Ministry of Health
COVID-19 Risk Score Tool
Release 1

Privacy Impact Assessment

April 2022
The author of this document is Risk and Privacy, Ministry of Health.

This Privacy Impact Assessment ("the Assessment") is the first PIA on the Risk Score Tool that will form part of the digital response platform when a positive COVID-19 case is identified. This Assessment concerns the first iteration of the tool.

This document will be made publicly available on the Ministry of Health website.

Disclaimer

This Assessment has been prepared to assist the Ministry of Health ("the Ministry") to review the use of Ministry-held information for the purposes of calculating a score to support triaging for a managed pathway of care those who may be at greater risk of hospitalisation from contracting COVID-19, and the privacy safeguards that are required to manage those purposes. It is not necessary or appropriate to focus on every possible privacy risk (such as the specific details of how security will be applied) but rather the focus is on the most critical points of the Risk Score Tool.

Every effort has been made to ensure that the information contained in this report is reliable and up to date. No inspection of the Risk Score Tool operation or its solution software has taken place as part of this assessment, and any performance representations are as reported to the author.

This Assessment is intended to be a ‘work in progress’ and may be amended from time to time as circumstances change or new information is proposed to be collected and used.
## Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Care in the Community</td>
<td>The Care in the Community model is based on enabling people to be cared for in their home, when it is safe to do so, when they or a member of their household are considered to have COVID-19. The model is flexible, nationally supported, regionally coordinated and locally led, in order to meet the needs of local populations and effectively allocate system resources especially in a time of uncertainty when parts of the local health system may well become non-functional for short term as well.</td>
</tr>
<tr>
<td>Case</td>
<td>A person who is considered to have COVID-19</td>
</tr>
<tr>
<td>CCCM</td>
<td><strong>Covid Clinical Care Module</strong>, a shared coordinating clinical record solution in the Border Clinical Management System (BCMS) to nationally support the Care in the Community requirements of individuals who are required to self-isolate as cases, and their household contacts. BCMS was originally created to manage the clinical component of Managed Isolation and Quarantine processes.</td>
</tr>
<tr>
<td>CPIR</td>
<td><strong>COVID Population Identification and Registration</strong> database</td>
</tr>
<tr>
<td>HIPC</td>
<td><strong>Health Information Privacy Code 2020</strong></td>
</tr>
<tr>
<td>NCTS</td>
<td><strong>National Contact Tracing System</strong>, which enables accurate and timely information on all COVID-19 cases and contacts to be recorded and allows all regions of New Zealand to work together when required.</td>
</tr>
<tr>
<td>NHI</td>
<td><strong>National Health Index</strong> number – this is the unique identifier that is assigned to every person who uses health and disability support services in New Zealand.</td>
</tr>
<tr>
<td>PHU</td>
<td><strong>Public Health Unit</strong></td>
</tr>
<tr>
<td>CCH</td>
<td><strong>Care Coordination Hub</strong> set up in the different regions to coordinate and oversee all active management COVID Cases in the community for that region. Activities include Case investigation, assignment for clinical assessment and management, welfare referral/management and overall coordination to ensure all people under care have been appropriately cared for during the period of care. These can be public health units and clinical or welfare manaaki hubs, and in some regions they are combined, and in others they operate separately (for example ‘Case investigation’ could be managed separately from the clinical and welfare component).</td>
</tr>
<tr>
<td>Reach Aotearoa</td>
<td>A Ministry of Health-contracted national provider responsible for contacting Māori and Pacific Island people over 35 (outside Auckland) within 12 hours, and anyone over 65 or who is not enrolled with a GP within 24 hours, unless they have completed the online self-service form.</td>
</tr>
<tr>
<td>AWS</td>
<td><strong>Amazon World Service</strong> secure data platform which hosts the Ministry’s CPIR database in Sydney, Australia.</td>
</tr>
</tbody>
</table>
Section One – Background and Overview

Background

1. Community spread of COVID-19 is a serious threat to the safety of New Zealanders and will adversely affect certain groups more than others. With the Omicron variant outbreak, Case numbers are increasing rapidly and are putting the health system under increasing pressure1. New Zealand has now moved to Phase Three of the Omicron response2, in which a key aim is to maintain our national hospital capacity by slowing spread and supporting those positive Cases who can to isolate and recover in their own homes.

2. The majority of Omicron Cases experience a mild to moderate illness and are able to safely self-isolate with minimal or no clinical assistance. However, to prevent those with clinical or social vulnerabilities who are likely to require more support from being ‘lost’, the system needs to be able to rapidly distinguish and prioritise them for timely personal contact to ensure they receive appropriate assistance.

3. Using clinical and demographic factors which are known to impact the risk of hospitalisation, the Ministry’s Data & Digital Directorate and COVID-19 Care in the Community teams have developed a population-based Risk tool derived from a model built by Waitematā District Health Board for assessing the risk of hospital admission for COVID patients in the Northern Region. The Waitematā model was developed using Cases from the Delta-strain outbreak and data available to the Northern Region from admissions, community services, and primary care, and has been simplified to reflect the data available nationally to the Ministry of Health. The tool will be implemented as a part of a suite of digital and assisted pathways to manage the growing number of COVID-19 Cases, and will sit in the COVID Population Identification & Registration database (CPIR). It will be used to support contact decision making only, and will not be used in support of, or in place of, clinical assessment.

4. In the first iteration of the tool, the calculation will be made from information held in CPIR (age, ethnicity, and vaccination status), and will be used to support decision-making to prioritise contact for the portion of the population that does not respond to the initial automated text outreach from the National Contact Tracing Solution (NCTS) system to indicate that they are positive for COVID-19; do not have activity on their file in this time to indicate they have been assessed and/or contacted by their own or another health provider; or for whom no cellphone number is available to send a text to.

5. The tool calculates a risk score between 0 and 1 that identifies whether a person is at higher risk of hospitalisation, and this will be calculated for every person with a record in CPIR3. The score will be added to the case file as it is created in NCTS and CCCM as part of the file creation process. In CCCM it will be displayed in the header of the case page alongside the Acuity rating, which is a clinical calculation added by a health provider after a clinical assessment. In both NCTS and CCCM it appears on the dashboard, which displays a patient per row with each row containing key status, upcoming activity, and other summarised information. The dashboard is used for COVID case allocation and monitoring by the regional Care Coordination Hubs (CCHs), and telehealth teams (clinical) also have access to this in

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3 This is everyone in the Health Services Utilisation (HSU) database, which includes all individuals who have used the New Zealand health system in the last two years, and the National Enrolment Service (NES) which holds information from everyone who has enrolled with a general practitioner.
order to support people who are in the “supported self management pathway” and do not have digital resources.

6. CCHs run a daily report in either NCTS or CCCM (depending on which system they prefer to use) to identify those who have not responded or been assessed/contacted within 24 hours. The report will rank identified Cases according to their Risk Score to enable prioritisation for contact of those identified as at higher risk.

7. Clinicians managing COVID care do not currently have access to the dashboard as they manage patients individually and work with their patient’s full record. However, where a practice has large numbers of people under their care, they have found the need for the dashboard overview and workflow capability and the Regional Hubs have permitted access to a Facility level dashboard. A monitoring and audit programme will be urgently implemented to oversee access via this expanded access option (see CCCM PIA).

8. An assessment under the Algorithm Charter was carried out when the tool was initially intended to support clinical assessment, and scored the risk of unintended adverse outcomes for individuals as low probability/low impact (Appendix 4).

9. The Ministry’s Māori directorate has been consulted about the tool and approves of its use as a way to identify high risk people, including Māori, for follow up. The Ministry also worked with Whanau HQ/Northern Region Health Coordination Centre (NRHCC) which was involved in developing the tool it was based on, and has consulted with DHBs and CCHs.

10. Subsequent iterations to improve the algorithm’s accuracy are planned, and will include information ingested from other databases and linked via NHI numbers as the tool is further developed and adjusted to improve its accuracy. Use cases of future iterations of the tool could include to facilitate identification and prioritisation for clinical assessment for interventions such as prescribing therapeutics. Use for any purpose other than supporting contact decision making will be subject to appropriate review and clinical approval, and updating of this PIA.

11. Future use cases of the tool also include health sector planning and readiness purposes at a population level, to understand the impact of an outbreak across regions and practices. Individuals would not be identified in the outputs of this use.

12. The Office of the Privacy Commissioner and the Government Chief Privacy Officer have been consulted and provided comments on a draft Privacy Impact Assessment. Their comments have been considered by the Ministry and incorporated as appropriate.

13. As additional data sets are layered onto subsequent versions of the model, this Privacy Impact Assessment will be reviewed and updated.

Scope of Assessment

14. This PIA has been prepared to assess the potential impacts on privacy to Aotearoa New Zealand’s population of an automated COVID risk score calculation based on three health and demographic points of information the Ministry holds about them, for use in prioritising for contact those people who are likely to require assistance on confirmation of infection with COVID-19. This PIA covers the first iteration of this tool only.

15. An online pathway for Cases who are digitally enabled provides for them to complete a self-assessment Contact Tracing Form following text notification that they are COVID positive, and completion rates for this as at the end of April 2022 are approximately 70%. The form gathers information around co-morbidities, other health conditions, and risk factors such as living alone, that provide more health information to guide pathway decision-making. The
processes supporting decision making and management of these Cases is outside the scope of this PIA but may be considered in future reviews if this information is included in later iterations of the tool. This PIA does not cover the Form other than as the information submitted through it (or not) impacts use of the risk score calculation. A separate PIA has been completed for the Form.

16. This PIA does not consider other automation changes to the contact tracing system, such as SMS text notifications and alerts, that will support the wider response to increased community transmission and higher numbers of individuals and households in self-isolation, or changes to the systems that will ingest the score such as CCCM. Separate PIAs are being completed for these applications.

17. Assisted channels are being developed in parallel with this tool and its supporting applications, such as the COVID-19 Contact Tracing Form, and assessment of these is outside the scope of this PIA.

Use of local population based Risk calculations by regions

18. A number of regions, including the Metro Auckland region which developed the model this tool is based on, are using risk calculations based on COVID-19 and other health information collected and/or held about their own populations to assist with case management decision making. These are outside the scope of this PIA.

Information Collected and User Information Flows

Assessing healthcare needs

Cases will self-manage by default but can escalate to active clinical management if indicated by their self-assessment, their primary healthcare provider’s assessment, or contact coordinated by their care coordinator.

Active clinical management

De/Escalating as needed by telehealth, primary healthcare, or acute care.

Self-management

- Patient continues to self-manage.
- Patient can escalate if needed by telehealth, primary healthcare, or 111.

Risk score based on

- Age
- Ethnicity
- COVID vaccination

New CCCM case

Hub coordinate contacting cases who haven’t been sourced, prioritised by risk score.

Primary care assessment

Primary care assesses and escalate higher risk patients and enter details in CCCM.

Assessment and documentation in CCCM

Whether case can continue self-managing or needs active clinical management.

Primary care notification

Notification to primary care

Result notified/ acknowledged by text with initial instructions.

Primary care notified by HealthX.

Outlier self-assessment

- Clinical assessment
- Contact tracing
- Welfare needs

Self-assessment

Ingest score into CCCM.

Insulation and de-escalation as needed.

Assessment

Hub coordinator assessment.
Section Two - Privacy Analysis

The potential privacy impacts resulting from this project are analysed below. The analysis has been completed, against the 13 rules of the Health Information Privacy Code 2020.

The Ministry has conducted its analysis under the Health Information Privacy Code as the information is about Consumers and their health services. Under clause 4(1)(e) it is considered that this is information about an ‘individual which is collected before or in the course of, and incidental to, the provision of any health service or disability service to that individual’.

Purpose of collection

19. The Ministry already holds the data points it will use for the calculation, and collected and uses them to support manual contact tracing decision making. As daily Case numbers outstrip the ability of Contact Tracers to manually follow up all Cases and contacts, the tool will apply statistical weightings to these data points to give automated support to the contact decision-making process.

Source of information

Collection from a source other than the individual

20. The tool will use information collected from the COVID Population Identification & Registration database (CPIR). In the first iteration, the calculation will be made from age, vaccination, and ethnicity information. Use of these factors is based on the known increased risk of hospitalisation from COVID associated with greater age, whether the person has been vaccinated and, for some populations, ethnicity. To date, Māori and Pacific Island people have suffered disproportionately worse outcomes from COVID infection and, due to historic and ongoing inequities, are also more likely to have underlying conditions or other inequity-related risk factors than other ethnicities.

21. Age and ethnicity information held in CPIR is sourced from the Health Service User database (HSU), and vaccination status from the Covid Immunisation Register (CIR). Age and vaccination status information is held for 100% of individuals in the database, and ethnicity information for 99.14%.

22. The information will be collected from a source other than the individual under Rule 2(2)(iii), that the Ministry believes on reasonable grounds that compliance with the requirement to collect the information from the individual would prejudice the health or safety of any individual.

23. The tool will be used to support decision-making for the portion of the population that does not respond within 24 hours to the initial text outreach from the national contact tracing solution (NCTS) system to indicate that they are positive for COVID-19. Cases for whom no contact details to enable digital outreach are held are immediately prioritised for follow up. These people will be contacted via telephone, if their contact number is held, or by a community health worker who will visit their home.

24. In parallel with the Risk Score tool, demographic information is also being used to support faster contact pathways for at-risk populations. On creation of a case for them in NCTS, Māori in Auckland are immediately referred to the Māori Regional Coordination Hub (MRCH), and Pacific Island people to the Pacifica Regional Coordination Hub (PRCH), for contact. Outside Auckland, the Ministry-contracted provider Reach Aotearoa is actively reaching out to Cases who have not completed the online form and are of Māori/Pacific
Island ethnicity over 35, or in Decile 9/10 on the New Zealand Index of Deprivation\(^4\), within the first 12 hours. Everyone else is expected to be contacted within 24 hours, unless they complete the form within this time and are assessed from the information provided as not at risk. Those who are not contacted will have been provided with information via the SMS and COVID Health Hub link on how to self manage and how to escalate their care if they have any concerns. GPs also receive notification via CCCM where one of their patients is a Case, and will assess whether the patient is potentially at high risk. If so, and the case has not been assigned to another provider, they will contact the patient for a clinical assessment to determine a management plan. Under Phase 3 of Omicron, however, agencies are struggling to meet these timeframes, and it is known that some Cases are not able to be contacted within the at-risk period of their illness. This tool is intended to assist with ensuring that those who are more likely to be at risk are not ‘lost’.

25. Collection of information for population-level analysis by region and practice for planning purposes will be under Rule 2(g)(i) that the information will not be used in a form in which the individual concerned is identified.

Manner of collection

26. The Ministry considers that the manner of collection from sources other than the individual is lawful and, in the circumstances of a serious threat to public health and safety, and the health and safety of individuals, does not intrude to an unreasonable extent upon the personal affairs of the individual concerned. The information will be collected from, and remain within, the Ministry’s secure systems.

27. External communications to the health sector and general public are being developed to explain and clarify what the tool is and what it does. Messaging will be included in existing channels such as health key messages and sector webinars. The Ministry does not intend to actively promote the tool to the public, but information on how it works, how it fits into the wider care in the community strategy, and the role it plays in ensuring clinical and welfare support can be targeted to where it is needed the most, will be available on the Ministry website together with a Privacy Statement and this PIA. FAQs will be developed to support both health sector and public communications and engagement.

28. Information about the algorithm will be published on the Ministry’s website in accordance with Rule 3 of the HIPC, and the transparency requirements of the Algorithm Charter. The tool will operate in the Ministry’s secure environment in CPIR, which is held in AWS servers in Australia, and the algorithm calculation will be made publicly available on Te Pokapū Hātepe o Aotearoa New Zealand Algorithm Hub\(^5\).

Access and Use

29. Individuals will be able to request access to, and correction of, their information in accordance with the Ministry’s standard channels and as permitted under the Health Information Privacy Code 2020. This includes access to audit log information for records held in NCTS, CCCM, and CPIR.

30. As noted above, the tool is iterative and will be updated as more data are reviewed and deemed appropriate to strengthen the model’s predictive capacity. This may mean that

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\(^4\) The New Zealand Index of Deprivation is a small-area-based index providing a measure of neighbourhood deprivation, by looking at the comparative socioeconomic positions of small areas and assigning them decile numbers from 1 (least deprived) to 10 (most deprived). The index is based on 9 socioeconomic variables from the Census. [https://ehinz.ac.nz/indicators/population-vulnerability/socioeconomic-deprivation-profile/](https://ehinz.ac.nz/indicators/population-vulnerability/socioeconomic-deprivation-profile/)

\(^5\) [https://algorithmhub.co.nz/](https://algorithmhub.co.nz/)
people’s scores will be updated over time. The Ministry intends to ensure that as newer scores are generated, the original and previous scores will still be available.

Security

31. All identifying information will be held and handled within the Ministry’s secure AWS systems in Australia, and carry the security classification of Medical IN-CONFIDENCE.

32. The risk score will be pulled from the tool (in CPIR) when a person is recorded as positive in NCTS and a case is created for them in CCCM. Access to CCCM includes non-Ministry users who are part of the public health response, and is subject to user controls and auditing. Non-Ministry users are:

- GPs – though the score will be available to them, it is expected GPs will generally rely on their knowledge of their own patients, and their patient records, when making decisions about who to prioritise for contact.
- Reach Aotearoa – a national provider responsible for contacting Māori and Pacific Island people over 35 (outside Auckland) within 12 hours, and people over 65 or who are not enrolled with a GP within 24 hours.
- CCHs – regional care coordination hubs which will run a daily NCTS or CCCM report of Cases who have not responded to digital outreach or had activity on their file to indicate contact by another provider, within 24 hours, and triage them for contact with the aid of the Risk Score.
- Hospitals – staff providing care can access patient files of individuals whose records are set to Active Management. They will not actively use the score as it is not provided to support clinical decision making.
- DHBs – District Health Boards data analysts will have access for reporting purposes.

33. Prior to each substantive release, the Project will be subject to Ministry security review processes.

Accuracy and verification of information (Rule 8)

34. An external peer review of the tool has been undertaken by Precision Driven Health to validate the statistical methods. Their review showed that the tool was not appropriate for clinical decision making, but would be appropriate to assist with prioritising calls to people who do not respond to the text notification within a determined timeframe.

35. In its current state, the model has significant limitations due to the limited data that the formula is based on, and the key risk is the accuracy with which it can identify those people able to safely undertake self-management. These limitations are due to the model being powered by data from the Delta outbreak when, in addition to the variant being less-infectious than Omicron, vaccination coverage was lower, eligibility was different for children, and boosters were not yet available. It also does not account for the difference between two and three vaccine doses, or the length of time since a person’s most recent dose. Appendix 1 includes a portion of the peer review undertaken by Precision Driven Health, and summary statistics are included in Appendix 2.

36. It is also likely that the current model underestimates the risk of hospitalisation by Māori and Pacific populations, in part because these groups represent small proportions of the overall population. One way we can mitigate this is to develop specific models for Māori and Pacific, and one for neither group to capture others. Due to the time constraints of a rapidly escalating community outbreak and the need to quickly stand up a response to meet
it, this is not planned for the first iteration. To address this limitation, Cases identified as Māori or Pacific Island over 35 are being immediately referred to Reach Aotearoa (or, for Māori and Pacific Island people in Auckland, their specific community hubs) for contact within 12 hours. Where these providers are not able to reach them within 24 hours, they will be prioritised via the score in the daily report run by their regional CCH.

37. It is expected that additional data and further mathematical considerations would materially improve the quality of the tool. The Ministry has considered the question of when a tool is good enough to use, or good enough to be of value in the circumstances (when the benefits outweigh the risks, and/or the risks can be sufficiently mitigated). Despite its limitations, it believes that using the tool in a limited scope, to prioritise people likely to be at greater risk of hospitalisation for contact, and where other outreach has either not occurred for any reason (for example, no mobile contact details are held) or has not been responded to, is an appropriate use.

Retention, Use, and Disclosure (Rules 9 – 12)

Retention

38. Under rule 9 of the Health Information Privacy Code, health information may not be retained for longer than is required for the purposes for which the information may lawfully be used. The information to be used in the first iteration of the calculation is already held in CPIR and subject to the retention period specified in the PIA for that system. The score will be sent to, and held in, NCTS and BCMS/CCCM, and subject to their retention schedules. Patient information will remain accessible in CCCM for six weeks after they are recorded as recovered, to support any follow-up care that may be required, and will then be archived and inaccessible to clinical users.

39. As noted above, the tool is iterative and will be updated as more datasets are reviewed and deemed appropriate to strengthen the model’s predictive capacity. This may mean that information from other databases will be copied to, and held in, CPIR, and that people’s scores will be updated over time. As the model is upgraded the team will communicate the change in scores and possible impacts to the Ministry and the health sector, and the Ministry intends to ensure that as newer scores are generated, the original and previous scores will continue to be available. Retention of this further information in subsequent iterations of the tool will be covered in updates to this PIA.

Use of Ministry-held information

40. This is a new use of the health dataset that the tool will ingest information from, and differs from the purpose for which the information was originally collected. The Ministry is using it for this purpose under Rule 10(1)(d)(i) and (ii) that the use of the information is necessary to prevent or lessen a serious threat to public health or safety, or the life or health of the individual concerned or another individual. The information will be used for the sole purpose of identifying those at higher risk of hospitalisation on becoming infected with COVID. It will be used in identifying form to calculate risk to the individual for purposes of prioritising them, as necessary, for assistance, and at a population level that will not identify individuals for response planning.

41. It is noted that age, ethnicity, and vaccination status are already used by contact tracers when manually assessing risk to contacts.

Use of the Risk Score
42. The tool has been integrated into the community assessment and follow up workflows, and a report downloaded daily by CCHs will rank Cases in priority order for contact. The tool will provide a risk score between 0 and 1 that identifies whether a person is at higher risk of hospitalisation and likely to be in need of active care management, or at lower risk and likely to be able to manage their COVID-19 infection through the self-service pathway. The scope of use will be limited in the first iteration to providing an initial triaging for contact of people who do not respond to initial NCTS outreach, or for whom contact details to enable this are not held. A health or Regional Hub provider will review each referral made via the tool prior to contacting the individual.

43. Providers will be the person’s own GP, whom it is expected will access and review their patient’s records rather than rely on the prioritisation assessment, or, where the Case is not enrolled with a provider, a Public Health Unit (PHU) or contracted PHU provider. The score will only be used where no other clinical information about the Case is available.

44. Use of algorithms for decision-making about individuals is sensitive and, as a government agency and signatory to Aotearoa New Zealand’s Algorithm Charter, the Ministry is committed to ensuring New Zealanders can have confidence in how it uses algorithms. The requirements of the Algorithm Charter include transparency and accountability to ensure the public can trust and support the government to use these tools in appropriate ways. The Ministry has established an algorithm governance body which includes privacy representation to maintain oversight of the tool’s development and use, and ensure transparency and compliance with the Charter. The Health System Preparedness Program Steering Group is the governing body that the Covid Care in the Community Team reports to, and it assumes responsibility for this work.

45. The information to be used is health and demographic information (age, ethnicity, and vaccination status). The calculation will be made and held in CPIR, and added to the individual’s NCTS and CCCM Cases when they are created. It will be made using demographic and vaccination data the Ministry already holds in CPIR and which is currently used manually in the contact tracing assessment process to assess risk.

46. Ethnicity (Māori, Pasific, and other) is included in this calculation because Māori and Pacific Island people have to date been impacted by COVID at a higher rate than other ethnicities. The Ministry also has responsibilities under Te Tiriti o Waitangi to achieve equity and improve outcomes for Māori. Early identification of people at higher risk, including by reason of the statistically poor outcomes indicated by ethnicity, will enable them to be quickly directed for contact and support through their local Care Coordination Hub (CCH) or, where available, a culturally appropriate provider. Where these providers are not able to reach them within 24 hours, they will be prioritised via their score in the daily report run by their regional CCH.

Disclosure

Internal disclosure of Ministry-held information for use in the Risk Score calculation

47. This is a new disclosure of information from the health datasets that the tool will ingest information from, and differs from the purpose for which the information was originally collected. The Ministry is disclosing it for this purpose under Rule 11(2)(d)(i) and (ii) that the disclosure of the information is necessary to prevent or lessen a serious threat to public health or safety, or the life or health of the individual concerned or another individual.

48. The disclosure and calculation will occur within the Ministry’s secure AWS systems, and the tool is Ministry-owned.
Disclosure of Risk Score calculation output

49. The tool will send an algorithmic score between 0 and 1 to NCTS and CCCM, and this will be available to authorised users in the Case record and a dashboard to support the patient contact triage decision where no other clinical information is available. The score goes to both systems to ensure that CCHs using CCCM have access to it when needed.

Disclosure outside New Zealand

50. There is no expectation of any disclosure of information outside New Zealand (otherwise than for safe custody or processing in compliance with s11 of the Privacy Act 2020, due to the hosting sites located in Australia).

Unique identifiers Rule 13

51. Information will be sourced and linked using NHI numbers. This use is consistent with the purposes for which these are assigned.

Privacy Risk Table

<table>
<thead>
<tr>
<th>Health Information Privacy Code Rule</th>
<th>Key Risks</th>
<th>Raw risk</th>
<th>Key Controls</th>
<th>Residual risk</th>
</tr>
</thead>
</table>
| Rule 1 Purpose of collection:      | The prioritisation calculation is not necessary to the public health response, making the collection unlawful | High | PIA03 Clinical approval for limited use
PIA01 Ministry Algorithm Governance
PIA02 Risk Score Tool Governance
PIA04 Limitations on use | Low |
| Rule 2 Source of information:      | Information collected from source other than person may be incomplete or inaccurate | Medium | PIA04 Limitations on use
PIA05 Additional collection from individual | Low |
<p>| Rule 3 Collection of information from individual: | | | PIA06 Privacy Statement, algorithm transparency, and public communications plan | Low |
| Rule 4 Manner of collection:       | Individuals may be concerned about their health information being | Medium | PIA01 Ministry Algorithm Governance | Low |</p>
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<tbody>
<tr>
<td>Rule 5: Storage and security:</td>
<td>• Be considerate when you’re getting it</td>
<td>used for a purpose other than that for which it was collected</td>
<td>PIA02 Risk Score Tool Governance PIA03 Clinical approval for use PIA04 Limitations on use PIA06 Privacy Statement, algorithm transparency, and public communications plan</td>
<td>Medium</td>
</tr>
<tr>
<td>Rule 6: Access to health information:</td>
<td>• Take care of it once you’ve got it</td>
<td>An unauthorised party accesses, alters, uses, and/or discloses personal information</td>
<td>High PIA08 Security Review PIA09 No disclosure outside Ministry systems</td>
<td>Low</td>
</tr>
<tr>
<td>Rule 7: Correction of health information:</td>
<td>• People can see their health information if they want to</td>
<td></td>
<td>Low PIA05 Additional collection from individual PIA06 Privacy Statement, algorithm transparency, and public communications plan</td>
<td>Low</td>
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<tr>
<td>Rule 8: Accuracy etc of information to be checked before use:</td>
<td>• Make sure health information is correct</td>
<td>The model has significant limitations due to the limited data, and limitations of that data (different variant, vaccination rates, and limited population) that is included. It is therefore possible that it will miss Cases for prioritisation due to their risk being from</td>
<td>Medium PIA01 Ministry Algorithm Governance PIA02 Risk Score Tool Governance PIA03 Clinical approval for use PIA04 Limitations on use</td>
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<tr>
<td>before you use it</td>
<td>factors other than those on which it is calculated. It is noted that the possibility of missing Cases is a programme risk that the tool forms one part in a suite of measures to address.</td>
<td>PIA1 Training</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rule 9 Retention of information</td>
<td>Risk calculations are retained in NCTS for longer than they are required for the purpose for which they may lawfully be used</td>
<td>Standard retention policies will apply to information entered into CCCM. (See CCCM PIA for control)</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>• Dispose of it when it’s no longer required</td>
<td>That a person was identified as being at risk is retained on their clinical records</td>
<td>PIA10 Limitations on disclosure, PIA11 Training</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Rule 10 Limits on use of health information:</td>
<td>Reputational damage due to public perception that the Ministry is using personal information for purposes it should not</td>
<td>PIA01 Ministry Algorithm Governance, PIA02 Risk Score Tool Governance, PIA03 Clinical approval for use, PIA06 Privacy Statement, algorithm transparency, and public communications plan</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>• Only use it for the purpose you got it</td>
<td>Cases at higher risk that are not prioritised by the tool are missed for priority contact due to non-clinical users relying too heavily on the score</td>
<td>PIA07 Sector Communications Plan, PIA11 Training</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health Information Privacy Code Rule</td>
<td>Key Risks</td>
<td>Raw risk</td>
<td>Key Controls</td>
<td>Residual risk</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
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<td>---------------------------</td>
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</tr>
<tr>
<td>Rule 11</td>
<td>Limits on disclosure of personal information:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Only disclose it for an allowed purpose</td>
<td>Medium</td>
<td>PIA10 Limitations on disclosure</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>That a person was calculated to be at risk is retained on their clinical records and disclosed to another party, such as an insurer</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Rule 12</td>
<td>Disclosure of health information outside NZ</td>
<td></td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>There is no expectation of any disclosure of information outside New Zealand (otherwise than for safe custody or processing in compliance with s11 of the Privacy Act 2020, due to the hosting sites being located in Australia).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rule 13</td>
<td>Unique identifiers:</td>
<td></td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>• Only assign and use unique identifiers as and how permitted</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No risks identified. NHI to be used as allowed to link information to an individual.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Privacy Control Table

<table>
<thead>
<tr>
<th>Control Reference Number</th>
<th>Control Name</th>
<th>Control Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIA01</td>
<td>Ministry Algorithm Governance</td>
<td>A Governance body with Privacy representation will be put in place to oversee the implementation, use of, and any changes to this tool and any others the Ministry implements. This body is to ensure that risk is assessed alongside benefit before use, that risk of unintended consequences can be monitored throughout the lifetime of an algorithm, and that there</td>
<td>In progress</td>
</tr>
<tr>
<td>Control Reference Number</td>
<td>Control Name</td>
<td>Control Description</td>
<td>Status</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>is oversight, accountability, clear change processes, and adherence to the Algorithm Charter.</td>
<td></td>
</tr>
<tr>
<td>PIA02</td>
<td>Risk Score Tool Governance</td>
<td>Health System Preparedness Program Steering Group is the governing body that the Covid Care in the Community Team reports to, and which assumes responsibility for this project.</td>
<td>In progress</td>
</tr>
<tr>
<td>PIA03</td>
<td>Clinical approval for limited use</td>
<td>The purpose for using the tool has been considered and endorsed by clinical experts as appropriate for use in prioritising unresponding or unreached Cases for contact only, in conjunction with parallel processes, in the circumstances. This supports the lawful use under Rule 10(1)(d)(i) and (ii) that the use of the information is necessary to prevent or lessen a serious threat to public health or safety, or the life or health of the individual concerned or another individual.</td>
<td>Implemented</td>
</tr>
<tr>
<td>PIA04</td>
<td>Limitations on use</td>
<td>Tool in its first iteration is to be used to support patient contact triage only, and is not to be used in any circumstances as an aid to, or substitute for, clinical assessment.</td>
<td>Implemented</td>
</tr>
<tr>
<td>PIA05</td>
<td>Additional collection from individual</td>
<td>Online self-reporting form will collect additional information from the individual</td>
<td>Implemented</td>
</tr>
<tr>
<td>PIA06</td>
<td>Privacy Statement, algorithm transparency, and public communications plan</td>
<td>Clear privacy statement on website, including how to request access and correction; plain language information about the algorithm; and publication of this PIA</td>
<td>In progress</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Update Algorithm Charter information on website to include Risk Score tool</td>
<td>In progress</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Publication of algorithm’s mathematical formula on the government’s Algorithm Hub, in accordance with transparency requirements under the Algorithm Charter</td>
<td>Implemented</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clear communications strategy to inform the public about how their information is being used and protected</td>
<td>In progress</td>
</tr>
<tr>
<td>PIA07</td>
<td>Sector communications plan</td>
<td>Clear communications to health sector about the purpose, intended use, and limitations of the tool</td>
<td>In progress</td>
</tr>
<tr>
<td>Control Reference Number</td>
<td>Control Name</td>
<td>Control Description</td>
<td>Status</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>PIA08</td>
<td>Security Review</td>
<td>The standard security Ministry security review processes will be completed to Authority to Operate level prior to go live. If any risks are identified they will be mitigated or eliminated prior to go live.</td>
<td>In progress</td>
</tr>
<tr>
<td>PIA09</td>
<td>No disclosure outside Ministry systems</td>
<td>All identifying information will remain within Ministry systems which operate in a secure AWS environment.</td>
<td>Implemented</td>
</tr>
<tr>
<td>PIA10</td>
<td>Limitation on disclosure</td>
<td>The risk score is not to be included in records saved from CCCM to GPs’ PMS files</td>
<td>Implemented</td>
</tr>
<tr>
<td>PIA11</td>
<td>Training</td>
<td>Training for non-clinical users in use of score</td>
<td>In progress</td>
</tr>
</tbody>
</table>
Appendix One—Summary from Technical Review

We do not believe that this model is sufficiently accurate at risk prediction to be used as the primary driver of treatment decisions. There appears to be a high likelihood that some people would be assessed as lower relative risk, but experience poor outcomes, therefore if this model is used then it should be done with significant and appropriate protections. We recommend that Governance consider an appropriate framework for deployment and display of this information. We do believe a suitable model could be developed using comorbidity or other information to improve accuracy. While the model development was technically sound, given the data constraints, overall risk estimation performance was average, with an AUC-ROC of 0.69 for the full data set. A range of statistical measures are used to report on how well the 1 model estimates risk (see Appendix A). We note that it is unclear what the status quo is in terms of risk estimation for the intended patient use cases and therefore what the impact of the model would be should it incorrectly rank risk when used in practice. Informed by clinical judgement, there may be benefit in using the model for directing certain cohorts, e.g. very low risk or very high risk patients, to certain care pathways. It could also be used as a secondary input to a rules-based system to identify cases where the model considers a case to be high risk, despite being in a lower risk group according to rules. Considering the goal of explainability and current data constraints, we consider the feature engineering and model selection methods to be appropriate. We do note, however, that due to the timing of the data used for model development, this does not include boosters which will be relevant to Omicron management. Modelling does not capture days since vaccination/booster which could model declining immunity with time.

As we understand for reasons of current data availability at the national level, this model excludes comorbidities as explanatory variables. If such a model is to be developed and used for clinical decision support or autonomous patient triage during the Omicron outbreak, we recommend that all options are considered to enable the timely collection and accessible storage of data on health conditions at the national level.
## Appendix 2 – Summary Output Statistics

### Confusion Matrix

<table>
<thead>
<tr>
<th></th>
<th>True</th>
<th>False</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>101</td>
<td>257</td>
<td>358</td>
</tr>
<tr>
<td>Negative</td>
<td>147</td>
<td>1170</td>
<td>1317</td>
</tr>
<tr>
<td>Total</td>
<td>248</td>
<td>1427</td>
<td>1675</td>
</tr>
</tbody>
</table>

**Sensitivity (True Positive Rate):**\[0.28 = \frac{TP}{P}\]

**Specificity (True Negative Rate):**\[0.11 = \frac{TN}{N}\]

**Accuracy:**\[0.14 = \frac{TP + TN}{P+N}\]

**Positive Predictive Value:**\[0.28 = \frac{TP}{TP + FP}\]

**Negative Predictive Value:**\[0.11 = \frac{TN}{TN + FN}\]

Further information is available from the technical review documentation.
Appendix 3 – Clinical Assessment

Key points

1. Nationally the Covid-19 population risk stratification tool will be useful and clinically safe to apply for ‘patient contact triage’

2. The risk stratification tool reflects an equity approach and honours Te Tiriti o Waitangi in that it prioritises Māori ethnicity

3. The added value in the risk calculation in the current form is to support prioritisation of patient contact triage at Care Coordination Hub level to identify those people who should be prioritised for contact for a first clinical assessment

4. It does not replace clinical assessment to determine the actual risk for a person based on pre-existing factors (age, ethnicity, vaccination status and co-morbidities) in combination with clinical acuity.

5. In its current form the tool must be restricted to point 1 above only and its implementation plan must include in parallel, strong mechanisms to safety net those stratified into a lower risk category for patient contact purposes

6. The governance of how this tool performs prospectively is critical.

7. The risk stratification prior to diagnosis is worth continuing to pursue to strengthen its accuracy by the inclusion of further data available nationally (for example NZePS data, disability sector data is worthwhile to increase utility for future-proofing Covid-19 disease management (any variant) over the course of the year).

8. Co-morbidity data is available at PHO level so this risk calculator would need the overlay of both patient specific data (from GP/telehealth or self-service form) and/or PHO data.

9. Resourcing a small team of experts to continue this work is important

Limitations and considerations

It will not support decision making at a clinical care provider level, particularly a general practice where a person is enrolled and has access to their medical record as well as knowledge of their broader circumstances.

Robust agreed safety netting to ensure all those that are deemed ‘lower risk’ get a timely clinical assessment and processes for ensuring this happens.

Other known higher risk patients and patient groups are excluded in this calculation for whom health equity of access and outcomes is a concern for example; refugee and refugee-background people, people with disabilities, moderate-severe mental health patients, etc. so the clinical safety of this tool RELIES on the ability of the localities to overlay their data.

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6 Note this assessment refers to the tool as a “stratification” tool as this was the original name. This has since been changed to Risk Score as a more accurate description of what the tool does.

The PDH review notes that this tool was developed based on a cohort of patients which may not reflect reality with omicron variant and was for a localised Auckland area outbreak which may not also be reflected nationally.

The tool doesn’t include booster doses which research confirms to be highly effective in preventing severe disease from Omicron. As such Booster dose status and time from booster dose must be included in future iterations as soon as possible to enhance accuracy and support patient contact triage.

Timeline of steps required to implement

1. We need to understand how the Covid Care Coordination Hubs will use this tool and how it would stratify its local population, and what local data overlay is possible, so approval to activate the risk tool with close prospective governance

2. A rapid surge will mean we do not have capacity to implement any new systems so if there is any utility in this tool at all we should not lose the momentum that we have created.

3. The team membership for the prospective analysis of this tool must be defined and resourced and ideally will include an epidemiologist to support the ability to understand where and why the model diverges from reality, if this occurs, in an OMICRON environment or indeed other variants.

Future

The governance of how this tool performs prospectively will determine if efforts to further refine the tool to increase its utility is worthwhile

The current user case of this tool must be restricted to prioritisation of contact triage only (as above point 1) to remain clinically safe.

It would be useful to continue to refine and strengthen the tool as part of winter planning as we approach any respiratory illness and potentially other severe resp illness as the border opens as the same populations will be more at risk of these other illness.

There is NO linear relationship between the variables in the tool and the human patient and whilst we can be sure from international experience, we have yet to see how this play in our Aotearoa communities, with our ethnic diversity and post-codes.
Appendix 4 – Algorithm Charter

**NOTE:** Since this assessment, the tool has been approved for use to support contact decision-making only and is not to be used for clinical assessment.

Should we complete the Algorithm Charter

The algorithm charter is recommended to be used when there is likely to be a high likelihood many people will suffer an unintended adverse impact. In the context of developing this, it has to be considered that without a prioritisation model, many people will miss out on care who would benefit.

It has been scored in a low probability/low impact space due to:

- Acts as an input to a clinical assessment only
- Is used as part of a clinical assessment
- Training has been provided for this to users to help them understand how it has been created and the use case for it,
- It is a calculated score similar to use cases that are prevalent in healthcare already in many different clinical settings.
## Controls associated with the commitments

<table>
<thead>
<tr>
<th>Commitments</th>
<th>Ways to demonstrate the commitments</th>
<th>How are we addressing these?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transparency - maintain transparency by clearly explaining how decisions are informed by algorithms.</td>
<td>Plain English documentation of the algorithm.</td>
<td>Privacy Impact Assessment.</td>
</tr>
<tr>
<td></td>
<td>Making information about the data and processes available (unless a lawful restriction prevents this).</td>
<td>Privacy Impact Assessment.</td>
</tr>
<tr>
<td></td>
<td>Publishing information about how data are collected, secured and stored.</td>
<td>Privacy Impact Assessment.</td>
</tr>
<tr>
<td>Partnership - Deliver clear public benefit through Treaty commitments by:</td>
<td>Embedding a Te Ao Māori perspective in the development and use of algorithms consistent with the principles of the Treaty of Waitangi.</td>
<td>Governance Group.</td>
</tr>
<tr>
<td>People - Focus on people by:</td>
<td>Identifying and actively engaging with people, communities and groups who have an interest in algorithms, and consulting with those impacted by their use.</td>
<td>Publishing to Algorithm Hub.</td>
</tr>
<tr>
<td>Data - Make sure data is fit for purpose by:</td>
<td>Understanding its limitations.</td>
<td>Technical Review.</td>
</tr>
<tr>
<td></td>
<td>Identifying and managing bias.</td>
<td>Technical Review.</td>
</tr>
<tr>
<td>Privacy, ethics, and human rights - Ensure that privacy, ethics and human rights are safeguarded by:</td>
<td>Regularly peer reviewing algorithms to assess for unintended consequences and act on this information.</td>
<td>Governance Group.</td>
</tr>
<tr>
<td>Human oversight - Retain human oversight by:</td>
<td>Nominating a point of contact for public inquiries about algorithms.</td>
<td>Governance Group/Publishing to Algorithm Hub.</td>
</tr>
<tr>
<td></td>
<td>Providing a channel for challenging or appealing of decisions informed by algorithms.</td>
<td>Governance Group.</td>
</tr>
<tr>
<td></td>
<td>Clearly explaining the role of humans in decisions informed by algorithms.</td>
<td>Governance Group.</td>
</tr>
</tbody>
</table>