# Public Health Protection Response Plan

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Prepared by Public Health Wales



lechyd Cyhoeddus Cymru Public Health Wales

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### Executive Summary

#### Introduction

This Public Health Protection Response Plan has been developed to provide expert public health advice to Welsh Government, multi-agency partners and for the people of Wales, to inform the next phase of the response to the COVID-19 pandemic as we move towards, and into, a recovery phase. It has been written to support the Welsh *Government's Leading Wales out of the coronavirus pandemic: A framework for recovery.* 

The Plan assumes that transmission of COVID-19 will continue until mass immunisation is available or there is enough acquired immunity in our population. As we continue to tackle this as a nation, we must rely on the best available scientific evidence, surveillance and international learning, together with the good will and response of the Welsh public, to inform our approach at pace and scale.

We will need strong and collaborative leadership across all of the different sectors in Wales. Central to this will be active engagement and involvement with our public to ensure that everyone knows what role they must play over the coming weeks and months.

#### What needs to happen

The Plan outlines three major activities for concerted public health action at scale. These are:

### 1. Preventing the spread of disease through contact tracing and case management

Contact tracing identifies individuals who have come in contact with an individual with COVID-19 in order to prevent the risk of others becoming infected and spreading the infection in our communities. The Plan proposes a three-tiered approach across Wales at a national, regional and local level. It will require very large numbers of people to be involved as local contact tracing teams. They will be managed locally and coordinated regionally on a health board footprint and will use a national framework. Local authorities, health boards and other partners will be pivotal in leading and supporting local action. It will also involve contact tracing technology to support the significant activity that will need to take place.

#### 2. Population surveillance

Our population surveillance system will track, monitor and help us understand the nature and spread of COVID-19 within our hospitals, care homes and communities. A wide range of skills across different partners in Wales will be required to do this at scale. Surveillance data will be published so everyone can see the progress being made. This is essential to prevent the spread of infection, monitor the impact of the lifting of social restrictions and support the NHS in resuming normal services whilst delivering COVID-19 related care.

#### 3. Sampling and testing different people in Wales

Sampling and testing for COVID-19 is a key part of our response to the pandemic and supports the contact tracing and surveillance activities outlined above. Access to testing will expand using drive-through centres, mobile vans and home-testing over the coming weeks. As we move into the recovery phase, the priorities for testing will be:

- diagnosing symptomatic hospital patients
- testing specific groups of our population to inform public health action
- testing groups of the population to check whether they have had the disease
- testing of key workers, or their family members as appropriate, to keep the essential services of Wales moving.

#### Summary

Wales has already needed to respond rapidly to the COVID-19 pandemic and it has had an unprecedented impact on our society as a whole. As seen in other countries, this has had a significant effect on the lives of the Welsh population and has sadly resulted in many people dying.

There is now the need to prepare for the next phase of the pandemic. Learning from other countries, this Plan sets out a clear proposal for what can be done at scale and pace to move through the recovery phase. Implemented together, with strong local, regional and national leadership from partners, the Plan will help to minimise the spread of COVID-19, protect our public and enable everyone to resume their normal lives over time.

### Part 1: Introduction and background

This is the Public Health Protection Response Plan for COVID-19 prepared by Public Health Wales for Welsh Government. It responds to a request from the Chief Medical Officer (CMO) for Wales to Public Health Wales for a plan that will inform the next phase of the response to the pandemic. The plan also responds to the intent set out in the document published 24 April 2020 by the First Minister of Wales, *Leading Wales out of the coronavirus pandemic: A framework for recovery*, specifically pillar 3, public health response.

The framework document reminds us that the harms caused by COVID-19 occur in several ways. The health harms can be described broadly as direct and indirect. First, are the individual, direct health harms arising from infection caused by the SARS-CoV-2 virus, resulting in illness (usually mild for most people), hospitalisation (that may necessitate intensive care) and sadly, for some, death. Second, the indirect effects occurring if the health and social care system cannot respond effectively to COVID-19, or from the consequences of the realignment of health and social care towards the response to COVID-19 necessitating postponement or delay in responding to or presentation of non-COVID illness. Indirect health harm also arises from the personal effects of living under the restrictions imposed to reduce transmission of the virus, for example, on mental wellbeing.

The response to COVID-19 must take account of these wider health (and other) impacts but these are not addressed in this plan. Public Health Wales will conduct studies on some of the indirect effects of COVID-19 and recently piloted a survey to capture information about the impacts of 'lockdown' on individuals. Further reports will follow.

The planning assumptions informing this Plan are set out in the sections covering case finding and contact tracing and sampling and testing. However, there is one over-riding fundamental assumption: transmission of the SARS-CoV-2 virus will continue until either sufficient people have acquired immunity from the infection or mass immunisation of the population with a safe and effective vaccine has taken place. This sets the likely timescale for the response to COVID-19 (at least until the end of 2020) and the parameters for the response (immediate to support the lifting of restrictions and medium-term to monitor and intervene to reduce the risk of transmission).

The Plan proposes a national effort commensurate with the national emergency that Wales is facing. A three-tiered model is described, overseen by Welsh Government, with expert health protection leadership and co-ordination provided nationally by Public Health Wales. However, critical to the successful delivery of the model is the leadership role of local government working with health boards in the regional tier. Together they will need to operationalise the model (make it work) including the successful deployment of local contact tracing teams. Using standard job descriptions and supported by training provided once for Wales, they will use their local discretion to determine the right 'solution'.

Success will depend on being able to successfully and rapidly mobilise and sustain a large nonspecialist workforce that will be supported by local and national public health expertise – the local environmental health officers and Public Health Wales specialist health protection staff. Across Wales regional leaders will need to work together and flexibly to enable the most efficient deployment of resources in response to the geographic pattern of the infection. Epidemiological surveillance will provide vital intelligence to inform national, regional and local action. Another critical requirement for success will be the rapid acquisition of a case management information system and an assessment of the available options has already taken place. Early decisions on this are now required.

There are also some key decisions that will be pivotal to the scale, pace and approach over the coming days, weeks and months. These include what the approach to the reproductive number (R) in Wales will be, the point at which contact tracing can commence as social measures are relaxed and the ability to blend workforce with technology as contact tracing is scaled up across Wales.

The Plan sets out an assertive approach to case finding and contact tracing. The  $R_t$  number in Wales is estimated at about 0.9. This has been achieved after nearly six weeks of lockdown and is too close to 1 for comfort. When restrictions are eased it would not take much for the R number to climb above 1 with the risk that community transmission will take off. If the approach proposed is to be effective, it needs to be implemented from the outset. If restrictions are lifted before the model has been operationalised, only limited passive case finding will be possible and community transmission could quickly take off before the full model is established.

The decisions that Welsh Government will need to make have some critical dependencies which are the:

- acceptability of relative harms and benefits in their widest sense
- the resources that need to be applied compared to the resources available

Public support will be essential to the making of these decisions. The success of the model will depend on public confidence and public acceptance of the proposals, as well as public adherence to the implications, for example, for individuals to be quarantined for up to 14 days. This will require an open and involving discussion with the people of Wales as the pandemic moves into the next phase.

The presentation of the Plan begins with an overview of the model in Part 2. Part 3 describes the core components (case finding and contact tracing, surveillance, and sampling and testing) followed by the key enablers including workforce. Part 4 sets out the implementation and necessary critical policy decisions. The key strategic objectives are set out in the figure overleaf and the Plan details the key activities required, where these are delivered at a national, regional and local tier, and the respective roles and responsibilities of partners.

Public Health Protection Response Plan for COVID -19	9	$\wedge$	$\wedge$	$\wedge$	$\wedge$	
Strategic Objectives (1) Reduce the risk of transmission and infection with COVID -19 as far as possible in communities in Wales using evidence based health protection principles (2) Risk assess cases and focus on the prevention of the spread of COVID-19 (respiratory infections) in agreed settings of most impact and for groups most at risk of severe illness and death (3) Work in a broad partnership network to deliver collective actions (4) Undertake active surveillance to generate information for action	Preventing the spread of disease including incident and outbreak management and contact tracing Agile epidemiology and surveillance Sampling and Testing	Communication (Public Communication and Communication of Risk) and Engagement	.earning from and application of International efforts on recovery	Workforce	Digital	
Underpin (1) Clinical ar (2) Pr (3) Clear und (4) Clear und	nned by the foundations of nd Information Governance rogramme management erstanding of financial impact erstanding of systems impact					

### Part 2: Overview of the Plan

This section provides a summary of the Plan and the main elements contained within it. Further detail on each core element is provided in the subsequent sections of the Plan.

The Public Health Protection Response Plan is comprised of three core elements: *case finding and contact tracing*, *population surveillance*, and *sampling and testing*. All three need to happen together. These elements will have workforce, information and planning implications and need to be supported by a proactive communications and engagement plan.

#### Case finding and contact tracing

The purpose of case finding is to identify those individuals in the population who have COVID-19. If someone has or is suspected of having an infectious disease, they are termed a 'case' and good practice is to try and confirm the diagnosis. At the same time contact tracing is initiated in order to identify people who the case may have come into contact with. We call these people 'contacts'. Contact tracing is a fundamental approach to public health practice and has the aim of reducing the number of secondary cases of an infectious disease in an outbreak and the consequences of infection in subsequent cases.

The interventions that can be applied to reduce subsequent transmission of the disease are to ask contacts to modify their behaviour, to reduce their contact with others by self-isolating, and to apply infection prevention measures including good personal hand and respiratory hygiene, and social distancing. If a vaccine is available, or there are proven treatments, then we can use these to prevent further spread of the infection or to minimise the effects of the disease on an individual. Unfortunately, neither of these is available yet for COVID-19. In the absence of other options contact tracing becomes even more important.

Contact tracing achieves its aim of reducing transmission of the infection by identifying contacts who may have come into contact with the person with COVID-19 at the time the case was infectious. It is known now that people can transmit COVID-19 infection before they become symptomatic and the greatest reduction in transmission of this disease will be achieved if contacts are identified and quarantined before a case is confirmed by a laboratory test. If the test on the case is then negative, the contact can be released from quarantine if they are not themselves showing any symptoms at that point in time.

In a large outbreak or a pandemic situation, contact tracing will need to be delivered at scale by non-specialist staff using simple criteria for defining cases and contacts, and clear and simple descriptions of the interventions that contacts will be asked to accept. These staff need to be supported by experienced public health professionals (consultants in health protection in the NHS and local environmental health officers in local government). Providing clear information to the individual and a national public information campaign are essential for effective contact tracing.

The Plan sets out in detail the key requirements to deliver an 'assertive' approach to reducing COVID-19 transmission. It describes a three-tiered model with national health protection leadership, co-ordination and enablement provided by Public Health Wales, regional

leadership and co-ordination provided by local authorities and health boards, working in close collaboration with each other and supported by senior health protection consultants from Public Health Wales, and local teams of non-specialist contacts tracers under regional direction and locally managed by local authorities or other partners.

If the approach proposed based on active case finding is to be effective then it needs to be implemented from the outset and at pace. If restrictions are lifted before the model has been operationalised then only limited passive case finding will be possible and community transmission could quickly take off before the full model is established.

The next section of this Plan provides worst case estimates of the total contacts that might need to be quarantined. These include contacts of suspected and confirmed cases. Currently, the positivity rate of testing is below 20% and as the case finding and contact tracing takes effect, this will fall further (based on international experience below 10% could be expected). When a suspected case is tested negative contacts can be released (provided they are asymptomatic), so the actual number of contacts needing to be quarantined will be a fraction of the figures estimated.

Symptomatic cases are identified in one of three ways: laboratory confirmation of a clinical diagnosis, electronic notification of an infectious disease and by self-reporting from a symptomatic individual. Self-reporting will occur through a web portal and existing options are being assessed as it will not be feasible to commission and build a new solution. The options include the Contact Tracing Advisory Service (CTAS) portal that England is planning to use or a commercial solution procured, as in Scotland, specifically in response to COVID-19. A preferred option will need to be concluded as an immediate action. The public-facing web portal is accompanied by a service user web-based portal (used by the contact tracing teams) and a database.

The system used in England feeds into a cloud-based database. In Wales we have a serverbased system called Tarian, which will not cope with the requirements of a response on the scale proposed and a robust database will still be required if we use the CTAS portal. Tarian will be required to maintain the daily non-COVID-19 infectious disease response across Wales. The system in Scotland appears to be a complete digital package. In presenting this proposal it is recognised that acquisition of the digital solution represents a significant risk to the delivery of the Plan. The telephony part of contact tracing, that is, the contact advisers (10-12 per team) could also be outsourced and this could mitigate some of the workforce risks or provide an additional option for long-term sustainability.

#### **Population Surveillance**

The second element of the plan is population surveillance. Surveillance is 'information for action'. Information is obtained from a variety of sources and analysed to guide policy decisions and timely actions. The key purpose of surveillance is to monitor the intensity, spread and severity of COVID-19 in the population in order to estimate the burden of disease and inform action. Surveillance also provides key indicators to measure the effectiveness of public health interventions. A typical surveillance system captures raw data from an *event of interest* (e.g. case numbers, age, sex, death) and is analysed to generate meaningful information that is

provided back to the stakeholders to enable timely action to be taken. Further details are set out in the section on population surveillance.

#### Sampling and Testing

Sampling is the process of taking a sample from the body that will then be tested. Currently, samples (swabs) from the back of the throat are taken to detect antigens (PCR tests) and whether someone *has* COVID-19. We will also be taking blood samples from people to check for antibodies (serology tests) which show if someone *has had* COVID-19.

The testing capacity is currently a critical planning consideration and will shortly become a critical operational consideration.

A table in the sampling and testing section sets out in detail the indicative laboratory capacity against demand.

Testing capacity will remain a factor and likely constraint until COVID-19 is fully mitigated. Case finding and contact tracing, key worker testing, hospital screening and population sampling will all require a share of the testing capacity. While health protection remains the overriding concern and statutory responsibility for Public Health Wales, there is recognition that other factors will contribute to how testing capacity is apportioned. An operational delivery mechanism will need to be established to apportion testing capacity across all of its uses, and within the available capacity at any given time, as the testing capacity is grown and then to maintain what will become business as usual. The mechanism will need to be informed by all stakeholders.

Equality of sampling and testing across Wales should be the desired outcome. Decisions will need to be taken at a national and local level to prioritise the available testing capacity. These decisions will be difficult and affect not just health protection but the wider response to the health emergency and will have a real impact on how the people of Wales go about their lives. Public trust, confidence in and adherence to the Public Health Protection Response Plan will be essential to its success and therefore the impact of prioritisation of testing will need to be clearly explained to the public, partners and ministers.

### Part 3: The Plan in detail

## 3.1 Preventing the spread of disease: contact tracing and case management

The goal of contact tracing is to reduce R (the effective reproduction number – the average number of secondary cases per infectious case). The greatest contribution to reducing R through contact tracing can be achieved by early intervention with both cases and their identified contacts to prevent onward transmission.

Further details of the range of available options are set out below and an evidence-based approach recommended. The recommendation is based on some important assumptions including positivity rate, case to contact ratio and the background incidence of respiratory symptoms in primary care. These generate very large estimates (with a wide range between upper and lower limits) of contacts that could need following up and will be determined by the success of preventing the spread of disease and the compliance of the public.

#### 3.1 Summary of the proposed model

The proposal described is based on a decentralised three-tier model that builds up from 94 local teams (covering population units of approximately 30,000), to regional teams (at health board level), overseen by a national co-ordinating team. This is necessary in order to achieve the volume of contact follow-up required and maintain a focus on the situation both regionally and nationally. The model is supported by digital infrastructure to enable real-time information sharing. The reasons for the geographic populations used to inform workforce planning are explained on page 24.

#### National Tier

The national tier has three functions which are provided by Public Health Wales:

- national expertise
- *"Once for Wales" functions*
- co-ordinated support

#### **Regional Tier**

The regional tier is based on the local health board footprint and will be delivered and managed by the wider public sector (local authorities, local health boards and others) with access to specialist support from Public Health Wales. The regional tier will have two roles as follows:

- leading the operational delivery, including the local contact teams
- preparing for and responding to small local clusters

#### **Local Tier**

The local tier will be made up of local contact tracing teams who will be managed and led at a local and regional level. They will be recruited and redeployed against standard job profiles and trained consistently with an e-training package developed by Public Health Wales. The figure below illustrates the model.

#### Figure 1 - National, Regional and Local Tier Model



#### Assessment

Public Health Wales, and indeed public health in Wales, will not have the workforce capacity to deliver this model alone. Instead, it is proposed that the existing specialist public health workforce (including specialist health protection and local environmental health officers) is supported by a large non-specialist workforce and there will be a number of options to secure this. It is envisaged that this will be mobilised at a regional level through a governance model agreed by the regional partners, and will be led by local authorities, supported by health boards and other partners. It will be supported by nationally-produced role descriptors and an e-training package developed by Public Health Wales and supported by Health Education and Improvement Wales. Mobilising at a local level may be different within each region and it will be for each regional tier of leadership to determine.

Whilst there is not a need for the community contact tracing teams to be physically located within the local population areas, the constraints of social distancing mean that large centralised facilities will not necessarily be appropriate. Therefore, a non-specialist workforce will require simple, easy to use systems for distributing workload, collecting data, and leading them through the intervention required. Furthermore, it must also allow for seamless escalation of cases or contacts to more specialist staff where appropriate. All members of the team must have access to appropriately networked IT and telephony systems.

To deliver this service it will be necessary to have a dedicated case and contact management system to support the workforce and automate much of the assessment and decision making. Public Health Wales has undertaken an assessment of its existing systems and concluded that it cannot support pandemic scale contact tracing. A substantially increasing load risks compromising the system's utility for essential non-COVID health protection work. Therefore, it is recommended that the existing system (Tarian) is not used to deliver the model of contact tracing proposed. An assessment of alternative options is underway and a decision on a suitable option will be taken as an immediate action.

#### Delivery of a contact tracing solution for Wales

#### Principles

As the UK moves from the delay phase to the recovery phase, it is important that measures are taken to mitigate a second peak of COVID-19 infections. Contact tracing forms part of those measures.

Using a prevention approach, there are three types of measures that can be undertaken to prevent the onward spread or the severity of the infection (Table 1).

Prevention level	Task
Primary Prevention	Limit exposures to reduce the risk of transmission
Secondary	Prevent the next wave when those already exposed to a case
Prevention	become infectious
Tertiary Prevention	Reduce adverse outcomes in severe cases

#### Table 1 - Levels of Prevention

Contact tracing - through identifying cases and their contacts - works across these prevention levels. Cases will be advised to limit their exposure to others at the first point of contact (primary prevention). Informing a contact of their exposure helps prevent the next wave (secondary prevention). Through signposting cases and identified contacts to present appropriately for clinical assessment, contact tracing also aims to reduce adverse outcomes for cases (tertiary prevention).

The goal of contact tracing is to reduce the effective reproduction number (R) the average number of secondary cases per infectious case. If R=10, then by wave 2 one case has become 100, whereas if R is reduced to 1, then the case numbers remain stable. The greatest contribution to reducing R through contact tracing can be achieved by early intervention with both cases and their identified contacts to prevent onward transmission. Some cases are at increased risk of contributing to a large R due to large numbers of contacts. Some cases will have contacts who are particularly vulnerable, or in occupations at higher risk of transmitting the infection to vulnerable contacts. Therefore, contact tracing can be described as a process for finding, prioritising, and acting on cases and contacts; using the intelligence gathered to direct further cycles (see figure overleaf).

#### **Disease assumptions**

From our current understanding of COVID-19, we know that there is:

- pre-symptomatic transmission occurring
- a range of symptoms from none to severe.

The earliest possible intervention is key as some exposure will occur before the onset of symptoms. In addition, only a proportion of infectious individuals will develop symptoms severe enough to be recognised as COVID-19, and only a small proportion of those will be tested and confirmed. Early warning for contacts that they have been exposed to someone with COVID-19, will increase the likelihood that they identify as a possible case and limit contact with others immediately. Considerable time may elapse between becoming infectious and laboratory confirmation during which other people can be exposed (see figure overleaf).

Contact tracing aims to limit the contact cases have with others ahead of being confirmed as a case. It also aims to inform contacts of their exposure to a case quickly so that they, in turn, limit their exposure to others and notify their symptoms early so their contacts can be traced too.

#### Figure 2 - Contact tracing process



Overall Goal – Minimise community transmission			
Find	Maximise Case / Cluster Finding		
Prioritise	Effectively prioritise those cases and clusters with highest risk or reward		
Act	Deliver effective action to highest priority cases and clusters as resources allow		
Report	Report on findings to inform policy, strategy, prioritisation and action		

#### Figure 3 - Timeline from exposure to case confirmation



#### Rationale for testing

#### There are four reasons for testing possible cases of COVID-19:

- clinical indication for severely unwell patients to contribute to the diagnosis and management of the case
- surveillance
- use as part of risk assessment, including but not limited to, enclosed settings (including the screening of patients accessing non-COVID-19 related care)
- workforce planning.

The distribution of these as part of a sampling and testing strategy will impact on the focus of any subsequent contact tracing. This is covered in more detail in the section on Sampling and Testing.

#### Controls on demand and capacity

The demand for contact tracing rests on two factors which are the:

- case definition
- extent of follow-up action.

If the case definition focuses only on those individuals with laboratory-confirmed infection, many infectious people who are not tested or test falsely negative will be overlooked. A broader case definition of individuals with symptoms will identify more cases and at an earlier stage but will also capture some who don't have the infection (e.g. with similar symptoms from a different pathogen). This trade-off of sensitivity (i.e. lots of cases identified but including some who may not have COVID-19) and specificity (i.e. identifying only those who are proven to have COVID-19 but missing many others) is a determining factor for demand.

Follow-up action for all possible contacts will pose a greater demand than if action is limited to those at highest risk from COVID-19. As each case has many contacts, the bulk of demand comes not from the number of cases, but from the number of contacts who need intervention.

Contact tracing should direct public health action with the aim of reducing the transmission of infection. With more contact tracing comes more public health action but, inevitably, more resource is required to undertake it.

Increased demand can only be addressed by adding capacity, improving efficiency or targeting of the intervention through a data-driven process of prioritisation. The more complex the prioritisation, the more data is needed to facilitate this. Consequently, there is a balance between complexity and scale.

#### Range of available approaches

The simplest form of action is passive secondary prevention, providing population messaging about action to take if people become unwell or have contact with somebody unwell. At the

other end of the spectrum is a wide case definition to take targeted action on as many people as possible (the table below summarises the approaches).

Ca	ase finding approach	Follow-up Approach	Resource	Risk
			Constraints	
0	No case finding	Universal risk Same action for all in the population	No constraints	Requires people to comply with message. No control, little surveillance
1	Clusters / Outbreaks	Targeted action to worst problem	Case finding limited by ability to identify clusters and outbreaks	Too late
2	Notification of laboratory-confirmed cases Limited Passive Case Finding	Action targeted at contacts of small proportion of cases Some ability to stratify contacts and target message	Case finding limited by testing capacity	Not equitable Action based on outcome for case, not preventing serious outcome in others Delay before case identified can lead to increased exposure to others Many cases will be missed
3	<ul><li>2 + Notification of suspected cases in healthcare</li><li>Passive Case Finding</li></ul>	Action targeted larger number of cases Increased ability to identify those at risk of becoming cases	Limited by healthcare capacity Captures only those who seek healthcare Increased case finding results in exponential demand increase Some prioritisation required	Undetected transmission Push suspected cases to seek healthcare to access intervention creating increased demand and transmission to vulnerable individuals
4	2 + 3 + Self reporting Active Case Finding	Broadest approach to case finding	Need to be able to gather and act on large number of cases Increased case finding results in exponential demand increase Contact prioritisation required	Total number of suspected cases may overwhelm system Intervention could be applied to large proportion of the population at any time

#### Table 2 - Case finding approaches

Before the introduction of the lockdown measures the average number of secondary cases for each infectious individual (R) was 2.7 to 3.0, this has been reduced to a current level of 0.9. To prevent an increase in cases, R must remain below 1 and transmission cannot increase by more than 10% -15%. Even with very good adherence to a highly effective system (i.e. an approach to contact tracing that rapidly identifies then quarantines the vast majority of cases and a large number of their contacts) the maximum reduction in reproduction number is estimated to be no more than 60%. Therefore, unless the incidence of COVID-19 is very low at the outset, aggressive contact tracing would result in an extremely high number of people being in

quarantine at any one time (i.e. a return to lockdown). As a result, contact tracing is unlikely to be effective unless the most aggressive approach (active case finding) is deployed from the moment lockdown is lifted.

#### Flexible response and exit strategy

Until there is an alternative primary prevention strategy (e.g. vaccination) an element of contact tracing intervention will be required. The plan may need to be in operation for over 12 months and must be sufficiently robust not only with the ability to deliver now, but also the ability to respond to future challenges.

During the next 12 months the service may have to cope with a number of changes including:

- periods of reduced prevalence in areas where transmission is effectively supressed
- increased prevalence of other respiratory illnesses in autumn/winter reducing the positive predictive value of symptoms
- co-circulation of COVID-19 with seasonal influenza in winter 2020/2021.

The model therefore attempts to achieve several key aims:

- provides a digital backbone which will remain in place through-out, and a case management and automated response for those who can access these tools. Also allowing real-time feedback to inform escalation and de-escalation on a local, regional or national level
- human resource, which can be regionally managed and deployed to meet need, local partnerships and resources but remains within a common structure which allows rapid escalation and scaling
- operates to a common set of standards informed by evidence, equitable across Wales and complying with the law on data protection and data sharing

#### Timing of the implementation of the model

The proposed operational model for contact tracing assumes that the model will be implemented to its full extent from the time point when lockdown restrictions are lifted. This does not use an incremental approach to expanding the size and scope of contact tracing in response to lifting of lockdown measures.

However, there is a necessary lead-in time to establish all the necessary workforce and digital infrastructure to deliver the model proposed. If lockdown is lifted before the model as proposed is in place, the scope, scale and speed of contact tracing will be significantly affected and Public Health Wales could only undertake contact tracing on a limited basis (for example, limited to enclosed settings) as outlined in the table on page 17.

Before the introduction of the lockdown measures, in an unmitigated situation, the reproduction number was around 2.7 to 3.0. Reducing it to its current level of 0.9, has required a reduction in transmission of approximately 80%. To successfully keep R below 1 means that any relaxation of measures cannot increase transmission by more than 10% -15% of its original

level. An aggressive contact tracing approach is an option that could support this goal and is recommended.

#### **Demand estimation**

Each day cases will be entered into the system from a number of different routes which, in turn, determines the number of contacts requiring follow-up (see table overleaf). The first route is via laboratory notifications, which are a legal requirement in Wales. It is anticipated that expanding the testing criteria will mean a reduction in the positivity rate to 10-20% (i.e. more people are tested but fewer test positive). Nevertheless, the net effect of the additional number being testing will result in 1,000-2,000 cases every day. The second route is notification by medical practitioners on clinical suspicion which is also a legal requirement. Surveillance data from sentinel practices allows estimation of the percentage of the population seeking medical attention with respiratory symptoms each day. Assuming these were notified in line with regulations, this route would generate 450-1,100 notifications each day from across the health service. The remaining route is patient self-reporting. Each week between 2% and 5% of the population will experience acute respiratory symptoms compatible with COVID-19 infection. Not all will choose to report but assuming reporting rates of approximately 50% this could result in 4500-11,000 notifications each day. Many will be tested before contact tracing occurs and so are already accounted for in the confirmed figures. However, a small proportion will be classed as high risk and contact tracing started immediately before a result is available. This is currently estimated to be an additional 1,000-2,000 suspected cases requiring contact tracing each day. Therefore, in total each day 2500 to 5000 cases may need contact tracing.

In the containment phase each case was found to have on average 10 contacts, each of whom needs to be followed up until 14 days from the last exposure. However, in countries where contact tracing has continued during lockdown (e.g. the Republic of Ireland) this figure has fallen to around three contacts per case. It is anticipated this this will increase once lockdown is eased, but with social distancing and rapid contact tracing this will still remain depressed compared to the containment phase. Therefore, it is estimated that each day between 7,500 and 30,000 new contacts will be identified. Not all contacts will be independent, or need follow up for 14 days. Even accounting for this the system is estimated to need to track a cumulative total of between 105,000 and 400,000 at any one time.

If the testing demand exceeds available capacity a clinical and public health risk-based prioritisation will be used to optimise the testing capacity.

These estimates are consistent with current estimates obtained from the Scientific Advisory Group for Emergencies (SAGE) consensus position of R for Wales is 0.9 (0.6-0.9 for UK). As the value is less than 1, case halving time is a better measure (than case doubling time, which is used when R is greater than 1). Modelling data estimates the halving time in Wales for new hospital admissions to be 14.6 days (95% CI 9.2-34.4) as estimated on 21 April 2020. If the current levels of (60-70%) compliance to social distancing rules continues at a population level it is estimated that by the end of May 2020, there will be approximately 1000-1500 cases in Wales (both diagnosed and undiagnosed).

Factor	Estimate	Evidence
Testing Capacity	10,000 tests per day	Testing Strategy
Positivity rate	10-20%	Currently ~35%
Case: Contact ratio	10-20	Based on containment phase
Confirmed cases needing contact tracing each day	1,000 - 2,000	
Clinical notification of respiratory symptoms	450-1,100	Background incidence of respiratory symptoms in primary care 0.1-0.25% per week.
Suspected cases self-reported each day	4500 - 11,000	Background incidence of respiratory symptoms 2- 5% per week. Assumed 50% reporting rate.
Total contacts in follow up (over 14 days)	105,000-400,000	Overestimate as not all contacts will be independent

#### Table 3 - Demand estimates for proposed contact tracing service

#### Recommended model

To have the greatest chance of successfully controlling the transmission of COVID-19, it will be necessary to take action at the earliest point to maximise primary prevention. Therefore, contact tracing should be initiated based on the broadest identified group - suspected cases. Where possible, this must be followed by rapid testing to confirm the diagnosis. However, demand estimates – as shown in the table above – mean that prioritisation of active intervention should be restricted to those with the highest risk of initiating widespread community transmission, outbreaks or transmission to vulnerable individuals.

#### Three-tier model

In order to achieve the volume of contact follow-up required, and maintain a focus on the situation both locally and nationally, a three-tier approach is proposed, supported by digital infrastructure to enable real-time information sharing. The overall strategic oversight for the contact tracing service rests with the Programme Board established and chaired by Welsh Government.

#### National leadership coordination and enablement

The national tier has three purposes which are provided by Public Health Wales.

*National expertise* – to support the provision of highly specialist health protection advice to partners to support their response and the strategic direction across Wales. Information gathered from the contact tracing system will feed into a dashboard and the real time evaluation process to provide an overview of the effectiveness of the intervention across Wales. This will allow the specialist health protection advice to be provided to partners to support their response and the strategic direction across Wales.

"Once for Wales" functions – to ensure that key functions are delivered consistently and equitably across all areas of Wales and will partly be delivered through a Public Health Wales National Contact Centre. National level functions that include reporting cases and managing enquiries from the public and professionals, the oversight of automated digital elements of the contact tracing and follow-up systems, and the provision of consistent support to enclosed settings (e.g. care homes) with ongoing outbreaks. These functions will also include the development of standardised job profiles and e-training packages for those taking on specific roles.

A Public Health Wales National Contact Centre will provide a single point of contact for all enquiries/ reporting into Public Health Wales and have three elements. This is illustrated in on page 23.

- a) Public self-reported possible cases digital literacy estimates from the Office for National Statistics suggest that at least 20% of people do not have access or skills to self-report through a web platform, and therefore a telephone contact service will be required for between 500 and 2000 cases per day. Based on call volume experienced in the Public Health Wales national contact centre during the earlier phases of this response, we now have more accurate modelling of the workforce required reflected as low, medium and high call volumes, detailed in the workforce section. Estimates suggest that the contact centre will require 15-60 call takers on duty each day for this purpose. The information captured will be fed into the same platform as the anticipated 80% response received through the digital response route.
- b) **Specialist health protection support** the contact centre will be supported by staff with more specific health protection training or experience for example, public health consultants and nurses. Some calls will be more complex and will need to be directed to this resource to support management of more specialist queries.
- c) General Enquiries Public Health Wales will need to maintain a general enquiry service for the public and professionals to seek advice in relation to services provided (e.g. testing etc). Although most enquirers will be directed to online information, the contact centre will need a capability to receive general enquiries from those without digital access or in relation to more complex problems and direct them appropriately. It is estimated that call volumes relating to this element will increase in comparison to the lockdown baseline, and will therefore need between 30-50 staff on duty each day made of a mixture of call takes (15-20) and call handlers (15-20) for this purpose

*Co-ordinated support* – to provide and coordinate support and the specialist health protection leadership to respond to clusters, outbreaks and incidents that impact on more than one region.

#### Regional leadership and coordination

This role will involve working proactively with settings (for example, care homes, schools or large employers) identified as presenting specific risks and responding to small clusters and outbreaks within their region. This tier is based on local health board footprints, and will be led and delivered by the wider public sector (local authorities, health boards and other key partners) with access to specialist health protection support from Public Health Wales. All data

collected by the system will feed into a dashboard and a real time evaluation process to provide an overview of the effectiveness of the intervention in their region. The regional tier will have two roles, as follows:

*Leading operational delivery including local contact teams* – the regional function will also be responsible for delivery of training to the local tier, recruitment of contact tracing teams, and workload management to ensure that demand on the contact tracing system can be met within their region.

*Preparing for and responding to small local clusters* – this role will involve working proactively with settings (e.g. care homes, schools or large employers) identified as presenting specific risks in their region. They will also be able to direct specialist expertise from the wider health protection system (Environmental Health Officers, Infection Control staff, Health Protection Nurses) to address clusters and outbreaks within their region

#### Local delivery

The local tier will be responsible for the interviewing of cases and follow up of contacts, supported by a case and contact management system, and organised in local contact tracing teams. These teams will be recruited and/or redeployed from the wider public sector workforce (not Public Health Wales) and from other sectors including the third sector and further and higher education. It is envisaged that the mobilising of the workforce will be led by local authorities based on the agreed approach within each region. They will be responsible for the interviewing of cases and follow up of contacts who need proactive human intervention (e.g. where text or web interaction is not appropriate). They will be supported by the case and contact management system which will support collection of the necessary data, direct the contacts into the appropriate follow-up system and direct the contact advisors to give the appropriate public health advice. Data collected will be fed back into the national system in real-time.



#### Figure 4 - Public Health Wales National Contact Centre Model

When considering how to distribute the local teams, there are two different geographies which could conceivably form the footprint for contact tracing teams.

The first is the Upper Super Output Area (USOA). These are standardised geographies routinely used for official statistics published by the Office for National Statistics. They comprise similar population sizes (population range 27,000 - 43,000; average 31,000) and are nested within existing local authority boundaries with no overlap. USOAs represent a clearly defined geography and can be looked up directly from the case or contacts postcode.

The alternative is to deliver the service on a primary care cluster footprint. Whilst clusters may be more familiar to healthcare providers, their use poses a number of key issues. Across Wales there is significant variation in cluster size (population 25,000-100,000) and therefore the contact tracing resource per cluster would be variable. The main challenge comes from their basis in patient registration rather than residence. To allocate cases at a cluster level, it would be necessary to look up which GP the patient is registered with. Welsh residents in border areas registered with GPs in England would not be covered by the contact tracing service in Wales, nor by the service in England which is residence based. Additionally, using registration will exclude those who aren't registered with GP practices who are also likely to be among the most vulnerable. Furthermore, the boundaries are 'fuzzy' as people in the same household, street or village may be registered with different GPs and therefore different GP clusters. This is particularly prevalent in rural areas where people are served by branch practices some distance from the main surgery.

For these reasons this Plan has based its assumptions on USOAs.

#### 3.3 Requirements

#### Workforce

To address demand, a large workforce will be required to undertake contact tracing and followup within a defined geographical area. This needs to be supported by digital systems to automate many routine actions, including risk assessment

The human resource proposed involves a large diffuse workforce distributed into teams that are each responsible for an area with a population of approximately 30,000. With each of the 94 teams (based on a USOA footprint) having between 15-17 members, a total workforce of 1400-1600 whole time equivalents would be on duty across Wales 7 days per week (see table overleaf). This is equivalent to approximately 3000 people.

However, even with a large workforce, the difference between demand and capacity will need to be met by digital systems which can reduce the amount of human resource needed to identify and intervene. The large amount of data collected will need to be analysed in real time to inform strategy at an all Wales levels, and inform the deployment of specialist health protection resource to address the most complex situations.

Role	Capacity assumption	Contact tracing capacity		
(based on 8hr working day)		Single team	All Wales	
			(94 teams)	
Clinical lead (1)				
Contact Tracer (3-4)	Interview 4 cases per day	12-16	1,130-1,500	
Contact Adviser (10-12)	Follow up 10-12 contacts per day	100-144	9,400-13,500	

#### Table 4 - Capacity estimates for proposed community contact tracing teams

The use of a non-specialist workforce is essential to allow specialist resources in Environmental Health Officers (EHOs) and the health protection team in Public Health Wales to focus on the more complex tasks and outbreaks. The non-specialist workforce may come from a range of sources and subject to standardised training and agreed governance, for example, handling of person identifiable information, will be for regional determination. It will be important for the Welsh Government to engage with national agencies, including the Food Standards Agency and the Health and Safety Executive, to explore a risk approach to the local government statutory responsibilities in order to enable EHOs to optimise their time in this activity.

Based on the number of teams in each region, there will be different staffing demands. The smallest region (Powys) will be required to host four teams (approximately 80 staff), whilst the largest (Betsi Cadwaladr University Health Board) will host 22 teams (approximately 440 staff). Logistical challenges will include providing IT and telephony services and facilities. Additionally, there is substantial complexity in coordination of workflow and oversight to ensure equitable, consistent and safe service. The workforce will need to be flexible to meet specific needs. There may be requirements at times to significantly increase the number of people contact tracing in any given region to meet local fluctuation in demand and this will require flexibility across regional boundaries.

A non-specialist workforce will require simple, easy to use systems for distributing workload, and collecting data, and leading them through the intervention required. Furthermore, it must also allow for seamless escalation of cases or contacts to more specialist staff where appropriate. All members of the team must have access to appropriately networked IT and telephony systems. Table 5 on page 27 summarises the proposed structure.

#### Digital systems

To deliver this service it will be necessary to have a dedicated case and contact management system to support the workforce and automate much of the assessment and decision making.

This must be designed to guide users through data collection and perform very simple tasks on a very large scale. The current shared platform (Tarian) is designed and built for management of a range of health protection issues by specialist staff. It is not fit for this purpose and does not have capacity for the additional users. The ability of Public Health Wales to continue to deliver statutory health protection services should be protected. The new case and contact management system comprises a front end and back end:

#### Front end

- communications Systems
- public-facing web-based platform for self-reporting symptoms and names of contacts, and providing a risk assessment function
- call handler-facing platform for Public Health Wales and wider workforce to see all information about cases and contacts.

Systems have to support both the telephony needs of the contact tracers, allowing both outgoing calls for all contact tracers and advisors, but also providing dedicated 'call centre' as a single point of contact for enquiries and a redirection service to the correct local team. It may be necessary to provide handsets to call handlers who may be working from home to comply with social distancing. The system should also support communication with contacts by text message and the receipt of a response during active follow-up and automation of test request generation and test result communication.

#### Back end

• a single database for cases and contacts across Wales, with data flows in to Public Health Wales.

This needs to include flows from ICNet, the hospital infection case management system in use across the NHS in Wales, as well from external sources including port health. Support real-time information for action through providing a single source of truth for automated descriptive / analytical epidemiology products to produce outputs for health protection teams and for evaluation of overall effectiveness of contact tracing measures. This element can be delivered by the NHS Wales Informatics Service (NWIS). Furthermore, systems must support real-time flow of data across the border regarding Welsh cases and contacts identified by England and English cases and contacts identified in Wales

An assessment of alternative digital solutions is underway

#### Interoperability and liaison with other UK countries

The well-established systems and processes between health protection teams across the UK countries will be used to manage cross-border issues relating to case and contact tracing.

#### Ongoing research, learning and evaluation

Throughout the process, principles of feedback, learning from research and evaluation will be used to continuously refine and adjust the approach to contact tracing.

#### 3.4 Conclusion

In order to stand the best chance of controlling the spread of COVID-19, and understanding transmission such that tactical deployment of controls to areas where spread is increasing is possible, a large contact tracing service will be required. This will need to be blended with

technology-enabling applications. The size of this resource; the rapid delivery of the necessary IT infrastructure; and the need to address the relevant information governance elements, will need to be worked through at pace to safely enable it to work for the timelines required. A series of tables and figures on pages 29-36 provide further detail on the approach set out in this Plan.

Level	Structure	Role
National	Contact tracing service programme board	Multi-agency strategic oversight of the service.
	Health Protection Response Cell	Strategic
	All Wales	Advise on common aims and objectives for the service
	Led by Director of Integrated Health Protection who is accountable for delivery of the whole service <b>Representation</b> Regional Teams CCDCs/CHPs Communicable Disease Surveillance Microbiology Communications PHW Emergency response structure	Ensure adequate resources are obtained and scaled as appropriate from PHW, key partner agencies and local communities Ensure integration of manual contact tracing service elements with digital/automated elements as these are introduced in Wales Oversee delivery of the overall service Ensure co-ordination of all elements of the service Oversee governance and ensure standard training package developed for regional delivery
		Support Support to Welsh Government with Specialist Advice Support coordination of incidents and outbreaks that include more than one region.
	Enclosed Settings Cell Representation Health Protection led Wider PHW support	Providing enhanced support to clusters or outbreaks in closed settings including residential care, nursing care and prisons.
	Contact Centre This function supports all tiers Non-specialist Call takers and call handlers working 8am – 8pm	Support self-referral and enquires Support single point of contact for enquiries into contact tracing service
Regional	<b>Regional Response Cells (7)</b> Operate on local health board footprint	<b>Tactical</b> Use "information for action" surveillance
	Director of Public Health led	outputs to identify geographical "hot spots" or groups with high transmission rates needing enhanced control
	Representation Local Authority Lead Officers* Public Health Consultants Infection Prevention Teams* Regional Hospital Epidemiology Logistical support*	Engage/collaborate with LHB/ LAs to identify issues and agree joint solutions Able to deploy specialist resource (HP or IP&C nurse, hospital epidemiologist etc) to manage complex issues in the region

#### Table 5 - Proposed structure for comprehensive contact tracing

Level	Structure	Role
	CCT Team leads* Health Protection Specialist support	Support the local CT clinical leads with expert advice where required and meet with these leads on a regular basis. Deliver training locally Support Providing enhanced proactive support to closed settings including residential care, nursing care who do not have current outbreak.
Local	Community Contact Tracing Teams (CT) (94) Upper super output area based (defined geography pop ~30,000) Led by local (non-health protection) clinical lead* supported in clusters by business manager (to organise teams operationally) and dedicated administration Supported by 3-4 case interviewers* (multiagency professionals) and 10-12 contact advisors* (local staff) Providing telephone-based contact tracing service 8 am until 8pm.	Deliver contact tracing intervention and public health advice to cases and contacts requiring human follow up in their area. Follow-up all identified contacts in their area and refer out of area contacts to other CT teams Escalate complex cases/contacts or clusters of concern to regional teams

The following tables and figures relate to this section:

Figure 5 – Case Pathway – Terms

Figure 6 – Case Pathway – flow diagram showing how cases are identified

Figure 7 - Contact Pathway - flow diagram showing how contacts are managed

Table 6 – Risk Assessments – how cases and contacts are defined

**Figure 8** – Information Flow Diagram

 Table 7 – Scope of Information Flows

#### Figure 5 - Case Pathway - Terms

**NHSX app** – This is a mobile phone mass contact tracing app being developed by NHS England and promoted by Department of Health and Social Care. This is anticipated to form the central pillar of contact tracing in England. App users will be alerted if their device has been in close proximity to a device belonging to a possible case (based on self-identifying to the app). When alerted they will be provided with public health advice (currently believed to be increased social distancing). Effectiveness of the app will be dependent on a high proportion of the population downloading the app, and compliance with advice provided.

**CTAS – Public Health England - Contact Tracing and Advice Service**. This is a web-based service provided by Public Health England to support contact tracing in England. All laboratory confirmed cases will receive and invitation to create an account and provide details of their contacts. Those contacts will then also receive an invitation to register with the system for monitoring. The web platform will be supported by a contact centre function that will fill in the web form on user behalf if they are unable to complete it themselves. This service is not currently expected to follow up possible (symptomatic) cases.

**ENOIDS – Electronic Notification of Infectious Diseases –** There is a legal duty for registered medical practitioners to notify cases of COVID-19 on clinical suspicion. ENOIDS represents an electronic tool for making this notification direct to the case management system, as opposed to standard approaches (e.g. telephone, email or fax) currently used.

#### Figure 6 - Case Pathway



#### Figure 7 - Contact Pathway



#### Table 6 - Risk Assessments

#### Case definitions

Possible case definition	Based on current clinical case definition
Confirmed case definition	A person who tests positive to a validated specific SARS-CoV-2 test at a reference laboratory.

#### **Contact definitions**

Contact definition	Face-to-face contact with a confirmed case for at least 15mins (can be cumulative) within 2 metres in the 48 hours
	prior to case's onset of symptoms
Close Contact definition	An individual who has shared a property overnight (shared kitchen bathroom etc) with a confirmed case at any
	point between 48 hours prior to onset of symptom and assessment.
	OR
	People who have given personal care to a confirmed case without PPE
Vulnerable contact	An individual who is considered to be vulnerable e.g. advised to shield based on medical history
definition	

All contacts will be advised to quarantine other than for healthcare staff who are contacts of confirmed cases. This is based on assessment of the current scientific evidence that healthcare staff who have been wearing personal protective equipment (PPE) during their contact would not be required to quarantine following contact with a case. This also assumes that PPE use continues to be widespread within all hospital departments.

#### Figure 8 – Information flow diagram



Table 7	– Scope	of information	flows
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ltem	Scope/mechanism	Throughput	Data items	Update	Actions	Links
				timescale		
Single input point	Lab Notifications – electronic lab reports	1000-2000 positive per day; 8,000 – 10,000 negative results per day.	Test result NHS Number Phone number Key worker status Whether hospital inpatient Referring organisation	Real-time	Update current cases with positive or negative results Create new cases if not known before	LIMS Electronic test request
	ENOIDS – Web form	450-1,100 cases per day	NHS Number Phone number Disease Symptoms Risk data Contact preference (phone text email) Onset date	Real-time	Update current cases with positive or negative results Create new cases if not known before	WDS
	Self Report – public- facing web form	4,500-10,000 cases per day	NHS Number Phone number Disease Symptoms Risk data Contact preference (phone/SMS/email) Onset dates Email address Name Address Date of birth	Real-time	Assess against case definition Reject cases if: • not meeting definition • insufficient information to follow up • not Welsh resident Create new cases if not known before	WDS CTAS
	Contact Centre for telephone self- reports (Staffed contact centre 8am- 8pm)	500-2000 cases per day (based on 80% digital literacy)	NHS Number Phone number Disease Symptoms Risk data	Real-time	Create new cases Collect MDS	WDS Risk assessment matrix

ltem	Scope/mechanism	Throughput	Data items	Update	Actions	Links
				timescale		
	PHW national call taker capacity		Contact preference (phone text email) Onset dates Email address Name Address Date of birth			
Risk assessment matrix	An algorithm in the back end of the case and contact management system categorises a case/contact as high or low risk of onward transmission Assigns actions based on risk level	N/A	Transmission risk category (high/low risk)	Real-time	Requests feedback via webform into the single input point if minimum dataset not met Assigns the risk transmission category to the case/contact record and determines the public health actions taken in terms of testing and contact tracing	Database Webform for additional info
Database	Cloud based database Contains master list of all cases and contacts.	Up to 400,000 records	<ul> <li>All information collected during case/contact journey, including:</li> <li>Current status (e.g. case / contact, active/lost/completed)</li> <li>Risk to self-status (high/low risk)</li> <li>Transmission risk category (high/low risk)</li> <li>Type of follow up needed</li> <li>Contact tracing team assigned to</li> </ul>	Real-time	Stores data for other parts of the system to draw upon	Risk assessment matrix Test referral process Surveillance
Automated follow up system	SMS text based follow up system for contacts in active digital follow up	80% of active surveillance	Symptoms: Yes/No	Real-time	Update symptomatic contacts to be cases	Database Risk assessment matrix

ltem	Scope/mechanism	Throughput	Data items	Update	Actions	Links
	Send daily text asking about symptoms Receives response	48,000-128,000 SMS text per day		timescale	Refer to risk assessment process	
Local case list	Subsets of database showing view of cases needing telephone follow up in contact tracing team areas	15-20 per day per team	Contacts' name Phone number Nature of contact (close/household/vulnerable) Known transmission risk category	Real-time	Refer contacts for interview	Database Risk assessment matrix
Local contact list	Subsets of database showing view of contacts for telephone follow up in contact tracing team areas	150 per day per team	Contacts' name Phone number Nature of contact (close/household/vulnerable), Known transmission risk category Type of public health advice given	Real-time	Update symptomatic contacts to be cases Refer to risk assessment process	Database Risk assessment matrix
Dashboard	Regional and national views of live case/contact numbers to enable co-ordination and planning Support regional interventions for complex situations	N/A	Summary statistics (based on surveillance data)	Real-time	Alert for trigger levels for escalation of social distancing restrictions	Database
# 3.2 Population surveillance

The European Centre for Disease Prevention and Control (ECDC) has stated that the objectives of COVID-19 surveillance are to:

- monitor the intensity, geographic spread and severity of covid-19 in the population in order to estimate the burden of disease, assess the direction of recent time trends, and inform appropriate mitigation measures
- monitor viral changes to inform drug and vaccine development, and to identify markers of severe infection
- monitor changes in which risk groups are most affected in order to better target prevention efforts
- monitor the epidemic's impact on the healthcare system to predict the trajectory of the epidemic curve and inform resource allocation and mobilisation of surge capacity as well as external emergency support
- monitor the impact of any mitigation measures to inform authorities so they can adjust the choice of measures, as well as their timing and intensity
- detect and contain nosocomial outbreaks to protect healthcare workers and patients
- detect and contain outbreaks in long-term care facilities and other closed communities to protect those most at risk of severe disease and poor outcomes

Public Health Wales has an established surveillance system for respiratory infections that was updated in 2018 and further updated in the containment phase of the pandemic response. This was accompanied by enhanced surveillance in sentinel general practices and intensive care. The section sets out a proposal for further enhancement of this system and notes that there are specific challenges arising from COVID-19 including the monitoring of the effectiveness of control measures, the assessment of population immunity, and the impacts of the infection on healthcare and other key workers (occupational health).

The plan sets out a specification for community and hospital surveillance, surveillance for incidents and outbreaks, the requirements for occupational health surveillance, surveillance of deaths and surveillance of immunity, as well virological and pathogen genomic surveillance. This is an extensive portfolio of surveillance activity and Public Health Wales considers that all of these are necessary to meet the objectives expected. Furthermore, most of these will need to be led by Public Health Wales but with strong support from health boards including occupational health. We will also need data from other sources and therefore the co-operation of other partners including the Welsh Ambulance Service NHS Trust, the Welsh Blood Service, and universities (genomic sequencing and bioinformatics).

A critical requirement will be the resources and structures to translate the data into action, that is, to analyse, review outputs and interpret surveillance and epidemiological investigations. Only with this infrastructure can we translate, for example, a detectable change in the R number into a rapid adjustment to control measures.

A lot of the resource requirements can be achieved within Public Health Wales by incremental adjustments but the commitment of key human resources to surveillance will limit their application to other core health protection activities including non-COVID-19 response. Therefore we will need to rapidly mobilise from other sources people with skills in statistics, epidemiology (not limited to human), and the handling of large datasets. The surveillance response will also depend on digital resources and information protocols. The surveillance service provided by Public Health Wales will require support from Welsh Government, NHS and other partners to improve data collection and quality.

Consideration should be given to mandating compliance for any essential surveillance requirements, including national-level support for surveillance form completion for hospitalised cases of acute respiratory infection, including intensive care surveillance; completion of electronic request and death reporting forms; and collection of data on outbreaks in enclosed settings (care homes and prisons) in particular and information in relation to testing of key works and explore other occupational health data. Furthermore, effective and efficient working with key partners to is critical to ensure that relevant information is received, analysed and reported on in a timely manner and this will need clear central direction.

## Background

The proposals set out in this Plan update the surveillance strategy dated 14 February 2020, which had aims relating to the containment phase of the epidemic, along with longer-term development plans for monitoring population spread, risk groups, and disease burden. The aims have changed to reflect the new phase of the pandemic, with a view to longer-term developments to support continued suppression and preparation for a vaccination programme. This part of the response plan also builds on the 2018 strategy for surveillance of acute respiratory infections.

The population surveillance part of this plan is in line with the recent communication from the Chief Medical Officer, which set out the elements required from a surveillance plan including information on severity and spread, modelling analysis to inform wider lockdown measures, consideration of community, healthcare setting and social care impacts, identification of risk groups, and use of surveillance to inform response, planning and decision making.

The ECDC has published guidance on surveillance objectives and planning for COVID-19. These are compatible with the aims and rationales described above, and also with current surveillance systems and developments.

Aim	Rationale			
Monitor effectiveness of control measures in	ffectiveness of control measures in To inform policy makers when to apply o			
real-time	reduce measures to reduce transmission			
Measure burden of disease in the general	To document the impact on the			
population	population over time, place, and			

## Aims of surveillance

	determinants such as demographics, ethnicity and deprivation
Identify risk groups for disease and severe outcomes	Inform shielding and future vaccination policy to ensure that vulnerable groups are protected as far as possible
Rapid detection of clusters, outbreaks and local increases	To direct outbreak investigation and control measures
Ongoing assessment of population immunity	To determine the risk of future waves of infection and to measure overall outcome proportions such as case-fatality.
Assurance of occupational health and protection of vulnerable groups through surveillance and screening of key occupational groups	To ensure that key workers are being protected through workplace risk reduction, and that those they care for are protected from introduction of infection.
Monitor the characteristics of the virus including genomic analysis and immune characteristics, and link to epidemiological information	To inform planning, introduction and effectiveness of vaccination programmes, and to better understand the patterns of transmission
Identify and address, with partners, research questions for COVID-19 and its impact, including longer-term direct and indirect effects on the population.	To inform longer-term decision making, including planning for vaccination programmes and Public Health Wales approach to infectious disease and pandemic planning. To trial countermeasures such as the COVID-19 vaccine
To add to the evidence base on COVID-19 and other respiratory infection epidemics using insights from the unique national data infrastructures in Wales and cutting edge genomics surveillance	To contribute to UK, European and global level surveillance and understanding of the epidemiology of seasonal respiratory infections

## Specific challenges for COVID-19

The aims listed above are similar to those for surveillance of other infections and in particular influenza and other vaccine-preventable diseases. Three areas are *specific challenges* for COVID-19, which are usually less well developed for other infections. These are monitoring of the effectiveness of control measures, population immunity, and occupational health.

Real-time monitoring of the effect of the unprecedented behavioural and social interventions applied for the COVID-19 epidemic in Wales is needed to be able to respond quickly to increases or decreases in transmission by lifting or reinstating a range of control measures. This is usually considered only at a basic level for outbreaks as they normally are brought under control within a short timeframe, but for COVID-19 the high transmissibility and lack of population immunity means that the risk of exponential growth will continue whilst no effective vaccines exists.

Population immunity is usually assessed through ad hoc or research-led serological studies, or inferred from vaccination uptake, but for COVID-19 it becomes a crucial element required to assess the risk of resurgence of infection, and to identify people who are immune and therefore at lower risk for themselves and others. This needs to be done in an ongoing and timely manner but will be dependent on the development of a reliable test.

## Priority areas

Through the experience of the Communicable Disease Surveillance Unit (CDSC) in Public Health Wales, and in response to the recommendation from the Chief Medical Officer (CMO) for Wales, there are specific priority areas for surveillance. These are:

- sensitive surveillance to describe the pattern of infection and to identify clusters, outbreaks and geographic spread
- monitoring the rate of transmission by area in real time using modelling (for impact of control measures)
- surveillance and analysis for risk groups for death and poor outcomes
- serological surveillance and the identification of immune individuals
- monitoring the impact on the health and social care system (through hospital, community outbreak and occupational health elements)

## Information for action and evidence-based decision making

A central purpose of surveillance is to provide information for action. As part of the wider Public Health Wales plan and work with other partners including health boards, local authorities and the Welsh government, it is essential that the interpretations and conclusions from this surveillance are used for evidence-based decision making.

It is therefore important to have key structures, groups and individuals which need to explicitly review the outputs and conclusions from our surveillance and epidemiological investigationsso that they are acted upon. For example, should we detect an increase in the reproductive number (R) above one in Wales or a specific area, we need to be assured that there will be a rapid response in stepping up control measures. Wherever possible and appropriate to do so, surveillance datasets and administrative datasets provided to Public Health Wales will be linked to enable rapid production of evidence on risks and outcomes.

## Surveillance plan

There are several elements of this.

## Community surveillance

This will comprise:

- passive surveillance of NHS Direct Wales/ NHS 111 Wales Symptom Tracker data
- working with partners to carry out surveillance using data available from contact tracing applications

- GP surveillance comprising:
  - expanded in hours sentinel GP virological surveillance to cover 20% of Welsh population, by targeted recruitment in urban areas (starting now)
  - modernised in hours sentinel GP virological surveillance to include self-swabbing, by post, to deal with COVID-19 related changes in GP health care models (rolling out within two weeks)
  - expanded epidemiological data collected through sentinel GP virological surveillance to provide information on ethnic group and key-worker status (within two weeks) – expanded to include 20% of population
  - o delivering a protocol for community serosurveillance using the sentinel GP network
  - addition of out of hours GP syndromic data to the daily surveillance dashboard (with two weeks)
  - roll-out of an out of hours equivalent of GP virological surveillance (rolling out as a sentinel surveillance within four weeks)
- maintain syndromic surveillance already in place through NHS Direct and NHS 111 calls
- develop surveillance indicators using data from Welsh Ambulance Service NHS Trust, ambulance call data and emergency department data (within four weeks)
- utilise electronic test request data from new community testing units where available for monitoring numbers of symptomatic key workers and confirmed COVID-19 cases (within two weeks)

## Hospital surveillance

This will comprise:

- enhancing passive surveillance of virological screening and diagnostic testing in hospital patients utilising data from electronic test request forms where available (within two weeks)
- using ICNet: develop surveillance indicators to monitor number of patients admitted with respiratory infections and numbers admitted to ICU (incidence and prevalence) (within two weeks)
- developing and roll-out active surveillance of (severe) acute respiratory infection (SARI) in sentinel hospital emergency departments (including paediatric assessment units), with linked syndromic and virological data (within four weeks)
- developing surveillance indicators for nosocomial COVID-19/ respiratory infections using ICNet (using admission dates and sample date of positive test results) (within four weeks)
- implementing post-mortem virological swabbing of sudden deaths in the community in sentinel hospitals (within four weeks)

- developing enhanced surveillance for severe outcomes in ICU (e.g. cases requiring proning or mechanical ventilation) (scoping)
- utilising linkage of surveillance data where possible to determine outcomes status and healthcare impact in relation to capacity (ongoing)

## Surveillance for incidents and outbreaks

This will comprise:

- surveillance of the number of new / ongoing closed setting outbreaks and incidence, providing operationally useful epidemiological intelligence to alert at-risk areas (geographic and time course maps). Monitoring growth in outbreak number and progression/ impact (within two weeks)
- monitoring incidence of confirmed cases in in key health and social care workers (utilising data from electronic test request forms) (within two weeks)
- monitoring of care-home outbreak associated mortality (within two weeks)
- improved detection of confirmed cases in care homes (via introduction of care home codes in the Laboratory Information Management System (LIMS)), alerting Public Health Wales closed settings cell, Health Protection Team and other partners (within four weeks)
- providing epidemiological support to the closed settings cell and Health Protection Team, incorporating flexible case-definitions to use in "hot-spots" for atypical case presentation (ongoing)
- development of hospital outbreaks surveillance using ICNet (within four weeks)

## Occupational health surveillance

This will comprise:

- Monitoring incidence of confirmed cases in health care workers (utilising data from electronic test request forms) (within two weeks)
- Scoping of healthcare staff sickness/ absenteeism surveillance using occupational health service data (linked ESR and Cohort data).
- Serosurveillance in NHS Wales staff (see below)

#### Surveillance of deaths

This will comprise:

- monitoring of confirmed and suspected COVID-19 mortality in care homes and other closed settings, using available data from Care Inspectorate Wales, the Public Heath Wales Health Protection Team and closed settings cell (within two weeks)
- rapid surveillance of deaths in hospitalised COVID-19 cases (through the Welsh Clinical Portal electronic surveillance form, including ethnicity, underlying risks and key worker status) (ongoing)

- scoping of rapid surveillance of COVID-19 community deaths (via electronic reporting from GPs) (within four weeks)
- use of internationally developed models (EuroMoMo) to detect excesses in all-cause mortality (ongoing)
- linkage of data from surveillance datasets to death certificates (provided by ONS) for further epidemiological analysis (within four weeks)

## Surveillance of immunity

This will comprise:

- development of serosurveillance in NHS Wales health care workers (protocol developed within two weeks)
- serosurveillance in residual routine blood samples taken from (protocols developed within four weeks)
  - antenatal services (pregnant women)
  - Welsh Blood Service
- surveillance for repeat infections and risks for not developing immunity (protocol developed within two weeks)
- scoping of serological studies in population samples (within eight weeks)

## Virological and pathogen genomic surveillance

This will comprise:

- analysis of viral genomes to determine variation and evolution of the virus and implications for immune response (ongoing)
- linkage of virus genomic and epidemiological data to inform outbreak investigation and spread between areas (ongoing)
- identification of variants to underpin vaccine and testing (e.g. escape variants) plans (ongoing)
- waste-water surveillance development (scoping)
- immunological profiles of host genetic and phenotypic comparisons (scoping)

## Digital resources, expanded community testing and linkage of data

The Communicable Disease Surveillance Centre (CDSC) will continue to identify sources of digital information on COVID-19 and its impact, and seek to incorporate these to address the overall aims. This will include consideration (and triangulation) of population symptom trackers such as the Kings College London application (<u>https://COVID.joinzoe.com/</u>).

Community testing, through private providers and other routes, is likely to provide a much wider source of data on community incidence and potentially prevalence of immunity.

CDSC recommends that access to such testing includes a single identifier (NHS number, with means to enable those without to be tested) and also that basic demographics, key epidemiological data and test results are made available along with the identifier. These principles will enable use of this testing data to augment existing community surveillance.

Where appropriate, surveillance and available administrative datasets should be linked by key identifiers to answer valid epidemiological questions on risks for infections, outcomes and effectiveness of counter-measures. This can be done in-house in CDSC for surveillance and accessible administrative data and with external partners in NHS Wales Informatics Service and Secure Anonymised Information Linkage (SAIL) for wider epidemiological evaluation.

## Intervention analysis and epidemiology of the wider impact

CDSC provides evidence through epidemiological evaluation of risks for severe illness and outbreak escalation, and effective measure to control outbreaks and reduce transmission. Work has been ongoing to develop methods to rapidly evaluate vaccine effectiveness with academic partners, through use of a virtual vaccination and outcomes registry. This should continue and be adapted to the current COVID-19 context to evaluate new vaccines.

COVID-19 will have an indirect, detrimental effect on many other health issues. Surveillance and epidemiological investigation, where appropriate led by CDSC in partnership with other teams and organisations will investigate these wider effects of COVID in areas such as childhood immunisation, other preventable diseases, and delays in interventions.

## Behavioural surveillance

Work is ongoing in other areas to monitor the effects of social isolation policies on the movements and economic activities of the population, including behavioural surveys.

CDSC will help to assess the attitudes and behaviours of people engaged through case-finding and contact tracing activities in order to continually improve this intervention and assess its impact, using information gathered by investigating teams. In the longer-term, attitudes toward vaccination acceptance will also be studied to inform vaccination policy and management.

## Convalescent plasma

CDSC is working with partners at the University Hospital of Wales and the Welsh Blood Service to identify and invite recovered COVID-19 patients to donate plasma which could be potentially used as therapies and help inform the development of serological tests.

## Epidemiological outputs and analyses

CDSC will use the surveillance data to address known and emerging questions about the epidemiology of COVID, including (but not exhaustive):

- causes of introduction and spread of COVID in closed settings
- analytic studies (case control/cohort) to determine risk and protective groups for infection and severe outcomes

- analytic support for outbreaks in community and hospital settings
- analysis of deaths data to assess direct and indirect impacts in different settings
- identification of transmission hotspots to direct control efforts and also flexi advice on case definitions for testing
- real-time modelling to estimate growth rates and reproductive number in different settings and populations

## **Enabling factors**

There are four main factors required to enable this strategy and plan, which should be considered in the light of other related parts of the Plan. Although some aspects of enhanced surveillance are time-limited to the duration of the COVID-19 pandemic, and sampling requirements may diminish over the following years, many developments should be considered as an ongoing long-term need. Enabling factors for this surveillance plan are below.

## Workforce, training and consumables

A workforce that is suitably trained and enabled to deliver these tasks with sufficient capacity in a sustainable way. The plan will mainly be undertaken by existing CDSC staff, utilising additional analytic capacity from other teams with colleagues seconded to CDSC from relevant sectors and organisations. The Healthcare Epidemiology Network and its links with health boards will be used to the full to support the strategy. A number of requirements of the surveillance plan will require administrative support.

The increase in active virological surveillance requires additional laboratory support and laboratory administrative support. Aspects of genomics surveillance will require support from Cardiff University. The increase in surveillance sampling and associated laboratory work requires an increased number of surveillance kits, postage, consumables and reagents which will need to be resourced through an increased dedicated surveillance budget. It is proposed to establish a *COVID Surveillance Unit* that will comprise a defined model of roles and workforce that will be led by, and based virtually from, Public Health Wales.

The increased capacity will be provided through several levels.

- increasing staff available within CDSC mainly for analysts at band 5 and 6 level, but also training leads in higher grades to supervise activities. Initially via embedded secondment and training, but a few key substantive posts will be required to secure ongoing surveillance. Consultant capacity can also be increased through secondments
- collaborating with other Public Health Wales departments to take on specific projects under supervision, as has been done with the modelling work with the observatory
- collaborating with wider partners, for example universities and organisations such as ONS, to bring in skills not currently fully developed in CDSC such as more advanced statistical modelling
- accessing knowledge and advice from international surveillance partners (e.g. other devolved administration teams, WHO and ECDC)

- increasing our training function to incorporate additional staff, training of partners (e.g. local authorities if involved in surveillance and contact tracing), and upskilling all staff through ad-hoc and collective programmes (UK Field Epidemiology Training Programme, FETP)
- having dedicated support from administrator and informatics enablers
- ensuring that laboratory side of surveillance is fully supported in developing and maintain expertise, building and retaining processing capacity

In addition, project management support (via a specific embedded post) will be an important part of the implementation of this strategy.

Additional funding for a UK FETP fellow for 2020-21 would be a key part of this activity and link Wales into wider UK developments.

Finally, CDSC will need to develop the expert scientific resource for respiratory infection and associated surveillance and epidemiology, recruit to unfilled posts and rapidly consider how to fill gaps in capacity.

## Support for additional data collection for surveillance

The rapid increase in healthcare demand has meant that additional data collection has been challenging, particularly in hospital and care home settings. One example has been the collection of data on deaths, which is now improving through implementation of an electronic reporting form.

CDSC will require support from Welsh Government, NHS and other partners to improve data collection and quality. Consideration should be given to mandating or encouraging compliance for any essential surveillance requirements, including national-level support for surveillance form completion for hospitalised cases of acute respiratory infection, including intensive care surveillance; completion of electronic request and death reporting forms; and collection of data on outbreaks in closed settings in particular and information in relation to testing of key works and explore other occupational health data. Effective and efficient working with key partners to ensure that relevant information is received, analysed and reported on in a timely manner so that this provides information and intelligence to facilitate appropriate action across multiple agencies.

An identified area of weakness in current surveillance capacity is robust capture of electronic information on respiratory symptoms in patients presenting at emergency departments. Consideration should be given to facilitating improvement, either through betting coding in existing emergency department data systems or improved capture of symptom and demographic data through other means.

## Digital and information management support

Barriers to simple reporting and data transfer need to be lowered by application of informatics resources, such as the ability to enter data on mobile devices, by partners and members of the public. The ability will be needed to link data from test requesting, through to results generation and public health action and information for action, including data on relevant

outcomes such as hospitalisation and deaths. Where appropriate to do so, surveillance outputs will be rapidly disseminated to appropriate stakeholders through dashboard technology.

Resources required include:

- dedicated programmer and developer time
- physical infrastructure such as servers, computers and mobile devices
- software such as Tableau, R shiny, Onomap and other relevant tools
- support by specialist resource within the NHS Wales Informatics Service

## Support from partners

Surveillance requires support from a whole system. Vital elements include support from occupational health, screening, Welsh Blood Service and health boards support for some activities, in particular serosurveillance. Some elements such as ambulance call and emergency department surveillance will also need partnership with health board colleagues.

Key partners for securing information flows are NWIS, ONS, and colleagues in Welsh Government. These are often rate-limiting elements of developments such as electronic request forms. A detailed summary of surveillance developments is set out in the table overleaf.

# Detailed summary of surveillance developments

Immediate and time-limited development from containment phase.

Activity	Data source	Status	Outputs	Costs
Possible case Monitoring	Reconciled data from Microbiology Test List, HPT Case List and PHE Minimum Dataset Forms	Complete – epidemiological evaluation now underway	Daily totals for PHW IMT, WG and PHE Respiratory Leads. Daily PHW IMT epi- summary.	Time costs for scientific/ analytical staff in CDSC and attached programmes in daily rota. Time costs to AWARE staff in filling out PHE MDS forms.
Containment phase confirmed case monitoring. Also contributing to PHE First Few Hundred (FF100) surveillance. Facilitating robust communication of test lists and results between HPT and Microbiology.	As above	Complete – epidemiological evaluation now underway	Daily totals for PHW IMT, WG and PHE Respiratory Leads. PHW IMT epi-updates as required.	Time costs for scientific/ analytical staff in CDSC and attached programmes in daily rota. Time costs to AWARE staff in filling out PHE FF100 forms.
Containment phase contact monitoring. Development of minimum datasets and data capture through Tarian. Provision of daily information for action to contact tracing cell. Assistance in managing daily line-lists.	As above	Complete – epidemiological evaluation now underway	Daily sit-rep for PHW IMT	Time costs for scientific/ analytical staff in CDSC and attached programmes in daily rota. Time costs to Contact tracing cell in filling out PHE FF100 forms.

# Post-containment long term ARI surveillance developments (as at 26 April 2020)

Activity	Data sources	Status	Outputs	Costs
Syndromic surveillance of respiratory calls to NHS tele-health	NHS Direct Wales, NHS 111 wales	Routine daily surveillance in place	Daily trends in respiratory symptom calls (symptom specific data, which can be grouped by syndrome)	Development costs (Public Health Wales CDSC/Vaccine Preventable Disease Programme (VPDP) and informatics staff resource, Welsh Ambulance Service NHS Trust time)
GP surveillance of incidence of respiratory infections in the community Develop new GP syndromic surveillance searches for suspected COVID-19, Acute Respiratory Infection, Upper respiratory tract infection and Lower respiratory tract infection. Scope whether additional surveillance can be carried out for those most at risk (clinical risks and key workers)	Diagnosed respiratory infection data collected from GPs via Audit+	Routine daily surveillance in place	Incidence in the Welsh pop of diagnosed: Acute Respiratory Illness, Upper respiratory tract infection, Lower respiratory tract infection, Influenza-Like Illness, Acute exacerbations of asthma, Pneumonia Reported on a daily basis	Time costs to CSDC/ VPDP and informatics staff in updating surveillance algorithms Time costs to NHS Wales Informatics Service Primary Care Informatics team in updating Audit+ and rolling out update
Sentinel GP virological surveillance of incidence of respiratory infections in the community Factor COVID-19 into GP sentinel surveillance virological tests Modernised GP sentinel surveillance to cope with primary care changes during lock-down and social distancing Additional provision of information on ethnicity and key worker status	Virological samples from the sentinel GP surveillance network Downstream data linkage required for outcomes	Laboratory developments complete System developments ongoing (use of self- swabbing by post). Updating stationary etc. Recruitment plan underway	Confirmed cases of SARS-CoV- 2 diagnosed by sentinel GPs Reported on a weekly/ daily basis	Time costs to CDSC/ VPDP team in engaging new sentinel GPs to this enhancement. Financial costs to Integrated HP and Microbiology for kits and laboratory consumables. Time costs for PHW virology/ specialist virology centre in processing samples

Activity	Data sources	Status	Outputs	Costs
Targeted recruitment of sentinel practices in urban areas (rural area coverage already adequate)				Additional administrative support required to prepare and post kits
OOH GP surveillance of incidence of respiratory infections in the community. Re-establish electronic data collection from system providers. Set up equivalents to in hours GP Read code surveillance indicators	Diagnosed respiratory infection data collected from Out Of Hours GP services	Issues with data collection now resolved Work underway to develop surveillance indicators and factor in to daily reports.	Incidence of suspected COVID- 19, ARI, LRTI, URTI, ILI in the Welsh pop seeking urgent primary care out of hours Reports on a daily basis	Time costs to CDSC/ VPDP and Informatics staff in developing the surveillance Assistance from NWIS
GP OOH virological surveillance of incidence of respiratory infections in the community. Establish an OOH equivalent of the GP in hours sentinel virological surveillance	Virological samples from the OOH virological GP surveillance network Downstream data linkage required for outcomes	Scoping and early discussions complete.	Confirmed cases of SARS-CoV- 2 diagnosed by OOH GPs Reports on a weekly/ daily basis	Time costs to CDSC/ VPDP team in developing surveillance and engaging OOH GPs Financial costs to Integrated HP and Microbiology for kits and laboratory consumables. Time costs for PHW virology/ specialist virology centre in processing samples
Passive virological surveillance of testing in patients and key workers. Improve capture of key risks and outcome data	Test request via the LIMS electronic test request form, via Datastore Test results via Datastore	Development work underway	Numbers of tests/ positive results in hospital patients & key workers Daily reports	PHW Microbiology, Informatics, CDSC and NWIS time in developing the updated electronic test request form and ensuring dataflow PHW CDSC and Microbiology time in setting up daily analyses and interpreting results

Activity	Data sources	Status	Outputs	Costs
Surveillance of Severe Acute Respiratory Infections requiring paramedic support/ conveyance to hospital	Welsh Ambulance Service Trust – ambulance call data	Data access complete Development of surveillance indicators ongoing	Ambulance call-outs for respiratory conditions/ respiratory distress, by outcome Reports on a daily basis	Time costs for CDSC and informatics staff in developing surveillance. Time costs for WAST staff in supplying data. Potential financial costs
Surveillance of Severe Acute Respiratory Infections in patients attending emergency departments. Sentinel hospital SARI surveillance	Sentinel hospital symptom/ epi data collection and virological swabbing for symptomatic ARI attendances. Downstream data linkage required for outcomes	New development – protocol development underway	Incidence of patients presenting to A&E with severe acute respiratory symptoms. Confirmed cases of SARS-CoV- 2/ other ARI in patients presenting to A&E with severe acute respiratory symptoms. Reports on a daily basis	Time costs for CDSC/ VPDP and informatics staff in developing surveillance. Time costs to A&E clinicians in providing data (less if electronic solution available) Time costs to A&E clinicians in sampling patients Financial costs to Integrated HP and Microbiology for kits and laboratory consumables. Time costs for PHW virology/ specialist virology centre in processing samples
Surveillance of Severe Acute Respiratory Infections – passive surveillance of testing from hospital locations	Datastore	Development work complete	Number of patients tested for respiratory infections who were sampled in A&E/ ICU/ other hospital locations	Time costs for CDSC/ VPDP and Microbiology in processing data Time/ financial costs for microbiology in the event that wide testing is recommended (although this is part of the diagnostic pathway and not surveillance)

Activity	Data sources	Status	Outputs	Costs
Surveillance of Severe Acute Respiratory Infections in hospital patients using ICNet Linkage of PAS and Datastore for testing, admission and outcome data Development of surveillance indicators for community vs nosocomial infection Incorporating downstream outcome data (ICU length of stay and mortality)	ICNET-Datastore link Master patient index Death certificate data from ONS	Methods developed for data linkage aspects complete, further work underway	Weekly/ daily number of patients admitted to hospital/ ICU. Weekly/ daily number of patients admitted to hospital/ ICU who were tested for SARS- CoV-2 or other respiratory infection. Severity index – proportion of admitted cases of COVID-19 requiring ICU/ deaths within 30 days	Time costs for CDSC in developing data linkage and analysis methods, processing data, analysing and interpreting new data
Surveillance of severe COVID-19/ ARI infections requiring ICU: requirement or ventilator support/ proning	Critical care network/ data systems. ICNet Downstream linkage to outcome data	Scoping phase underway	Scoping phase underway	Time costs for CDSC and other stakeholders in heath boards, and informatics
Mortality surveillance: Use of EuroMoMo (modelling) to detect weekly occurrences of excess all-cause mortality Rapid Mortality Monitoring in hospitalised COVID-19 cases (via WCP e- Form) Collection of death notifications from care homes	Welsh Clinical Portal (WCP ICNET Datastore ONS deaths registrations Pii and data linkage to enable epidemiological evaluation	Rapid Mortality eForm developed and rolled out in 3 health boards and 1 trust Work to quality assure, reconcile and analyse data from closed settings cell underway Daily patient level access to death	Daily numbers of deaths in COVID-19 confirmed cases in hospital Daily numbers of deaths in care home residents. Weekly EuroMoMo outputs Case-fatality rate in patients who were admitted to hospital with COVID-19	Time costs for CDSC/ VPDP and HARP in processing data Time costs for NHS Wales Informatics Service to amend data flow from ONS Possible financial costs if ONS development work needed Support from PHW Observatory

Activity	Data sources	Status	Outputs	Costs
Work with ONS and Public Health Wales Observatory on more detailed mortality surveillance using death certificates Linkage of Public Health Wales testing, rapid mortality monitoring and ONS deaths certificate data for epidemiological evaluations		certificate data agreed with ONS (analysis proposal signed off)	(deaths in hospital or within 30 days of discharge) Weekly trends in pneumonia deaths/ respiratory related mortality Estimates of settings based mortality	
Outbreak and incident surveillance: Surveillance of new and ongoing outbreaks and incidents in care homes/ closed settings Monitoring of testing and cases in key social care workers. Improved detection of cases within closed settings utilising LIMS electronic test data Supporting the closed settings cell and HPT with rapid surveillance information and epidemiological/ virological investigation Developing and utilising tools within ICNet for hospital outbreak surveillance	Tarian ICNet PHW closed settings cell (and care homes	Ongoing development work underway	Daily/ weekly numbers of new and ongoing incidents, by setting Daily numbers of tests/ cases in key social care/ healthcare workers Alerts to closed settings cell and epidemiological information Reconciled data and subsequent epidemiological evaluation.	Time costs for CDSC, Health Protection Team, closed setting cell, other stakeholders
Occupational health: Monitoring of confirmed cases in healthcare workers (utilising data from LIMS electronic test request form) Scoping of healthcare staff sickness/ absenteeism surveillance using occupational health service data	Datastore Health Board Cohort/ ESR databases Serosurveillance	Scoping underway	Number of tests/ cases in health care workers Trends in absenteeism (depending on availability of data) Levels of SARS-CoV2 antibodies in NHS Wales staff	Currently under scoping

Activity	Data sources	Status	Outputs	Costs
Serosurveillance in NHS Wales staff				
Analysis of viral genomes to determine variation and evolution of the virus and implications for immune response Linkage of virus genomic and epidemiological data to inform outbreak investigation and spread between areas Identification of variants to underpin vaccine and testing Waste-water surveillance development Immunological profiles of host – Genetic and phenotypic comparisons	Linked epidemiological, microbiology and sequencing data Other datasets under scoping	Developmental work underway	Reports on virus variability and detailed genetic epidemiology underpinning outbreaks and transmission Routine reports on viruses detected in environmental sources Epidemiological reports on variation in pathogenicity between virus types and host factors	Laboratory and administrative support for sample management and processing Laboratory consumable costs and potential improvements in processing capacity Other costs currently under scoping

# 3.3 Sampling and Testing

## Introduction

Sampling is the process of taking a sample from the body that will then be tested. Currently, samples (swabs) from the back of the throat are taken to detect antigens (PCR tests) and whether someone *has* COVID-19. We will also be taking blood samples from people to check for antibodies (serology tests) which show if someone *has had* COVID-19.

Testing for COVID-19 is a critical part of the response to the pandemic in Wales. The Welsh Government has developed a National Testing Plan which sets out a phased and scaled approach to COVID -19 testing and has two prime objectives:

- 1. reducing harm from COVID -19 (direct and indirect)
- 2. enabling the release from behavioural and social interventions.

A Task and Finish Group, led by Welsh Government has been established to develop and oversee the National Testing Plan. It is acknowledged that delivering this Plan at pace will require agility, lateral thinking, co-production and engagement with a range or trusted partners and external stakeholders. The Welsh Government has already undertaken a rapid review of current arrangements and the learning and recommendations of the <u>review</u> has been built into the next phase of the response.

## **Types of Testing**

Two main types of test are / will be available over the next phase of the pandemic:

- Antigen polymerase chain reaction (PCR) test for ribonucleic acid (RNA): To identify those who are currently infected by the virus
- Antibody test: To identify those that have had COVID -19 and have developed an immune response to the infection and thereby confirm infection.

Antibody tests remain under development and so the next phase of the response will rely mainly on antigen testing. However, the same co-ordination and process, implementation arrangements are required and can potentially be utilised for both tests

#### **Priorities for Testing**

Within the overall objectives of a Testing Strategy there are key priorities for utilising the available capacity for testing both now and as the capacity increases.

An enhanced sampling and testing process needs to be integrated into the response plan for the next phase of the pandemic. This needs to be understood and owned by all stakeholders.

Testing in the next phase of the response will need to be delivered for several priority reasons:

- diagnosis of symptomatic hospital patients
- healthcare / social care management including infection, prevention and control
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- testing to inform risk assessment of symptomatic general or specified populations, antigen and antibody (+/- contacts) and public health control actions including contact tracing
- testing for surveillance (sero-prevalance of specific cohorts as well as genomic analysis)
- critical worker testing

Decisions about testing priorities will need to be taken on a system wide basis, relating to the testing capacity available at any given time and following clinical, ethical, and health protection principles.

# **Testing process**

Key to implementing the next steps is a clear understanding, ownership and delivery of the various aspects of the testing process. The testing process can be described as having four elements:

- test requesting
- sampling
- laboratory testing
- reporting of results

## Learning from current challenges

The multiple purposes for testing outlined above will continue to challenge available capacity. Current implementation has already highlighted the complexities involved in delivering the four elements of the testing process across multi-agency partner organisations across Wales, and in the context of a pandemic with a globally challenging and competitive supply chain for equipment and chemical reagents that every country worldwide is competing in.

Given the need to apportion and prioritise the available testing capacity at any given time to optimise its use, it is recommended that A *National Sampling and Testing Group*, as a subgroup to the Welsh Government led national Programme Board, should be established. This should agree a once for Wales service specification for sampling and testing and have operational oversight of the end-to-end process in order to ensure an efficient and effective model for sampling and testing across Wales. The group should monitor real-time, relevant measures of performance for the key steps in the process.

Details of the sampling and testing plan are outlined in the next sections. To facilitate swift progress, Public Health Wales has identified a number of critical dependencies and key decisions for the National Sampling and Testing Group referenced above, which have been summarised at the end of the section. That will build in efficiency, timeliness and a clear operational model for the testing process.

#### Role of Public Health Wales in the Sampling and Testing Plan

Public Health Wales has specific roles to deliver as part of the overall Sampling and Testing plan. Primarily, Public Health Wales will undertake laboratory testing including genomic sequencing of samples in accredited laboratories. Public Health Wales will also provide Public Health Protection Response Plan Page 56 of 98 *professional* advice in support of the sampling arrangements established across Wales. This is because different cohorts of people being tested will need different platforms and/or deployment and use of different tests, for example, point of care testing (POCT) in care homes. The *professional* involvement of Public Health Wales will also allow testing priorities to be adjusted within the limits of the laboratory capacity.

Public Health Wales should not be involved in the *operational* management of any of the sampling facilities and health boards have expressed the desire to manage the current sampling sites, and any that will come online in the future.

## Roles of other key partners in the Sampling and Testing Plan

The Welsh Government National Testing Plan acknowledges that the plan requires coproduction and engagement with a range or trusted partners and external stakeholders to develop and implement. Describing this as part of a wider public service framework, the range of roles are outlined overleaf.

TASK	Welsh Government	Public Health Wales	Health Boards	LRF / SCG	Key Worker Employers (including Local Authorities)	NHS Wales Informatics Service	NHS Wales Shared Services Partnership
Development of a single integrated network, coordinated nationally to oversee delivery of sampling and testing across Wales to support the Recovery plan	Policy Lead	Strategic Advice	Support	Support	Support	Support	Support
Test subject selection and identification	na	Strategic Advice & Delivery (General Population/ Surveillance)	Delivery (Patients/Health Care Worker)	Delivery (Key Workers)	Support	Support	-
Sampling ordering process (digital & manual)	na	Strategic/Operational Advice	Support	Support	Support	Delivery (digital solution with partners)	-
Sampling solution	na	Strategic/Operational Advice Delivery (Home testing with partners)	Delivery (Coronavirus Testing Units/Drive through/Mobile Unit) with partners	Support	Support	Support	Delivery (kit ordering logistics)

TASK	Welsh Government	Public Health Wales	Health Boards	LRF / SCG	Key Worker Employers (including Local Authorities)	NHS Wales Informatics Service	NHS Wales Shared Services Partnership
Coordination of sampling/testing demand/capacity	na	Strategic/Operational Advice & Delivery (General Population/ Surveillance)	Delivery (Patients/ Health Care Worker)	Delivery (Key Workers)	Support	Support	Support
Test requesting (ETR & coding)	na	Strategic/Operational Advice	Support	Support	-	Delivery (Electronic Test Requesting solutions with partners)	-
Coordination of transport from sampling solutions to appropriate labs	na	Strategic/Operational Advice	Support	Support	-	Support	Delivery
Test selection for different cohorts	na	Strategic/Operational Advice and Delivery	Delivery	Support	-	Support	-
Test location (platform locations/Near patient tests/POCT)	na	Strategic/Operational Advice	Support	Support	-	Support	Support

TASK	Welsh Government	Public Health Wales	Health Boards	LRF / SCG	Key Worker Employers (including Local Authorities)	NHS Wales Informatics Service	NHS Wales Shared Services Partnership
Test Delivery	na	Strategic/Operational Advice Delivery (Platform testing/Near patient testing)	Delivery (Point of Care Testing/Platform testing/Near patient testing)	-	-	Delivery (Laboratory Information Management System coding/ Interfacing)	Support
Result delivery	na	Strategic/Operational Advice Delivery (Patient results via text messaging))	Support	Support	-	Delivery (Digital solutions)	-

# Sampling and Testing Plan

The strategic plan for testing needs to address all aspects of the testing process and ensure that these are appropriately co-ordinated, so as to address the key priorities and maximise the use of the available laboratory testing capacity at any one time. The next section provides further details of the sampling and testing process requirements.

The COVID-19 Sampling and Testing plan needs to be integrated into the general response to the next phase of the incident. There are specific elements that are delivered wholly by Public Health Wales, and others that will be delivered largely by partners. As outlined previously, the key processes that, irrespective of delivering organisation, need to be integrated are:

- test requesting
- sampling
- laboratory testing
- reporting

Consideration needs to be given to the differences between the Welsh and English health systems and approach to testing. In order to utilise single dry swab, electronic test requesting and integration into the Welsh Clinical Portal to ensure that we have access to results, an alternative to the UK wide approach will need to continue to be developed.

#### Test Requesting

Test requesting has been a significant challenge to-date and a simplified system is required. Targets for testing beyond the current focus on diagnosis and clinical decision-making, health and other key workers, and residents in care homes and other closed settings are described in more detail later in this section.

Electronic Test Requesting is required for as many tests as possible and electronic/online sampling requests solutions are being implemented and rolled out. A critical dependency with any test requesting system is the link to the Welsh Clinical Portal, to facilitate use of the test results. This is one of the key reasons why Wales has pursued an alternative approach to the rest of the UK.

The process of requesting a test, has three elements:

- identification of people who need testing
- process of arranging sampling
- electronic test requesting.

Based on the various purposes for testing, different cohorts of people may be identified for testing. These will include:

• patients for diagnostic purposes:

- this will be undertaken by health boards and trusts. The normal processes will be followed for the identification of patients requiring testing, supported by guidance and criteria.
- key workers to support maintenance of the workforce:
  - key workers are currently identified by their employing organisation as per the Welsh Government policy for Critical Worker Testing. It is important that all employers own and discharge this responsibility
  - once identified, health boards will oversee the co-ordination of sampling of both Health Care Workers (HCWs) and Social Care (notably Care Home, Domiciliary Care, Supported living) workers
  - oversight and co-ordination of other critical worker groups needs to be undertaken by each of the four Local Resilience Forums (LRF)/Strategic Coordinating Group partnerships across Wales, or one of the key constituent partners.
- residents in care homes or other enclosed settings:
  - residents in care homes and other enclosed settings (e.g. prisons) are currently identified through Public Health Wales Health Protection, following notification. At the date this report has been written, this is being reviewed with Welsh Government, Care Inspectorate Wales and health boards, in line with recent changes to Welsh Government policy. Health boards have been given responsibility for swabbing residents (within 24 hours) and staff (within 48 hours) of notification.
- symptomatic general population and contacts to support control measures:
  - symptomatic members of the general population and any contacts who require testing will be identified through Public Health Wales Health Protection or a digital solution.
- specific cohorts (e.g. HCW sample, antenatal) to be sampled for surveillance:
  - specific cohorts to be sampled for surveillance purposes will be identified by Public Health Wales CDSC.

The process of arranging sampling will follow normal procedures for patient diagnostic sampling.

For other groups, an electronic sampling request solution will be available. At the time of writing this Plan, this is under development as an initial key worker module and is now being rolled out in phases. The further development of additional modules for closed settings residents and symptomatic general population will also be required. These arrangements/ contracts need to be concluded. The principle is that a subject is identified as requiring testing, and this is validated online leading to assignment to one of the available sampling options, as they become available: home sampling, Coronavirus Testing Unit sampling, Mass Testing unit sampling, or Mobile Sampling Unit Sampling. Depending on allocation, appointments would be booked or sampling kits dispatched.

Electronic Test Requesting is required for as many tests as possible in order to:

- ensure rapid smooth flow of testing through the laboratory
- enable appropriate patient information is collected (e.g. patient type, location etc)
- support electronic delivery of results
- support end-to-end process and performance monitoring
- reduce the risk of transcription errors.

Electronic Test Requesting (ETR) for COVID -19 exists within the Welsh Clinical Portal (WCP), and is available in the health board instances of the WCP to allow in-patient test requesting. An all-Wales instance of WCP with COVID -19 test requesting has been created to allow ETR in non-inpatient settings such as CTUs, Mass Testing Centres etc. This version of the test request includes additional qualifiers to enable further information to be collected about keyworker status. The digital sampling-requesting solution being developed will link to the WCP ETR, and should be able to automatically generate an electronic request.

For the next phase of COVID -19, when delivering COVID -19 testing at scale, all samples should be requested either via existing WCP ETR solutions or via the digital sampling-requesting solution generating an ETR.

#### Sampling

Several arrangements are now established or being established to deliver the sample taking process. These have predominantly been delivered for antigen testing, but may have use for serological testing as this develops. These include Community Testing Unit sampling, Mass Testing unit sampling, Mobile Sampling Unit Sampling. Current approximate sampling capacity for pcring is outlined below. Note this excludes in-patient sampling.

Facility	Max Capacity (approx.)/day	Total (approx.)/ day
Coronavirus testing units		
• 20 units	2000	2000
Population Sampling centres		
Cardiff City Stadium	400	
Llandudno	120	
Carmarthen	120	1040
Abercynon	400	
Liberty Stadium	ТВС	
Mobile Testing Units		
8 teams	300 (each team)	2400
	Total	5440

Home self-sampling is currently in development and will create significant additional capacity that supports the increase in testing capacity that is due to come online. Further increases in sampling capacity may be required, especially with regard to serological testing. At the present

time there is no additional support from UK Government for population sampling centres. Additional resource will, therefore, need to be sought to create them.

Public Health Wales has supported the setting up of and delivery of certain elements of sampling capacity. However, the majority of sampling to date has been provided by health boards. Operational delivery of sampling should remain with health boards, enabling Public Health Wales to focus on timely delivery of testing.

In ensuring that sampling and testing is effectively coordinated, an appropriate network of 'local sampling facilities' across Wales is required to implement the testing requirements. These will be further described, by local area, in the supporting operational plan.

Sampling for different tests require different solutions. Currently, the three main sample types are:

- throat swab for viral detection
- serum sample for serological testing
- pin-prick blood sample for lateral flow serological test

A number of routes through samples could be obtained will form part of the plan:

- diagnostic testing in hospitals via 'normal' processes
- diagnostic testing in primary care via 'normal' processes
- Coronavirus Testing Units (CTUs)
  - o currently delivered by all the health boards
  - o may double as drop-off centres
- population sampling centres
  - currently (at the time of writing) established sites are Cardiff City Stadium, Rodney Parade, Carmarthen Showground, Llandudno and Liberty Stadium (being established)
  - o plans are progressing for a site in Merthyr Tydfil
  - o currently used for throat swab testing
  - may be appropriate for serological sampling.
- home self-sampling
  - throat swab for virus detection
    - involves drop-off centres
    - may involve pick-up element
    - may involve postal service.

- may be appropriate for lateral flow serological test (dependent on utility of the available lateral flow kit)
- may be appropriate for future virus detection POCT.
- mobile testing units
  - a number of units have become available and will be deployed to areas of greatest need to deliver
    - sampling of care homes and other enclosed settings, where access may be otherwise difficult
    - pop-up CTU facilities.

Sampling requirements for serology, using the planned conventional methods will be a significant challenge, due to the need for large scale phlebotomy. Future potential developments using lateral flow devices may mitigate this, but appropriate kits are not currently available, and the timeline for availability remains uncertain.

## Laboratory Testing

Laboratory testing is undertaken either to detect the virus to identify current infection or to detect the immune response to infection. Several platforms are in use or planned but these have been subject to external supply chain factors. Public Health Wales has also been undertaking genomic analysis and this will form an important part of the testing plan throughout the next phases of the pandemic.

#### Detection of Virus

Detection of the virus is used to identify current infection. The methods available for detection of the virus are:

- PCR to detect viral RNA in a sample.
  - The WHO endorsed targets for PCR testing are:
    - E gene assay
    - RdRp gene assay
    - N gene

#### The current platforms available in Wales are:

Platform	'E' Gene	RdRp (ORF1)	'N' gene	RNAse P (Sample control)
In House	Yes	No	No	Yes
Seegene CE	Yes	Yes	Yes	No
Roche EU	Yes	Yes	No	No
M2000 EU	No	Yes	Yes	No
Luminex EU	Yes	Yes	Yes	No
Perkin Elmer	No	Yes	Yes	No

- PCR can be delivered by
  - bespoke in-house assay
  - high-throughput laboratory platforms (e.g. Roche)
  - rapid low-volume laboratory platforms (e.g. Cepheid, ePlex, Biofire).
  - Point-of-Care (POCT) assays (e.g. Menarini)
- Selection of platforms must be suitable for the cohort tested
  - o high throughput automated platforms for Key Workers
  - platforms that allow more quantitation and interpretation for in-patients or special groups (e.g. BMT)
- POCT tests may be useful for care home settings with mobile testing units
- Tests to detect viral antigens
  - None available currently, but likely to appear in the next month as Point of Care Testing, or Lateral flow kits. Performance characteristics unknown.

#### Detection of antibody to the virus

The immune response to the virus involves production of IgM initially (by approximately Day 7 of illness) and later, the production of IgG. The detection of IgM may be useful in the initial diagnostic pathway of patients, although IgM assays commonly have issues with a lack of specificity, and the IgM response will not be present in early infection. The detection of IgG may be used to establish if a person has been previously infected by COVID-19, and therefore may be useful for seroprevalence surveys. It is unknown whether the assays currently available detect immunity, or just previous infection, and they cannot therefore be used for establishing immunity.

The methods available for detection of antibody to the virus are:

• Laboratory based platforms that detect IgG or IgM, or total antibody (e.g. Euroimmune, Epitope, Ortho Clinical Diagnostics)

• Lateral flow kits that detect IgG and IgM (e.g. Menarini)

## Location of laboratory testing facilities

At the time of writing, PCR platforms are all located within the Public Health Wales Cardiff Microbiology laboratory in University Hospital of Wales. Additional sites will be coming on-line with the arrival of additional equipment. Serology platforms are not operational yet within Wales.

In the next phase, further PCR platforms and serology platforms will come online, across NHS Wales and this will need to be coordinated with the Welsh Pathology Network to maximise efficiency and delivery of the appropriate testing for the various testing scenarios, and to ensure that non-COVID-19 microbiological testing can be maintained. The outline proposal will deliver this through a coordinated distributed testing resource as below:

- development of a Central COVID-19 testing facility is being explored, subject to approval, the purpose of this will be to:
  - give adequate space for the delivery of high throughput testing sited at a new facility outside the current footprint of the Public Health Wales Cardiff Microbiology laboratory
  - include large testing platforms for PCR testing (e.g. Perkins Elmer) and serology testing (e.g. Ortho Clinical Diagnostics)
- maintenance of specialist PCR testing in Cardiff Microbiology laboratory in University Hospital of Wales (e.g. Seegene, in-house)
- expansion of specialist PCR testing platforms to Public Health Wales regional Microbiology Laboratories in North Wales and Swansea (e.g. Seegene)
- expansion of rapid PCR testing to acute hospitals across Wales (e.g. Cepheid, ePlex, Biofire)
- development of serology testing capacity within Bioscience and other pathology laboratories across Wales. This is dependent on the performance of new serology tests (when they become available) that can be run on existing platforms in Biosciences departments.

## Genomics

Genomic analysis of the virus is performed on positive samples and can be combined with other data types (e.g. eHealth, epidemiological and/or mobile phone data) to;

- identify imported versus local cases
- characterise groups of cases that may or may not be consistent with local transmission
- estimate rates of epidemic growth from the genome data
- determine patterns of within-country (UK and Wales) virus spread
- provide support in the monitoring of the effects of non-pharmacological interventions on SARS-CoV-2 spread, epidemiology and biology

# Reporting

Reporting results has also been problematic though reporting within the healthcare system through the Welsh Clinical Portal (WCP) and the normal flows into DataStore, ICNet and Tarian are working well. The recent introduction of mobile phone texting is a positive step and is making a difference to reporting of results of key workers.

This is a key part of the proposal and decisions are necessary on the expansion of this service. Digital access and literacy will also need to be considered as we introduce and expand online and mobile systems.

Once suitably identified samples have been received and tested in the laboratory, the results will be available for the 'normal' routes of reporting. They will go to WCP, and be available to clinicians, and there will be the normal flows into DataStore, ICNet, and Tarian etc.

However, there will be additional requirements for key worker testing and general population sampling.

For key worker testing, a mobile phone texting service is used by Public Health Wales to deliver a result by Text, and to direct the subject to an information webpage. This is currently only deployed at small scale, and other key workers are getting their results through a variety of means. Ideally the Public Health Wales solution will be rolled-out to deliver results to all key workers, wherever they are sampled. It is envisaged that a mobile phone texting service will be used to communicate results to the general population.

For key workers, there is also a line-listing being developed by NWIS for each employer that will be automatically shared daily.

Appropriate electronic coding at the point of test requesting will be essential to facilitate disaggregation and effective communication of results.

## Turnaround times for results

It is important that turnaround times are clinically appropriate for the end-to-end process from identification of a subject requiring testing, to the delivery of the result. The plan describes a number of elements (digital requesting solutions, sampling options, digital reporting solutions) that will speed up the overall process.

In terms of laboratory turnaround times, there will be a mixture of high throughput platforms centrally, smaller platforms regionally, rapid (1 hour) platforms in all acute hospitals, and, when available, near patient tests. This model will deliver suitable laboratory turnaround times for the different testing scenarios.

## Projections for testing capacity in the next phase

In the next phase, testing will need to be delivered for a number of functions including acute patient care, facilitating patient flow, enabling key workers to remain at work, and surveillance.

An important element will be the confirmation of suspected cases self-reporting each day, to support the contact tracing programme.

Table 8 overleaf gives estimates for the potential demand for PCR testing (diagnosis of current infection) and serology (diagnosis of previous infection). The estimates are based on modelling data and the usual incidence of acute respiratory infection.

In the table the figures given for PCR testing are estimates of daily demand. The figures for clinical testing in hospital are modelled (Ferguson) on a suppressed peak scenario, giving 300 projected cases/day and an unmitigated peak scenario giving 3600 projected daily cases.

The figures for care home residents are based on a range of new incidents being identified in 20 - 150 care homes/week, and all residents (asymptomatic and symptomatic) being sampled

The figures for PCR testing of symptomatic key workers are based on the fact that each week between 2 and 5% of the population will experience acute respiratory symptoms compatible with Covid-19 infection.

The figures for PCR testing to support contact tracing are based, as described in Section 2.3, on the back ground rate of acute respiratory symptoms (2 - 5%) and a 50% acquisition rate.

Regarding serological testing, there is a relatively modest demand for surveillance studies. It is anticipated that key worker organisations will wish to test their employees to establish whether they have had COVID-19 infection, although it should be noted that it is currently unknown whether a positive serological test correlates with immunity.

The figures for serological testing of key workers are total numbers of staff in the different staff groups. It is assumed that testing will be prioritised and phased over the coming months.

Lateral Flow Devices that detect antibody from finger-prick blood sample are currently being evaluated as having a potential role for the diagnostic work-up of new admissions with possible COVID-19, and demand is projected to be most likely 300 tests/day. It is possible that Lateral Flow Devices may emerge as having a role in wider serological testing of previous infection. In this case, the demand may be significant.

Factor		PCR	Serology
	Testing Capacity	10,000+ tests/day	10,000+ tests/day
Clinical	Hospital admissions/in-patients with Acute Respiratory Infection	300-3,600	-
Social Care	Care Home residents (Symptomatic & Asymptomatic) when a care home identifies a possible case	100 - 650	-
Patient flow	All hospital admissions (elective & non-elective)		
	All patients prior to surgical interventions	1,000	
	All hospital discharges to social care		
	NHS Workers (Symptomatic)	230 - 570	
	NHS Workers (Asymptomatic)	Dependent on Policy	80,000 to be phased
	Social Care Workers (Symptomatic)	140 - 340	
	Social Care Workers (Asymptomatic)	Dependent on Policy	48,000 to be phased
	Other Health care staff (Symptomatic)	100 - 260	
	Other Health care staff (Asymptomatic)	Dependent on Policy	36,000 to be phased
	Education and childcare workers (Symptomatic)	300 – 760	
	Education and childcare workers (Asymptomatic)	Dependent on Policy	106,000 to be phased
Key Worker	Public safety and national security workers (Symptomatic)	60 - 150	
	Public safety and national security workers (Asymptomatic)	Dependent on Policy	21,000 to be phased
	Food and other necessary goods workers (Symptomatic)	160 - 410	
	Food and other necessary goods workers (Asymptomatic)	Dependent on Policy	57,000 to be phased
	Transport workers (Symptomatic)	170 - 440	
	Transport workers (Asymptomatic)	Dependent on Policy	61,000 to be phased
	Utilities, communication and financial services workers (Symptomatic)	80 - 190	
	Utilities, communication and financial services workers (Asymptomatic)	Dependent on Policy	27,000 to be phased
	Key public service workers (Symptomatic)	60 - 150	
	Key public service workers (Asymptomatic)	Dependent on Policy	21,000 to be phased
	Local and national government workers (Symptomatic)	60 - 160	

## Table 8 - Estimates of Sampling & Testing Demand in the next phase

Factor		PCR	Serology
	Local and national government workers (Asymptomatic)	Dependent on Policy	22,000 to be phased
Contact Tracing	Suspected cases self-reported each day	4,500 - 11,000	
	Population sampling	50	
Surveillance	Serosurveillance HCW		300/day
	Antenatal surveillance		50/day
	Blood donors		50/day
			480,000 total
	Total	7,310 - 19,730/day	(Phased over a period of months depending on prioritisation)

# Conclusions

Until effective coronavirus vaccines or drugs are available, testing will remain a powerful way to monitor and manage the pandemic. There is therefore going to be a significant demand for PCR testing and serological testing. The delivery requires coordination throughout the process from identification of subjects, to arrangements for sampling, electronic requesting, testing, and communication of results. Public Health Wales is best placed to deliver some of these processes, but others (e.g. sampling solutions) are most appropriately delivered by partners. If this is to be delivered within the requisite timescale, strong direction will be required to bring all of the complex elements together successfully. It will be essential for a national integrated approach to testing and sampling through an integrated network to ensure coherence, consistency, equity and accessibility as we move through the Recovery phase.

Similarly, the approach to optimising the available capacity of antigen and antibody testing at any given time will be fundamental to making the best use of testing for the purposes outlined above.

## Critical Dependencies and Key Decisions for the National Sampling and Testing Group

Critical Dependencies		
Supply chain for equipment		
Supply chain for reagents and consumables		
Supply chain for test kits		
Policy arrangements that affect testing demand e.g. enclosed settings, non-elective /		
elective admissions and general population.		
Operational processes that implement the national policies e.g. which groups of individuals		
will access sampling / testing through the web front end.		
Timely provision of IT interfaces into LIMS and WCP		

Reporting data extracts for key worker employers

Delivery of the web front end

That the front end can generate Electronic Test Request and appropriate labelling

Maintenance of provision of swabs and PPE to undertake sampling and testing

Confidence and evidence to support new testing approaches e.g. PCR POCT and lateral flow.

The global demand for testing resources during the COVID pandemic has put significant strain on traditional supply chains and there is continuing uncertainty about both availability and delivery timelines for equipment, reagents and test kits.

#### **Key Decisions**

Agreement to support external supplier contract and consequent development of the Welsh web front end

Agreement to use specialist logistics supplier (business case in train) for home delivery

Establishment of COVID-19 laboratory quickly to avoid service disruption before lock-down relaxation and increase in test demand.

Where sampling should take place and to what volume

Where the decisions around the sampling and testing activities / capacity are going to be decided to direct operational effort.

Process of how to accommodate new testing models into the existing system (that might make other approaches redundant or less critical)

Is there a need for a coordinated approach to reporting results to patients and by whom On the use of the text reporting and financial implications

Clarity with clear governance architecture on coordinating our sampling and testing
# 3.4 Learning from international experience

The fast evolving nature of the CovidCOVID-19 pandemic and the significant unknowns, coming with a new virus and the disease it causes, have led to unprecedented challenges for health systems, as well as to dramatic wellbeing, social and economic impacts. To understand, mitigate and address these, joined-up, collaborative, timely, and evidence-informed public health action is essential across all governance levels, sectors and stakeholders, as well as internationally. Continuous and timely learning from the experience of other countries and the emerging evidence and guidance, provided by key international organisations, is critical to inform such action and the approach going forward.

Public Health Wales has already established strong international links and partnerships, allowing active learning, sharing and access to intelligence on COVID-19. Public health thinking and response have been continuously informed by international experience, evidence and key international guidance, starting from the early stages of the epidemic and moving towards mitigation and management of wider public health, societal and economic impacts in the transition and recovery stages.

As a member of the International Association of National Public Health Institutes (IANPHI), Public Health Wales hosted a webinar in early March, attended by 11 European national public health institutes including Germany, Italy and France, focusing on public communication. We have also taken part in webinars with the South Korean and China Centres for Disease Control and Prevention. Public Health Wales has also had a bilateral discussion with the Robert Koch Institute in Berlin, the National Health Protection Centre for Germany.

Our World Health Organization (WHO) Collaborating Centre on Investment for Health and Well-being is working closely with the WHO Regional Office for Europe, including the Venice Office and the Regions for Health Network. We have gained first hand access to the latest global and European guidance, evidence and learning, related to the wider COVID-19 impacts on people's health and wellbeing, equity, community and system resilience, society and the economy.

Our International Health Coordination Centre (IHCC) has been helping to disseminate and utilise international learning and experience from a range of European and global networks and organisations, and in collaboration with the five nations (including the Republic of Ireland). A weekly e-bulletin with the most recent information and resources is circulated to our Wales' networks.

More recently, in response to the evolving COVID-19 measures, informing Wales' public health response and recovery plans, Public Health Wales has focused on developing an *International Horizon Scanning* work stream (as agreed with Welsh Government). This focuses on international COVID-19 responses, wider impact mitigation, transition and recovery approaches, including:

- proactive gathering and monitoring of international COVID-19 public health experience, data and emerging evidence/learning (from key organisations and selected countries
- collating, summarising and synthesising relevant information and intelligence

• providing a regular (weekly) briefing/report to inform public health and wider action

This work is currently being aligned with and feeding into the Welsh Government Office for Science (and through to the Welsh Government Technical Advisory Cell), as well as into Public Health Wales high level decision making (Gold Command). *For example,* we have been looking into transition/recovery considerations, phases and approaches, in relation to surveillance, contact tracing (track and trace), testing, and the use of masks in community settings.

A particular ask from Welsh Government has been to focus on the wider health, wellbeing, social and economic impacts, outlined as *COVID-19 related harm four in the Welsh Government Framework for Recovery*. This is also part of a wider Public Health Wales' systematised approach to intelligence gathering informing policy action, as outlined in the table overleaf. In addition, we have been looking to understand and provide an insight into the rationale behind implementing and the impact of different policies and public health action, for example, what works and why in different countries.

We are currently exploring how to progress and frame these complex issues to be most relevant and useful to Wales' decision-making, in the context of the rapidly evolving national and global situation, and the vast amount and variation of learning and information both nationally and internationally.

Examples of international learning, applied in this plan include the need:

- to recruit a large cohort of non-specialist staff to undertake contact tracing (learning from South Korea<sup>1</sup> and Germany)
- to develop a decentralised model to deliver contact tracing (learning from the Republic of Ireland and Germany<sup>2</sup>)
- for a set of key indicators to inform the application and lifting of restrictions with regular review (in Germany every two weeks).

Our WHO CC is working with national and international partners to establish an approach to systematic intelligence gathering in order to inform policy action in Wales for the purpose of understanding and mitigating the harms from the COVID-10 pandemic (see diagram overleaf).

<sup>&</sup>lt;sup>1</sup> South Korea has learned from its experience with SARS in 2003 and MERS CoV and had established an extensive network of laboratories, ready and able to test for coronavirus at the start of the pandemic. They had also developed a large workforce capable of mobilising quickly to undertake contact tracing.

<sup>&</sup>lt;sup>2</sup> Germany has an established internationally recognised research involvement in coronavirus and was therefore alert to the virus even before cases were reported outside China. The country also has a longstanding network of laboratories capable of testing very quickly. Since the onset of the pandemic Germany has recruited and mobilised a non-specialist workforce to undertake contact tracing (approximately 5000 university students as so-called 'containment scouts').

# Figure 9 - Systematic intelligence gathering to inform policy action and decision making for COVID-19 response and mitigating wider public health action

Systematic Intelligence to Inform Policy and Other Public Hea Decision-making on COVID-19 Restrictions				Public Health ns		
Objectives		<ol> <li>Identify wider health and well-being impacts associated with any changes in COVID-19 containment or in maintaining the status quo</li> <li>Identify options for minimising harms to public health and maximising benefits of changes and status quo</li> <li>Understand public acceptance, compliance, and broad impacts of COVID-19 measures across Wales and in specific populations</li> <li>Monitor the trends in health and well-being (and morbidity and mortality) not directly caused by COVID-19 infection throughout recovery</li> </ol>				
PHW Tools		COVID Health Impact Assessment	National Public Engagement Survey	International Horizon Scanning	Dashboard of broader health trends	
Outputs		Series of short rapid HIAs on specific topics: lockdown, schools; etc. Wider integrated HIA linking topics	Weekly population and sub-population: Acceptance measures Compliance measures Behaviour changes Well-being impacts	Intelligence exchange with WHO, IANPHI, etc. - weekly insight / synthesis on impacts of lockdown & recovery in other nations	On-going routine analysis of indicators - changes in other mortality, morbidity nationally and in sub-pops	
Target		Continuous - Welsh Government, Public Health Wales				
		As required and requested - Wider NHS, LAs, Criminal Justice, Education, WHO, Other Nations, Business Reps				
		Depending of Potential Benefits – Media, General Public				

# 3.5 Communications and engagement

Developed with partners, it is proposed that a specific phased and open Communications and Engagement Plan is developed to address:

- communication with the public
- communication within and between key partners
- risk Communication to identified and prioritised settings and groups.

Communications and engagement are key tools to enable a smooth transition from the current lockdown phase into subsequent phases of the communications plan. The Communications and Engagement Plan will feature:

- tailored interventions for different segments of the population
- plans to encourage and enable community action and ownership of the solution
- deep insights about what will persuade us all to comply
- ongoing feedback about compliance with protective behaviours and community action that encourages and supports others to do so.

The approach aligns to the Government Communication Service OASIS Model and draws upon evidence set out in published World Health Organization Risk Communication Toolkit and European Centre for Disease Control Social Marketing guidance.

#### Objectives

Communications and engagement for exit/recovery must make the overall recovery strategy clear and actionable, reducing cognitive load wherever possible to ensure messages are easy to understand and follow.

The public health objectives are to support safest possible lifting of lockdown measures by preventing the spread of disease through contact tracing, population surveillance, sampling and testing. Particular consideration will need to be given to how public messages from all partners align to and support Welsh Government messages, and more broadly, how these are influenced by and interact with messages from UK Government.

To support this, the high-level campaign aims are to:

Help people feel confident in the Exit/Recovery approach set out in this document. Building on trust in Public Health Wales, and partners, is an essential pillar of risk communications, as set out in the WHO Risk Communications Toolkit: increased trust is correlated with greater degree of compliance with guidance (WHO, 2017).

Help people understand what they need to do by explaining what we are doing, and what the role of the public is. This will include helping the public to understand public health activity such as surveillance, contact tracing, sampling and testing.

**Reinforce public health messages**, including hygiene messages, when to isolate and adhere to social distancing as advised.

#### Audiences

Audiences must be segmented and messages tailored by audience to reflect the different needs, wants, desires and influences on groups of people.

A range of insights have been used to inform the development of the positioning to date including 'Conceptual Model of Mental Health' and 'Transtheoretical Model' (stages of change) to analyse drivers, motivations, barriers facing the adult population of Wales in the context of the pandemic. This insight was used to inform the 'How are you doing?' campaign. The next phase of public messaging must build on this insight and take into consideration insights derived from the UK Government commissioned YouGov survey, as well as key findings from the 'Wellbeing in Wales' survey led by Public Health Wales, and social media surveillance research commissioned by the Public Health Wales Communications Team.

The four audiences are:

#### 1. Mass population

We will develop and deliver a multi-channel, national public information campaign to drive awareness of the Exit/Recovery strategy across the whole of the adult population of Wales. It will be pivotal for us to engage in an open dialogue with the public so that every individual is understands the role they must play to protect themselves, their family and friends and their communities. The channel approach for mass population is to use a varied media mix, including owned, earned and paid.

- TV, video on demand, radio, paid social
- Public Health Wales social media and web channels
- proactive PR plan to leverage media as key partner
- stakeholder network as a channel, helping our partner organisations to carry the key messages in their owned channels, tailoring materials for them as needed. This includes providing other public sector bodies with relevant, consistent material for their web sites and other channels

#### 2. Vulnerable groups

Vulnerable groups are defined as those at greater risk of becoming seriously ill or dying from COVID-19; people with underlying health conditions, over age 70, with compromised immune systems; individuals who have received shielding letters from Welsh Government.

The channel approach for vulnerable groups is to achieve high level awareness through the activity outlined in the Mass Population segment and support this with specific tailored messages for this audience.

- Public Health Wales web site will be a key channel to house the specific information and guidance people need to support themselves and others
- tailored information packs will be created for dissemination via stakeholder networks who hold existing relationships with the target audiences.

#### 3. Enclosed settings

Enclosed settings, including care homes and prisons require materials in formats that management and residents can access and use. In particular it will be important to help care home workers to feel empowered to overcome perceived barriers to implementation. In addition, as with other groups, it will be essential to limit the cognitive load, making materials simple to access, easy to understand and action.

The channel approach for closed settings is to work in partnership with the enclosed settings cell as well as end users to adapt messages and guidance material for closed settings. Dissemination will be directly to care homes and prisons through existing stakeholder relationships.

#### 4. Stakeholders and partners

There should be a communications work stream within the national programme board which brings together key stakeholders in this plan. This will ensure an effective dissemination mechanism to include Health Boards and Trusts, Local Government, Local Resilience Forum, Local Public Health Teams, Third Sector. Public Health Wales has been working to widen this network to increase connectivity with specific groups including Traveller and Roma Gypsy communities, sensory loss groups, learning disability community, religious communities, the digitally excluded and social influencers.

The approach to support our stakeholders and partners is to achieve high level awareness through the activity outlined in the Mass Population segment and support this with specific tailored messages for this audience, delivered through existing mechanisms such as targeted distribution.

#### Evaluation

The evaluation plan is being devised by the Research and Evaluation team within Public Health Wales and will incorporate a number of measures to understand effectiveness. Specifically, it will evaluate impact on:

- trust in the organisation
- uptake of the desired behaviours

#### **Resources Required**

This strategy should be developed drawing on a wide range of expertise and disciplines. It should also attempt to include meaningful public engagement in its development. Doing this at pace presents a significant challenge and clearly, such a community driven strategy will need robust coordination, management and evaluation.

Investment will be required for:

- media buy (TV, video on demand, radio, paid social)
- social marketing consultancy
- research (focus groups and feedback)
- PR and communications consultancy

# 3.5 Workforce

#### Introduction

The leadership and management of the next phase of the response in Wales will rely upon significant workforce mobilisation both within Public Health Wales and particularly at a regional level and local level across multiagency partners.

The workforce mobilisation requirements need to cover the following elements:

- national, regional and local contact tracing (including enclosed settings outbreak management)
- surveillance
- sample taking and laboratory testing
- national and regional advice and support

Public Health Wales does not have the workforce capacity to deliver this plan and therefore it is essential that concerted leadership is provided at all tiers if it is to be successful. It is recognised that local authorities and health boar.ds, together with other partners, have many of the resources and skills at regional/local levels, to lead and mobilise the implementation of the next phase of the response. In addition, consideration needs to be given as to whether a national agency or agencies such as Health Education and Improvement Wales (HEIW) partnering with NHS Shared services, could also take lead roles in supporting and supplementing the workforce required at both national and regional levels. This could potentially be achieved through COVID Hub Wales, which was set up at an earlier stage of the response, for example, this could assist with the identification of additional epidemiological surveillance and laboratory workforce capacity.

Pace and efficiency is more likely to be achieved through the mobilisation of a workforce identified through redeployment, rather than recruitment processes which are likely to take more time. However, all options to identify the necessary workforce must remain on the table and this will be decided by the regional governing arrangements of partners based on the local context. It is recognised that there will be competing demands for workforce mobilisation as measures for the next phase of the response are introduced. Policy decisions being made at this time must consider the impact on workforce interdependencies, which will impact on available capacity at regional and local levels. It is thought that there would need to be a reasonably constant refresh of the workforce pipeline for it to be sustainable – particularly as and when essential services in local authorities, and other services, may resume over time.

There will be a need to utilise existing multiagency partnerships architecture across regions in Wales, in order to rapidly establish Regional Contact Tracing functions, workforce arrangements will need to be determined and co-led by the Directors of Public Health (DPH) and Directors of Public Protection (DPP) because regional partners understand what multiagency resources they have available to them. Regional Contact Tracing functions will be responsible for the oversight and coordination of multidisciplinary teams at USOA level which

equates to 94 teams across Wales. However, the purpose of detailing teams at a local level is to ensure that there is a consistent approach to contact tracing.

Suggestions have been made that the Welsh university population could be utilised to increase workforce capacity, although HEIW has advised that in some cases university programmes continue to run, and hence this sector may not provide a sustainable workforce pipeline even in the short term. Similarly, the third sector representatives involved in contributing to the plan have expressed the options for the local third sector to be approach and mobilised as part of the workforce where possible.

It is recognised that Public Health Wales has the specialist knowledge, expertise and functions in Health Protection, Surveillance and Virology and therefore will provide the leadership, expert advice and support for the implementation of the COVID-19 response plan. Public Health Wales currently has limited Consultants in Communicable Disease Control (CCDC) capacity and active recruitment is ongoing. It is important that the national resource is able to support regionally while maintaining national resilience across all relevant aspects of infectious disease activity. To maximise utilisation of the available resource, a hub and spoke arrangement between the national Public Health Wales specialist workforce and multidisciplinary Regional Contact Tracing cells/units who will coordinate and manage the 94 multidisciplinary contact tracing teams. The National team will be led by the Incident Directors, assisted by Consultants in Communicable Disease Control, supported by the Health Protection Nurse/AHP team, who will provide specialist advice and support to the Regional Contact tracing cells/units.

Public Health Wales will also provide a National Contact Centre, which will provide additional people-based telephony support and advice, comprised of a non-specialist workforce supported by algorithms.

All elements of workforce mobilisation will be supported and complimented by digitally enabled systems nationally, connected to local levels. The intention is to ensure that any member of the public who enters the system either digitally or by telephone, whether nationally or locally, symptomatic or asymptomatic, is put on the correct pathway to receive the right level of support according to the presenting issue, which includes being directed to local support as appropriate. The model comprises of a combination of automation and people support.

The actual demand for the Contact Centre will be unknown, therefore surge capacity will be required drawing from knowledge gained from the Contact Centre used at the containment phase. The national and regional workforce model will also require suitable IT and telephony supporting infrastructure.

An accountability framework for the workforce is set out in the figure overleaf.

#### Figure 10 - The Accountability Framework

NATIONAL Tier	Strategic direction Information gathered from Regional and Local Contact Tracing systems will feed into National dashboard	<ul> <li>"Once for Wales" functions</li> <li>All Wales contact centre for reporting cases and managing enquiries from the public and professionals (8am-8pm, 7 days a week)</li> <li>Oversight of automated digital elements of the contact tracing and follow-up systems</li> <li>Consistent support to enclosed settings (e.g. care homes, prisons) with ongoing outbreaks</li> </ul>	<ul> <li>Coordinated support (and) specialist health protection leadership</li> <li>Respond to clusters, outbreaks and incidents that impact on more than one region</li> </ul>
REGIONAL Response	Use "information for action" surveillance outputs to identify geographical "hot spots" or groups with high transmission rates needing enhanced control Engage/collaborate with Local Health Boards/ Local Authorities to identify issues and agree joint solutions	<b>Operational responsibility for local contact teams</b> (responsible for delivery of training to the local tier, recruitment of Contact Tracing (CT) teams, and workload management to ensure that demand on the Contact Tracing system can be met within the region)	<ul> <li>Preparing for and responding to small local clusters:</li> <li>Working with care homes, schools or large employers identified as presenting specific risks in their region</li> <li>Direct specialist expertise from the wider health protection system to address clusters and outbreaks within their region</li> <li>Support the local CT clinical leads with expert advice where required and meet with these leads on a regular basis</li> </ul>
LOCAL CCTC	Led by local (non-health protection) clinical lead	Follow-up all identified contacts in their area and refer out of area contacts to other Contact Tracing (CT) teams. Escalate complex cases/contacts or clusters of concern to Regional teams (via Clinical Lead)	Deliver Contact Tracing intervention and public health advice to cases and contacts requiring human follow up in their area
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Public Health Protection Response Plan

#### Regional/Local Contact Tracing Cells/Units

The proposals require a large diffuse workforce distributed into teams that are each responsible for an area with a population of approximately 30,000. It is proposed that each of the 94 teams (based on upper super output area footprint) would operate with a Clinical Lead, Contact Tracers and Contact Advisers. This model (at maximum numbers) has the requirement for nearly 3000 whole time equivalent (WTE)staff across Wales to maintain a service 7 days per week.

Role (per team)	Workforce	Capacity assumption (based on 8hr working day)	Contac cap	t tracing acity
	All Wales		Single team	All Wales (94
				(earns)
Clinical lead (1) x 94	244.9			
	WTE			
Contact Tracer (3-4) x	668.0	Interview 4 cases per day	12-16	1,130-
94	WTE			1,500
Contact Adviser (10-12)	2004	Follow up 10-12 contacts per	100-144	9,400-
x 94	WTE	day		13,500

However, even with a large workforce, the difference between demand and capacity will need to be met by digital systems which can reduce the amount of human resource needed to identify and intervene. The large amount of data collected will need to be analysed in real time to inform strategy at an all Wales levels, and inform the deployment of specialist health protection resource to address the most complex situations.

#### Workforce tools

Public Health Wales will provide role profiles where existing job descriptions do not apply. Job profiles for the Contact Tracing Team have been developed and will be made available.

An e-learning training package will be made available closer to the confirmed go live date, however curriculum content will be provided in advance to support aspects of the implementation of the response plan including contact tracing. Induction information bespoke to local arrangements will also be required by the regional teams, to compliment the national e-learning package of training.

In order to mobilise the human resource elements of this plan, Public Health Wales will work with agencies who are best placed both nationally, regionally and locally to redeploy or recruit the right skills needed for the roles outlined in the plan. For the regional and local teams, it is not appropriate for Public Health Wales to become the employing organisation, and recruitment or redeployment is will be led by the Local Authority or Local Health Boards within the area. Agile systems for employment/mobilisation will be an essential criteria.

NHS Workforce Directors have agreed a set of principles which have been termed as 'mutual aid'. These exist to enable a member of staff to be loaned from one organisation to another

and are designed to simplify existing processes by agreeing how items such as insurance, indemnity and costs are dealt with during the COVID-19 response. A single Memorandum of Understanding has been developed, that each organisation has committed to. Whilst these principles were not designed for the large scale of recruitment that is being scoped here, it is possible for the same principles to be applied.

Combining these elements together, it is possible to envisage how a large-scale campaign could be organised to supplement local recruitment and redeployment approaches using the already established NHS Wales platform and for staff to be mobilised as part of mutual aid across the public sector. Legal advice has been sought to determine if the principles agreed across the NHS could be widened in scope to cover other parts of the public sector. The Welsh Local Government Association will be another source of support to assist with workforce mobilisation requirements to deliver this plan.

#### National Contact Centre

The National Contact Centre will deliver a single point of contact for all enquiries into Public Health Wales.

For resilience and to facilitate social distancing the contact centre should operate across sites in Matrix House, No. 2 Capital Quarter and Preswylfa in Mold. Additional capacity on other sites, and some remote working could be deployed to manage the demand of the selfreporting function. The proposed workforce requirements for the National Contact Centre are set out on page 85 onwards, with proposed numbers based in high/medium and low call volume.

#### 7.4 Workforce Arrangements for Surveillance

To successfully deliver the strategic objectives of the surveillance function outlined in the recovery plan, a highly skilled workforce that operates in an agile, once for Wales way is essential. Expertise available within Wales in the areas of statistics, modelling, data linkage, artificial intelligence and digital capability will need to be fully harnessed. In order to do that, Public Health Wales recommends Welsh Government's Technical Advice Cell (TAC) to lead the co-design of this function. Public Health Wales will work closely with TAC members to support TAC in identifying the human resource, skill set and scale of resourcing required for this and will outline an operational model for delivery. Public Health Wales will establish a COVID Surveillance Centre populated resources from within public Health Wales and also from other key partners as a collaboration.

The plan will mainly be delivered by existing Communicable Disease Surveillance Centre (CDSC) staff, utilising additional analytic capacity from other teams with colleagues seconded to CDSC. The Healthcare Epidemiology Network and its links with health boards will be used to the full to support the strategy. A number of requirements of the surveillance plan will require administrative support.

The increase in active surveillance requires additional technical and administrative support, which can be identified within existing hospital surveillance arrangements. Aspects of genomics surveillance will require support from Cardiff University.

Larger elements (for example the NHS modelling work) will be done by collaboration with partners within and outside Public Health Wales – for example statistical modelling supported by academic colleagues in Swansea University, and NHS modelling by the Public Health Wales observatory analytical team.

Project management support will be an important part of the implementation of this plan. Training and development will be needed to support CDSC staff but also to support increased capacity for field epidemiology, surveillance and contact tracing through training. This is an extension of our usual role in training of partner staff. Additional funding for a UK Field Epidemiology Training Programme fellow for 2020-21 would be a key part of this activity and link Wales into wider UK developments. Finally, CDSC will need to develop the expert scientific resource for respiratory infection and associated surveillance and epidemiology, recruit to unfilled posts and rapidly consider how to fill gaps in capacity.

#### Workforce Arrangements for Sampling and Testing

#### Sample Taking

Public Health Wales will continue to provide professional leadership and technical advice to ongoing sample taking arrangements for Mass Testing Sites and other testing arrangements. Public Health Wales does not have continued workforce capacity to provide operational deployment to support the physical place-based sampling and this will be managed by health boards. The workforce requirements for the operational running of mass sampling sites needs to be determined and led by the regional tiers.

#### Wales Specialist Virology Centre

Public Health Wales laboratory workforce have continued to run Microbiology and specifically virology testing to meet the demands of COVID-19 within the current workforce establishment operated over three laboratory sites, with additional support provided by staff from the Bacteriology service, Welsh Blood and the Genetic service. Staff have been deployed balancing specific competencies and transferable skills to the requirements of the laboratory speciality. Ensuring the correct immunisation status are in place for staff. The university laboratory workforce is also supporting the supply chain, for example by preparing reagents.

The need for an additional site for a dedicated laboratory for COVID-19 testing has been identified and if progressed is likely to be based in the South East Wales region.

Within the Wales Specialist Virology Centre, Public Health Wales is currently having to utilise six different platforms or processes to be able to deliver the national COVID response. Above the current laboratory establishment and mutual aid support already mobilised, it is anticipated that there will be a need for an additional 25 WTE staff.

The increase in surveillance sampling and associated laboratory work requires an increased number of surveillance kits, postage, consumables and reagents which will need to be resourced through an increased dedicated surveillance budget.

#### Equality Impact Assessment

As we move into the next phase of the COVID-19 response, which involves utilising resources around Wales from across the Public Sector, and possibly obtaining other resources from the Community, it is important an Equality Impact Assessment is carried out in order to fully understand the differential impacts and needs of different groups of people. This will enable us to ensure that people have the correct equipment and resources available for them to safely undertake their work, and for us to make sure that the different impact and needs of different groups of people have been considered.

Summarv	of	Workforce	Rec	uirements	and	Roles
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Level	Structure	Role	Workforce
			Requirements
National	Structure         Health Protection Response Cell         All Wales       led by Director of Integrated         HP who is accountable for       delivery of the whole service         Representation         Regional Teams       CCDCs/CHPs         Communicable Disease       Surveillance         Microbiology       Communications         PHW Emergency response       structure	StrategicSet out clear strategicaims and objectives forthe serviceEnsure adequateresources are obtainedand scaled as appropriatefrom PHW, key partneragencies and localcommunitiesEnsure integration ofmanual contact tracingservice elements withdigital/automatedelements as these areintroduced in WalesOversee delivery of theoverall serviceEnsure co-ordination of allelements of the serviceOversee governance andensure standard trainingpackage developed forregional deliverySupportSupport to WelshGovernment with	Resourced by PHW (24/7 on call provision)
		Specialist Advice Support coordination of incidents and outbreaks that include more than one region.	
	Enclosed Settings Cell		Low call volume:

Level	Structure	Role	Workforce
			Requirements
	Representation Health Protection led Wider PHW support	Providing enhanced support to clusters or outbreaks in closed settings including residential care, nursing care and prisons.	Professional Lead 2.6 WTE Call Adviser+ 7.8 WTE Cell Admin 2.6 : Medium call volume: Professional Lead 5.2 WTE Call Adviser+ 15.6 WTE Cell Admin 5.2 High call volume Professional Lead 7.8 WTE Call Adviser+ 20.8 WTE
	Contact Centre Non-specialist Call takers and call handlers working 8am – 8pm 500-2000 cases per day (based on 80% digital literacy)	Support self-referral and enquires Support single point of contact for enquiries into contact tracing service	Cell Admin 7.8 Low call volume Contact Centre Manager 2.6WTE Supervisor Call Adviser 2.6 WTE Call Adviser 10.4 WTE Supervisor Call Taker 2.6 WTE Call Taker 10.4 WTE Moderate call volume: Contact Centre Manager 2.6WTE Supervisor Call Adviser 2.6 WTE Call Adviser 15.6 WTE Supervisor Call Taker 2.6 WTE Call Taker 15.6 WTE
Surveillance	Existing CDSC staff Consultant Head of CDSC (x 1wte)	Increasing staff available within CDSC	Contact Centre Manager 2.6WTE Supervisor Call Adviser 5.2 WTE Call Adviser 31.3 WTE Supervisor Call Taker 5.2 WTE Call Taker 31.3 WTE 3 WTE analysts 2 WTE epi scientists 2 WTE scientists Consultant
	Consultant epidemiologists (x 1.5 wte),		1/2 WTE seconded consultant colleagues

Level	Structure	Role	Workforce
			Requirements
	7 senior scientists (band 8a – 8c) managing analyst resource and leading on a subject area. Epidemiologists, analysts and scientists: B7 senior epidemiologists/ research scientists/ senior data scientist (x4 wte), B6 analyst specialists/ epidemiologists ( x 7), B5 analysts (x 9), B4 information officer (x1)	Senior epidemiology support- external consultants for specific projects, identified through networks Consultant and scientific support to enable protocol development, research governance, grant applications	<ol> <li>1 FTE Project manager</li> <li>2 FTE Administrative Asst</li> <li>External contractors /secondments</li> <li>0.5 WTE Consultant</li> </ol>
	The Healthcare Epidemiology Network Cardiff University (genomics surveillance) Swansea University (statistical modelling) PHW observatory analytical team NHS Wales Informatics Service	Surveillance inputs and data flows Increasing training function resource Support with laboratory side of surveillance	1 WTE Developer 1 WTE UK FETP fellow for 2020/2021
			1/2 W/TE Analyst
Wales Specialist Virology Centre	Virology establishment 26.6 WTE Lead Biomedical Scientist/Operational Manager x 1WTE (band 8) Senior BMS x 6 WTE (band 7) BMS x11.6 WTE (band5 annex u, band 5 & band 6) Higher scientific support worker x3 WTE (band 4) Support staff x5 WTE (band 2&3) Cardiff Micro staff x3 WTE (band 2-7) Additional staff from across Cardiff micro (up to 14 different people have assisted at various stages over the past 2 months) Routinely have up to 3 extra staff members per day (more on weekends -6) from across the labs in Cardiff Micro. These are a variety of grades, and we have been developing their skills & proficiencies dependent on what their	Increase in platforms and activity	Additional 24.0 WTE band3/4 1 WTE band 6 Scientific oversight

Level	Structure	Role	Workforce Requirements
	baseline is. This also helps to ensure we have resilience in the system Additional external staff x5 WTE		Requirements
Communications & Engagement			Requirement to procure/buy Social Marketing consultancy; PR and communications consultancy and facilitate Research (focus groups and feedback)
Regional	Regional Response Cells (7) Operate on local health board footprint Director of Public Health led Representation Local Authority Lead Officers Public Health Consultants Infection Prevention Teams Regional Hospital Epidemiology Logistical support CCT Team leads Health Protection Specialists (e.g. senior nurse / practitioner)	Tactical Use "information for action" surveillance outputs to identify geographical "hot spots" or groups with high transmission rates needing enhanced control Engage/collaborate with LHB/ LAs to identify issues and agree joint solutions Able to deploy specialist resource (HP or IP&C nurse, hospital epidemiologist etc.) to manage complex issues in the region Support the local CT clinical leads with expert advice where required and meet with these leads on a regular basis. Deliver training locally Support Providing enhanced proactive support to closed settings including residential care, nursing care who do not have current outbreak.	To be determined by Health Board DPHs and LA's
Local	Community Contact Tracing Teams (CT) (94)	Deliver contact tracing intervention and public	Clinical Lead (1) Contact Tracer (4)
	Upper super output area based (defined geography population approximately 30,000)	health advice to cases and contacts requiring human follow up in their area.	Contact Adviser (12) All Wales
	Led by local (non-health protection) clinical lead* supported in clusters by business manager (to organica	Follow-up all identified contacts in their area and refer out of area contacts	Clinical Lead (244.9 WTE) Contact Tracer 668.0 WTE Contact Adviser (2004.0 WTE

Level	Structure	Role	Workforce Requirements
	teams operationally) and dedicated administration Supported by 3-4 case interviewers (multiagency professionals) and 10-12 contact advisors (local staff) Providing telephone-based contact tracing service 8 am until 8pm.	Escalate complex cases/contacts or clusters of concern to regional teams	Based on one 11 Hour Shift (with 2 x 30 minute breaks)

# 3.6 Finance and resources, risk management and programme management

#### Finance and resources

NHS Wales organisations were recently asked to submit monitoring returns which captured planned additional spend estimates for all COVID-19 costs for 2020-21 along with non-delivery of planned savings, planned operational expenditure cost reductions and slippage on planned investments. Returns were submitted on 20 April, which contained Public Health Wales estimated costs for the first 4 months of 2020-21. It is recognised, that these were best estimates at this stage, and will continue to be amended as and when procurement and supply chain issues related in the main to testing capacity are confirmed.

The return presented the forecast costs over key areas COVID19 expenditure; establishment of a contact centre, communications/media campaign, community testing (Cardiff City Stadium) and laboratory testing capacity.

Any additional costs associated with the next phase of the plan for contact and trace, surveillance and the logistics of testing will now have to be coordinated by Welsh Government, as these costs will be incurred across the public sector in Wales. It will be important for the Welsh Government to provide clarity as to the financial support arrangements that will be provided to partners, particularly local authorities and health boards, for the rapid implementation of this Plan. There will be need clear definition of additional costs and a methodology for requesting the funding of these directly from Welsh Government.

#### Managing Risk

This plan is written with a clear expectation that all partners across the wider public health system and Welsh Government will play their part in ensuring the plan is implemented as detailed within. We are in a national public health emergency and the implementation of this plan will be an integral part of the Welsh Government's Framework to lead Wales out of the pandemic.

The risk map on page 92 recognises that there is a need to work at pace and this will bring significant risks in relation to workforce mobilisation. Advice will be required from Welsh Government legal department, particularly in relation to possible future litigation and indemnity. Many of the risks which can be attributed to this plan are system risks and will need to be shared across public sector bodies and Welsh Government and so to deliver this plan at pace there is a need for a whole system approach with Welsh Government.

We are living through an unprecedented event and the actions that we may take in responding to the pandemic will inevitably come with risk. However, for every risk there is an opportunity. All organisations, and governing partners, will need to play their role in seeking to manage the risks associated with delivering its functions effectively in order to contribute to protecting the public, improving outcomes and maintaining the essential services in Wales.

As we move towards relaxing of the current lockdown, it is recognised that there will be competing priorities particularly in relation to wider (non COVID related) public health issues, and this will need to be addressed at a policy level. There will also be a need for collaborative working by Welsh Government and specialist public health professionals to ensure that high risk groups are quickly identified and managed appropriately.

To set the context for risk management, we have identified a strategic level risk, and then conducted a threat assessment to consider what operational level risks might prevent the delivery of the objectives set out in this plan, and this is shown on the risk map below. The assessment was carried out using a PESTEL model (Political, Environmental, Scientific, Technological, Economic, Legal), with environmental threats in this context relating to the environment in which this plan will be delivered.

The risk assessment does not go into specific impact descriptions for each risk, recognising that the impact of any one of them could result in failure to deliver the plan and all the consequences that this would bring. However, it is clear that there are two immediate risks that will need to be addressed as a matter of urgency. These are:

- commencing the recruitment and/or redeployment or a large contact tracing workforce
- securing an operable solution to the case management information system.

Actions relating to these risks are in the Implementation Section.

There are significant risks to the public's health and wellbeing that can result from measures taken to control the spread of COVID-19. Public Health Wales is undertaking a population survey, Health Impact Assessments and examining learning from the international public health community in order to understand such risks and inform an evidence based population health approach to tackling COVID-19 across Wales, as we progress through the recovery phase additional research to inform our learning and approaches will be shared across Wales and beyond.

#### Figure 11 - Strategic Risks

#### Strategic Risk

There is a risk that the Public Health Protection Response Plan will fail to deliver the strategic objectives. This will be caused by a failure to understand and mitigate the risks associated with delivery.

	Threats	Risks (There is a risk that)	Part 3 sections	Section list
olitical	<ul> <li>Lack of buy in from partners</li> <li>Business continuity</li> <li>Lack of suitably trained resources</li> </ul>	1. There will be an inablity to harness cross-sector resources to deliver the plan at a sustainable and sufficiently scaled level.	1 2 3 4 5 6 7	1. Contact Tracing
ď	<ul> <li>Inability to capitalise on international learning</li> <li>Ineffective command structure</li> </ul>	2. The Welsh response will not be appropriately informed by lessons from international experiences	1     2     3     4     5     6     7       x     x     x     x     x	2. Population
iental	<ul> <li>Lack of available training</li> <li>Lack of SOPs</li> <li>Failure in a critical supply chain</li> </ul>	3. The systems and processes implemented to deliver the objectives will be unfit for purpose	1 2 3 4 5 6 7	
Environm	<ul> <li>Poor operating models</li> <li>Lack of time to test operating models (systems)</li> </ul>	4. The quality of evidence and data in the system will be insufficient to effectively deliver the objectives and to inform action	X     X     X     X       1     2     3     4     5     6     7	3. Sampling and Testing
	Poor reporting systems     Poor data quality	5. The ability to effectively carry out public health surveillance will be severely compromised	X X X X X 1 2 3 4 5 6 7	4. Learning from international
Scientific	<ul> <li>Lack of timely scientific evidence</li> <li>Lack of surveillance and testing</li> </ul>	6. There will be an unmanageable failure in one or more technical areas	X     X     X     X     X       1     2     3     4     5     6     7	
Cal.	Failure of IT networks	7. One of more critical IT system developed to deliver the strategic objectives will be unfit for purpose		and Engagement
Techni	<ul> <li>Lack of appropriate out of hours IT support</li> <li>IT systems not fit for purpose</li> </ul>	8. There will be insufficient funds to deliver one or more of the strategic objectives		6. Workforce
Economic	Insufficient funding to meet     objectives	9. Harm or a loss of confidence will be caused to a member of the public or staff	1       2       3       4       5       6       7         X       X       X       X       X       X       X         1       2       3       4       5       6       7	7. Finance and Resources
Legal	<ul> <li>Regulatory breach</li> <li>Harm to member of the public</li> <li>Data breach / breach of confidentiality</li> </ul>	10. There will be a loss of confidence in the systems and functions by the public following a high-profile breach of confidentiality/data breach.	X       X       X       X       X       X         1       2       3       4       5       6       7         X       X       X       X       X       X       X	

#### Information Governance

In order to deliver this Plan effectively, there will be a requirement for the handling and processing of sensitive personal data on a large scale. We live in an age where people are ever more concerned about the privacy of their personal information and so appropriate information governance systems and procedures will be critical in ensuring not only that the processes we put in place are effective and enable delivery of the plans objectives, but also to ensure that the confidence of the public is maintained.

Privacy and respect for the confidentiality of personal data will be woven through all processes. Software systems intended to support the response will be designed with privacy in mind from the outset, and every process that staff are required to follow will be underpinned with clear standard operating procedures. Bespoke training will be delivered both for the systems being deployed and for confidentiality and privacy in general, to ensure that staff who are not familiar with handling health information can feel confident in their duties and that the risk of any breach of confidentiality is minimised.

To fulfil our responsibilities for transparency and accountability a full Data Protection Impact Assessment (DPIA) will be undertaken in consultation with key stakeholders, including the Information Commissioner and all steps required will be taken to ensure that personal data is processed legally, fairly and with due respect for confidentiality. Through the DPIA, Information risks will be identified and managed proportionately to ensure as far as possible that personal data is handled securely.

#### Programme management

As Wales enters the next phase of its response to COVID-19 it is clear that the scale will be larger and timescales longer than the previous phases.

It will be imperative that there is a coordinated, focused, decisive and seamless approach to the implementation of the Plan at the national, regional and local tiers. It will be expected that the appropriate programme and project management arrangements are put in place to match these tiers, and by all key organisations involved at the relevant level.

Similarly, in Public Health Wales, as we move into the next phase, our programme management and governing arrangements will be adapted to mirror this Plan.

# Part 4: Implementation and Conclusions

### 4.1 Implementation

The successful delivery of this Plan, and at the pace required, will rely on an organised, coordinated and decisive approach with clear roles and responsibilities understood at the national, regional and local tiers.

Many of the actions that will need to be delivered are interdependent between the different tiers of the system. Consequently, there will be a need for a focus on synchronised delivery and execution as we move into the recovery phase. An associated Implementation Plan will be required at a national level and also within each region and its associated organisations respectively. Similarly, Public Health Wales will establish its own Implementation Plan for its relevant activities.

#### National architecture

It is understood that the Welsh Government is establishing a national 'Programme Board' to oversee the implementation of an approved Plan. It is important that the Board comprises an appropriately balanced representation of key partners. It is recommended that a number of sub-groups to the Programme Board are established for the all-Wales elements of the Plan as appropriate with clear timelines for the delivery of actions.

#### Regional architecture: contact tracing and case management

An overriding view from partners across local government and health is that the regional footprint for contact tracing and case management should be that of the health board footprint. They are also generally of the view that local authorities should lead on the local mobilisation to recruit and/or redeploy a workforce to meet the large-scale contact tracing requirements across Wales, supported by the health board and other partners (including third sector and higher/further education).

A guiding framework, including the required job profiles and relevant training packages will be provided by Public Health Wales, to ensure consistency in the roles and standards across Wales. It will be up to the respective regional arrangements to establish the appropriate governance and operational model for the regional function and the local contact tracing teams, consistent with the framework proposed. This will need to be established and the workforce recruited/redeployed as soon as possible. Similarly, the regional arrangements will need to rapidly identify and secure the required local infrastructure to support the local contact tracing teams.

#### Key milestones for implementation

Our assumptions in mobilising and scaling up directed public health action to protect the public, optimise outcomes, maintain essential services and support the relaxing and reviewing of behavioural social measures assume a possible timeline to begin to relax the measures at a point in or around the middle of May.

With this in mind, the Plan assumes two key milestones:

- 7 May 2020 Government consideration of restrictions and what we will need to have commenced by that time
- 31 May 2020 a fully scaled up operational model needs to be in place

If the approach proposed based on active case finding is to be effective then it needs to be implemented from the outset. If restrictions are lifted before the model has been operationalised then only limited passive case finding will be possible and community transmission could quickly take off before the full model is established.

#### Key Actions by 7 May 2020

There is an urgency in mobilising a number of focused actions over the coming days, in advance of the Government's requirement to review the restrictions. These include:

- 1. Public Health Wales will provide job profiles and e-learning training packages to support the establishment of the contact tracing workforce at the regional and local levels.
- 2. The regional and local tiers will need to have agreed their local workforce model, consistent with the framework, and rapidly commenced the recruitment and/or redeployment of the workforce to establish the local contact tracing teams.
- 3. The Welsh Government will need to provide clarity as to the mechanism to secure financial support, as appropriate, for organisations in the implementation of the plan.
- 4. A *National Sampling and Testing Group*, as a sub-group to the national Programme Board, should be established. This should agree a 'once for Wales' service specification for sampling and testing and have operational oversight of the end-to-end process in order to ensure an efficient and effective model for sampling and testing across Wales. The group should monitor real-time, relevant measures of performance for the key steps in the process.
- 5. The information and digital solution to support contact tracing and case management system needs to be sourced (these include a case management system to meet the scale of the activity and any digital applications to support contact tracing). There is an urgent need for investment, procurement and rapid implementation of these systems (where appropriate) to support activity at a local, regional and national level across Wales.
- 6. A Communications and Engagement Plan to support this Plan needs to be developed and implemented with the involvement of partners. This should include easy to understand and accessible information and messages for the public and partners.

#### **Key Enabling Actions**

There are a number of key all Wales enabling actions to provide coordination and direction at this time. These are as follows:

- 1. Public Health Wales will work closely with the Welsh Government in order to assess the effectiveness of actions to prevent an increase in the spread of COVID-19 and monitor the impact of the lifting of social restrictions in real-time through the development of key measures, and through future modelling, to inform a planned and managed approach to the Recovery phase.
- 2. Public Health Wales will support Welsh Government in developing the *Sampling and Testing Strategy* to support the recovery phase. This should include the ongoing modelling of demand, against the agreed purpose of testing through this phase, and agreeing the relative apportioning ratio of the testing capacity (both antigen and antibody) at any given time against the demand as capacity increases.

The key actions are outlined in the table below with suggested lead organisations. These are subject to the approval of the Plan by the Minister and Welsh Government and require a detailed operational plan.

Related Activity	Action	Lead Organisation
Case Management and Contact Tracing	Confirm specification for Case and Contact Management System	PHW/WG/NWIS
Case Management and Contact Tracing	Procure and commission Case and contact Management System	WG/NWIS
Case Management and Contact Tracing	Procure and commission digital application solutions for contact tracing	WG/NWIS
Case Management and Contact Tracing	Conclude job descriptions, training programme for contact tracing workforce	PHW/HEIW
Case Management and Contact Tracing	Recruit and/or redeploy the workforce to establish local contact tracing teams	Regional tier
Surveillance	Specify and secure additional physical and digital infrastructure requirements for expanded surveillance activities	PHW/WG/NWIS
Surveillance	Mandate requirements of relevant partners to submit defined data and comply with reporting requirements for COVID Surveillance centre	WG
Surveillance	Identify and source additional skills and workforce required for COVID Surveillance Centre based in PHW	PHW/WG (TAC)
Surveillance	COVID Surveillance Centre established and operational	PHW/WG (TAC)/Partners
Sampling and Testing	Agree the Sampling and Testing Strategy based on capacity and recovery phasing	PHW/WG
Sampling and Testing	Submit proposals for expanding space for hot labs for COVID testing, secure additional capacity and implement	PHW/WG/Military
Sampling and Testing	Establish National Integrated Sampling and Testing Group	PHW/WG

Sampling and Testing	Mandate compliance with service specification for	WG
	sampling and testing	
Sampling and Testing	Roll out end-to-end online sampling and testing with the first phase of booking drive through slots in designated centres and second phase home testing	PHW/WG/Deloittes
Communications and	Conclude detailed Communications and	PHW/WG/Partners
Engagement Plan	Engagement Plan to support implementation	

# 4.2 Critical Policy Decisions

There are a number of critical policy decisions that will need to be made as soon as possible to inform the model, approach and scale for key elements of the Plan. Public Health Wales can advise on these. However, these are decisions for the Welsh Government. These are:

- 1. What the approach to the R number will be for Wales?
- 2. What is the approach to apportioning the testing capacity at any given time (antigen and antibody) for the purpose of the three main testing activities: symptomatic testing, key workers and community surveillance?
- 3. At what defined point will we need to switch on a critical mass of contact tracing relative to the relaxing of social measures and what are the signals to indicate that we are at that point?

## 4.3 Conclusions

This Public Health Protection Response Plan has been developed to provide expert public health advice to Welsh Government, multiagency partners and for the people of Wales, to inform the next phase of the response to the COVID-19 pandemic as we move towards, and into, a recovery phase.

It has been written to support the Welsh Government's *Leading Wales out of the coronavirus pandemic: A framework for recovery* and has benefited greatly from the contributions of partners from across local authorities, NHS organisations, third sector representative organisations, trade unions and all Wales peer groups and a number of professional Coordinating Groups.

The Plan assumes that transmission of COVID-19 will continue until mass immunisation is available or there is enough acquired immunity in our population. As we continue to tackle this as a nation, we must rely on the best available scientific evidence, surveillance and international learning, together with the goodwill and response of the Welsh public, to inform our approach at pace and scale.

In considering what will be required to scale up the public health interventions outlined in the Plan, and reflecting on our experience over the Containment and Delay phases, there are a number of key enabling actions and critical decisions that we feel need to be progressed at

pace and these have been outlined in the section above. These aim to create coherence and consistency in order to orchestrate the system response that will be needed if we want to achieve the pace and scale of what is a whole-of-society response.

What is clear is that we will need strong and collaborative leadership from across all of the different sectors in Wales and an enabling approach that exploits the strengths of partners, locally, regionally and nationally – at pace. Central to the success of the Plan will be the active engagement and involvement with our public to ensure that everyone knows what role they must play to protect themselves, their family and friends and their community.

This is a substantial plan that matches the unprecedented public health challenges that we face as a nation as we move into the recovery phase. It will rely on the commitment and agility of all partners working collaboratively, openly and in tandem with each other in a concerted way at the pace and scale required over the coming weeks and months. This will require direction from Welsh Government and leadership and delivery by partners locally, regionally and nationally.

It will be important for us to continually evaluate the effectiveness of public health interventions and the impact of lifting the social restrictions in order to minimise the spread of coronavirus in the days, weeks and months to come. This Plan may therefore change over the course of the Recovery phase.

We continue to have a single focus as we move into the next phase of this pandemic – to save lives and that must be our governing compass.