

**Direct Laboratory
Notification of
Communicable Diseases**
National Guidelines

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MANATŪ HAUORA

Foreword

The surveillance and control of priority communicable diseases remains a fundamental public health task. Surveillance, particularly through disease notification, is important not just because of the information it provides us on broad trends in these diseases, but more importantly because it is the trigger for actions to control outbreaks, and hence protect the health of our communities. More complete and speedy reporting of diseases allows more complete and speedy responses, and so more effective protection of health. Surveillance and response systems also require the participation of individuals and organisations both across the health sector and in other sectors.

Disease notification in New Zealand has formally relied on reporting of cases by medical practitioners, under the provisions of the Health Act 1956, but with informal reporting of at least some diseases by laboratories. However the Epidemic Preparedness Act 2006, designed to help improve our ability to respond to future epidemics, provided an opportunity to update our notification system, and specifically to introduce a formal notification role for laboratories. This is a key step in strengthening disease surveillance and therefore control systems, as it will increase both the timeliness and completeness of reporting.

During 2007 much work has gone into planning the implementation of this legislative change, and we have received a lot of input from the health sector on how this can best be done. We have also had extensive input from an Advisory Group, and I would like to thank all of the members of the Group for sharing their expertise and wisdom, which has been crucial to getting this important initiative to the implementation stage. I would also like to recognise the extensive work done by the Ministry's project team, working with the Advisory Group and broader sector on the design of systems and processes to support laboratory notification.

Implementing laboratory notification will present further practical challenges. This Guideline document has been prepared to assist with the implementation process, and we are keen to receive feedback both on the document, and on how we can best support and utilise laboratory notification into the future.

Mark Jacobs
Director of Public Health

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1 Introduction

1.1 Background

Communicable diseases remain a significant public health priority, both in New Zealand and internationally. The problems facing New Zealand in this area today are diverse, and include food-borne diseases, the emergence of antimicrobial-resistant bacteria, sexually transmitted diseases, vector-borne diseases, and vaccine-preventable diseases. New and emerging diseases such as pneumococcal disease and sudden acute respiratory syndrome (SARS), as well as the threat of an intentional release of a biological agent, pose potential threats to public health.

Surveillance is fundamental to the prevention and control of communicable diseases. A key surveillance instrument for the monitoring and management of communicable disease (and some non-communicable issues) is notification. Under the Health Act 1956 there are 49 diseases and conditions that are required to be notified (including on suspicion) to a Medical Officer of Health (and territorial local authority for some conditions). The primary purpose of notification is to trigger an appropriate public health response so that further illness can be prevented. The secondary purpose is for surveillance; that is, to predict, observe, and minimise the harm caused by outbreak, epidemic and pandemic situations.

In 2003 the Ministry of Health initiated a review of the current system of notifiable diseases and conditions. This review was undertaken by the consultancy group Allen & Clarke, regulatory and policy specialists. The review identified a need to improve the effectiveness of the current system, especially in relation to data accuracy and timeliness. A major recommendation was to create a legal framework that would allow the direct laboratory notification of notifiable diseases.

The Health Amendment Act 2006 was passed in December 2006. As well as improving the Government's ability to respond to an outbreak of pandemic flu or a similar highly infectious disease, this new legislation also provided for direct laboratory notification of notifiable diseases.

The old legislation (prior to 18 December 2007) saw considerable variations in reporting rates and some under-reporting. The new legislative requirements will improve the old system, including an improvement to the rates of reporting. This new legislation requires laboratories to directly report the results of positive tests that indicate the possibility of a notifiable disease to Medical Officers of Health. This is expected to support reporting by clinicians and result in more comprehensive and faster overall reporting of communicable diseases to Medical Officers of Health. Accurate and timely data is essential if we are to promptly identify and respond to important public health events such as pandemic influenza, or a similar emergent infectious agent with epidemic or pandemic potential.

1.2 Purpose of the guidelines

In July 2007 the Ministry of Health established a project team and a sector advisory group to help facilitate the introduction of the new legislation. This document is one of the outcomes of that work.

The main purpose of these guidelines is to inform the health sector about what is involved in meeting the new legislative requirements, and to present a set of national minimum requirements for those parties that are required to comply with the legislation.

The preferred method of notification is through a national electronic system that builds on existing systems, including EpiSurv – the national notifiable diseases database maintained by Environmental Science and Research (ESR). The development and implementation of the national electronic system for direct laboratory notification requires a phased approach to ensure the implementation of electronic notification is co-ordinated with other IT projects involving laboratories. This will ensure there is efficient and effective use of IT resources and systems, and will help minimise the compliance costs for all parties involved.

The national electronic system provides a base set of functions and tools for:

- electronic and manual data capture
- recording of cases of notifiable diseases and subsequent investigation details
- recording of contact tracing information and linking of cases
- data analysis and reporting.

Sections 6.3 and 6.4 of this document discuss in more detail the functions provided by the national electronic system.

The national electronic system is intended to be able to coexist with local public health unit (PHU) systems that are used to support more advanced requirements for notifiable disease case management, contact tracing and management, and outbreak and emergency response. It provides interfaces through which data can be exchanged electronically. Section 6.9 discusses integration in more detail.

There are also other legislative changes in the near future that will have an impact on direct laboratory notifications. The Government is looking to add additional communicable diseases to the notification schedule around March 2008. In addition, new public health legislation was introduced into the House in November 2007. This will see further changes to what clinicians are required to do under the Act, and will stipulate more clearly what information is required within a notification to a Medical Officer of Health.

For these reasons, it is important to note that this is only version 1 of the national guidelines, and that these are expected to change over the coming year. Updates of the national guidelines will be posted on the Ministry of Health website. If you are unsure of what version to use, please contact:

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1.3 Structure of the guidelines

These guidelines begin with an overview of the existing processes, and then outline what high-level changes will occur after 18 December 2007 with the move to direct laboratory notifications.

Following this overview of process changes, the guidelines focus on specific areas, including:

- commonly asked legal questions
- the set of laboratory notification flowcharts that establish the trigger points for notifying a test result
- more detail on business processes
- the high-level technical specifications relating to the national electronic notification system.

At the end of the guidelines there is a set of appendices that contain detailed technical information. There is also a companion document to these national guidelines that sets out the technical details for implementing the national electronic solution. The *Electronic Notifiable Disease Messaging System (ENDMS) Implementation Guide* is available on the Ministry of Health website in the publications and resources section.

2 Overview: Before and after the law change

Under the Health Act 1956 certain individuals are required to notify scheduled medical conditions to a Medical Officer of Health.¹ Clinicians (both hospital and community) currently represent the main group required to notify. Conditions are required to be notified on clinical suspicion and/or confirmation, and notification should occur as soon as is practicable.

As of December 2007 laboratories will be required to report test results that indicate a person or thing has, has been or may be infected with a notifiable disease to a Medical Officer of Health at a public health unit (PHU). There are 20 PHU offices around the country. PHU staff are responsible for delivering core public health services, including the management and containment of outbreaks of communicable diseases.

Medical Officers of Health located at each PHU are public health medicine specialists responsible for undertaking a range of public health actions in response to notification. These actions may include contact tracing, immunisation, giving advice about management of the case and contacts, outbreak investigation, environmental evaluation, exclusion of an individual from a school, workplace or other facility, and public awareness campaigns.

2.1 Pre-December 2007 notification process

Prior to 18 December 2007, the source, method and form of transfer for notification information varied between PHUs. Most notifications are presently received by telephone or fax ('manually'). Notification information may be recorded on a locally designed notification form by staff at the medical practice, or by PHU staff as it is received.

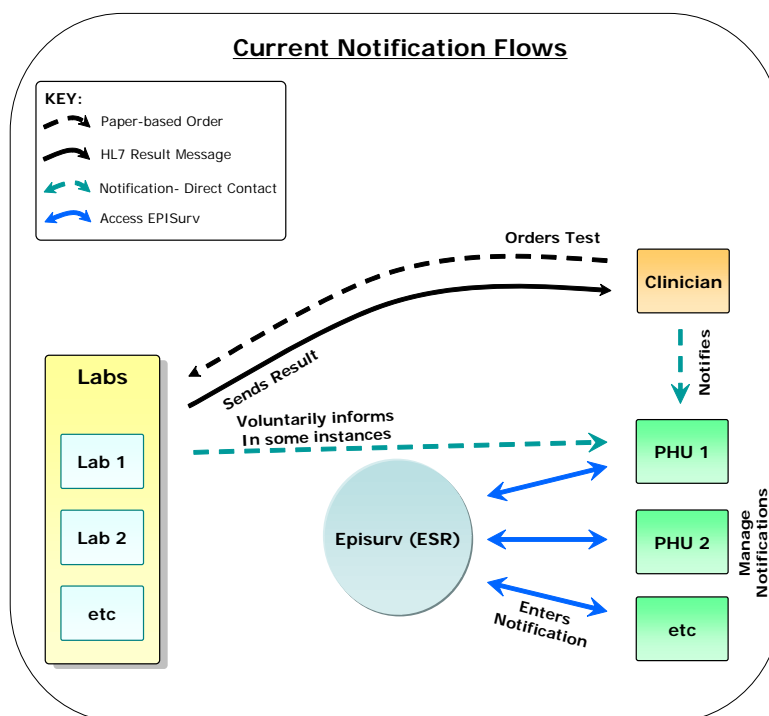
At the PHU, information may be written on a paper form and then entered into EpiSurv (the national notifiable diseases database) via a web-based form, or entered directly into EpiSurv and the case report form printed from there, thus creating an electronic copy and a hard-copy record. Most PHUs use some form of cover sheet to record processing information for the case. The case report form and cover sheet may then be forwarded to other PHU or territorial authority staff for review and investigation of the case.

The initial details recorded in EpiSurv are updated and added to as more information becomes available (investigation and outcome). Once all investigations have been completed, the case is closed. Cases may be reopened if further information becomes available.

A schematic overview of the pre-December 2007 system is shown in Figure 1.

¹ See Appendix 1: Diseases notifiable in New Zealand.

Figure 1: The pre-December 2007 system for notification



2.2 Post-December 2007 notification processes

To meet the new legal requirements to report directly to a Medical Officer of Health, the person in charge of a medical laboratory will have several options, depending on their laboratory's capacity. The following methods may be used to notify Medical Officers of Health:

- manual notification, including phone or fax
- electronic copying of test results from a District Health Board (DHB) laboratory to a DHB public health unit (for DHB patients only)²
- use of a modified³ HL7 message sent electronically to the Medical Officer of Health
- electronic notification via the national EpiSurv system.

Laboratories may decide to continue to use the current manual system, and in some smaller districts this will not cause any problems due to their small volumes of notifiable disease results. In the larger districts, volume increases will mean more work for both laboratories and the PHUs.

Those PHUs that receive an HL7 message directly from laboratories may wish to consider using an HL7 viewer (a basic software package) to enable the receipt and display of electronic information from laboratories. The PHUs will need to work closely with their local laboratories to ensure the information received using an HL7 viewer remains compliant with the Privacy Act.

² This option may not be available to all DHB laboratories due to organisation structures and contractual arrangements.

³ A copy of the test results modified to exclude all information unconnected to the notification.

DHB hospital laboratories will need to approach their corporate services to determine what information can be transferred from the hospital laboratories to the local PHU. Organisation structures, governance and contractual arrangements will differ from DHB to DHB. It may be permissible to send test results unconnected to the notification to another medical practitioner (eg, a Medical Officer of Health within the same DHB). Because the determinants will differ for each DHB, the Ministry advises DHBs to seek their own legal advice on this issue.

For private laboratories, all information not linked to the notification must be removed from the test result before it can be transmitted to the Medical Officer of Health.

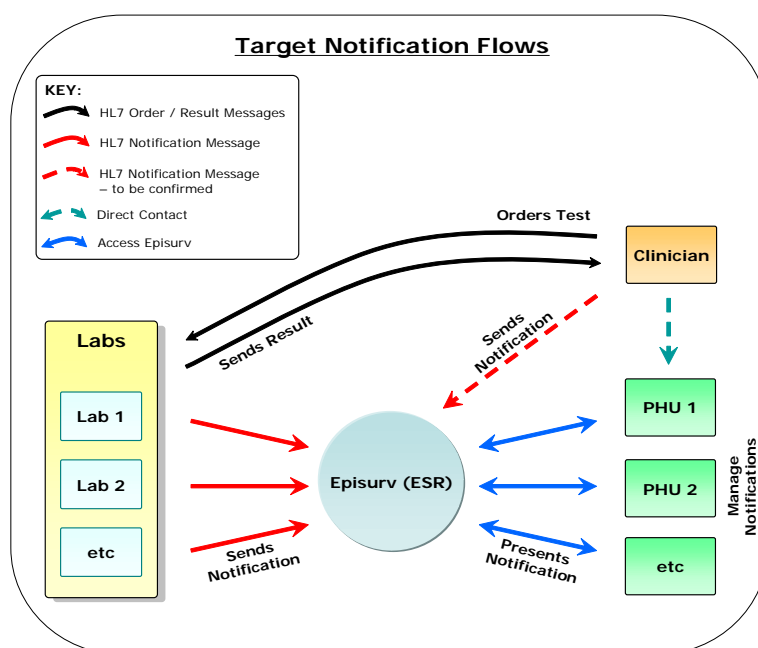
Laboratories and PHUs are encouraged to continue working together to develop solutions/processes appropriate to local circumstances, bearing in mind that a national electronic system with a central repository is the desired outcome of the laboratory notification project. Whatever interim solution is adopted post-18 December 2007, PHUs and their local laboratories should plan for a transition to the national electronic system over time.

2.3 Overview of participating organisations and systems that support the direct notification of notifiable diseases

Target notification data flow

Figure 2 provides a simplified view of the targeted future flow of information for the direct notification of notifiable diseases.

Figure 2: Target system for notification



The participants and their functions are as follows.

Clinician	Requests laboratory tests and sends a notification message to a public health unit (via EpiSurv) on suspicion of a notifiable disease. A clinician may also contact the PHU directly.
Laboratory	Undertakes the tests requested, sends the results to the requesting clinician and sends a notification message (via EpiSurv) to a public health unit on confirmation of a notifiable disease.
ESR (Environmental Science & Research)	Receives a notification message from a laboratory, stores the notification information in the EpiSurv database, and alerts the appropriate public health unit. EpiSurv is a national notifiable diseases reporting and basic case management system.
Medical Officer of Health	Accesses a 'notifications module' on EpiSurv via a web browser at the PHU. Case report forms are created where necessary (an automated process). The Medical Officer of Health may contact the attending clinician, testing laboratory and/or patient for information, follow-up or public health action purposes.
Message broker	While not shown in the diagram, the message broker's role is to manage laboratory order and results messages and notification messages to ensure they are securely passed between the appropriate parties – in this case a clinician and a laboratory, a laboratory and ESR, and a clinician and ESR.
Communication network	While not shown in the diagram, this is the underlying telecommunications-related infrastructure over which messages are securely passed between the parties – in this case the health network.

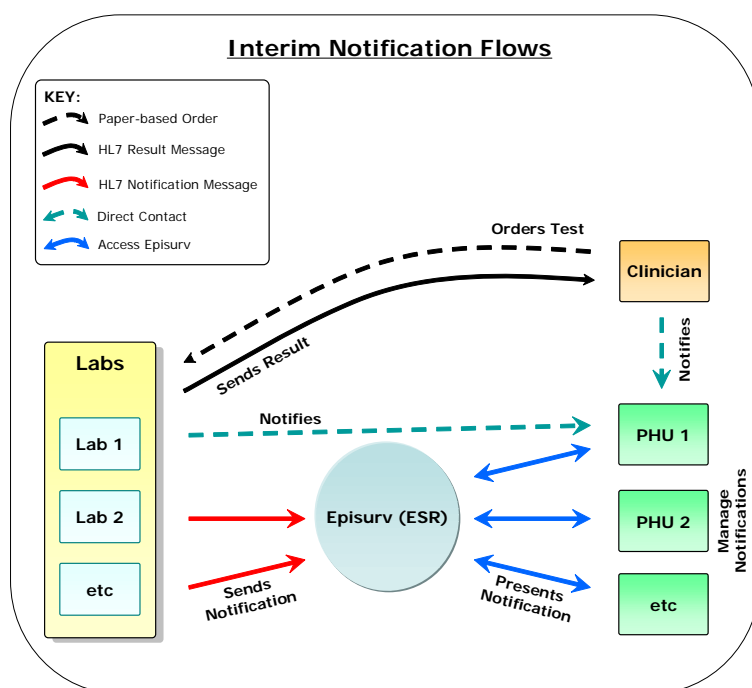
Laboratory test orders, results and notification messages ensure information is provided in a structured and consistent manner and can be easily stored and processed by ESR's EpiSurv system. A PHU does not need to manually create a case in EpiSurv. These messages comply with the current HISO HL7 standard (as at December 2007 this is v2.4).

Direct contact between a clinician and a PHU may be via phone, fax or email. Typically this would be because a clinician wants to provide early warning to a PHU of a suspected patient with a notifiable disease. In the future, clinicians will probably also be able to send electronic notifications to a PHU via EpiSurv using, for example, their practice management system.

Interim notification data flow

Figure 3 provides a simplified view of the interim flow of information for the direct notification of notifiable diseases.

Figure 3: Interim system for notification



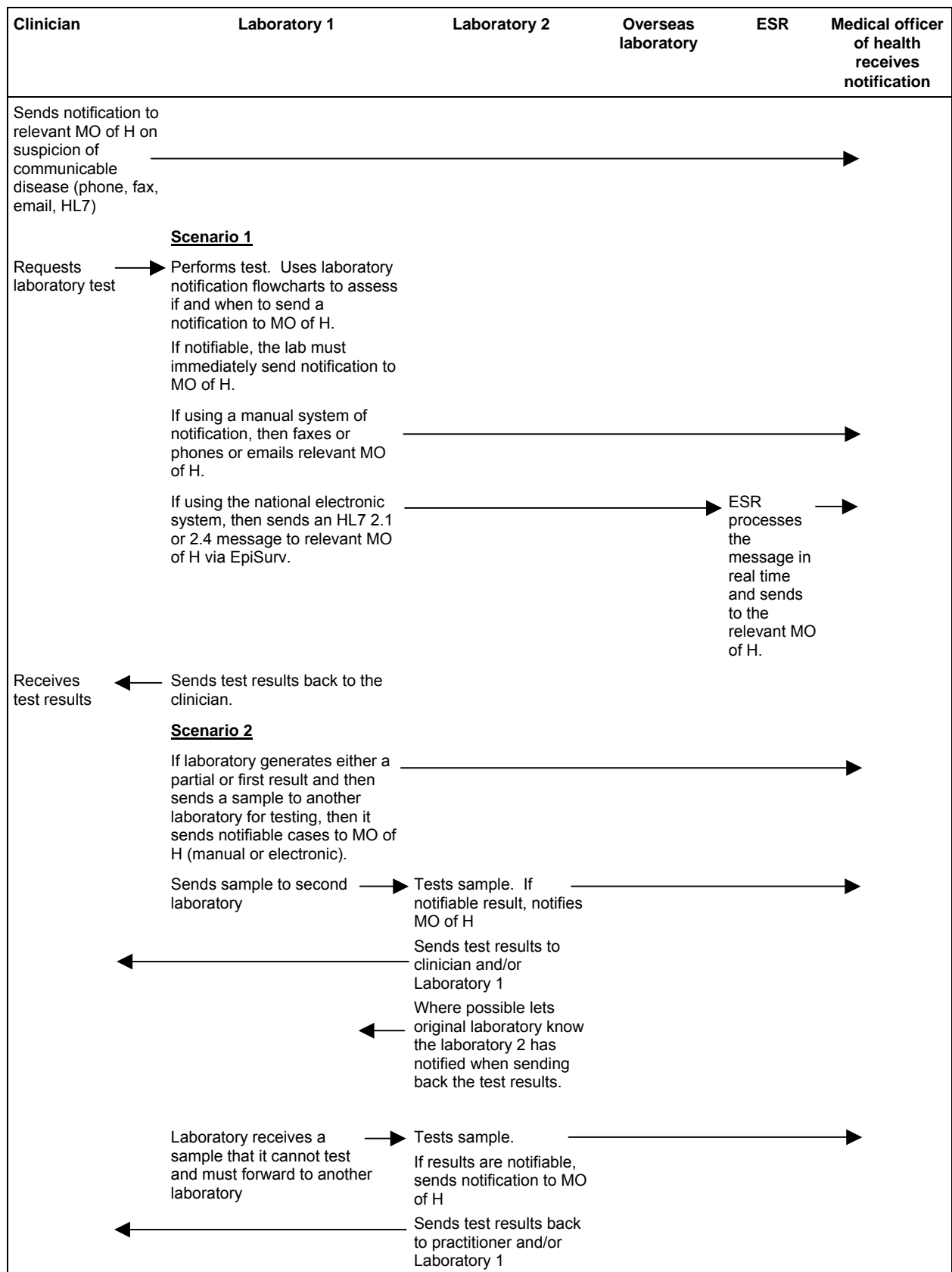
The participants are the same as in the target state diagram. Notification messages must comply with the current HISO HL7 standard (as at December 2007 this is v2.4) and HealthLink’s HL7 v2.1 message format (as an interim solution only).

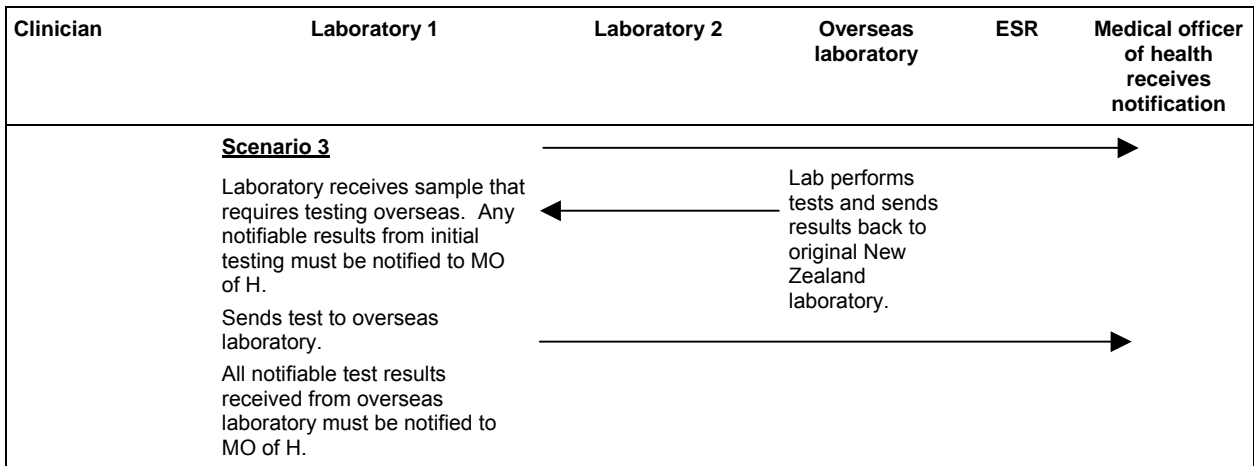
Direct contact between a laboratory and a public health unit may be via phone, fax or secure email, or possibly an electronic message. Typically this would be because a laboratory is unable to send a notification message that meets the required specification. Where an electronic message is sent directly to a Medical Officer of Health, the PHU will require the capability to receive such information and will need to manually create a case in EpiSurv.

2.4 End-to-end laboratory notification process map

The following map sets out the main notification routes required for different circumstances – depending on whether a manual or electronic notification system is used and whether more than one laboratory is involved with testing the sample.

Figure 4: The main notification routes





3 Legal Requirements

3.1 Changes to the Health Act 1956

Section 8 of the Health Amendment Act 2006 will insert the following section 74AA into the Health Act 1956 as from 18 December 2007.

Medical laboratories to give notice of cases of notifiable disease

1. *The person in charge of a medical laboratory must take all reasonably practicable steps to ensure that there are in place in it efficient systems for reporting to him or her (or to any other person for the time being in charge of it) the results of a test or other procedure undertaken in it that indicate that a person or thing is, has been, or may be or have been, infected with a notifiable disease.*
2. *The person for the time being in charge of a medical laboratory to whom results are reported under subsection (1) (or who himself or herself becomes aware of results of a kind to which that subsection applies) must immediately tell the health practitioner for whom the test or other procedure concerned was undertaken, and the medical officer of health, of the infectious nature of the disease concerned.*
3. *A person who fails to comply with subsection (2) –*
 - a) *commits an offence against this Act; and*
 - b) *is liable to a fine not exceeding \$10,000 and, if the offence is a continuing one, to a further fine not exceeding \$500 for every day on which it has continued.*

3.2 Advice on laboratories' new legal obligations

The Ministry of Health commissioned legal advice on a number of issues raised by the sector at regional meetings and via the advisory group. This legal advice is set out below. Laboratories may wish to seek their own legal advice rather than rely solely on the advice provided here.

Do all notifiable diseases need to be reported from December 2007?

From 18 December 2007 any notifiable disease reported to the person in charge of a medical laboratory must be reported to those persons set out in section 74AA(2). If the person in charge of a medical laboratory does not report those results, he or she commits an offence under the Act and may be liable to a penalty.

Section 74AA(1) places the onus for ensuring that an efficient reporting system is in place on the person in charge of a medical laboratory. That person 'must take all reasonably practicable steps' to ensure that efficient reporting systems exist so that he or she receives results of tests where a notifiable disease has been identified.

In terms of the words' ordinary meaning, the dictionary definition of 'practicable' is 'capable of being done; feasible' (Collins English Dictionary), and in law the use of the word 'reasonable' implies an objective test. What is considered reasonable will be measured against what a reasonable person in those circumstances would have done. Therefore, the person in charge of a medical laboratory must take all steps that are 'objectively feasible' to ensure a reporting system is in place.

In the context of this legislation, what does ‘immediately’ mean, and does this apply to all diseases on the schedule?

‘Immediately’ will bear its ordinary meaning of ‘without delay or intervention; at once’ (Collins English Dictionary).

The reporting requirements of section 74AA relate to notifiable diseases (see subsection [1]). ‘Notifiable disease’ is defined by the Health Act 1956 as meaning ‘any notifiable infectious disease, and any disease for the time being specified in Schedule 2’. The requirement to ‘immediately tell the health practitioner ... and the medical officer of health of the infectious nature of the disease’ relates to all notifiable infectious diseases listed in part one of Schedule 1, and Schedule 2, of the Health Act.

The reporting requirements may also apply to any other notifiable infectious disease even if not listed in a schedule to the Health Act (this would include, for example, all forms of tuberculosis [notifiable under the Tuberculosis Act 1948]).

What are the privacy responsibilities of the PHUs that receive information under section 74AA? What onus is on laboratories to ensure that non-relevant patient information is not sent in the first instance?

The Privacy Act and the sections of the Health Act that relate to personal and/or health information (sections 22B to 22I) place the responsibility for ensuring the protection of that information on the organisation that collects and holds the information.

Once a PHU receives health information, it must handle that information in accordance with the Health Information Privacy Code (the Code); that is, the PHU must have sufficient systems or processes in place to store and protect any health information it receives. Rule 10(1)(d) permits a PHU to use the health information to prevent or lessen a serious and imminent threat to public health, and, if necessary, rule 11(2)(d) enables a PHU to disclose the health information for similar reasons.

In relation to the labs, they must be satisfied that they also have suitable systems to store and protect all personal and/or health information they collect. A laboratory may disclose personal and/or health information relating to a notifiable disease to a Medical Officer of Health in accordance with section 74AA under the following provisions.

- Section 22C(1)(b)(i) of the Health Act provides that a person (this includes a lab) may disclose health information if that disclosure is permitted under the Code.
- Rule 11(2)(d) of the Code enables health information to be disclosed without requiring the consent of the person to whom the information relates, if the disclosure is necessary to prevent or lessen a serious and imminent threat to public health or public safety. The reason for requiring the notification of certain specified diseases is to enable an appropriate person (a Medical Officer of Health) to determine whether certain public health actions/interventions are necessary.
- It is important to note that rule 11(3) provides that disclosure under 11(2) is only permitted to the extent necessary for the particular purpose. Labs should therefore consider what information is necessary to disclose (eg, name, address, notifiable

disease, clinician), and what additional information the laboratories have obtained that will not be required by PHUs and so should not be disclosed.

The Ministry of Health has been advised that it may be difficult for labs to remove test information not relating to a notifiable disease from the information the labs will send to PHUs. However, given the requirement in rule 11(3) of the Code, labs may be breaching their privacy obligations if they disclose additional personal or health information that is not required under section 74AA.

Labs may need to obtain their own independent legal advice on how they should collect, store and disclose information relating to notifiable diseases.

3.3 Clinicians' continuing legal obligations

The new legislation does not affect existing legislation relating to clinician obligations. It is most important that clinicians continue to notify all notifiable diseases to their local Medical Officer of Health, for the following reasons.

1. Notification from the diagnosing clinician is still a legal requirement under the current Health Act.
2. Clinician notifications contain valuable personal information that will not be available from laboratory notifications. The laboratory notifications will essentially be limited to a person's name and date of birth, and may have no patient contact details.
3. Clinicians may have information not available to laboratories (eg, associated cases in an outbreak situation, the diagnosis of AIDS, or the clinical cases where consecutive serology is needed for confirmation).
4. The clinician may suspect that a patient has a notifiable disease on clinical grounds prior to laboratory confirmation: this clinical suspicion is sufficient for notification and to trigger public health action, and in some situations such early action could be vital.
5. The Medical Officer of Health will not receive clinical aspects of the case via a laboratory notification.
6. Some notifiable diseases are clinical syndromes, and there is no diagnostic laboratory test.

3.4 Timeframe for adding new notifiable diseases to the Schedule

The recently completed review of notifiable diseases and conditions was conducted to update the existing schedules to the Health Act and to provide a list of diseases and conditions to be made notifiable under the new Public Health Bill once enacted.

Proposed changes include the addition of:

- botulism
- noroviral gastroenteritis
- toxic shellfish poisoning
- verotoxin-producing *Escherichia coli* (VTEC)
- chlamydia

- gonorrhoea
- hepatitis D
- hepatitis E
- HIV
- invasive pneumococcal disease
- Q fever
- smallpox
- syphilis
- tularaemia.

Note that the sexually transmitted diseases chlamydia, gonorrhoea and syphilis will be unnamed notifications, but will still contain a National Health Index (NHI) number. HIV notifications will be anonymous. Notifications for HIV should not be sent or entered onto Episurv.

It is expected that the proposed amendments will be sent to the Minister/Cabinet for approval in late 2007 or early 2008. Once the amendments have been approved by Cabinet, changes to the schedules are expected to be in force before April 2008.

Laboratory notification flowcharts have already been developed for verotoxin-producing *Escherichia coli* (VTEC), hepatitis D and hepatitis E (see Appendix 2). The rest of the additional communicable diseases will have flowcharts developed in early 2008, before the new schedule comes into force.

4 Laboratory Notification Flowcharts

4.1 Purpose

The notification flowcharts have been designed to provide clinical laboratories with guidance on which laboratory results, at a minimum, should trigger a notification to the Medical Officer of Health. These flowcharts do not attempt to qualify results as suggestive or definitive evidence of a notifiable disease, but rather to include all results that indicate a person *may* be infected with a notifiable disease. Subsequent clinical information or additional laboratory results may result in de-notification of the case.

These flowcharts also aim to strike a balance between fulfilling legal obligations and inundating PHUs with information that is unlikely to indicate a notifiable illness. The flowcharts are provided in Appendix 2.

4.2 How to use the flowcharts

The flowcharts have been modelled on the e-notification flowcharts used in New South Wales (NSW), although, as stated in 4.1, without providing levels of evidence. The range of laboratory methods that are currently used or may be used more commonly in the future have been included, whenever possible. More than one method can often be chosen when testing for an infectious agent, and these flowcharts should not be interpreted as recommending one method over another, or that multiple methods need to be performed.

The flowcharts signal which result or results should trigger notification to the appropriate Medical Officer of Health.

4.3 Timing and process for updating

The flowcharts are new and yet to be tested, so they will be reviewed twice in 2008. The first review will be in March, and will coincide with the addition of new communicable diseases to those listed in the legislation. A second review will occur late in 2008. If only minor adjustments are required at this time, we will move to annual reviews of the flowcharts.

A four-member clinical committee will be used to review the flowcharts (two clinical microbiologists and two Medical Officers of Health). They will review the flowcharts and work with the sector to agree on any changes. The committee's recommendations will then be submitted to the Director of Public Health for his/her final approval. All changes will be notified on the Ministry of Health website.

Any changes made to the flowcharts will not come into force for six months, to allow laboratories to make the necessary changes to IT systems (unless the Director of Public Health indicates that the changes are urgent).

5 National Electronic Notification System

The Ministry of Health has identified the impending change to the Health Act as an important issue and a good opportunity to be involved with ensuring a nationally consistent approach to direct laboratory notification that is low-cost, efficient and simple.

A number of other jurisdictions have or are in the process of implementing electronic notification systems. NSW is a good example, where they have had paper- and phone-based laboratory notification since 1991. A significant amount of work has been conducted since 2004 as part of the NSW e-Notification project, including work on notification algorithms (trigger points), standardised message content and structure, and the secure communication of data.

The Ministry has developed a national electronic solution in consultation with the Direct Laboratory Notification Advisory Committee, which acknowledges the sector's current electronic capability and looks to build a new national electronic solution over several phases that aligns with other IT investment initiatives.

As well as providing a fast and efficient way for laboratories to notify their local Medical Officer of Health, the national electronic solution will provide a centralised database for receiving electronic information and real-time access to notification data. The centralised database will incorporate functionality to enable notification data to be used in a number of ways, including providing a way for public health officials to identify problems rapidly and take action to prevent the further spread of disease.

The national electronic system will provide a base set of functions and tools, including electronic and manual data capture, recording of cases of notifiable disease and subsequent investigation details, recording of outbreak information with links to individual cases, data analysis, and reporting. Section 6 of this document discusses in more detail the functions that will be provided by the national electronic system.

The national electronic system is intended to be able to coexist with local PHU systems that are used to support more advanced requirements for notifiable disease case management, contact tracing and management, and outbreak and emergency response. It will provide interfaces through which data can be exchanged electronically.

5.1 EpiSurv messaging system

The Direct Laboratory Notification Advisory Group, convened by the Ministry of Health, approved a proposal from the Institute for Environmental Science and Research (ESR) to use the existing national notifiable disease database, EpiSurv, to receive notifications from laboratories and pass these on to Medical Officers of Health.

ESR recently invested in an enhanced, robust and secure information management platform known as SurvINZ. It is on this platform that ESR has integrated (and continues to integrate) its surveillance systems and activities to drive greater efficiency and deliver more integrated and timely information to its stakeholders and end users for the benefit of public health.

EpiSurv7, a new web-based real-time version of the national notifiable disease surveillance system, was deployed in April 2007. In May 2007 ESR developed and

deployed a prototype contact-tracing module for use with EpiSurv7 for Exercise Cruickshank. EpiSurv7 is currently used by 20 PHUs throughout New Zealand, with 150 registered users. The system is extensible and scaleable.

ESR is able to receive electronic laboratory notifications in HL7 format from external laboratories. ESR can process the messages to appear in EpiSurv so that local PHU staff can use EpiSurv to check whether the case already exists and then update or create a new case if required. The results can be appended to the appropriate case record and viewed as required.

The fact that the routing of messages from laboratories to a medical officer of health happens in real time ensures that the legislative obligation for laboratories to report immediately is met.

As mentioned above, the development and implementation of the national electronic system for direct laboratory notifications requires a phased approach that allows the implementation of electronic notification to be co-ordinated with other IT projects involving laboratories. This will ensure the efficient and effective use of IT resources and systems, and will help minimise compliance costs for parties.

There is also a need to phase the implementation of additional functionality at the PHU user end. The plan is to implement additional EpiSurv functionality for PHU users using the two phases outlined below.

Phase 1

1. Laboratory results from an external Laboratory Information System (LIS) sent electronically using agreed HL7 standards will be automatically stored in the EpiSurv system, eliminating the need for users to manually enter data relating to the notification. When an electronic message from an external LIS is received, users of the central system will be able to view and process the notification.
2. Where appropriate, details from the electronic notification will be mapped into a case report form, avoiding the need for manual data entry.
3. PHUs will be able to extract all data generated for their PHU for use in their local systems used to support their notifiable disease case management, contact tracing and management, and outbreak and emergency response needs. They would also be able to use accumulated data for medium- and long-term surveillance purposes at a local level.

Phase II

The central system will accept 'notification update' files or messages from local PHU systems (with this capability) that modify, close and delete cases, etc when standards for data interchange have been developed and agreed. This is to ensure the national system, as the master source of the core data for notifiable diseases, accurately reflects any change in status and avoids the need to manually update the central system (reducing the chances of an error being made).

5.2 ESR contacts

For further information about the requirements for sending electronic notifications, please contact the ESR helpdesk in the first instance:

ESR Service Desk: 04 914 0784

or one of the following ESR electronic reporting and eLab notifications project staff:

Carol Kliem
Senior Information Analyst
Institute of Environmental Science and Research Ltd (ESR)
Tel: 04 914 0692
E-mail: carol.kliem@esr.cri.nz

Ruth Pirie
Senior Advisor (Public Health Information)
Institute of Environmental Science and Research Ltd (ESR)
Tel: 04 914 0744
E-mail: ruth.pirie@esr.cri.nz

5.3 Links with other IT projects

There are a number of Ministry-led initiatives relating to laboratories being conducted over the 2007–2009 period. The Ministry is co-ordinating work internally to ensure:

- obvious synergies between initiatives are captured
- duplication and avoidable costs are identified and removed.

The projects involved are:

- electronic reporting of cervical screening results to the National Screening Unit
- direct laboratory notification of notifiable diseases
- Health Information Strategy, Action Zone 5 (eLabs)
- electronic reporting to the Cancer Registry.

The Ministry will be working with the laboratory sector over the next few months to develop a plan to ensure there is effective co-ordination across these projects.

6 IT Specifications

6.1 Information requirements

Currently, laboratories receive – but do not enter – some patient-specific information into their information systems (eg, the patient's address). Because the test results are sent back to the requesting clinician, who already has the patient's details, there is no requirement to hold such information.

From 18 December 2007, when laboratories are required by law to notify the Medical Officer of Health, a subset of the ideal data set of patient details will be mandatory. The absolute minimum information required by the Medical Officer of Health to ensure public health action can be initiated following notification (by contacting the clinician) is:

1. patient name
2. date of birth or age
3. name of referring practitioner
4. diagnosis / test results
5. laboratory name / sample reference number.

Other information that should be sent where available is:

6. patient's or clinician's contact details
7. name of appropriate public health unit (PHU) (the reporting authority is the PHU in the health district where the case was staying at the time of illness; if this is not known, refer the notification to your local PHU).

Due to privacy requirements laboratories must send only the test results pertaining to the notifiable disease in question. PHUs may require some negative results to enable de-notification of a previous clinician notification. This is particularly important for some diseases which are likely to have been notified by a clinician on suspicion (eg, invasive meningococcal disease).

Ideally, additional information would be available at initial notification (see the list below). This will need to be collected from secondary sources (ie, they still require clinician notification or information from other hospital or laboratory information systems):

- NHI number
- date of birth (if not provided as part of the minimum data set above)
- sex
- ethnicity
- occupation
- address details (house number, street name, suburb, town/city, postcode)
- phone numbers (home, business, mobile)
- diagnosis
- test results (if not provided as part of the minimum data set above)
- unique order number
- symptoms

- date of onset.

It is envisaged that a rich data set sent directly from laboratories to PHUs, including most or all of the information outlined above, will become a reality in the near future following developments such as electronic ordering of laboratory investigations.

6.2 Privacy

The Health Act 1956 allows for named patient information to be shared for the purpose of protecting the public health. However, all health-related information relating to individuals must still be adequately protected.

Some notifiable conditions (AIDS and sexually transmissible infections) are, or will be, notifiable on either an anonymised or an unnamed basis. AIDS notification presently utilises an anonymised code set out in Schedule 1 of the Health (Infectious and Notifiable Diseases) Regulations 1966. The diagnosing clinician assigns an anonymous code (set out on the paper case report form) and sends this via the PHU to the AIDS Epidemiology Group. AIDS cases are not entered onto EpiSurv. Only the diagnosing clinician is able to identify a patient, based on the code used for AIDS notification. From 2008 HIV will be made notifiable on an anonymous basis using the special case report form available on the ESR website.

Notifications for HIV should not be sent to, or entered onto, EpiSurv.

In the near future (early 2008), the addition of conditions such as chlamydia, gonorrhoea and syphilis will require 'unnamed' data to be captured. Unnamed notifications are likely to be linked with a patient's NHI number (a unique identifier) and so are not anonymous. For this reason, additional security, provided through an electronic system such as role-based security (ie, blocking certain information from general view) will be the ideal solution to ensure individual privacy. By using an electronic solution, access to patient-level data for all other diseases and conditions will be restricted to the staff at the responsible (local) PHU. All identifiable information will be blocked from the view of 'national users'.

Electronic data transfer will require the use of SSL encryption, digital certificates, closed networks and/or other means to ensure security. See section 6.5, 'Security requirements', for more information.

6.3 Notifiable disease database

Internationally, many surveillance systems rely on, or are moving towards, electronic reporting of notifiable diseases. To be effective, such reporting must be timely and accurate, and the system user-friendly and low-cost.

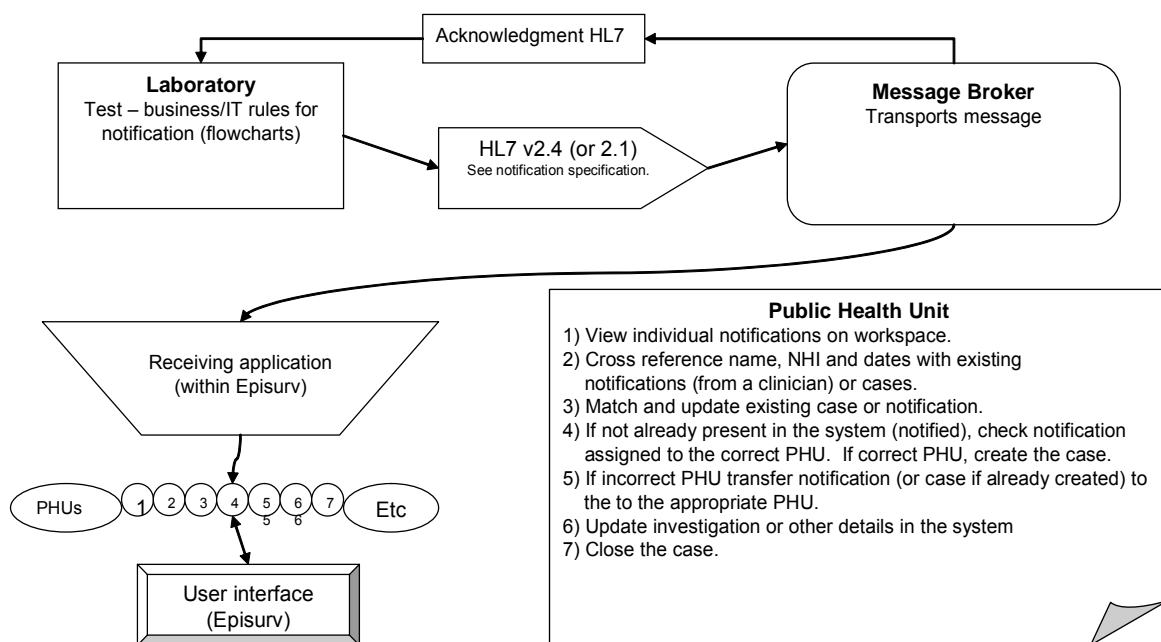
Functional areas to be supported by an electronic notifiable disease reporting information system include:

1. **information receipt** – the capability to capture data either electronically or manually (web-based); a schematic overview of the information flow is detailed in Figure 5

2. **case processing (ESR, EpiSurv)** – the recording of cases of notifiable disease and subsequent investigation details
3. **contact tracing** – the recording of contact tracing information
4. **outbreak reporting** – the recording of outbreak information, with links to individual cases
5. **analysis** – providing functionality and tools to enable temporal, demographic and spatial analysis of data
6. **reporting** – providing tools to extract data in tabular, graphical and geographical formats.

Figure 4 summarises the national electronic notification process. Section 6.4 provides more information about the system’s functionality requirements.

Figure 5: Electronic laboratory notification process



6.4 System functionality

Data will be managed at the PHU provider level but will not be physically restricted to a single location or office. All data will be available in real time at a national level (see section 6.11). Security arrangements will allow a PHU to view and report on their local data in detail, and to view and report on national data at a summary level.

The system will:

- support the ability to receive data from external systems (eg, laboratory information management systems and practice management systems)
- support the relevant messaging and coding standard(s) (eg, HL7, LOINC and NZPOCS)
- support geographical information system (GIS) capability
- support reporting capability at a local PHU and national level
- support notifiers to notify electronically or manually
- support condition-specific design and functionality
- support privacy and freedom of information legislation and policies
- parse relevant data (if parsing is not possible, data will be able to be viewed in a human-readable format to enable manual processing)
- alert users that new results are available for viewing
- assign, or be able to display, results by priority
- allow attachments in the following formats: .doc, .pdf, .txt, .xls, .qes, .rec, .jpg, HTML
- support integration with local case management systems
- control functionality through the access level assigned to individual users
- include activity logs (audit trails) with the ability to show who (which user) made changes to the data and what changes were made
- ensure data security (eg, audit trails and user identification, encryption, secure SSL certificates)
- be able to support 100 concurrent users and 'significant' volumes of electronic messages (eg, during a serious epidemic)
- improve data quality through more rigorous validation at data point-of-entry
- provide a national and local view of the data in real time
- enable sharing and re-use of data for epidemiological analysis
- automatically parse, process and store information with minimal user intervention
- include or allow for contact tracing management, analysis and reporting functionality
- allow *ad hoc* searches over multiple criteria across different components of the system
- be flexible, configurable and expandable and allow for increased functionality – it is expected that in future, further functionality required by system users will be able to be included in the system
- be designed to ensure flexibility to make minor changes (centrally) without application development change
- allow for de-notification of a case upon receiving additional information from a clinician or a laboratory
- be designed to allow for the future use of mobile technologies (eg, PDAs).

6.5 Security

- Each user will require a unique username and password.
- Users will be managed through a directory service as a national administration function.
- The system will automatically time out after 60 minutes of inactivity. After this, the program will log out and all unsaved information will be lost.
- PHU users can access information for cases and outbreaks relating to their PHU.
- National information about cases and outbreaks outside a PHU boundary is to be available at a summary level (with personal details restricted).
- Role-based security will be utilised to enhance privacy protection.
- There will be a national read-only view, which will allow national information to be accessed with sensitive information removed from the view.
- The system will support different security models for different diseases in the future.
- The system will keep an audit trail of all data accesses and a record of changes made by users. Basic audit information will be available through the system (eg, last updated by 'user name'). Specific analysis of the audit trail will be available on request.

6.6 Availability

- The system will be available 24 hours per day, seven days per week.
- In any situation where the system is unavailable, an email message will be sent to all registered users. Those same users will be notified by email once the system becomes available again.
- IT support should be available during normal business hours. Faults that occur outside these hours will be addressed on the following business day. This includes a national administration service (ie, issuing users' IDs and passwords).

6.7 Data management

- The provider will manage the data captured in the system.
- The data will be securely backed up daily, with an offsite back-up storage regime. Restorations will be practised every six months.

6.8 Data warehouse

Data entered into the system is stored in a data warehouse. Data is transferred to the data warehouse with each updated transaction (that is, when the 'save case' button is clicked). This provides a national view of the system data, instantly. The data warehouse also holds historical 'views' of the system; that is, a view of the data at a particular date. This provides the ability to analyse the data over time.

6.9 Data integration

- PHUs will be able to extract all data generated by their own PHU for integration in other systems.
- Local PHU systems will be able to send messages to the central system modifying, closing, deleting cases, etc.
- Laboratory results from an external LIS will be automatically stored in the system, eliminating the need for users to manually enter data. When an electronic message from an external LIS is received, users of the central system are notified.
- Where appropriate, existing details will be able to be copied over into a new case/form/field.

6.10 Software

The system will be accessible using PCs with browser software Internet Explorer version 6 and above installed.

6.11 Performance

Electronic data exchange will be in real time. That is, once a notification message is received by the central system, it will be available to the assigned PHU within one minute.

Appendix 1: Diseases Notifiable in New Zealand (include suspected cases)* as at December 2007

Notifiable infectious diseases under the Health Act 1956

Section A: Infectious diseases notifiable to a Medical Officer of Health and local authority

Acute gastroenteritis**	Campylobacteriosis
Cholera	Cryptosporidiosis
Giardiasis	Hepatitis A
Legionellosis	Listeriosis
Meningoencephalitis – primary amoebic	Salmonellosis
Shigellosis	Typhoid and paratyphoid fever
Yersiniosis	

Section B: Infectious diseases notifiable to a Medical Officer of Health

Acquired immunodeficiency syndrome	Anthrax
Arboviral diseases	Brucellosis
Creutzfeldt-Jakob disease and other spongiform encephalopathies	Diphtheria
<i>Enterobacter sakazakii</i> invasive disease	<i>Haemophilus influenzae b</i>
Hepatitis B	Hepatitis C
Hepatitis (viral) – not otherwise specified	Highly pathogenic avian influenza (HPAI)
Hydatid disease	Leprosy
Leptospirosis	Malaria
Measles	Mumps
<i>Neisseria meningitidis</i> invasive disease	Pertussis
Plague	Poliomyelitis
Rabies	Rheumatic fever
Rickettsial diseases	Rubella
Severe acute respiratory syndrome (SARS)	Tetanus
Viral haemorrhagic fevers	Yellow fever

Diseases notifiable to a Medical Officer of Health (other than notifiable infectious diseases)

Notifiable to the Medical Officer of Health

Cysticercosis
Taeniasis
Trichinosis
Decompression sickness
Lead absorption equal to or in excess of 0.48 µmol/l (10 µg/dl) ***

Poisoning arising from chemical contamination of the environment

Notifiable diseases under the Tuberculosis Act 1948

Notifiable to the Medical Officer of Health

Tuberculosis (all forms)

Notes:

- * During times of increased incidence, practitioners may be requested to report, with informed consent, to their local Medical Officer of Health cases of communicable diseases not on this list.
- ** Not every case of acute gastroenteritis is necessarily notifiable – only those where there is a suspected common source or from a person in a high-risk category (eg, food handler, early childhood service worker, etc), *or* single cases of chemical, bacterial or toxic food poisoning such as botulism, toxic shellfish poisoning (any type) and disease caused by verocytotoxic *E. coli*.
- *** Blood lead levels to be reported to the Medical Officer of Health (10 µg/dl or 0.48 µmol/l) are for environmental exposure. Where occupational exposure is suspected, please notify OSH through the NODS network.

Appendix 2: List of Public Health Units and Medical Officers of Health

PHU	Medical officers of health	Phone	Fax
Northland District Health Board Public Health	Jonathan Jarman Loek Henneveld	(09) 430 4100	(09) 430 4498
Auckland District Health Board Public Health	Sheryl Jury Craig Thornley Greg Simmons Cathy Pikholtz Julia Peters Andrew Lindsay Simon Baker Denise Barnfather	(09) 623 4600	(09) 630 7431 Healthlink address (HL7): adhbphth
Waikato District Health Board Public Health	Dell Hood Felicity Dumble Anita Bell	(07) 838 2569	(07) 838 2382
Toi Te Ora Public Health Tauranga Office	Phil Shoemack	(07) 571 8975	(07) 578 5485
Toi Te Ora Public Health Whakatane Office	Phil Shoemack (based in Tauranga)	(07) 306 0717	(07) 306 0987
Toi Te Ora Public Health Rotorua Office	Phil Shoemack (based in Tauranga)	(07) 349 3520	(07) 346 0105
Tairāwhiti District Health Board Public Health Unit	Bruce Duncan Geoffrey Cramp	(06) 867 9119	(06) 867 8414
Hawke's Bay District Health Board Public Health Unit	Lester Calder Caroline McElnay	(06) 834 1815	(06) 834 1816
Taranaki Health Public Health Unit	Richard Hoskins	(06) 753 7798	(06) 753 7788
Wanganui Public Health Units	Patrick O'Connor	(06) 348 1775	(06) 348 1783
Mid Central District Health Board Public Health Units Palmerston North	Jill McKenzie	(06) 350 9110	(06) 350 9111
Regional Public Health Hutt Valley District Health Board (covering Wellington, Hutt Valley and Wairarapa)	Annette Nesdale Margot McLean Stephen Palmer Deborah Read	(04) 570 9267 A/H: (04) 570 9002	(04) 570 9373
Nelson Marlborough District Health Board Public Health Unit – Nelson Office	Ed Kiddle	(03) 546 1537	(03) 546 1542
Nelson Marlborough District Health Board Public Health Unit – Blenheim Office	Maree Leonard	(03) 577 1914	(03) 578-9517

PHU	Medical officers of health	Phone	Fax
Community & Public Health Christchurch Office	Mel Brieseman Alistair Humphrey Ramon Pink	(03) 379 9480	(03) 379 6484
Community & Public Health South Canterbury Office	Daniel Williams	(03) 688 6019	(03) 688 6091
Community & Public Health West Coast Office	Cherly Brunton	(03) 768 1160	(03) 768 1169
Public Health South Dunedin Office	John Holmes Marion Poore Derek Bell	(03) 474 1700	(03) 471 4624

Appendix 3: Members of the Advisory Group and Project Team

Direct Laboratory Notification Project Team

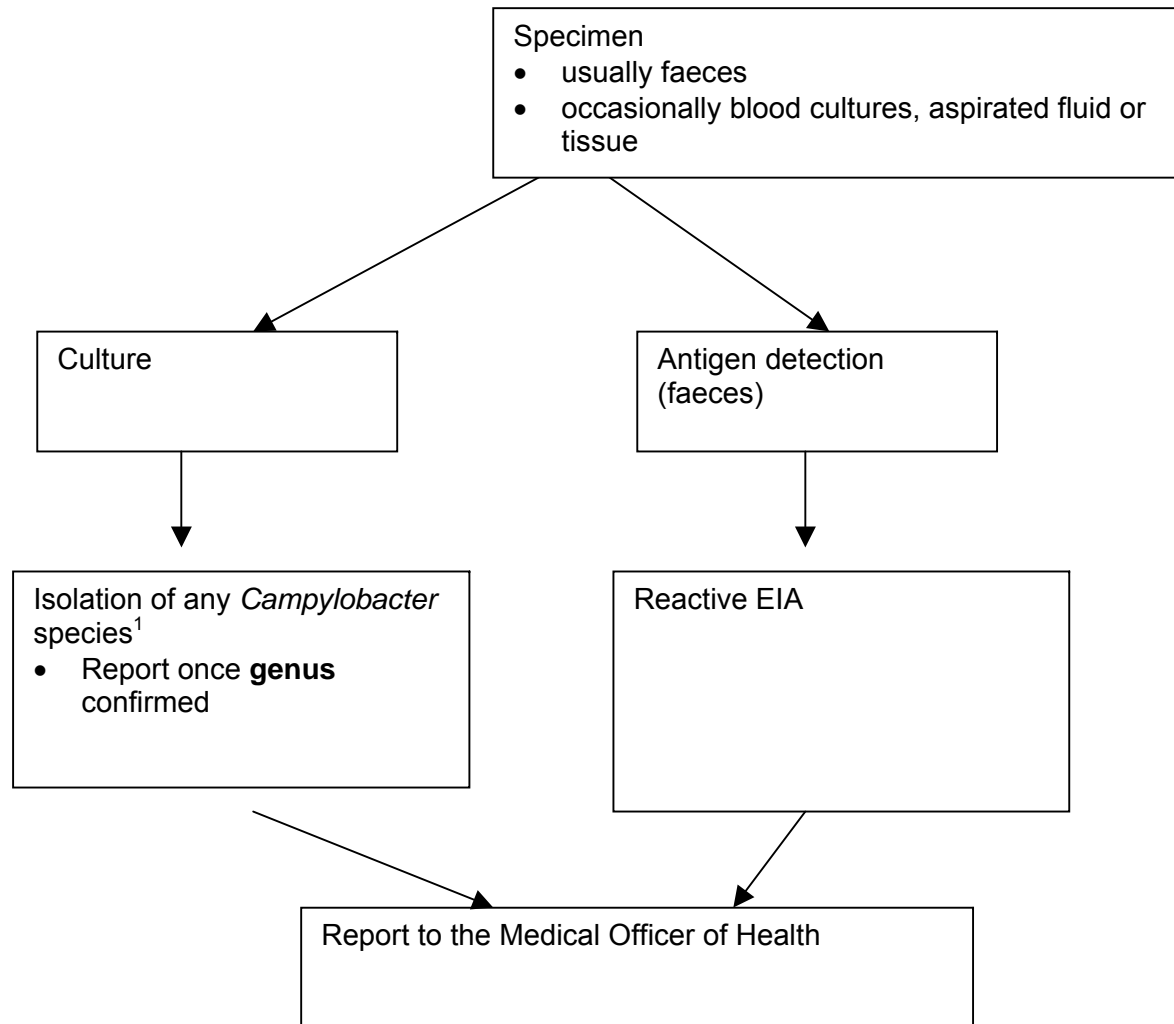
Don Bandaranayake	Senior Advisor Public Health Medicine, Ministry of Health
Rebecca Blackmore	Team Leader, Communicable Diseases, Ministry of Health
Shayne Hunter	Senior Information Management Consultant, Ministry of Health
Mark Jacobs	Director of Public Health (sponsor)
Colin Kumpula	Analyst, Communicable Diseases, Ministry of Health
Ruth Wiltshire	Project Manager, Wiltshire Hogan Ltd

Direct Laboratory Notification Advisory Group

Don Bandaranayake	Senior Advisor Public Health Medicine, Ministry of Health
Timothy Blackmore	Clinical Microbiologist, Capital and Coast Laboratory
Mel Brieseman	Medical Officer of Health, Community and Public Health
Carole Hazelman	Portfolio Manager, Public Health Operations, Ministry of Health
Mark Jacobs, Chair	Director of Public Health
Sheryl Jury	Medical Officer of Health, Auckland Regional Public Health
Iain Loan	General practitioner, Taupo Health Centre
Colin Meehan	Senior Advisor, Sector Accountability & Funding Directorate, Ministry of Health
Ruth Pirie	ESR, Kenepuru Science Centre
Susan Taylor	Clinical Microbiologist, Microbiology Department, Middlemore Hospital

Appendix 4: Complete Set of Laboratory Notification Flowcharts

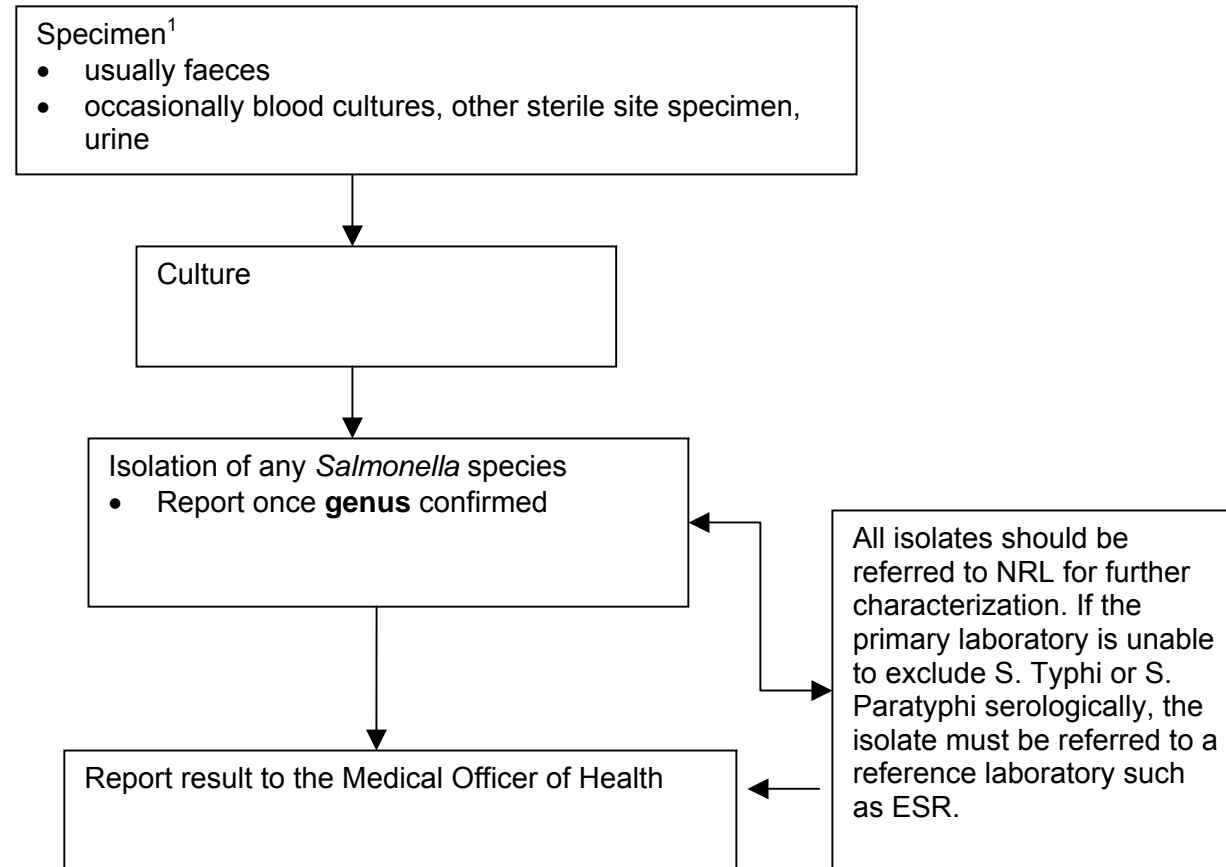
Campylobacteriosis



Notes.

1 Recommend that any sterile site isolates are identified to the species level by primary or reference laboratory

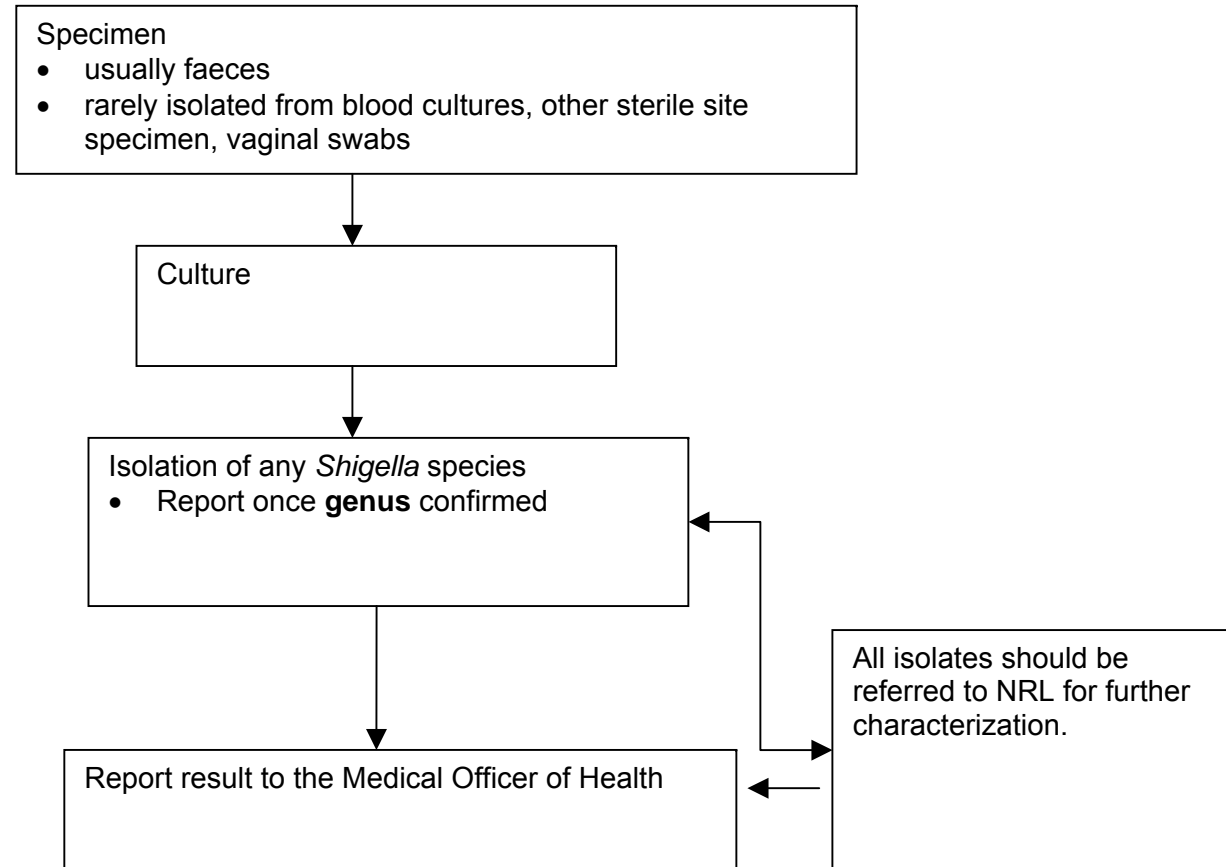
Salmonella including typhoid and paratyphoid fever



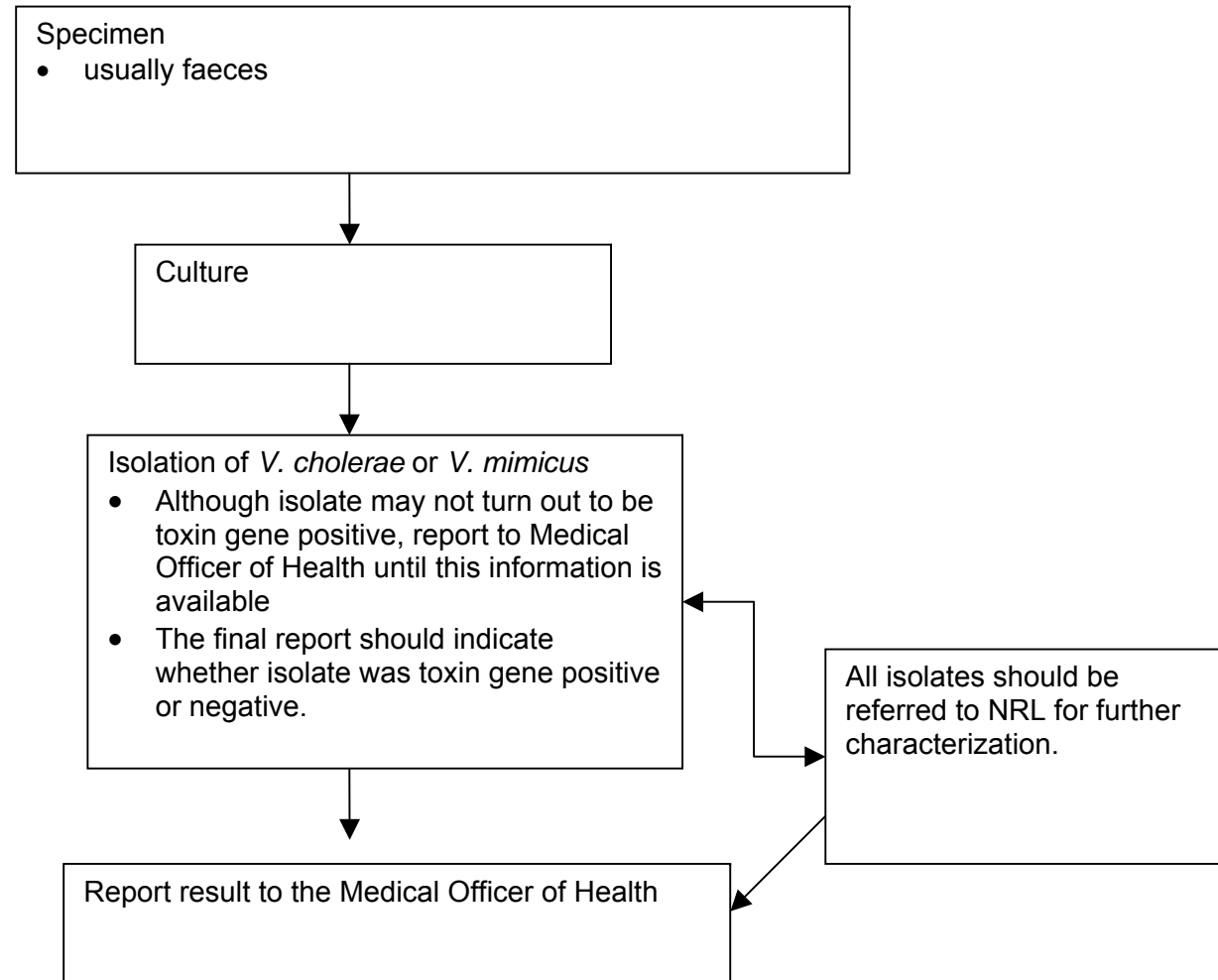
Notes

1. *Salmonella* serology may provide evidence of past infection but is not useful for diagnosis of acute illness. Requests for salmonella serology should be replaced with or performed in conjunction with blood cultures if the patient has a febrile illness.

Shigellosis



Cholera¹



Notes

1. The notifiable condition is disease due to toxin-producing *Vibrio cholerae*. Rare strains of *V. mimicus* carry the cholera toxin gene and can produce cholera-like symptoms.

Acute gastroenteritis

Acute gastroenteritis is a clinical notification and laboratory notification is not required.

When a potential enteric pathogen is detected from a faeces sample, e.g. rotavirus, Cyclospora, *Aeromonas*, non-cholera *Vibrio*, *Plesiomonas*, *C. difficile* toxin, the laboratory will not know whether:

- the person has acute symptoms
- this case is linked to other cases
- the affected person is in a high-risk occupation

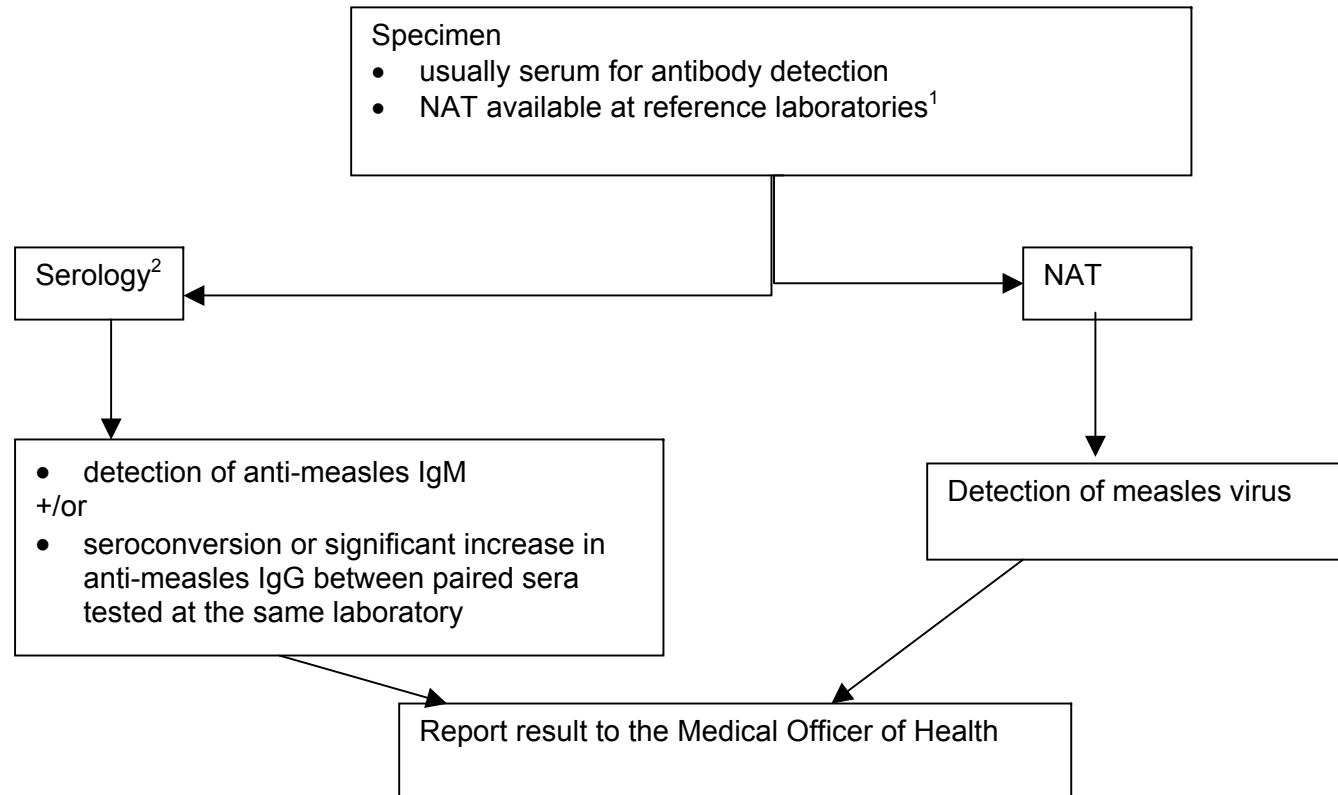
However, a comment reminding clinicians of the need to notify if they are aware of further information is suggested and could be added when the above enteric pathogens are found.

For example:

“Acute gastroenteritis is notifiable to the local Medical Officer of Health when occurring in 2 or more linked persons, a person in a high risk occupation (food handler, early childhood worker, <5 year old attending child care, health care worker, or any others at higher risk of transmission because of illness or disability.”

Only if a laboratory becomes aware that cases are linked, need they notify the Medical officer of Health.

Measles

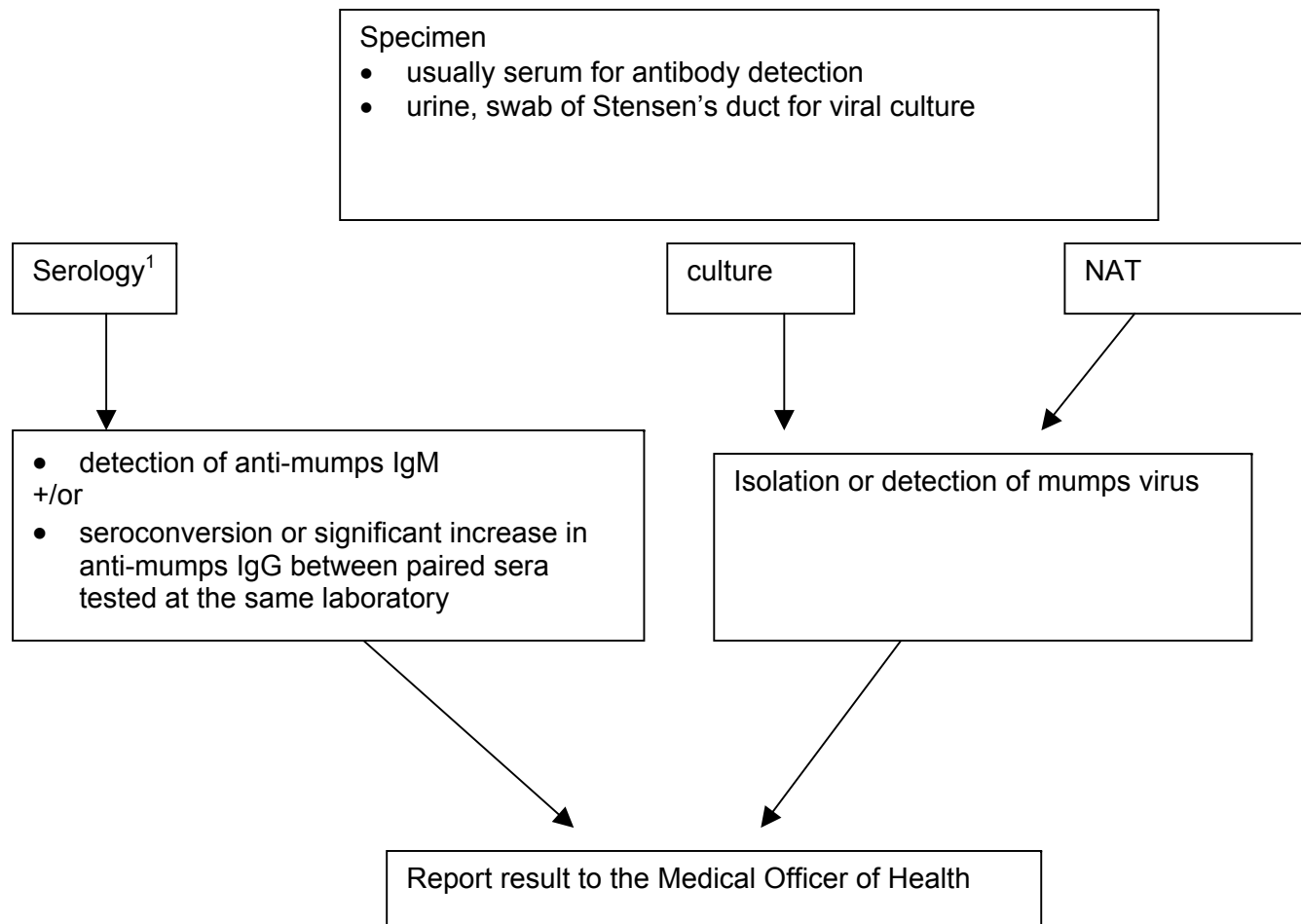


Note

1. For specimen requirements refer to www.cdhb.govt.nz/measles/ or www.labplus.co.nz

2. Recent immunization with MMR may also result in detectable anti-measles IgM or a significant increase in anti-measles IgG. Since laboratories do not necessarily have access to this information, all results consistent with possible measles infection should be reported to the Medical Officer of Health.

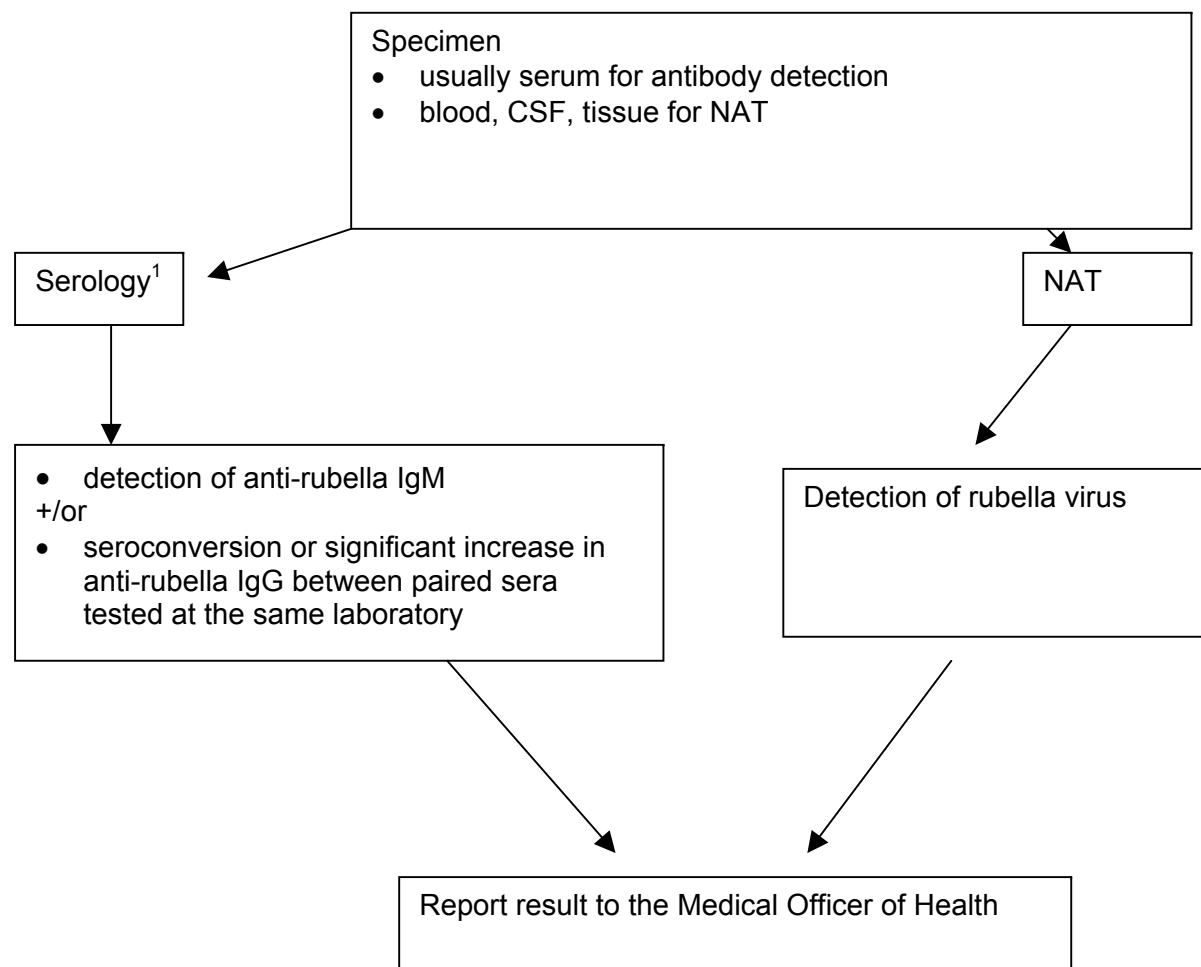
Mumps



Note

1. Recent immunization with MMR may also result in detectable anti-mumps IgM or a significant increase in anti-mumps IgG. Since laboratories do not necessarily have access to this information, all results consistent with possible mumps infection should be reported to the Medical Officer of Health.

Rubella



Note

- 1 Recent immunization with MMR may also result in detectable anti-rubella IgM or a significant increase in anti-rubella IgG. Since laboratories do not necessarily have access to this information, all results consistent with possible rubella infection should be reported to the Medical Officer of Health.

Tetanus

The diagnosis is clinical.

Neither culture of the organism nor presence of antibodies to the toxin is proof of disease.

No action required for laboratories.

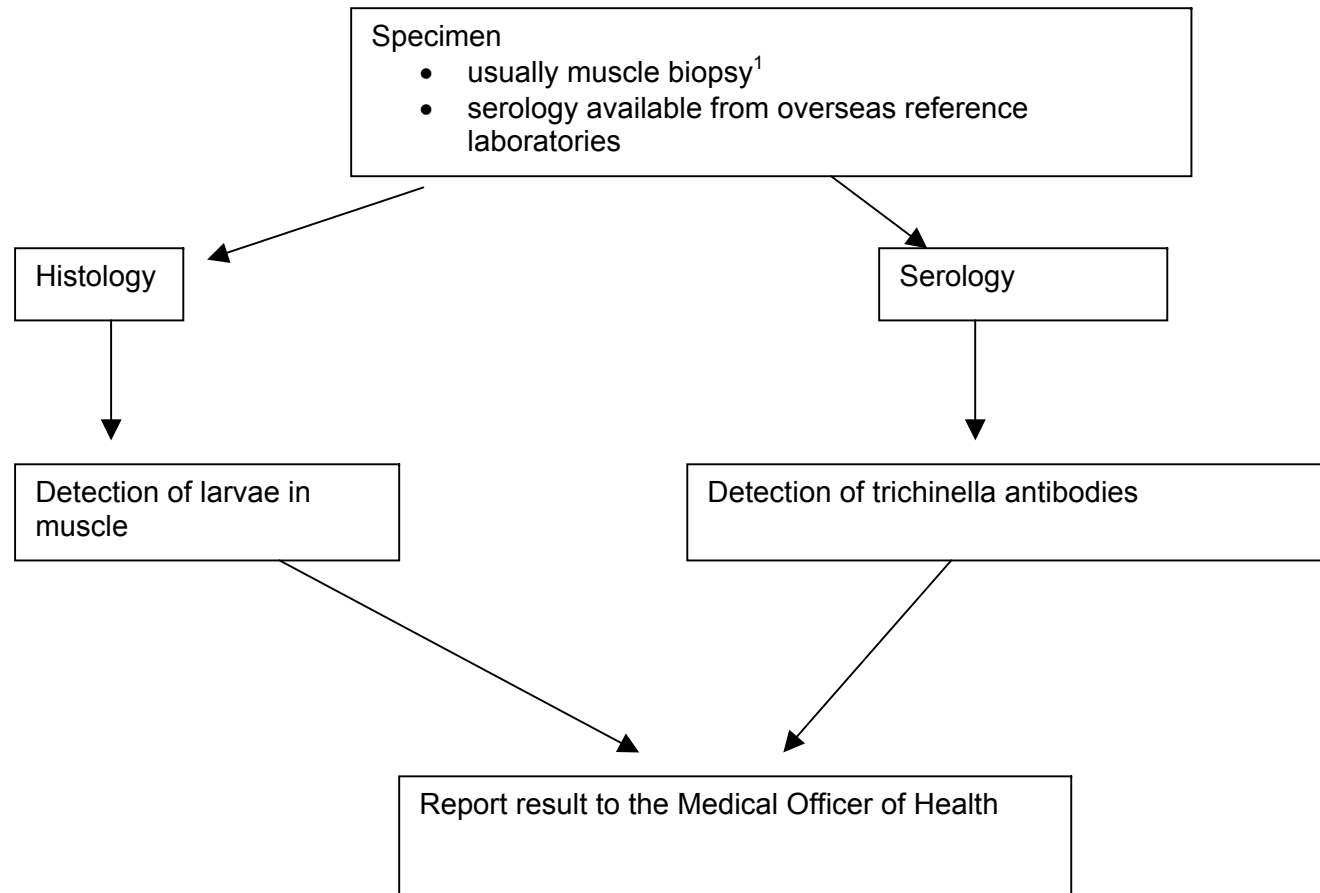
Rheumatic fever

The diagnosis is clinical.

Detection of pharyngeal *S. pyogenes* or changing streptococcal serology does not make the diagnosis.

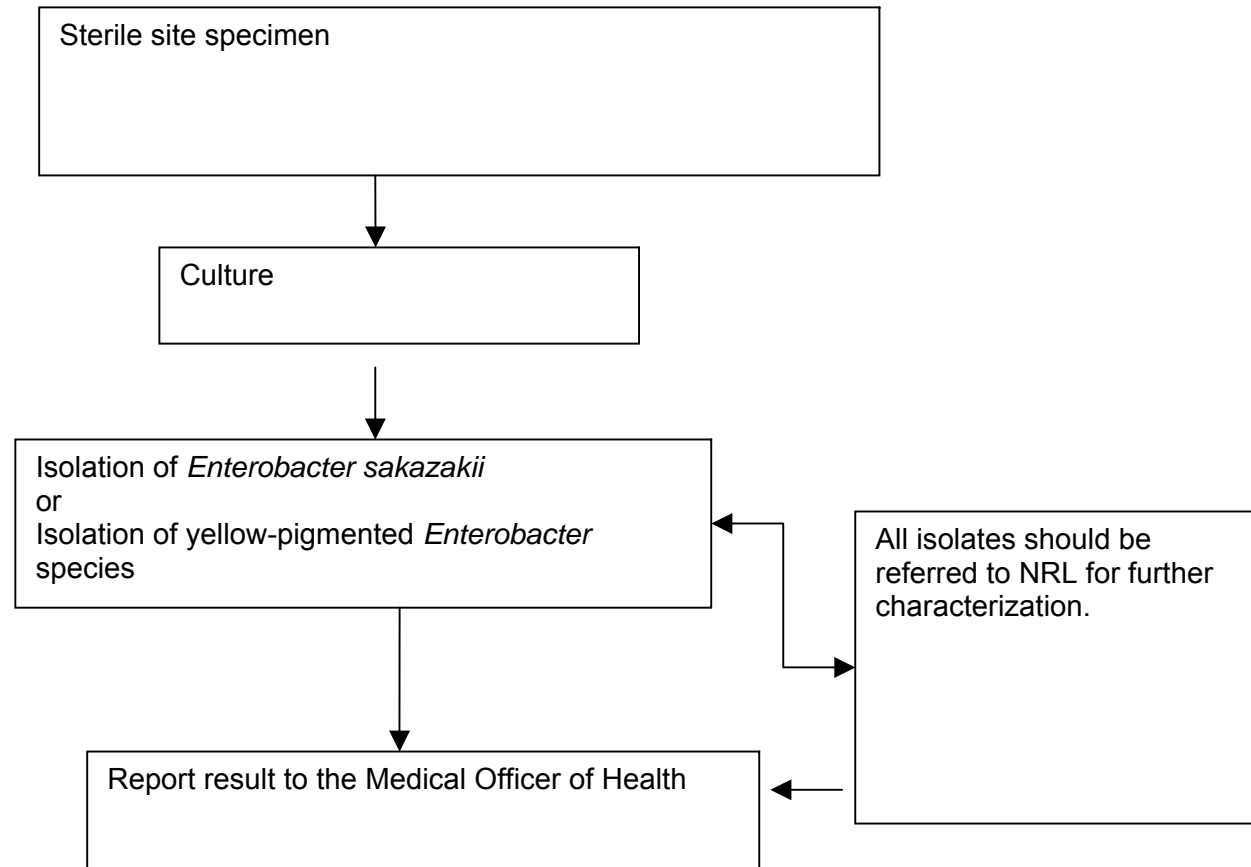
No action required for laboratories.

Trichinosis = Trichiniasis = Trichinellosis

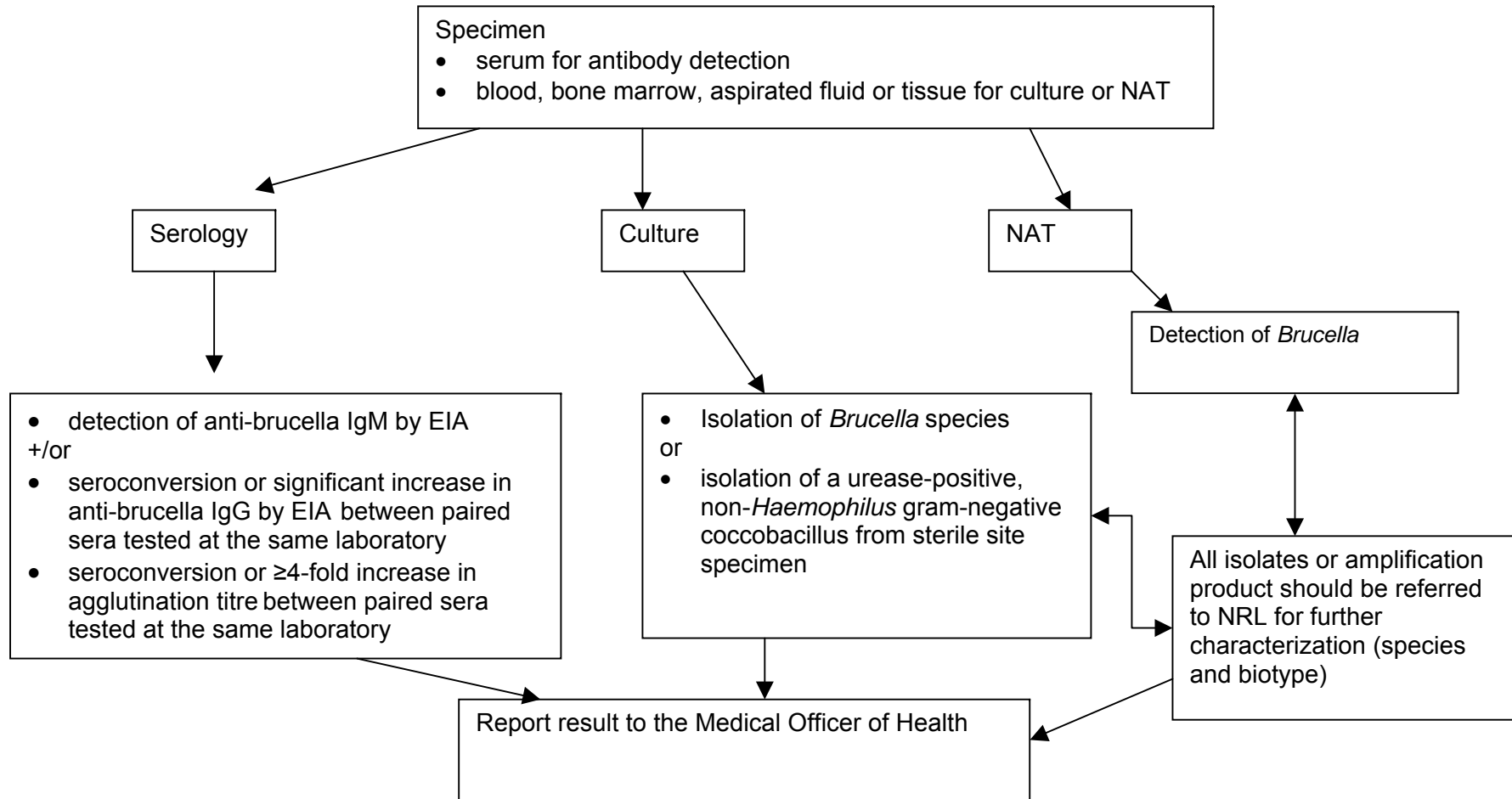


Note
1. Muscle biopsy for histology collected at least 10 days and ideally ~4 weeks after infection.
2. Eosinophilia is supportive but not diagnostic.

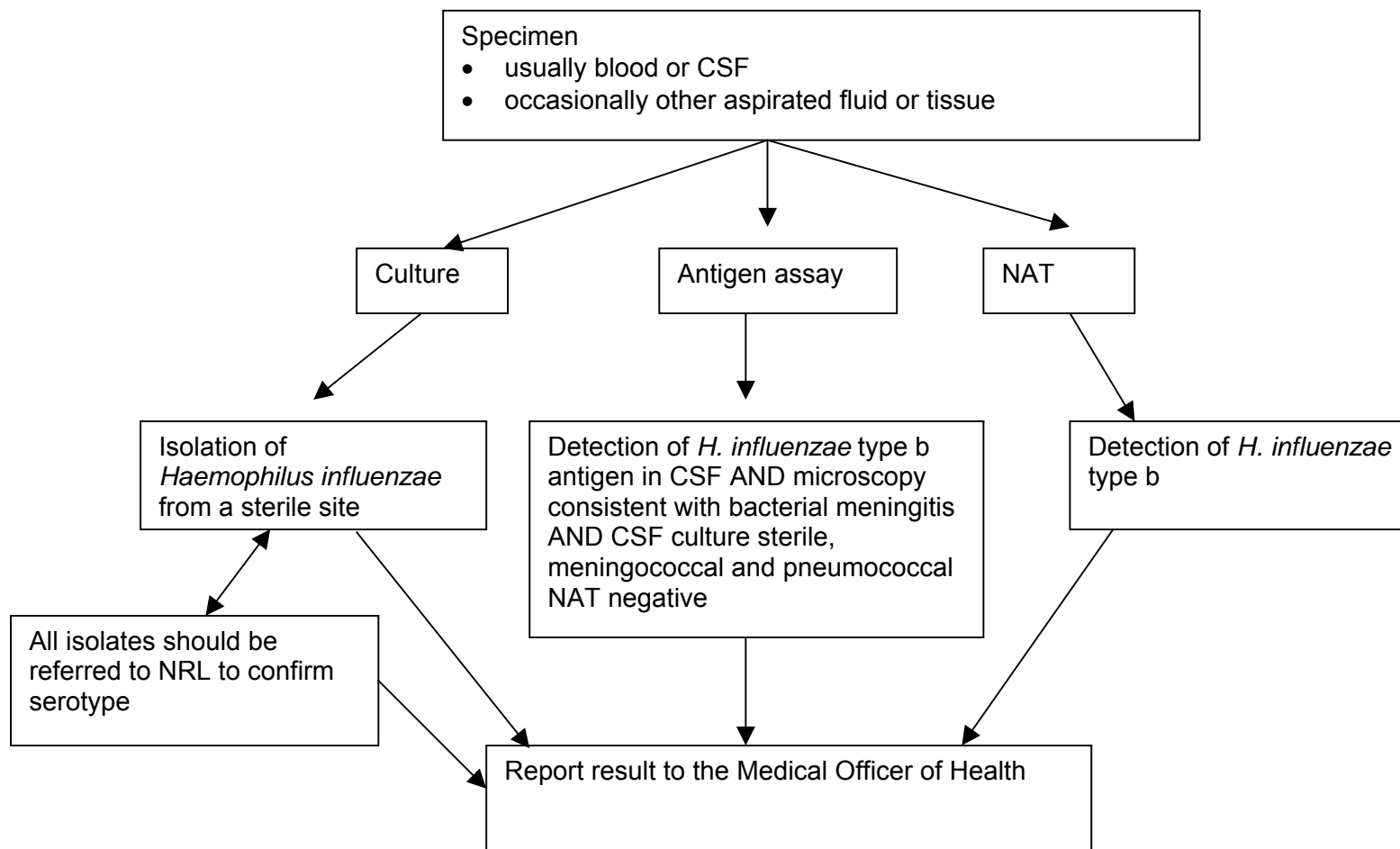
***Enterobacter sakazakii* invasive disease**



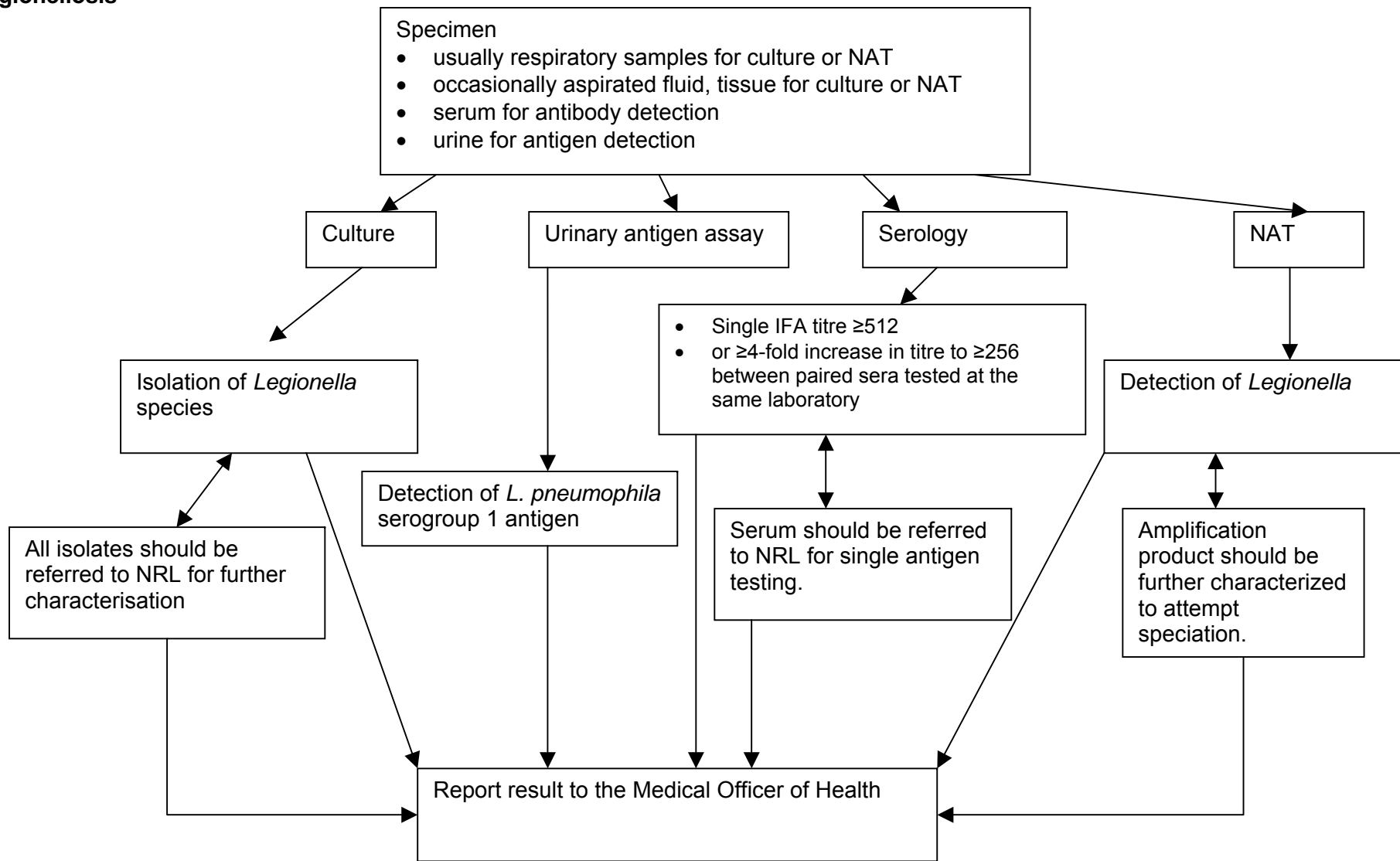
Brucellosis



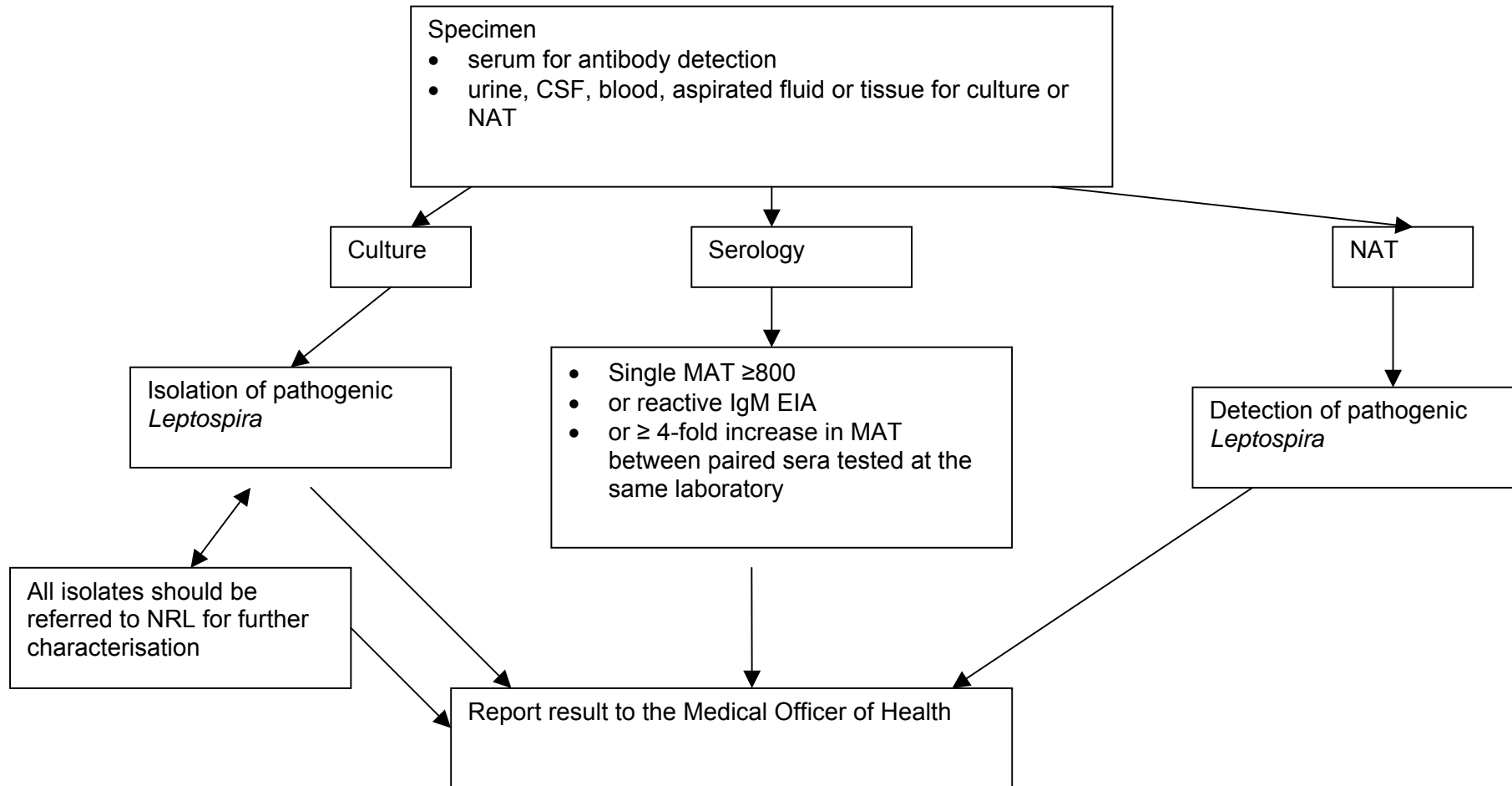
Haemophilus influenzae type b invasive disease



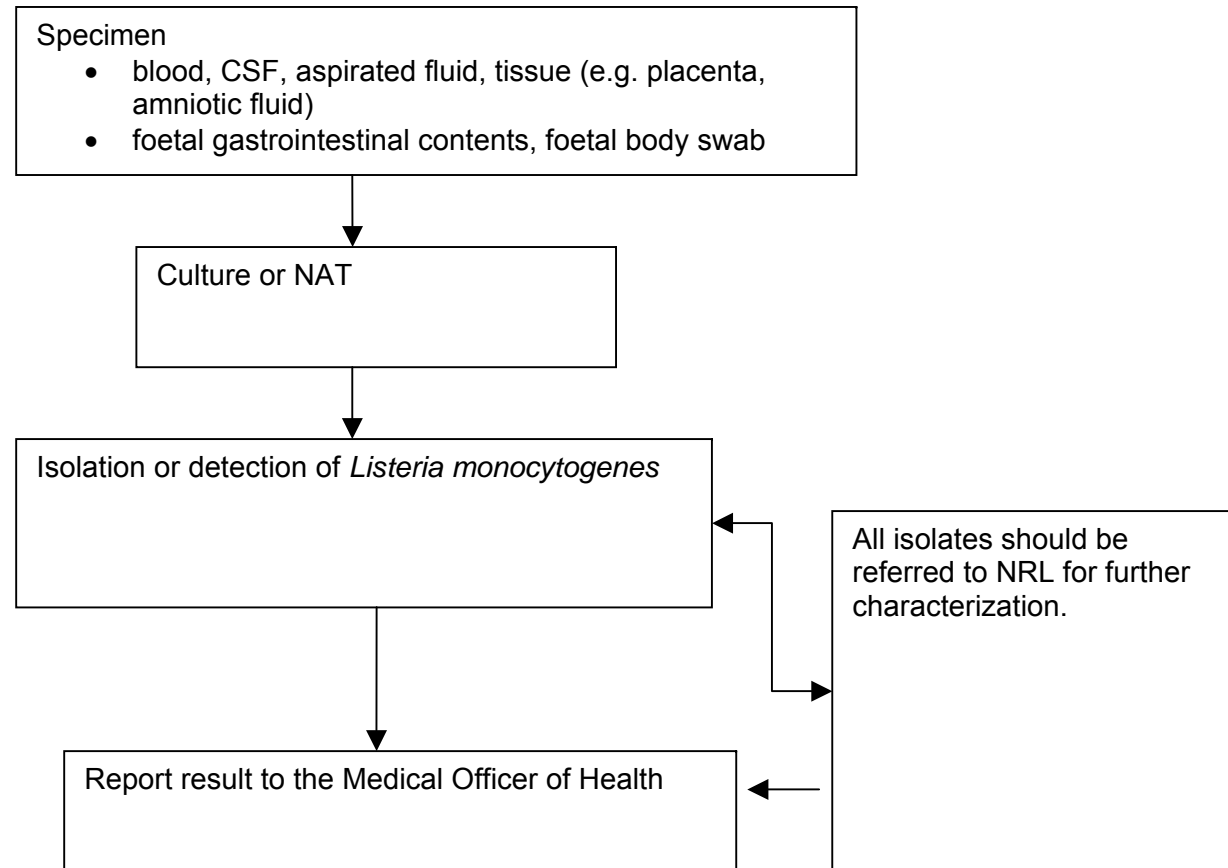
Legionellosis



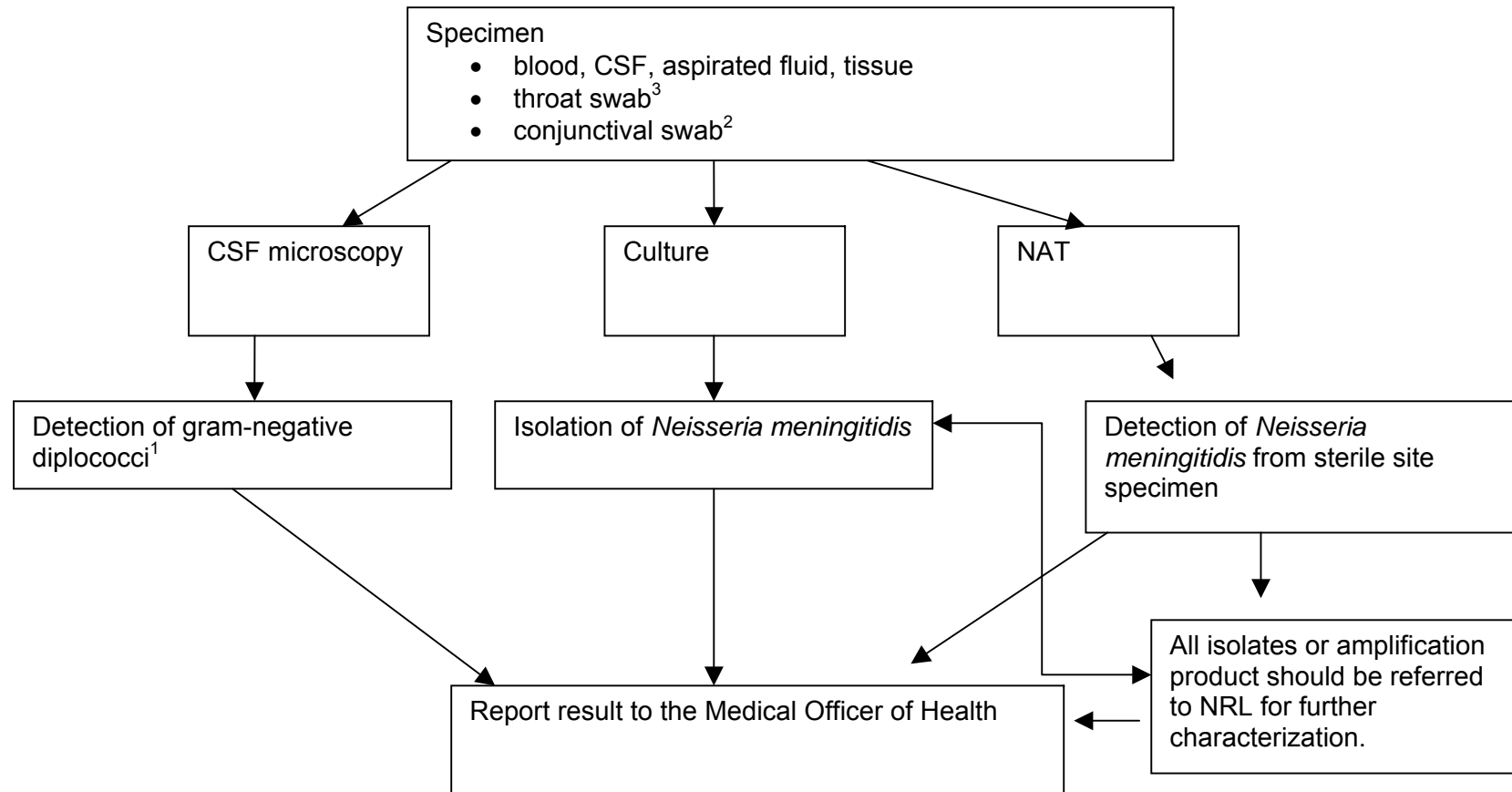
Leptospirosis



Listeriosis



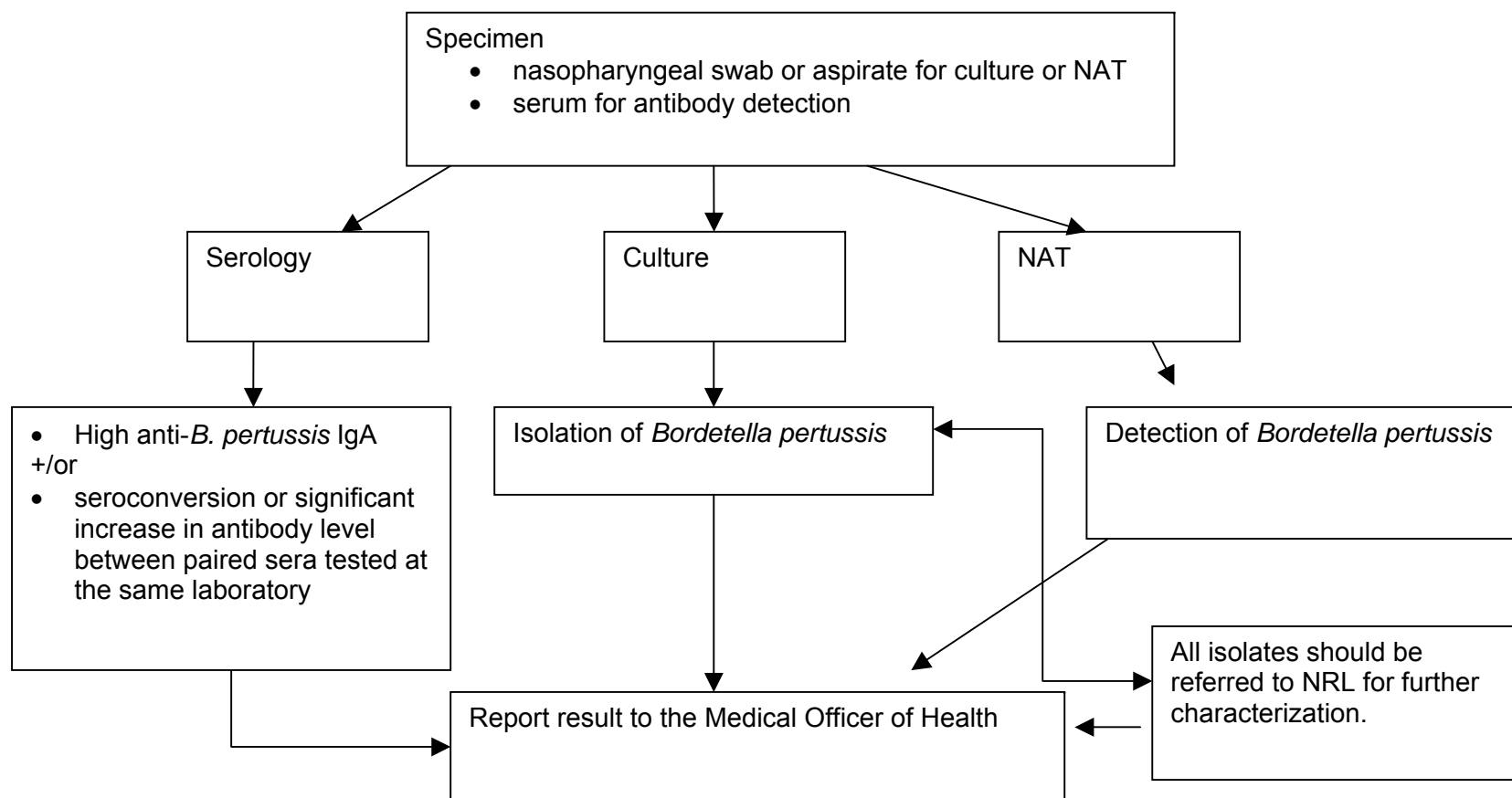
***Neisseria meningitidis* invasive disease**



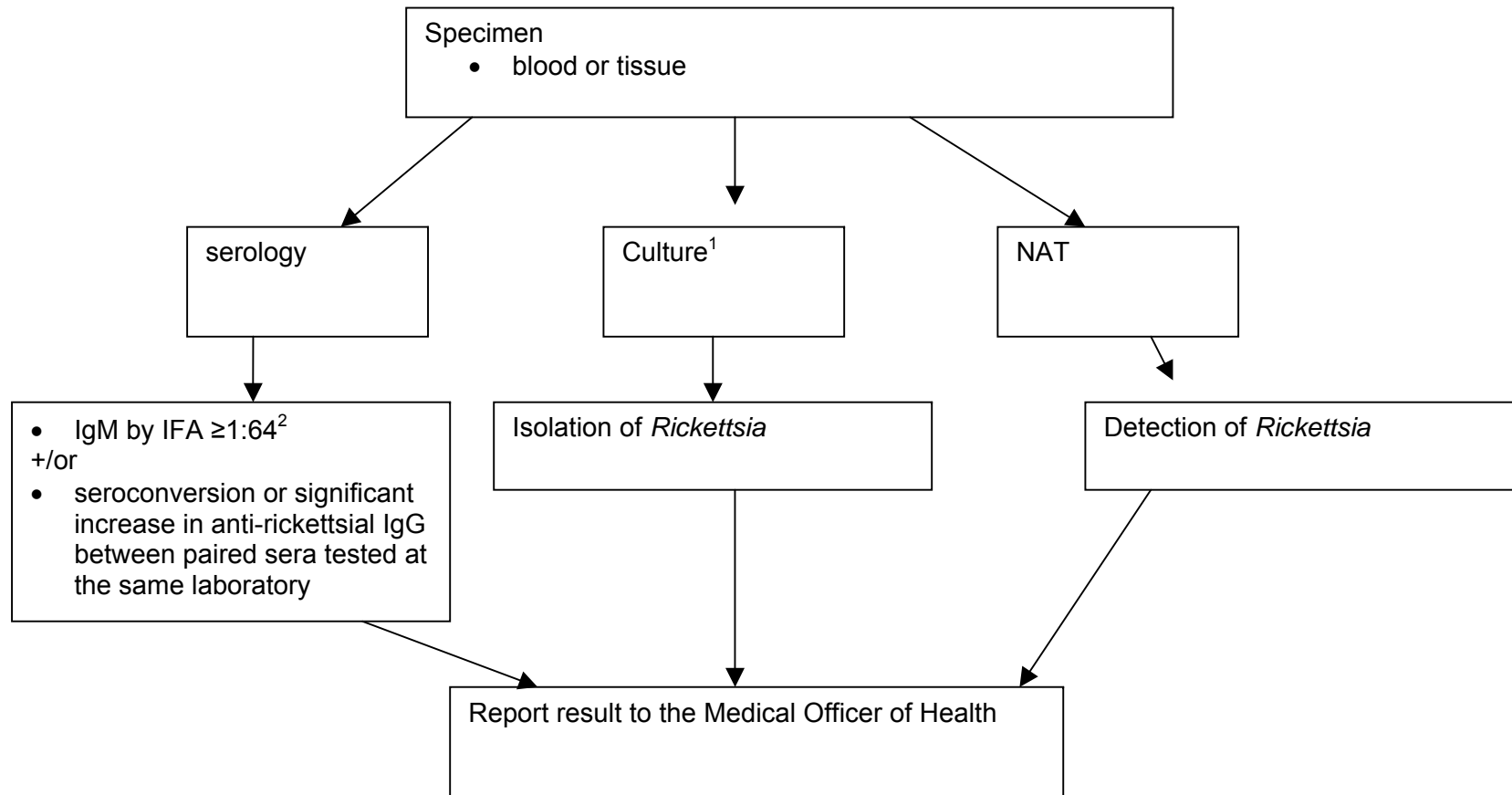
Notes

- 2 Arrange for NAT testing on CSF if cultures sterile so that amplification product can be further characterised by ESR.
- 3 Meningococcal conjunctivitis should be notified to the Medical Officer of Health because of the potential for invasive disease in contacts of case
- 4 **Only if** clinical details provided of meningococcal disease.
- 5 Meningococci isolated from genital swabs are not associated with systemic disease (except for rare neonatal meningitis in babies born to colonised mothers) and need not be reported to the Medical Officer of Health.

Pertussis



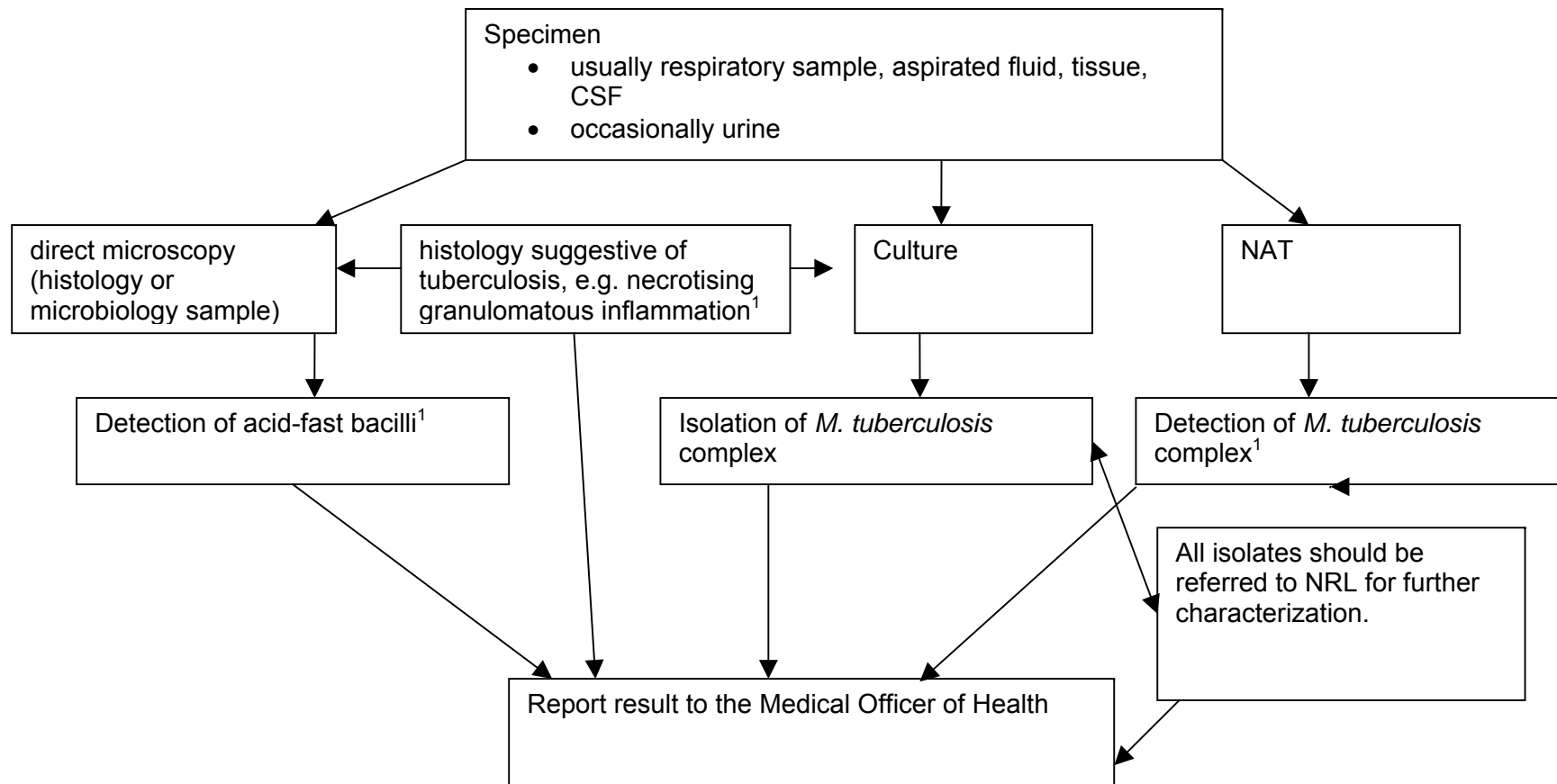
Rickettsial disease



Notes.

- 1 Not routinely performed. Requires PC-3 facilities.
- 2 Titres of $\geq 1:64$ are considered presumptive evidence of recent or current infection by organisms of the appropriate Rickettsial antigen group

Active Tuberculosis (new case, reactivation)



Notes

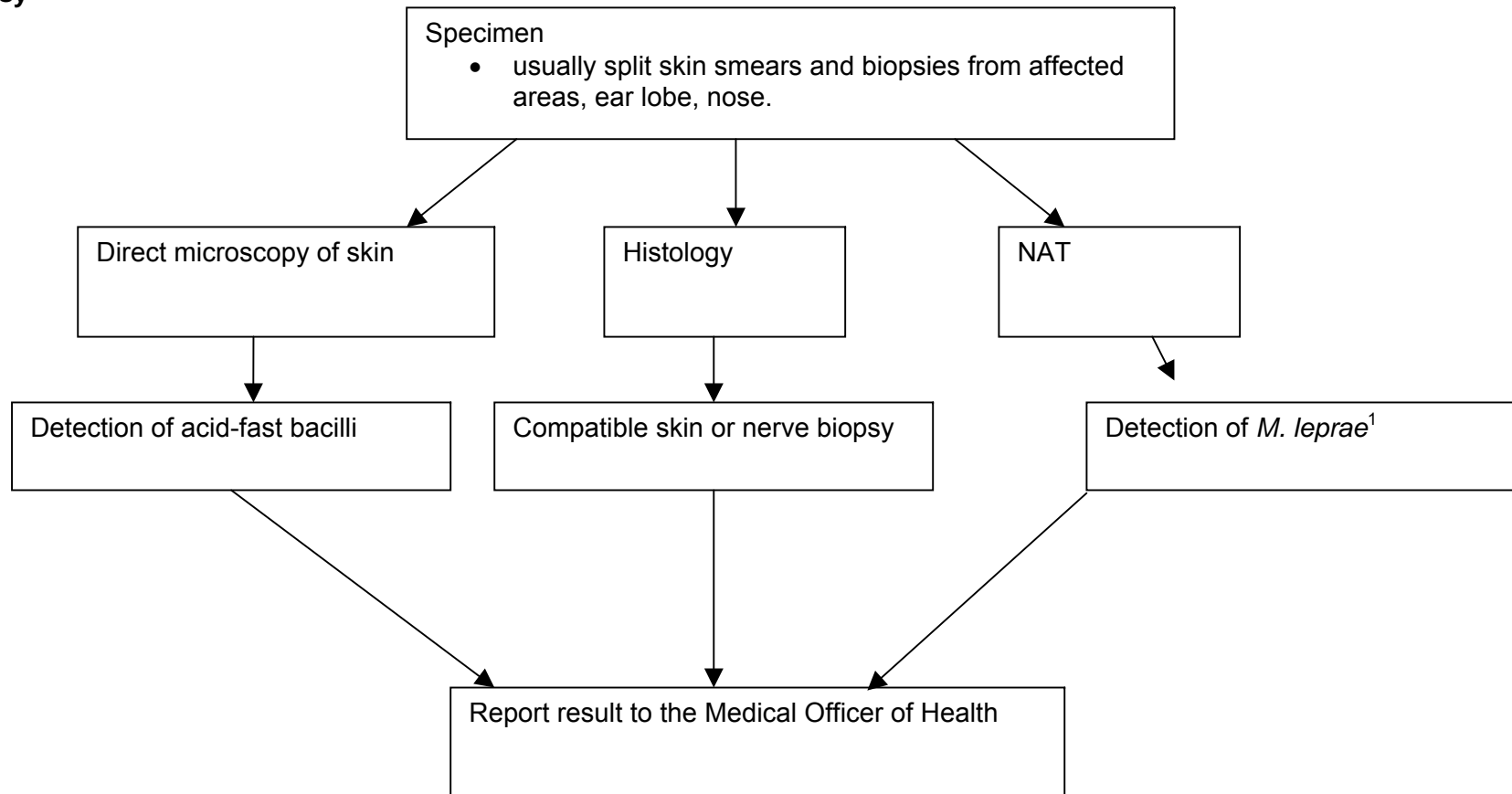
- 1 Samples should be collected for mycobacterial culture, if not already done.

Latent Tuberculosis (LTBI)

Latent Tuberculosis is only notified when there is a decision to treat.

Therefore no action is required by laboratories.

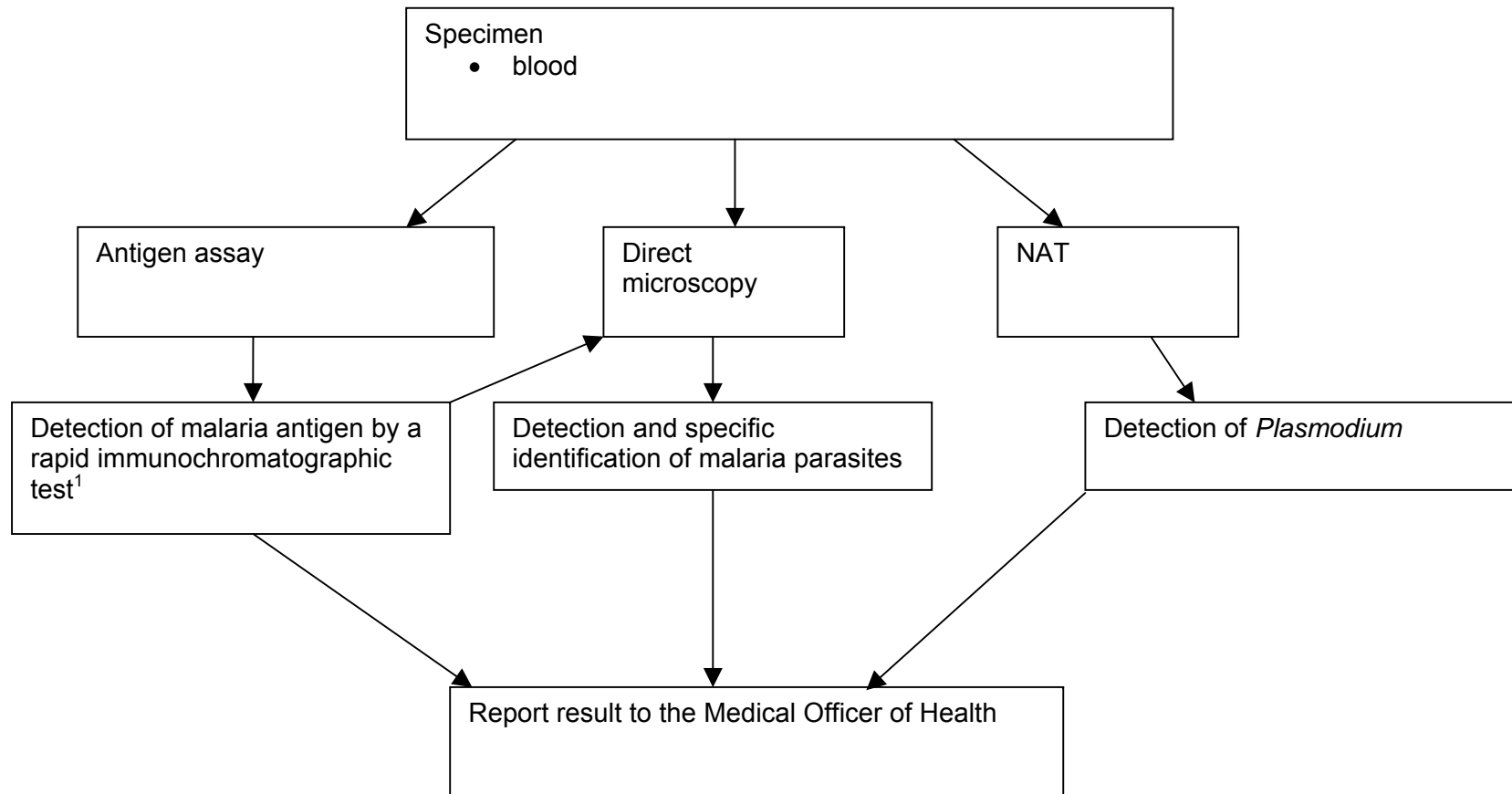
Leprosy



Note

1 Where confirmed by sequencing or validated species-specific PCR

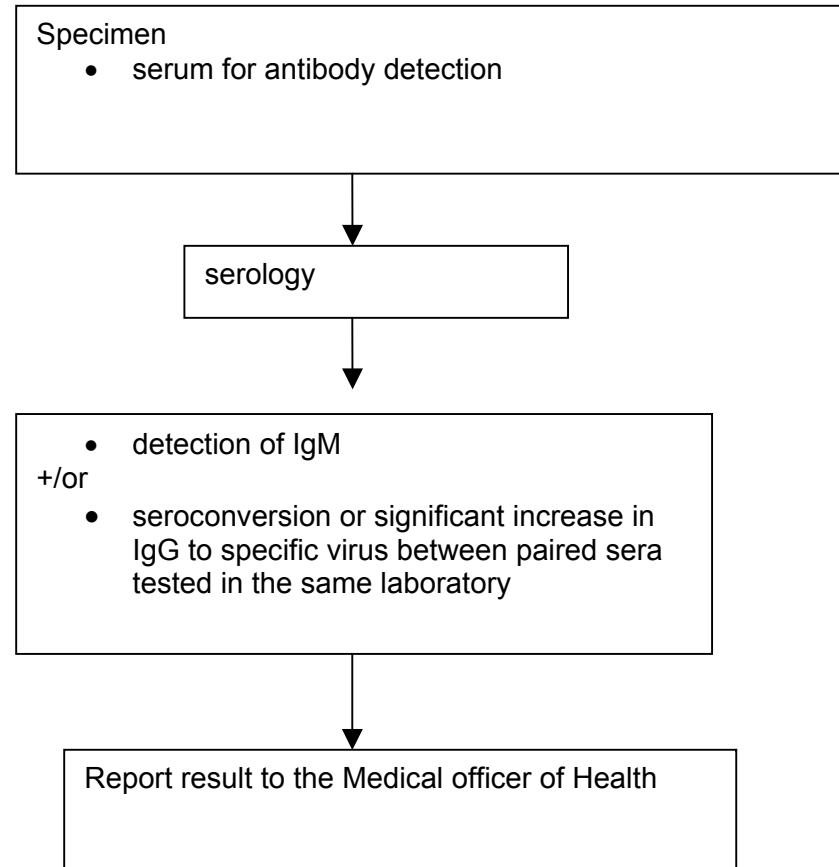
Malaria



Notes

- 1 This result should always be confirmed by microscopy

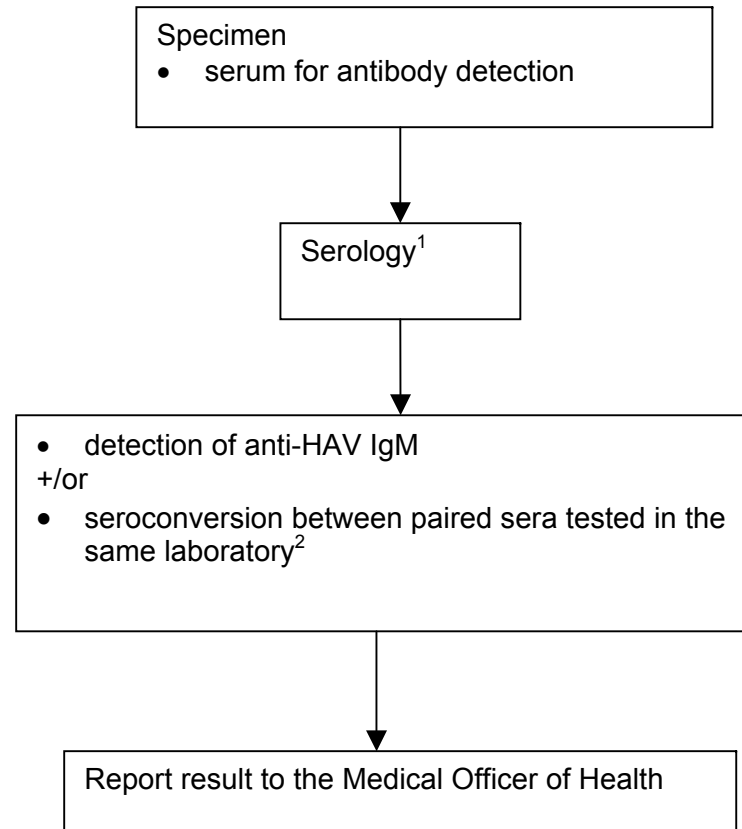
Arboviral infection– Dengue & Ross River Virus¹



Notes.

- 1 Serology for other arboviruses (e.g. Japanese encephalitis, West Nile, Chikungunya) are available through overseas reference laboratories. The referring laboratory should also report any results from an overseas laboratory that are consistent with recent infection to the Medical officer of Health.

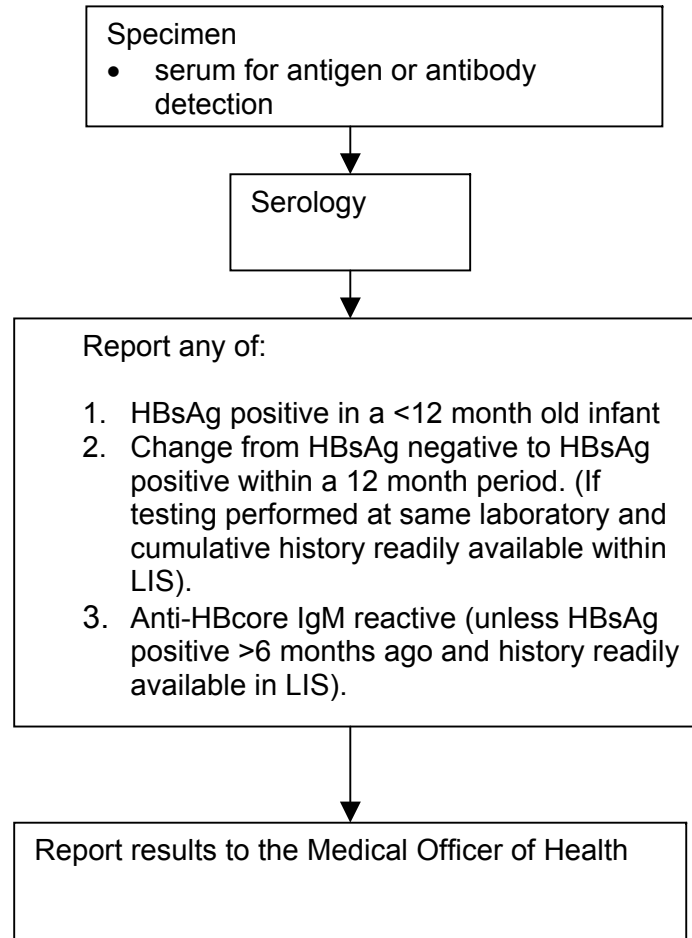
Hepatitis A



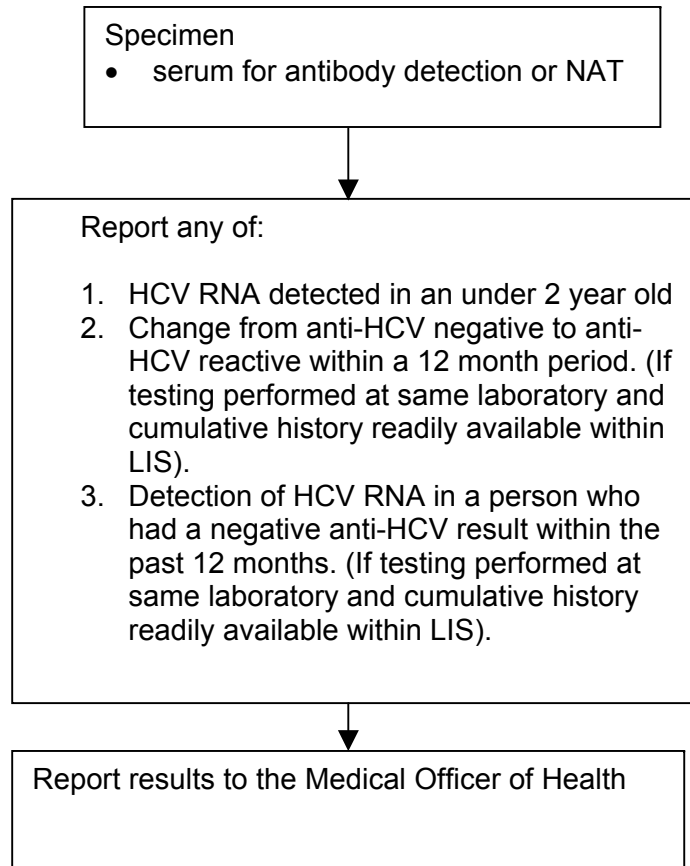
Note

1. Recent infection is not excluded without testing anti-HAV IgM. This should be noted on the result if the clinician specifically requests testing for HAV IgG only.
2. Recent immunization with HAV vaccine may also result in seroconversion. Since laboratories do not necessarily have access to this information, all results consistent with possible Hepatitis A infection should be reported to the Medical Officer of Health.

Recent Hepatitis B infection



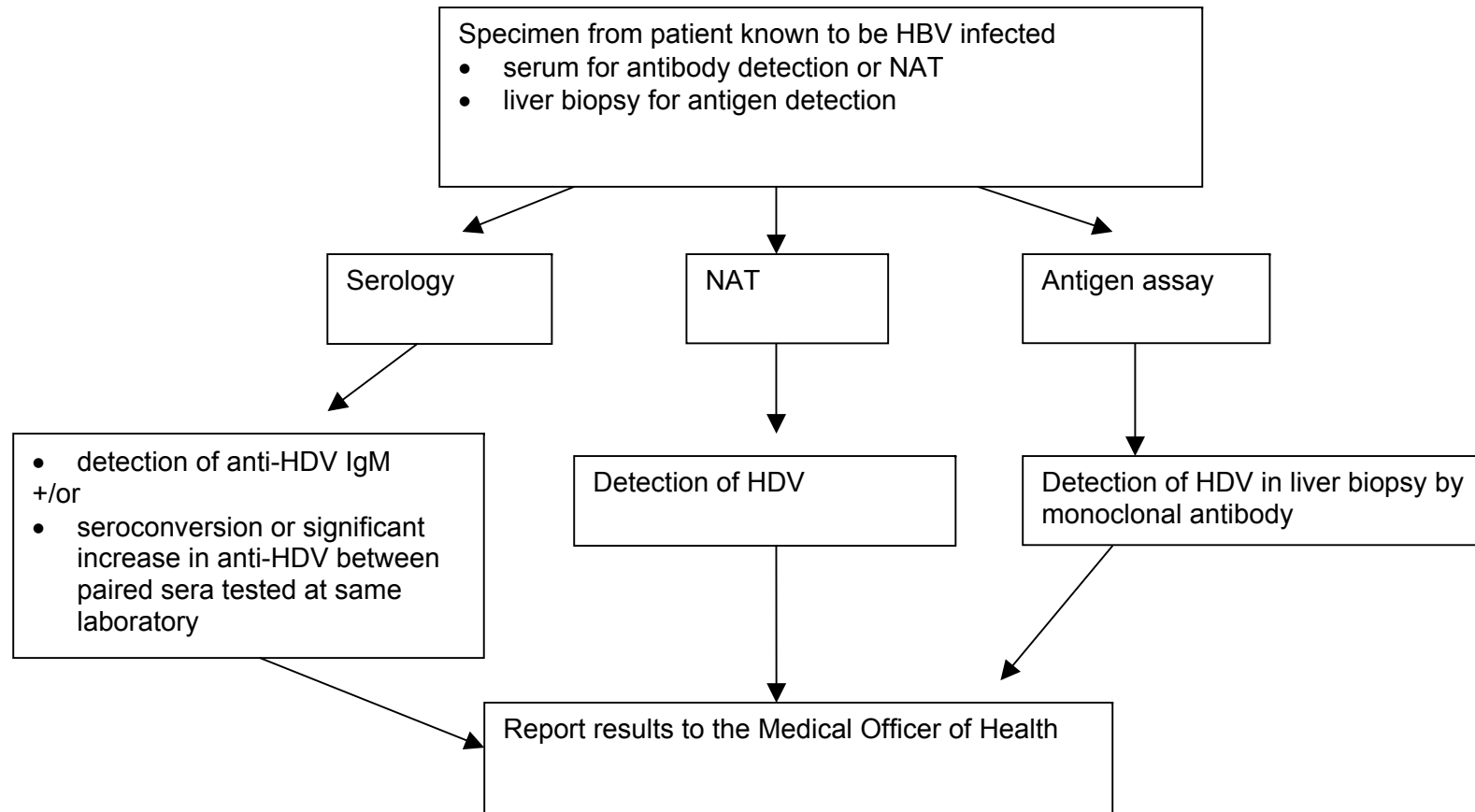
Recent Hepatitis C infection



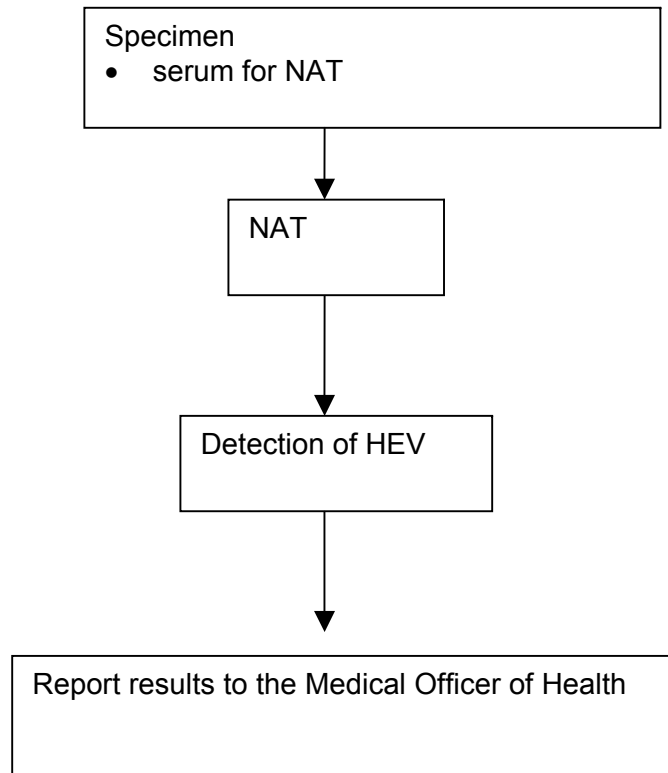
Note

1. A reactive anti-HCV result alone is insufficient evidence of recent HCV infection.

Hepatitis D



Hepatitis E



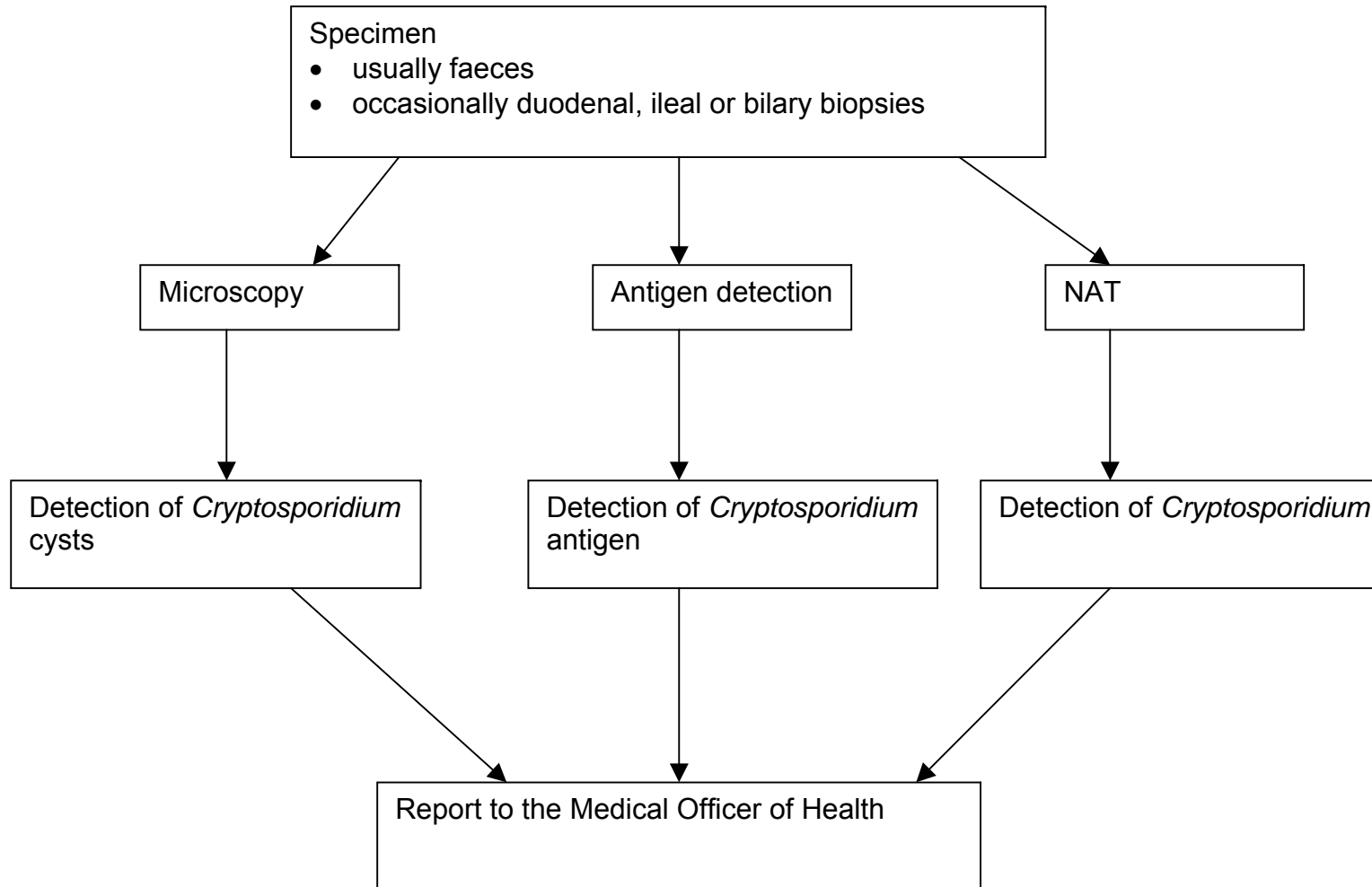
Note

- 1 HEV serology not performed in NZ.

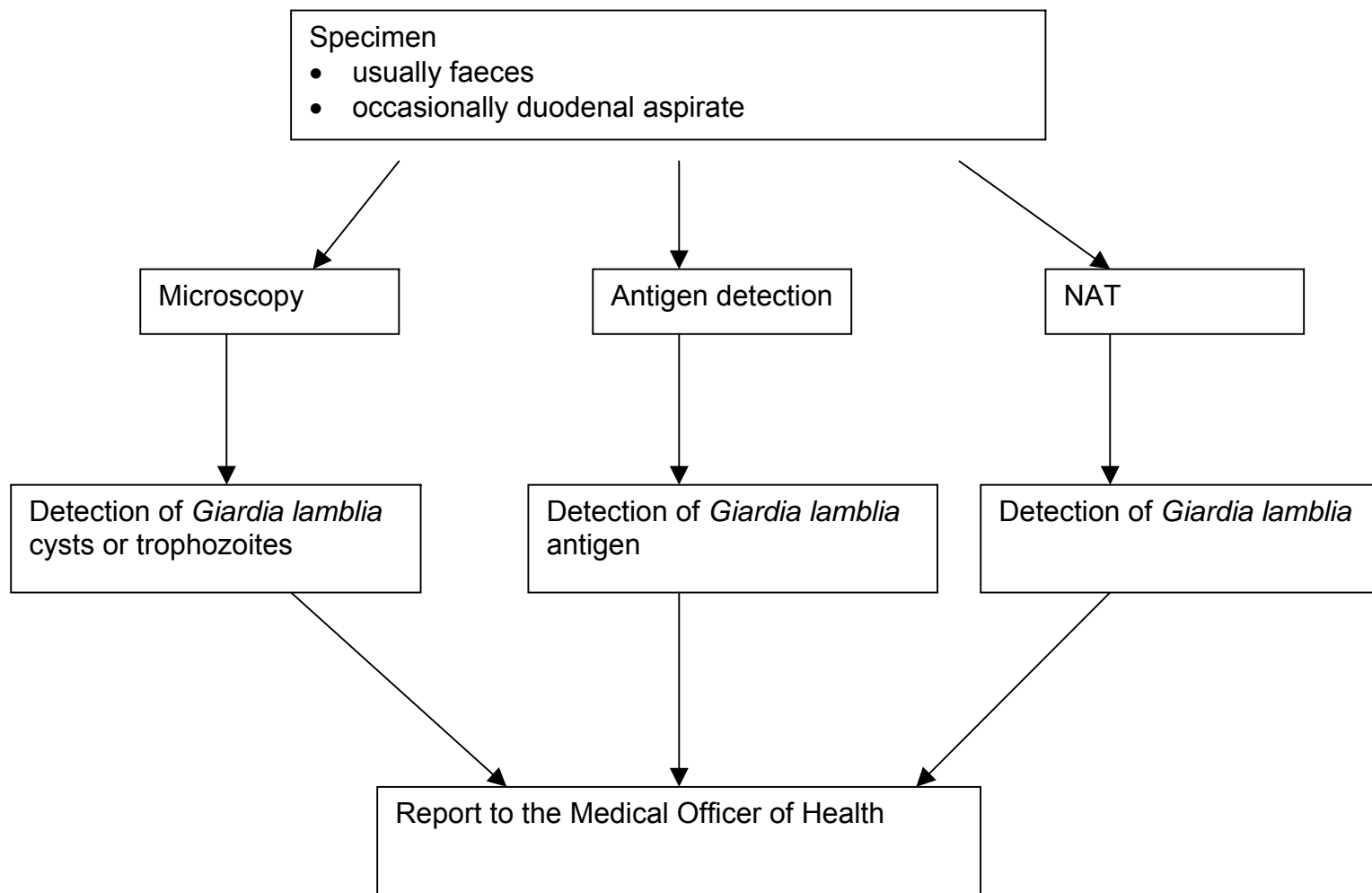
Acquired Immunodeficiency syndrome (AIDS)

AIDS is a clinical syndrome. No action is required by laboratories.

Cryptosporidiosis

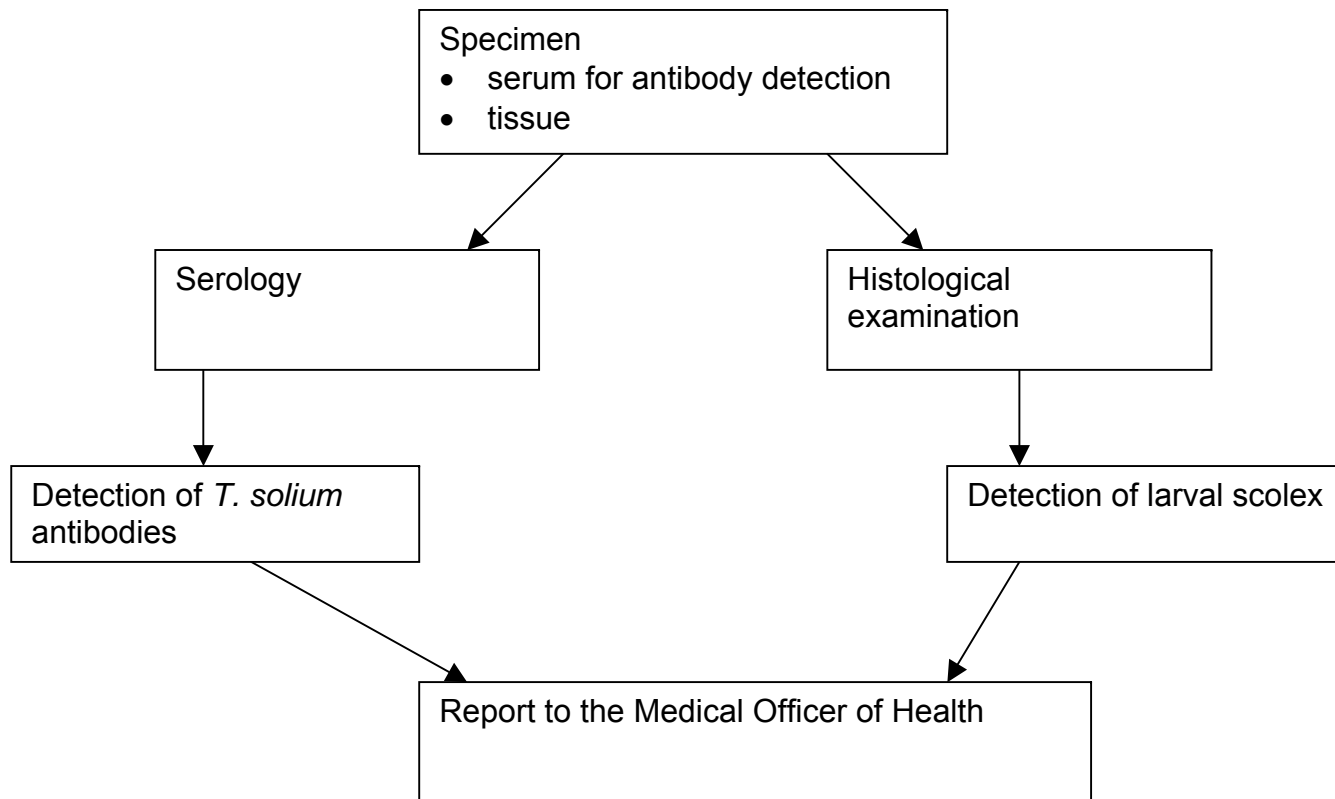


Giardiasis



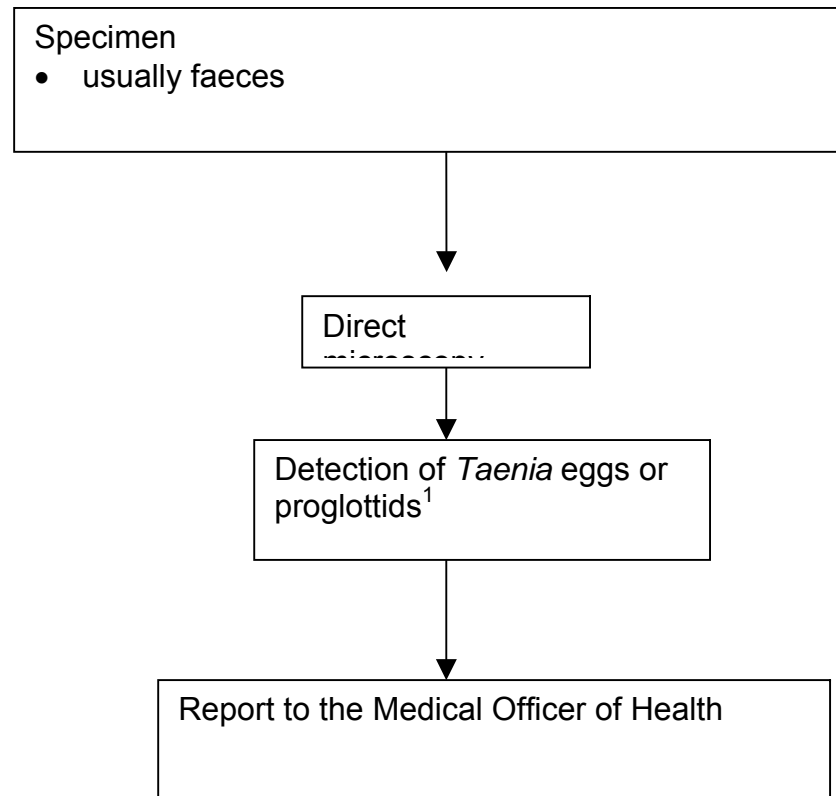
Cysticercosis

- Cysticercosis is caused by the **larval** stage of *T. solium* after ingestion of eggs, rather than encysted larvae, from contaminated food, water or via faecal-oral autoinoculation.
- Stool examinations can be performed; however, eggs are typically not found, since the majority of people diagnosed with cysticercosis do not have a viable *T. solium* tapeworm in their intestines.
- Serology is available through overseas reference laboratories for patients with suggestive radiological findings. Occasionally, the diagnosis of extraneural cysticercosis is made by finding a larval scolex in an excisional biopsy of a skin or muscle lesion.



Taeniasis

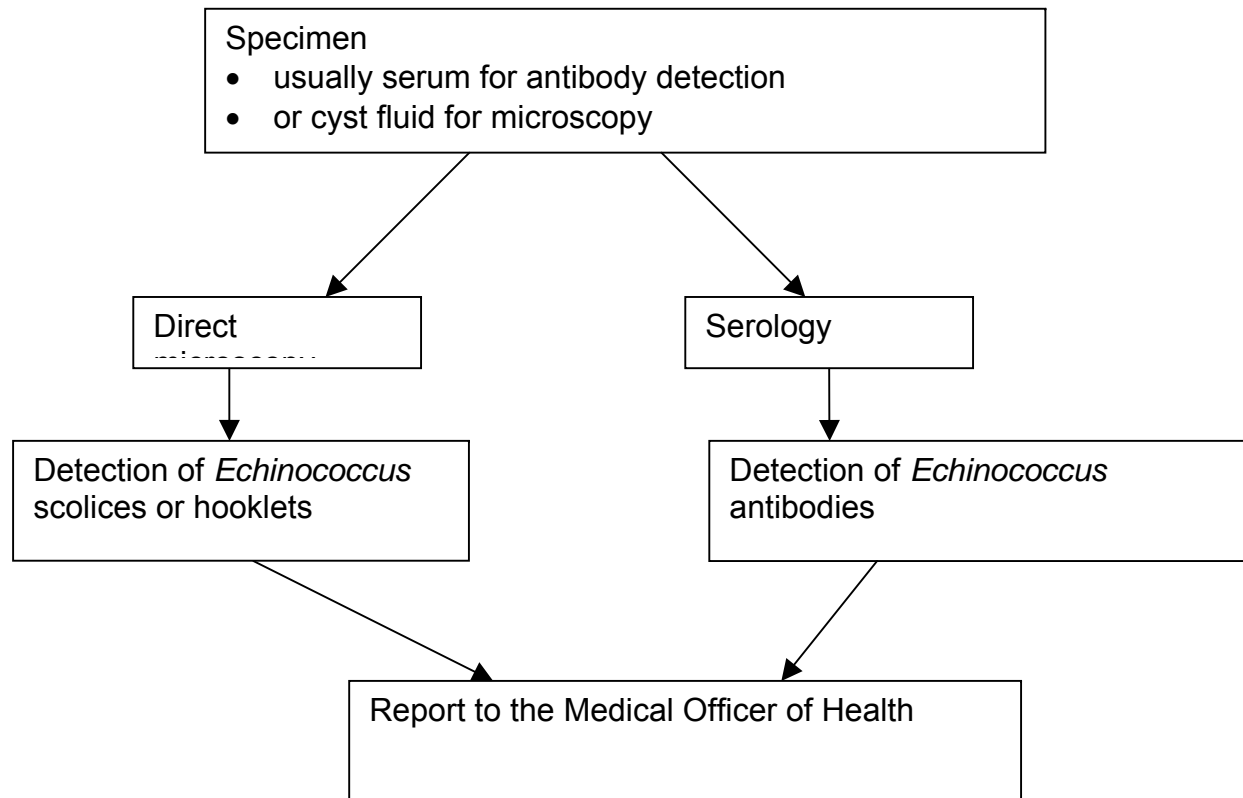
- Taeniasis (adult tapeworm infection) occurs after the ingestion of inadequately cooked pork containing encysted *T. solium* larvae.



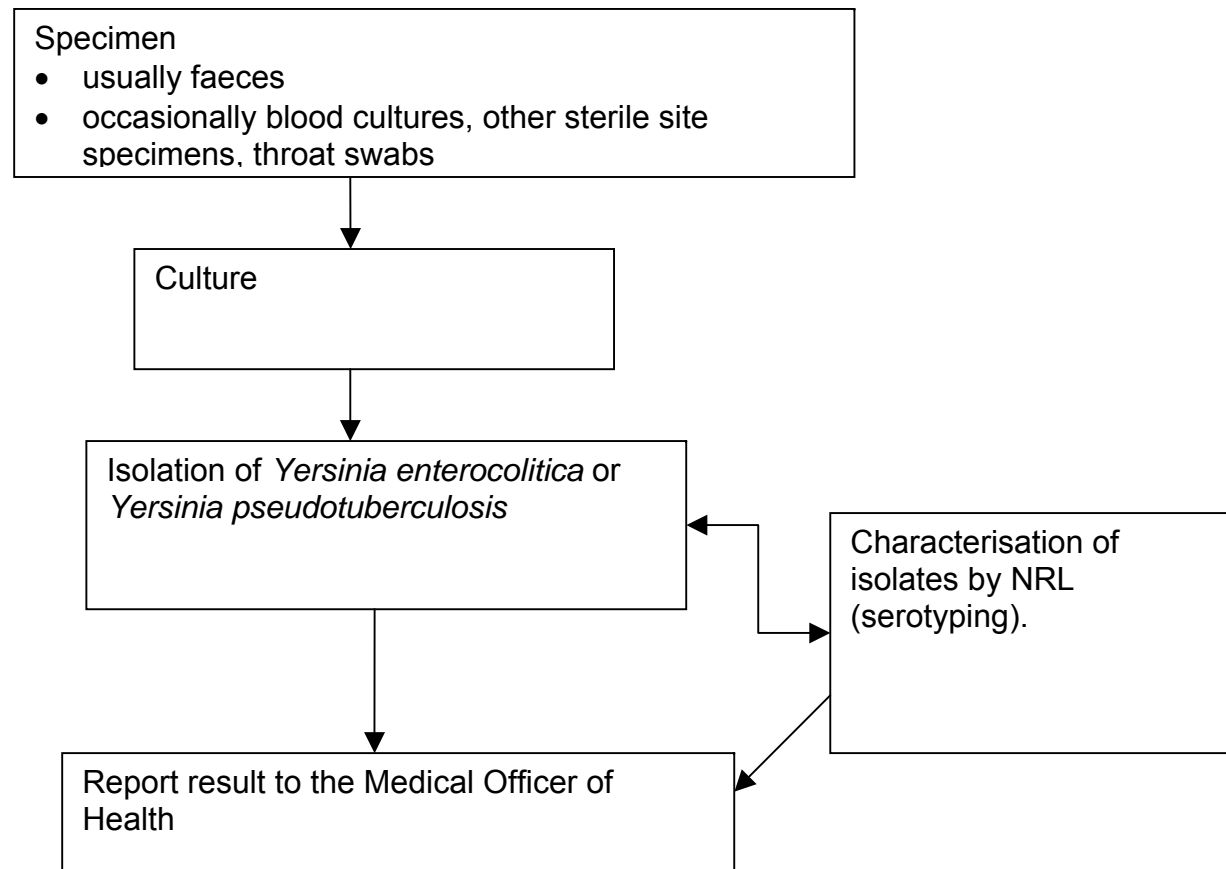
Notes

1. It is not possible to differentiate the eggs of *T. solium* from the beef tapeworm *T. saginata*. Identification to species level requires examination of proglottid segments passed in the stool.

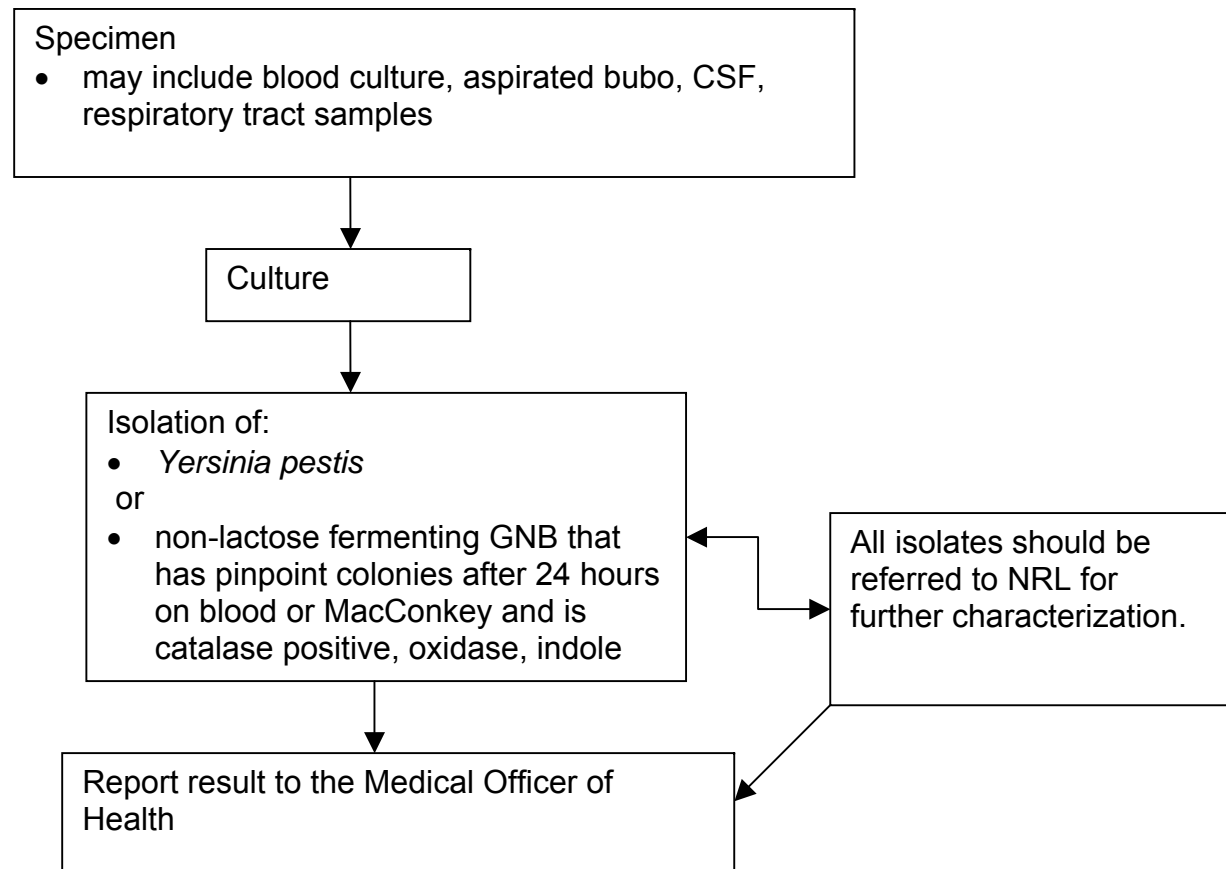
Hydatid disease



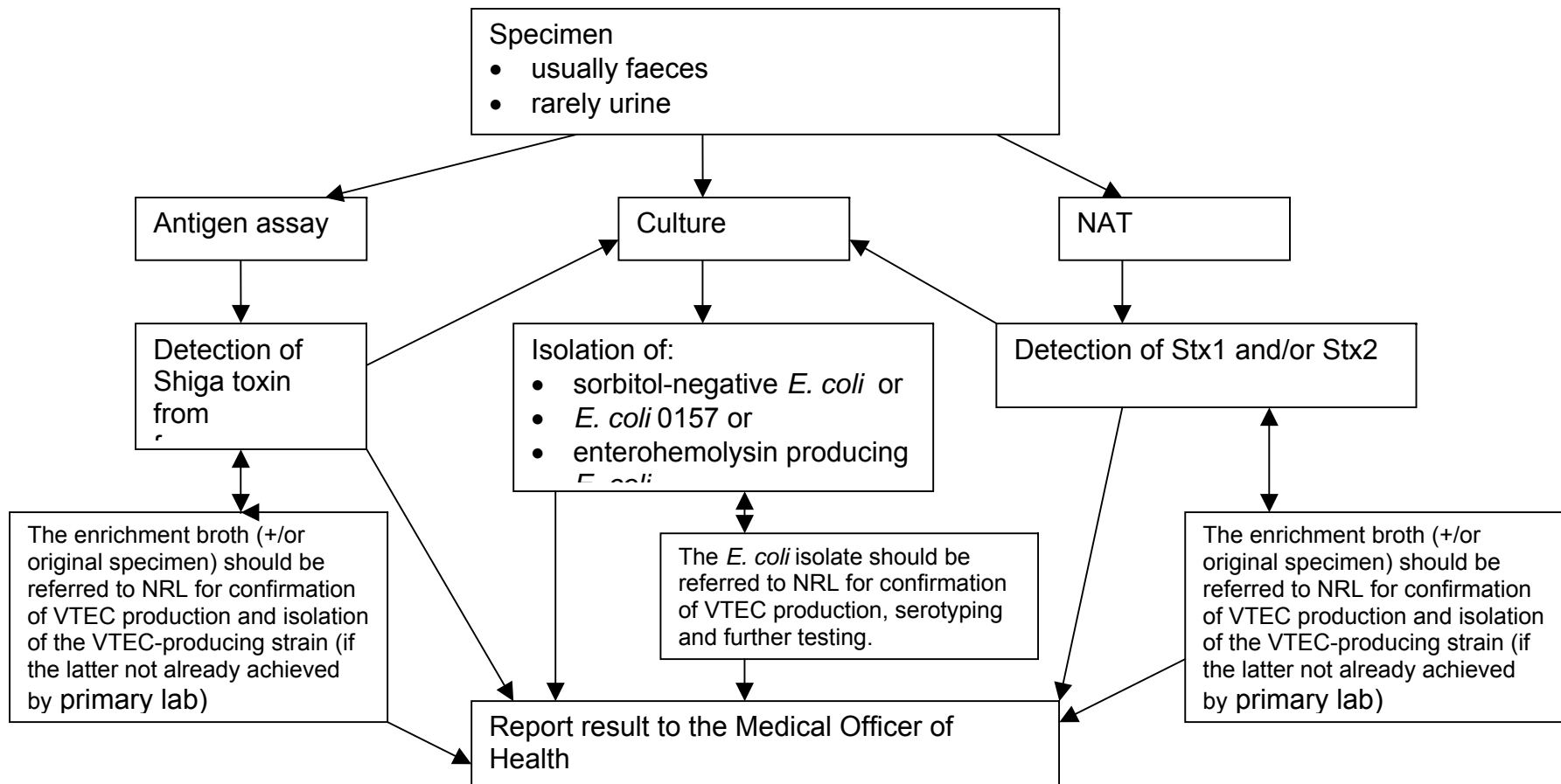
Yersiniosis



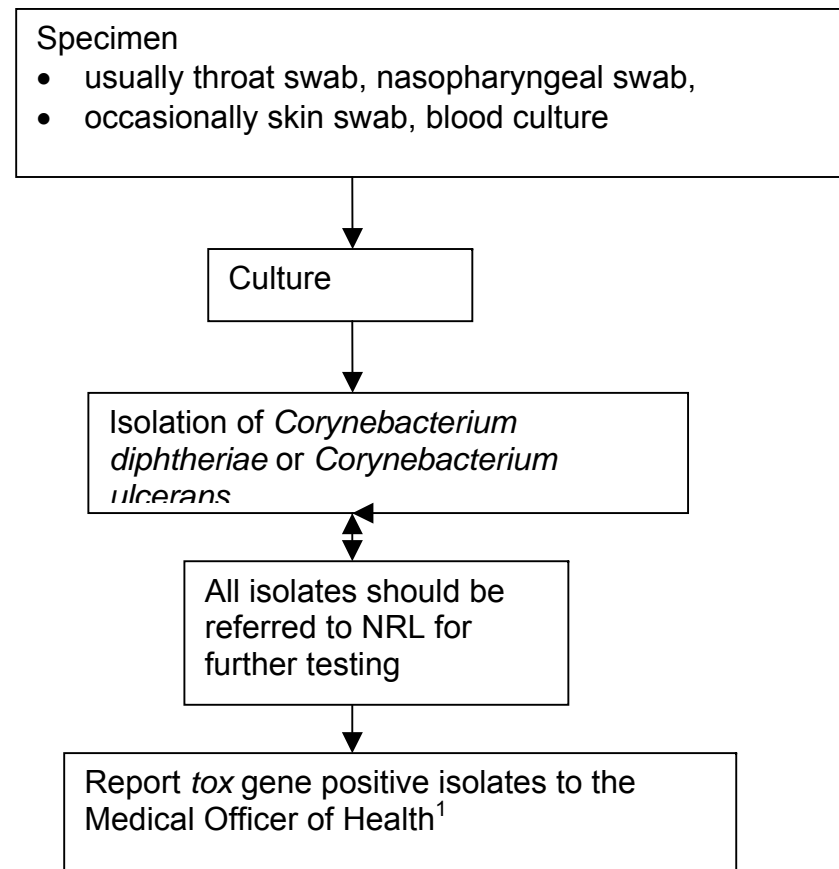
Plague



Verotoxin-producing *E. coli* (VTEC) also known as Shiga toxin-producing *E. coli* (STEC)



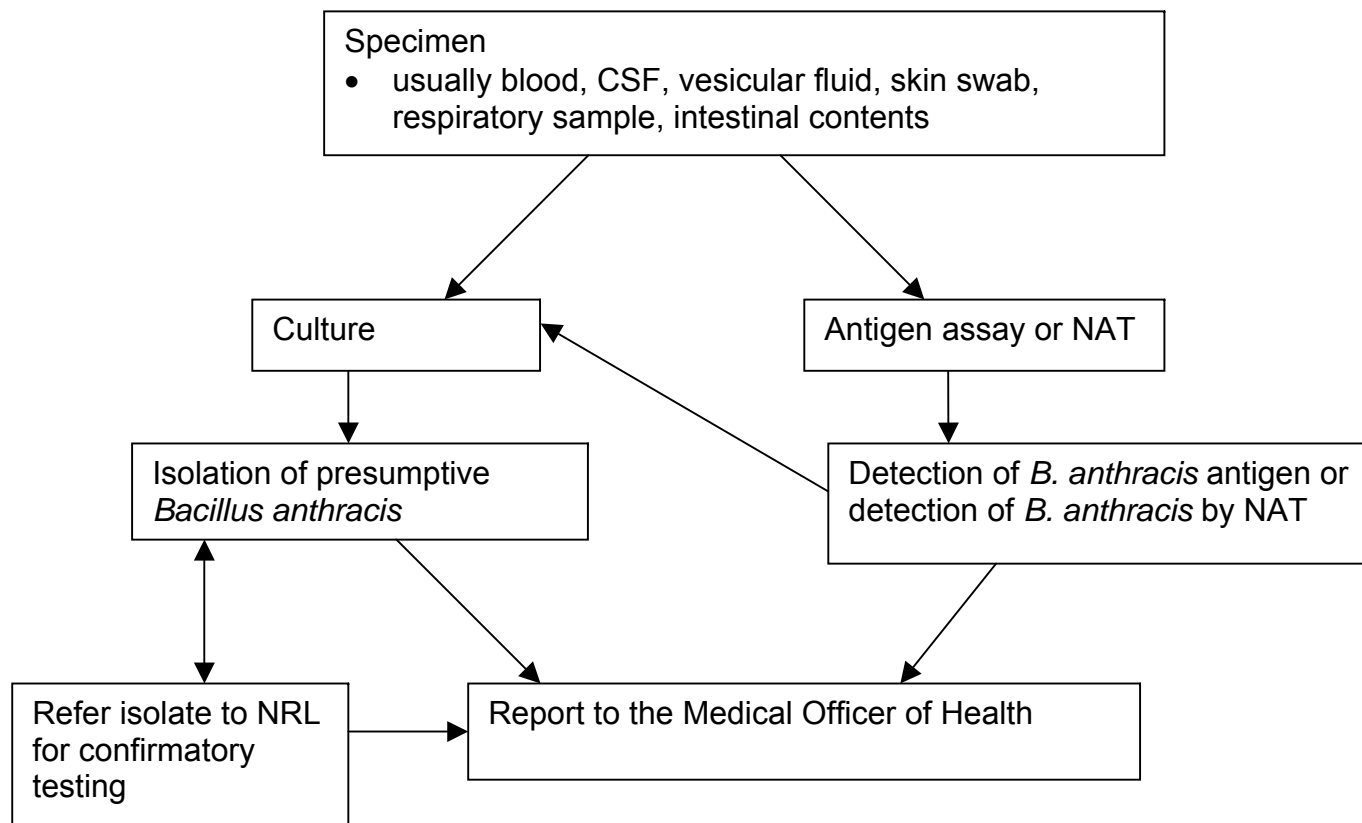
Diphtheria



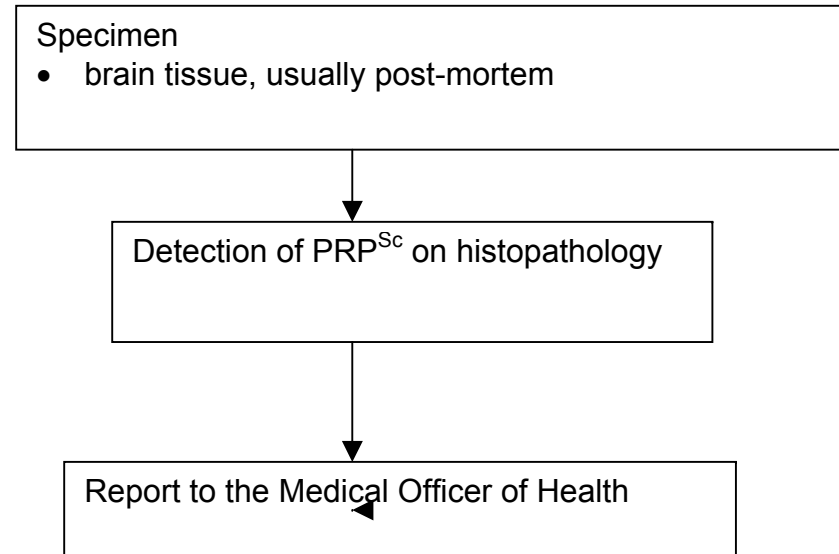
Notes

1. The diagnosis of diphtheria is primarily a clinical one. *Tox*-containing, nontoxigenic isolates have been described.

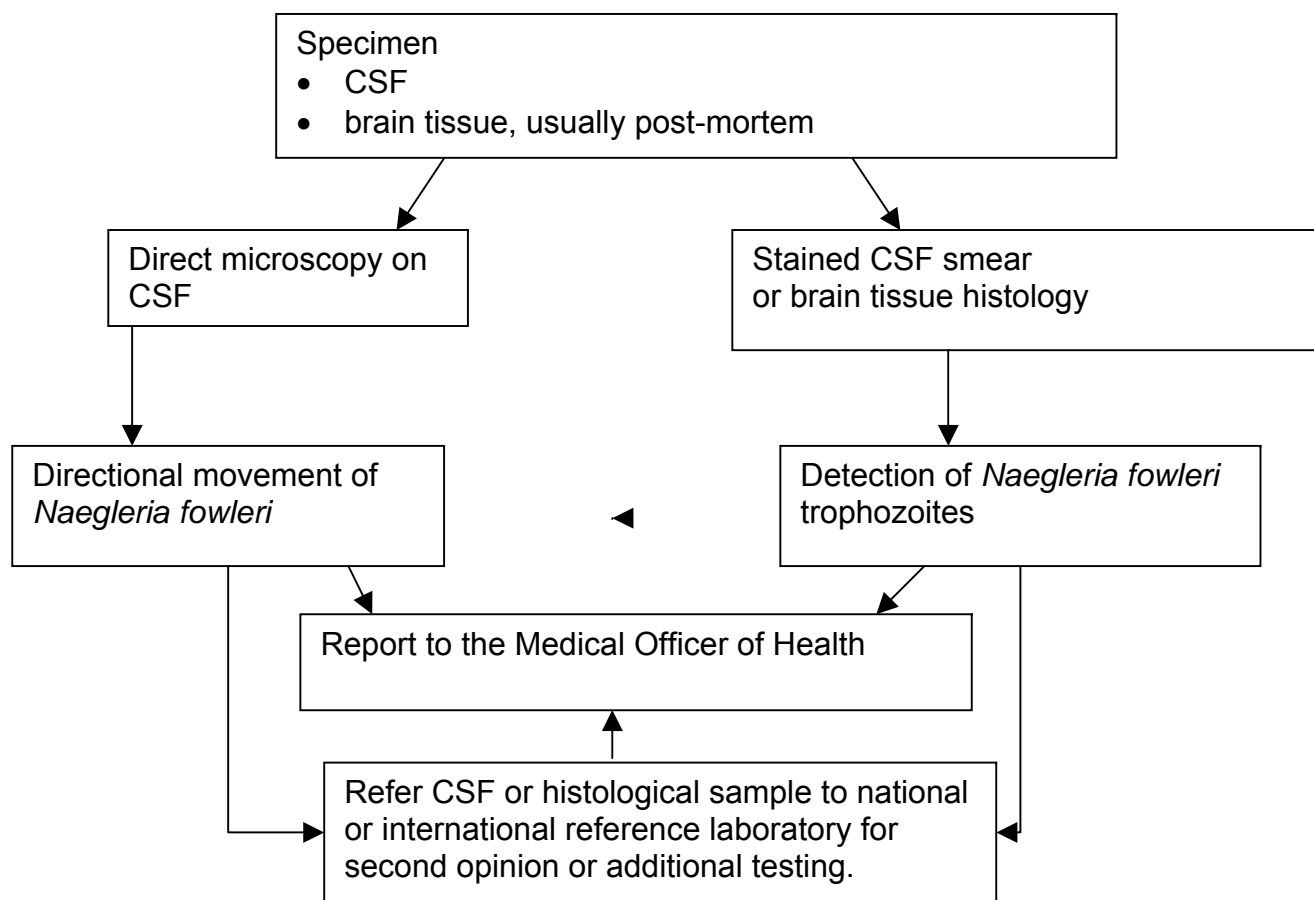
Anthrax



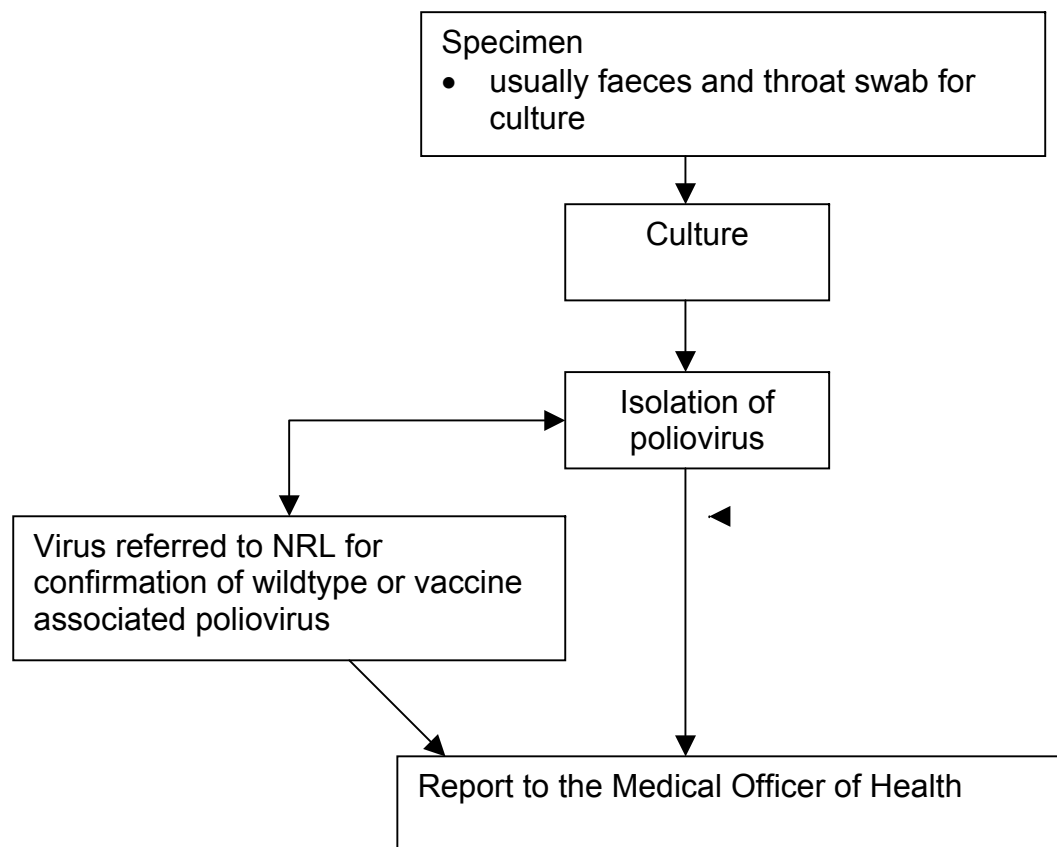
Creutzfeldt-Jakob Disease and Other Spongiform Encephalopathies



Primary amoebic meningoencephalitis



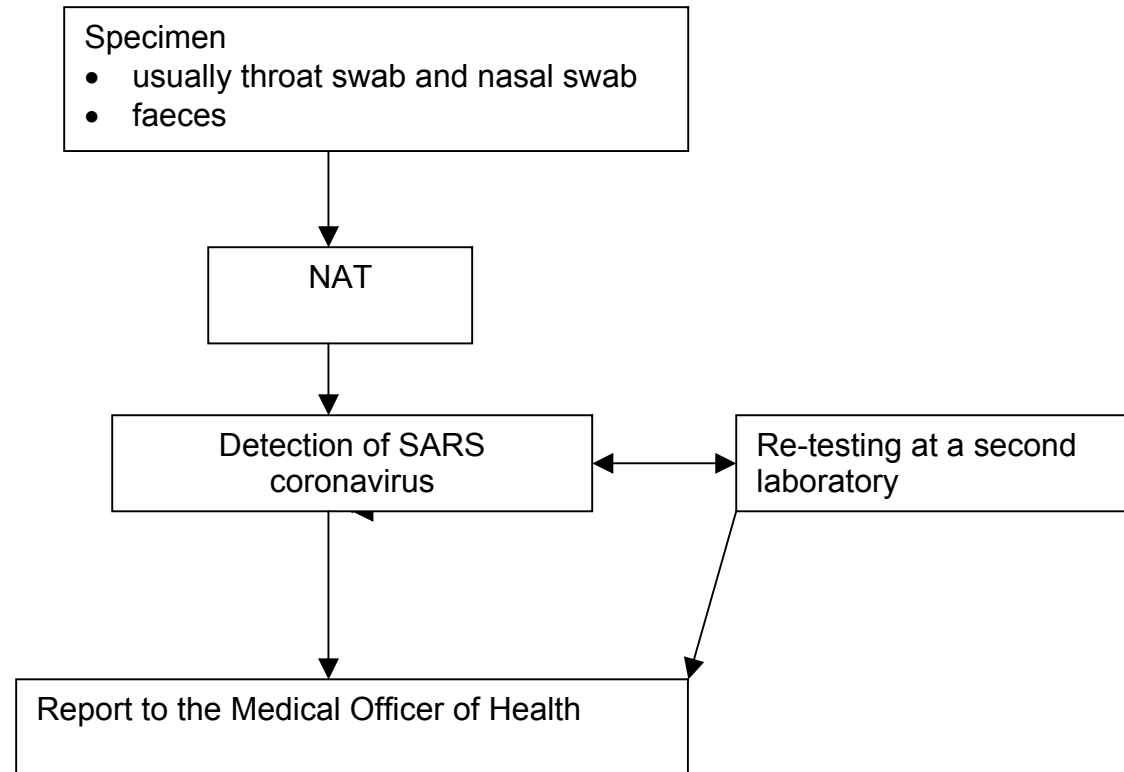
Poliomyelitis



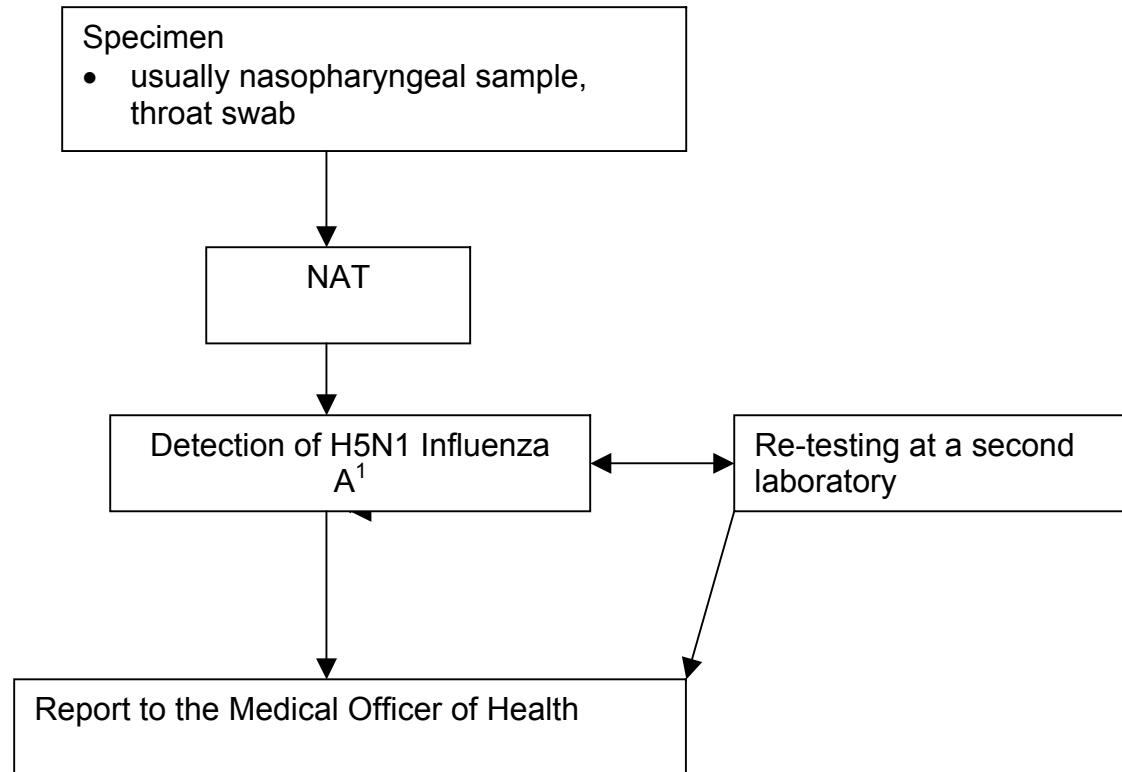
Notes

1. Enteroviral PCR performed on CSF may detect an enterovirus potentially including poliovirus. Unless PCR amplification product has been further characterized because of the clinical scenario, positive enterovirus PCR results need not be notified to the Medical Officer of Health.

SARS



Highly Pathogenic Avian Influenza



Notes

1. Or other novel subtype of influenza A

Rabies or other Lyssavirus

Yellow Fever

Viral Haemorrhagic Fever (e.g. Ebola)

Laboratory testing for these viruses is not performed at this time within NZ.
Specimens from suspected cases would be referred to overseas laboratories.

For further information on laboratory testing refer to <http://www.health.gov.au/internet/wcms/publishing.nsf/Content/cda-surveil-ndss-casedefs-distype.htm>