Practices have well developed and tested systems for identifying at risk patients (eligible for subsidised vaccines) and recalls.

Examination of our data shows that the influenza vaccination program coincides with the COVID-19 vaccines – with the first vaccinations starting in week 7 and peaking in week 16. In that week, our general practices vaccinated 23,049 people with AZ, and 77,887 with the influenza vaccine. The pattern can be seen in Figure 5. The influenza surge is now rapidly dropping off, and will likely soon be overtaken by COVID-19 vaccinations, especially as the second dose program will now be increasing. At the same time supply of the AZ vaccine is stabilising and more practices have come on board.

Figure 5 Vaccinations by week - Influenza v COVID-19



Looking at vaccination in more detail we also looked at the figures for other vaccinations often performed in general practice. Travel vaccination has, of course, dropped to negligible levels. General practice has a significant role in childhood immunisations, and throughout the year runs at a consistent level of around 1,500 vaccinations per week. The other common vaccination is Pneumovax and Shingles, which run at a small baseline throughout the year, but also increases in line with influenza as opportunistic vaccination occurs.

Effects on General Practice as a whole

This section examines just how significant the rolling out of the program has been on general practice. For practices, 2020 had already been a tumultuous year, with multiple changes impacting their operations:

- Introduction of respiratory clinics
- Telehealth
- Impacts on chronic disease care
- Screening of patients and restructuring waiting rooms

We have documented these areas in our previous reports⁵. The involvement of general practice in the vaccination program represented significant logistical challenges, especially when considering practices could expect large numbers of patients new to the clinic.

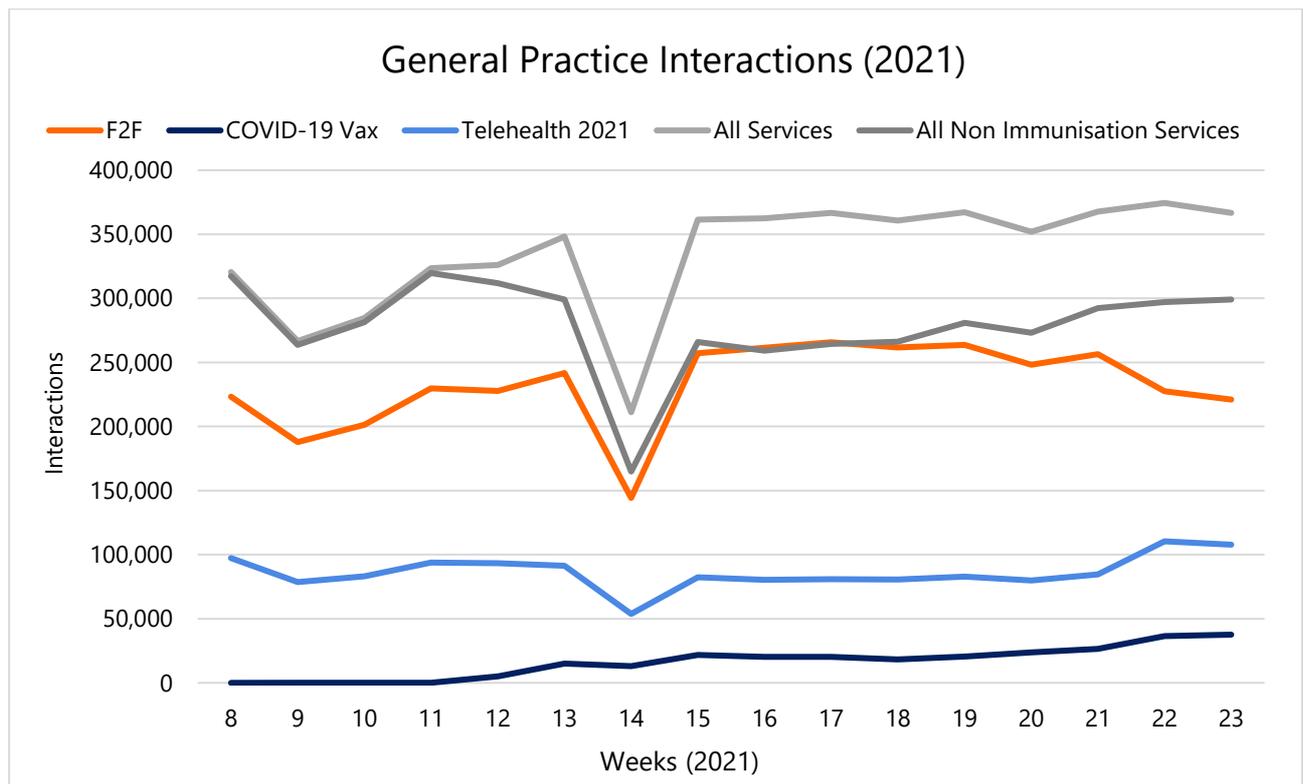
⁵ [COVID-19 Data Insight Papers – POLAR \(polargp.org.au\)](https://www.polargp.org.au/COVID-19-Data-Insight-Papers)

Activity Impact

To understand the current state, we looked at the weekly numbers of vaccinations, face to face consultations and their telehealth equivalent, and therefore the overall numbers of interactions. When we compare year on year figures, general practices are generating on average 20% more activity compared to last year. The last two weeks have seen that figure spike to 30%. So practices are far busier than at the same period last year.

We examine the impact in more detail in Figure 6 below. This looks at the various cohorts of all combined services and the categories of face-to face consultations, telehealth⁶, COVID-19 vaccines and all non-immunisation based activity. We can clearly see the impact of the various vaccination programs on general practice’s ability to service the population. Up until week 11 the figure for all interactions is roughly the same as all non-immunisation services. At week 12 the two lines start to markedly diverge, which represents both an increase in services as practices accommodate the need for vaccine clinics, and an impact in reducing the numbers of available non-immunisation related consultations. The average number of non-immunisation based consultations in the period of weeks 1-10 was **288,529** consultations per week while for weeks 11-22 it was **274,589**: an overall decrease of **5%**. So our practices are busier than ever, but have less time for the usual general practice services. Telehealth, from a peak last year of 50%[^], seems to have stabilised at around 25% of services.

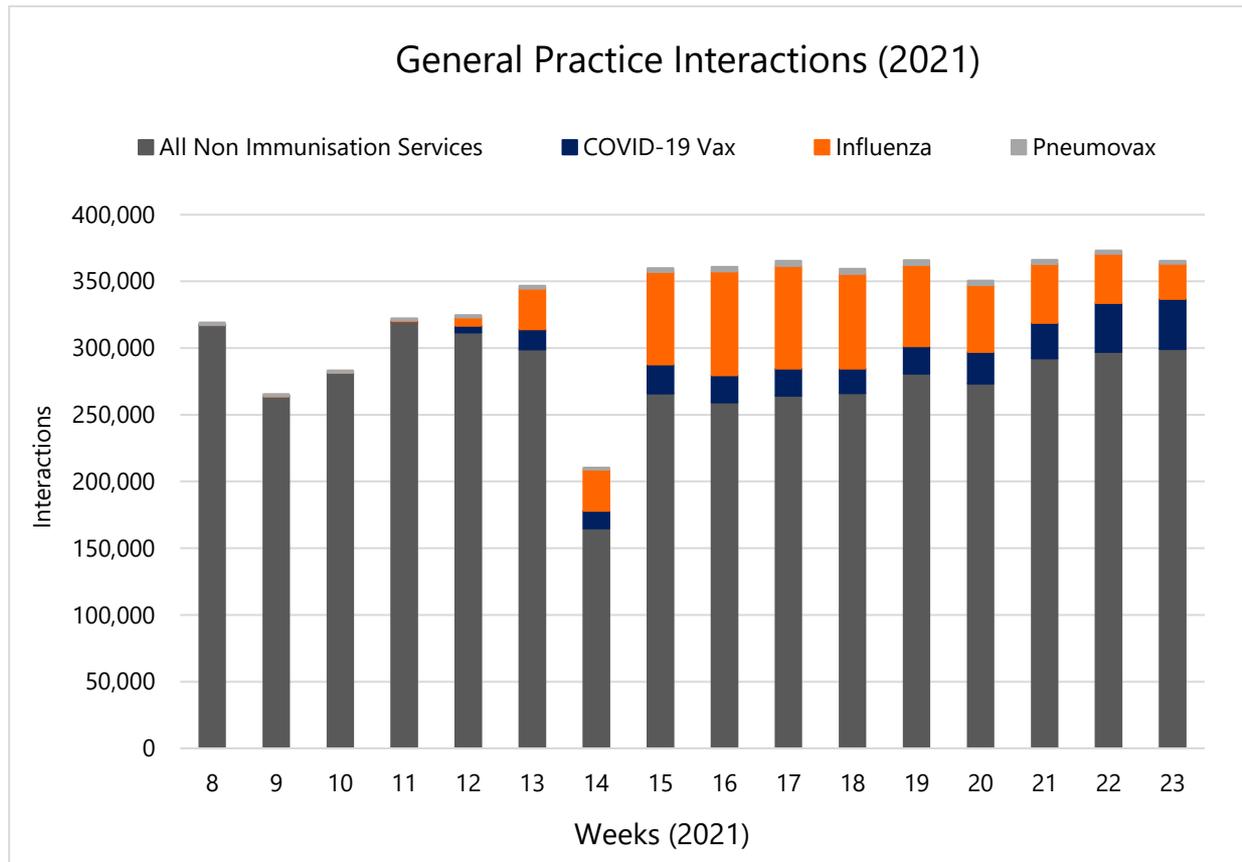
Figure 6 Interaction numbers across cohorts



⁶ In keeping with our previous papers, telehealth includes video and telephone activity. The use of video remains small.

Figure 7 below graphically demonstrates this. We can see the rise in influenza and COVID-19 reaching maximal impact across weeks 16 to 22 with a concomitant drop in non-immunisation consultations. Week 14 represents the impact of Easter. There is a small, but significant increase in the pneumovax vaccinations as well, showing the usual process of opportunistic vaccination.

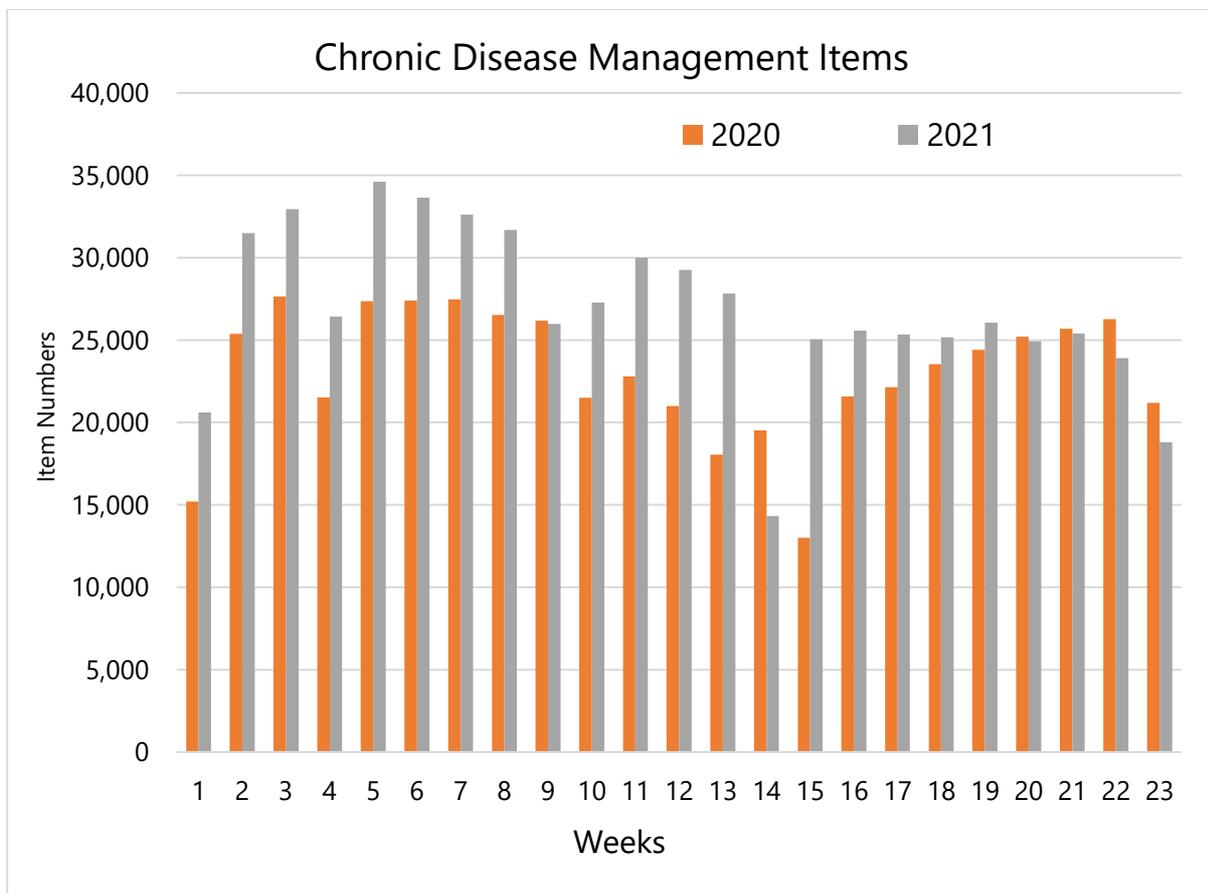
Figure 7 – Immunisation and non-immunisation activity



Chronic Disease Management

If general practice consultations are up, and an extra 10% activity is taking place due to COVID-19 vaccines (and more if we consider influenza), then what might be suffering? In this section we decided to look at the management of chronic disease, through the use of health assessments and care planning items. Figure 8 shows a week by week comparison from 2020 to 2021. We can see a significant increase in the early part of the year 2021, which may well indicate a period of catchup from last year and the effects of the pandemic. This starts to fall off, reaching parity around week 19. Again, the message here is general practice managing to maintain the service levels despite the overall increase in activity.

Figure 8 Chronic Disease Management Items by Week



Discussion

Having rapidly reorganised to accommodate changes in care models last year, we saw that general practice for the latter part of the year was able to maintain service levels despite significant challenges. This data would support that general practice is managing to maintain that flexibility and responsiveness while at the same time, successfully absorbing a significant increase in activity as it becomes part of the mass vaccination program. In doing so it has changed the traditional model of practice, in that the participating practices accept all comers for vaccination, not just their own patients.

Managing, processing and analysing the data reflect the ongoing issues with coding and complex diagnostic criteria. The specific item numbers for COVID-19 vaccination simplified analysis of the impact, whereas strict criteria around eligible diagnoses (not always reflected in the source EMRs) made precise classifications exceedingly difficult.

One of the limitation of the dataset (presented in more detail below) is that it deals only with general practice, and there were many confounding factors surrounding other vaccination programs.

Conclusion

General practice has again proven itself capable of responding rapidly to challenges associated with managing a global pandemic and mass vaccination rollout, despite being (in our case) 1,300 individual practice entities with varied management structures. It does so through the support of Primary Health Networks (and has done so through their predecessors⁷) and the strong commitment practices have to serving the community, as different to their individual patients. The COVID-19 vaccination program represents the demonstration of how practices have evolved from individual GPs treating individual patients and how practice can leverage of this to ensure the health of the population

Limitations to our data:

This series of papers is being produced rapidly to help guide early thinking about the impact of COVID-19 on Australian General Practice. Given speed of development, limited resources available for analysis and other factors beyond our control, these papers should be understood as early thinking and appropriate caveats applied. In particular it should be noted that:

1. The limitations to the data have been expressed in the body of the text and revolve around the lack of adequate coding structures or detailed guidance for GPs and software providers on relevant codes.

⁷ Pearce C, Shearer M, Phillips C, Hall S, Kljakovic M, Glasgow NJ, et al. Views of GPs and practice nurses on support needed to respond to pandemic influenza: a qualitative study. Aust Health Rev. 2011;35(1):111-5

2. Not all general practices opt in to each PHN's QI program. Accredited and general practitioner owned practices are over-represented in the dataset. Data from some corporate general practice, non-accredited general practices and 'paper only' general practice are not included - the 'paper only' group now represents approximately 5% of general practice. Use trends from these groups may well be markedly different from this data set. Nevertheless, the sample represents the vast majority of practices.
3. Change is occurring rapidly: daily and weekly reports show snapshots of weekly activity that may not represent longer term trends. Peaks can oscillate in weeks.
4. We have made some assumptions around social factors and context which were necessary for us to be able to interpret the data- all such assumptions should be explored by further research.

We encourage all health system decision-makers to consider these impacts and early insights and to plan ahead, in particular working with PHNs to facilitate the changes needed to further enhance the overall system response to the current pandemic situation.

Acknowledgments and thanks to the practices that contribute data and for their commitment to quality improvement.

Next steps

We believe that the information contained here, and our capability around ongoing monitoring, will be of interest to policy makers and other PHNs. We encourage groups to engage with us on ongoing issues, and we look forward to being involved in policy discussions in the future. We intend to continue these papers, if we can attract funding support.

In addition to the contacts below, if you have feedback and/or questions of the data – contact Karina Gardner, Research Manager - kgardner@outcomehealth.org.au. This activity remains a service provided by Outcome Health on behalf of the PHNs, as we feel it important to inform policy and planning. It is not funded in any other way.

Contacts for more information

POLAR Research: A/Prof Chris Pearce 0417 032 618 drchrispearce@mac.com

Outcome Health: Martin Wilkinson 0419 358 405 mwilkinson@outcomehealth.org.au

The POLAR Program

Outcome Health is a Not-For-Profit providing innovative services to the Healthcare sector and Primary Health Networks in particular. The POLAR suite provides advanced data analytics and population health to GPs and PHNs, with an emphasis on delivering outcomes. Data is used to support patient care, population health and research. More information at www.outcomehealth.org.au.

Across five PHNs – Outcome Health extracts data from over 1300 practices for the purposes of informing practice and policy at the GP, PHN and national level. Data is extracted using a purpose built tool, data is stripped of identifying information and further coded and classified to create a useful and responsive data set. At the practice level all data can be re-identified, creating meaningful tools for practices to identify at risk patients. At the PHN level, information is collated and made available for population health and practice and community support initiatives. Finally, the pooled de-identified data is made available for collaborative research via the Aurora research platform.

Appendix 1 – COVID-19 Vaccination Program

