



Institute of Environmental
Science and Research

Protecting New Zealand's health and wellbeing



STATEMENT OF CORPORATE INTENT 2013–2018



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Executive Summary

The coming few years will mark an important evolution in the Institute of Environmental Science and Research's (ESR's) strategy. This Statement of Corporate Intent sets out our intended direction and areas of focus.

We are the lead Crown research institute providing specialist services focused on forensics, radiation science and infectious diseases that impact on human health. We have a unique role in protecting and defending New Zealand by providing specialist scientific and research services based on our expert capabilities and national science assets.

The Government has a goal of doubling the value of science to New Zealand. The contribution of New Zealand's science and innovation system will be vital to lifting productivity. Alongside all other parts of the science and innovation system, we will play our part in achieving this goal.

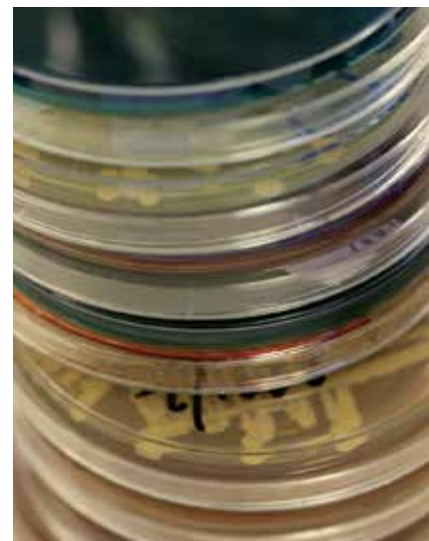
To do this, we will be expanding our traditional focus from providing scientific testing services to supporting science-based innovation in the sectors where we have core capabilities. This means we need to better understand and align our work with the science-based needs of New Zealand industry, government regulators and other users of research.

ESR is clear about the need to ensure that the knowledge and technology innovation achieved by ESR in collaboration with its partners is transferred for the benefit of the sectors in which we work, and for wider New Zealand. Throughout this document, we have highlighted a shift towards a more outward-focused approach to how Crown-funded research is undertaken, driven by clear sector issues and with sector support. Our revised core funding allocation framework will support focused sector partnerships that enable the transfer of knowledge and technology.

Our intentions are:

- ▶ to keep advancing in our core business to offer the best, and most efficient, science-based testing services for our clients in our core areas of focus
- ▶ to use our significant national assets and capabilities to deliver new value-adding services in the areas of justice and security (for example, using the DNA Profile Databank), health and disease (for example, personalised medicine), and food safety and integrity (for example, using unique capabilities in biocontrol products and radiation science)
- ▶ to use our unique capabilities in biocontrol products and diagnostic tools to help New Zealand food companies to maintain and gain international market access.

As part of repositioning ESR, our range of clients will broaden and is likely to include government and private sector organisations that carry out manufacturing, service provision, regulation and monitoring. We will also be strengthening engagement with our key sectors through strong partnerships, and our core funding allocation framework has been revised to reflect this.



ESR's Purpose and Roles

OUR ORGANISATION

The Institute of Environmental Science and Research (ESR) is a Crown research institute (CRI). It was incorporated in July 1992 and is wholly owned by the New Zealand Government. The two shareholding ministers appoint a board of directors to govern the organisation. ESR has scientific facilities in Auckland, Wellington (Porirua and Wallaceville) and Christchurch.

OUR PURPOSE AND GOALS

ESR is New Zealand's first line of defence in protecting New Zealanders' health and is the nation's one-stop shop for forensic science. Our purpose is to protect and enhance the nation's health and well-being by working to address challenges that require science-based innovations in health and disease, justice and security, food safety and integrity, and environmental health and hazards.

Our independent scientific advice and services help our clients to deliver better evidence-based policy, and better operational outcomes. The specific outcomes and impacts we are seeking to achieve are set out in our Statement of Core Purpose and discussed throughout this document. Our full Statement of Core Purpose is set out in Appendix 1.

OUR ROLES AND ACTIVITIES IN THE SCIENCE AND INNOVATION SYSTEM

ESR provides a range of research and science-based services to different clients. Through our services, we aim to:

- ▶ support the sectors we operate in to achieve their goals
- ▶ support innovation-based productivity gains for New Zealand by partnering with industry
- ▶ ensure that New Zealand avoids significant social, economic and fiscal costs and harm.

Most of our services have traditionally involved using our advanced science technology and skills to detect and positively identify the source of problems early. This allows the appropriate authorities to act before these problems escalate and generate significant costs and harm. Examples include identification of disease outbreaks before they progress along the epidemic curve, or identification of food safety problems that could compromise New Zealand's economic interests. If we do our job well in these situations, New Zealanders will not notice a thing, but the costs that we help to avoid are considerable.

This role remains at the core of our business. But we are also in the process of broadening our role and impact in the science and innovation system – from primarily being a provider of specialist scientific services to government, to being an enabler of science-based innovation in the sectors where we have core capabilities.

OUR UNIQUE CAPABILITIES DEFINE WHERE WE CAN ADD VALUE

Our capabilities enable us to be an authoritative advisor on critical national reference science in health, radiation science and forensics. Our strategy outlined in this document builds on the unique capabilities and resources that are embodied in our people, networks, knowledge, technology and facilities:

- ▶ ESR has the largest team of forensic, radiation and infectious disease scientists and epidemiologists in New Zealand. They collect, collate and analyse huge amounts of data and apply scientific expertise and context to create insights and added value intelligence.
- ▶ ESR has unique national and international science expertise, especially in diseases and microbiology, surveillance systems and epidemiology, related medical specialties, and forensic science.
- ▶ ESR is recognised by its major customers as the ultimate arbiter of critical national reference science in health and forensics.
- ▶ ESR is the custodian of unique data sets, modelling and interpretation capability to support future intelligence focused science and risk analysis.
- ▶ ESR partners with multiple stakeholders to deliver applied science data and knowledge in the health, food and justice sectors.

We manage a range of critical national science assets and facilities for New Zealand. These include the:

- ▶ National Centre for Radiation Science (NCRS)
- ▶ National Centre for Biosecurity and Infectious Disease
- ▶ National Influenza Centre, Polio and SARS Reference Laboratories
- ▶ DNA Profile Databank
- ▶ National Vaccine Services
- ▶ New Zealand Reference Culture Collection (Medical section)



We have a unique role in protecting and defending New Zealand in the following areas.

JUSTICE, DEFENCE AND COMMUNITY SAFETY

We aim to increase the effectiveness of forensic science services applied to safety, security, and justice investigations and processes. ESR plays a lead role as the sole provider of forensic services to the New Zealand Police. Other partners we are working with in this sector include Customs, the Department of Corrections and the Defence Technology Agency (DTA). Our services contribute to more effective justice sector operations and judicial outcomes, and more efficient justice sector processes.

HEALTH AND DISEASE RISK AND PROTECTION

We aim to safeguard the health of New Zealanders through improvements in the management of human biosecurity and threats to public health. We work with others to identify and manage public health threats from diseases and the environment, and in doing so we contribute to a reduction in harm from illness, reduced health sector costs, increased human productivity and a safer, more productive use of water resources.

We are the principal science advisor to the Ministry of Health. In this role, we undertake many activities that underpin and inform Government responses, and decision and policy-making. For example, we provide national coordination of major outbreak investigations for the Ministry of Health through:

- ▶ collation, management and transmission of information by our surveillance specialists, field and infectious disease epidemiologists, and medical specialists
- ▶ our internationally benchmarked biological laboratory for microbiological reference lab testing, for example phage typing for *Salmonella*
- ▶ managing the national notifiable diseases database and the associated surveillance system
- ▶ early notification as part of our surveillance role via an established electronic direct lab notification system that allows quick and accurate information flow and notifications from our public health sector partners.

Our work also includes advice on the impacts of the environment on human health, including radiation; groundwater, freshwater and drinking-water quality; and safe biowaste use.

FOOD SAFETY AND INTEGRITY

We aim to protect the integrity of New Zealand's economy and grow New Zealand's competitive advantage in overseas markets. We do this by contributing to the better management of issues in domestic and export food production systems, and helping to maintain access to key export markets, in partnership with the Ministry for Primary Industries and New Zealand food manufacturers, processors and distributors. We help to protect the public from consumption of foods contaminated with harmful microorganisms or chemicals by providing expert advice, analyses and research to government agencies and industry. We help to evaluate the nutritional composition of foods and how this relates to total dietary intake and subsequent health impacts.

WHO WE WORK WITH AND HOW WE WORK

We work with a range of clients in central and local government, industry organisations and the private sector, with the majority of our current work supporting government agencies to improve their services and operations. We work in partnership with our government clients to ensure that the science they purchase is meeting their needs and addressing the Government's priorities.

We operate a project-based business model, which enables us to bring together the best team to tackle any given task we undertake, be it research, stakeholder engagement, service delivery or evidence for policy. We lead and participate in teams drawn from across ESR, and from external collaborator and stakeholder organisations in New Zealand and overseas.



ESR'S PURPOSE AND ROLES

VISION MĀTAURANGA

ESR has a proud reputation for engagement and collaboration with Māori, particularly on health and water-related research projects with strong social science dimensions. ESR will continue to incorporate Vision Mātauranga concepts into research and operational activities in environmental health and forensic science.

For example, all forensic scientists attending crime scenes receive tikanga Māori training to assist them to do their jobs while being fully aware of cultural sensitivities and the needs of whānau under difficult circumstances. ESR will place more emphasis in future on assisting iwi/Māori corporations in their commercial endeavours as well as on health improvement projects and support for local iwi to increase their science capacity and capabilities.

We are committed to increasing the capability and capacity of Māori to utilise research outcomes to grow and sustain future development opportunities. We will focus on the following areas:

- ▶ Maintain and develop responsive, long-term relationships with iwi and Māori organisations.
- ▶ Grow our core Māori capacity to ensure our staff have the confidence to develop and maintain long-term relationships with iwi and Māori organisations.
- ▶ Continue to incorporate Vision Mātauranga concepts into research and operational activities in environmental health and forensic science.



A key initiative in which ESR continues to partner with Māori is the Biowastes programme, which aims to better understand the human and environmental risks and benefits that can arise from applying biowastes to land, particularly sewage treatment plant biosolids. Fundamental to the Biowastes programme is the involvement of communities to explore important social, cultural and economic considerations in tandem with the emerging scientific environmental knowledge. The research team endeavours to better understand how re-use decisions are considered and debated by tangata whenua and communities, and how they can become familiar with the reasoning behind waste management decision-making.

INTERNATIONAL CONNECTIONS

ESR places a high priority on using international relationships and collaboration to achieve our purpose. Highlights include the following:

- ▶ ESR leads international research in blood spatter pattern analysis and forensic mRNA research, with core funding augmented by National Institute of Justice (United States) funding.
 - ▶ ESR environmental health scientists participate in multiple European Union-funded projects, particularly in food safety, where we offer unique expertise now being leveraged into China.
 - ▶ ESR forensic products and services continue to be targeted to Australia, North America, Asia and the Middle East.
 - ▶ ESR is assisting the Ministry of Foreign Affairs and Trade with bilateral relationships with Australia and Asian countries and the Pacific.
 - ▶ ESR has memoranda of understanding with several key international research organisations, including the United States Department of Agriculture, Chinese Cereals and Oils Association, and Shanghai Jiao Tong University.
 - ▶ ESR, through the NCRS programme, provides international monitoring and support activities under the terms of the Comprehensive Nuclear-Test-Ban Treaty.
- ▶ NCRS scientists represent New Zealand on international forums and research programmes, for example the International Atomic Energy Agency (IAEA) and the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO).
 - ▶ ESR is leading a multi-million dollar (US\$) research project funded by the US Centers for Disease Control and Prevention on influenza surveillance in New Zealand, working with public health, clinical and academic collaborators to perform 'flu surveillance, which will inform the United States' public health response. This work attracts global recognition and requests by commercial entities for health-related information.
 - ▶ ESR contributes to the work of the Pacific Public Health Surveillance Network, the World Health Organization (WHO) and the South Pacific Commission.
 - ▶ ESR scientists are members of and advisors to many international and global organisations (such as PulseNet and WHO's Global Outbreak Alert and Response Network) and collaborate actively with the US Centers for Disease Control and Prevention, the WHO Collaborating Centres for influenza, the European Centre for Disease Prevention and Control, the Health Protection Agency in the United Kingdom, and the Institut Pasteur.

Strategic Context and Direction

OPERATING ENVIRONMENT

This section briefly describes general elements of ESR's operating environment that present challenges or opportunities that ESR's strategy needs to consider. Aspects of the operating environment that are specific to each of ESR's four outcome areas are discussed in the section on focus and activities.

TIGHTER FISCAL ENVIRONMENT IN GOVERNMENT

Pressure on government agency baselines continues to affect our key government clients as they seek to manage costs while delivering Better Public Services. This pressure presents both a challenge and an opportunity for ESR. On one hand, we need to ensure that we are providing services that are value for money, at a time when pressure on agencies to realise savings has the potential to impact on our revenue streams. On the other hand, there are opportunities for ESR to develop and provide science-based innovations and services that help to manage the increasing pressure on government resources in key sectors.

For example, our work in the environmental and health areas helps in managing escalating costs in the health sector by enabling the earlier detection and management of disease outbreaks and by putting our science closer to the sources of the problems. Similarly, there are opportunities for innovative forensic services to reduce the time (and costs) associated with aspects of investigative and court processes.

A CHALLENGING COMPETITIVE ENVIRONMENT

Over time, we are seeing increased competition in some areas of our core business, such as drug testing. Our intended strategy aims to address the revenue risks this presents by keeping us at the forefront of innovation (with the right investments in capability to back this up) and by broadening our client base to avoid heavy reliance on a few key contracts.

'NZ INC' IMPERATIVES IN THE NATIONAL SCIENCE AND INNOVATION SYSTEM

The Government expects all players in the national science and innovation system to work in a more integrated way so that this system delivers better value to New Zealand. In a small country with constrained expertise and capital, we need to maximise the returns from science and innovation investment as a whole – in essence, 'the whole needs to be greater than the sum of the parts', and the Government is expecting ESR and other parts of the science and innovation system to leverage expertise more efficiently through 'hubs' where possible.

In practice, this requires the different parts of the system, which includes ESR, to understand and leverage their complementary strengths more collaboratively to support innovation in key social and economic sectors. There is a range of key areas where we will be working with others across the science and innovation system, and partnering more actively with firms that are looking to develop and exploit commercial opportunities. We will increasingly be looking outwards to understand and respond to the needs of our key sectors, then supporting and partnering with them to deliver innovative services and products. Changes in our framework for allocating core funding have been made to reflect this imperative and the need for a more strategic 'top-down' view of priorities.

We will engage within our sectors to discuss capital investment plans and will work with hub partners and stakeholders for the benefit of New Zealand.

NATIONAL SCIENCE CHALLENGES

New Zealand faces a number of important challenges and opportunities. Many of these are complex issues that require new knowledge obtained through science and research. The Government has recently announced the National Science Challenges to provide a means to address the most pressing of these complex issues.

STRATEGIC DIRECTION

WE ARE PURSUING A NEW STRATEGY

Last year, ESR revised its strategic direction to respond to new challenges and opportunities. We are aiming to focus our attention increasingly on addressing challenges in New Zealand that require science-based innovation in our areas of focus. By developing and supporting innovation in these specific areas, we will aim to help our clients to solve today's problems and assist them to avoid future catastrophes, and contribute to improved sector performance and productivity.

REPOSITIONING ESR – FROM SCIENTIFIC TESTING TO SCIENCE-BASED INNOVATION

For a long time we have seen our primary role in the science and innovation system as providing unique, specialist scientific and research services to government agencies, based on our expert capabilities and national science assets in forensic science and infectious diseases.

We have developed a strategy that will build on these services, using leading-edge science to improve results for our clients. To support science-based innovation, we need to better align our work with the science-based needs of New Zealand industry, government regulators and other users of research.



STRATEGIC CONTEXT AND DIRECTION

ELEMENTS OF OUR STRATEGY

Our strategy has four priority areas of focus.

1. Strengthening our impact on the sectors we work with

The Government is clear about the need for strong knowledge transfer from its CRIs. If ESR is to make a substantial difference to its key sectors, merely increasing the amount of knowledge generated will not achieve that goal. ESR will ultimately be research-led but we will need to ensure that intellectual capital in all its forms is more efficiently and effectively transferred to sector users.

Our objectives under this priority are to:

- ▶ more effectively leverage our existing science assets (including data) to generate smarter insights that can be used by our existing and new customers to better achieve their goals
- ▶ provide a wider range of value-adding services to new customers in our core sectors
- ▶ carry out more research and commercialisation activity in partnership with key sector clients to underpin productivity growth. To support this, more than 40% of our core funding in future will be directed towards work that relates to the challenges and opportunities currently facing the sectors in which ESR operates. Projects will be outwardly focused, driven by clear sector issues and with sector support. We are also accessing New Zealand-based commercialisation networks to accelerate our capability in this area. The aim will be to use the funding from this part of the funding portfolio to leverage sector co-funding, helping to drive a partnership approach to developing solutions jointly
- ▶ strengthen our capabilities (through acquisitions and partnerships) to build greater critical mass in key areas of strength, for the benefit of New Zealand.

2. Improving our approach to customer and stakeholder relations

We recognise that to provide a valued service, we need to better understand the new and changing needs of our existing and potential customers, and work with them to tailor our services to fit those needs. This is partly about remaining valued and competitive as a service provider, but is also about ensuring that customers see how our ever-improving science-based services can help them.

A stronger outward focus will also enable us to become more effective in our collaborations with others, as either leaders (in our areas of strength) or supporters (where we don't have a lead role but can complement the efforts of others).

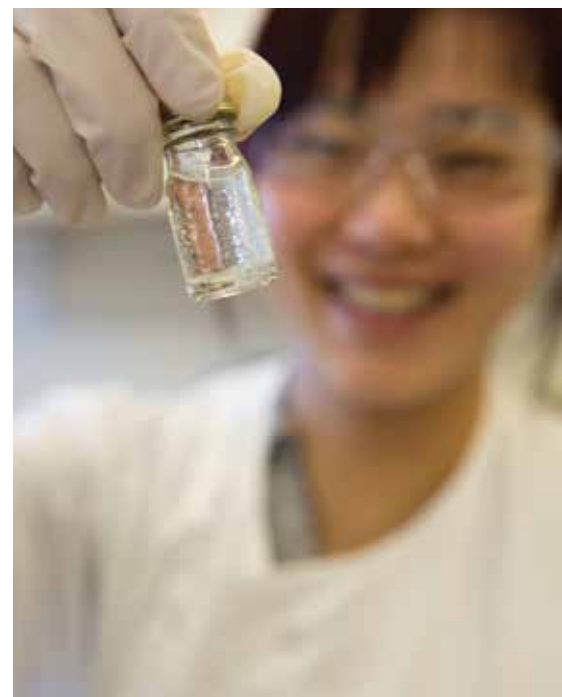
In many of the sectors in which we work (such as the food production sector), the reality is that there are multiple, complementary sources of expertise. This means that best value for 'NZ Inc' will be delivered to clients by multilateral partnerships with fellow CRIs, universities, local authorities, health authorities, consulting firms and others. We will actively seek to build collaborative arrangements where these are needed to deliver better results for clients in different sectors. Our partnerships in our key areas of focus are described in later sections of this document. Our team of business development managers and our new general manager for external relations and marketing are focused on developing our relationships.

3. Strengthening our core systems

We will continue to prioritise targeted investment in our infrastructure to support the strategic direction we are pursuing, including facilities, information management, equipment and property. This investment is required for us to continue to provide world-class services, as well as reduce our long-term operating costs. Key investments include our building stock, our laboratory information system, and other systems such as the EpiSurv surveillance system.

4. Building a high performing organisation

The quality of our staff is one of the biggest contributors to our organisational success. We need to strengthen a range of internal systems and processes to ensure that we actively support our staff to excel in their work. Our focus in the coming year will be on implementing a more effective performance management system, investing in leadership and management development, and implementing stronger project management disciplines.



ESR'S OUTCOME AREAS

Reflecting our Statement of Core Purpose and our underlying areas of capability, we focus on contributing to four important outcome areas for New Zealand. Our outcomes are listed below.

FIGURE 1: OUR OUTCOMES

OUTCOME 1: Safeguard the health of New Zealanders through improvements in the management of human biosecurity and threats to public health

OUTCOME 2: Increase effectiveness of forensic science services applied to safety, security and justice investigations and processes

OUTCOME 3: Enhance protection of New Zealand's food-based economy through the management of food safety risks associated with traded goods

OUTCOME 4: Improve the safety of freshwater and groundwater resources for human use and the safer use of biowastes



Focus and Activities

This section sets out further detail on the impacts we are seeking to achieve, the focus of our efforts, and the measures we will use to assess our performance in each area.

OUTCOME 1: SAFEGUARD THE HEALTH OF NEW ZEALANDERS THROUGH IMPROVEMENTS IN THE MANAGEMENT OF HUMAN BIOSECURITY AND THREATS TO PUBLIC HEALTH

ESR Health will expand its focus to a whole-of-health-system burden of infectious diseases by leveraging its experience and capabilities in notifiable and emerging infectious disease.

WHAT DO WE SEEK TO ACHIEVE?

The economic cost of human disease is very high as a result of lost productivity, direct costs to the health and social welfare systems, and the financial and social costs to individuals, families and communities. Our work under this outcome area contributes to a reduction in the harm and costs from disease and other environmental risks by providing services that support Government and the health sector to minimise the impacts of microbiological, non-ionising radiation (medical and environmental) and other environmental hazards on public health.

Issues and pressures that present challenges in this outcome area include:

- ▶ pressure to control the rate of increase in costs in various sectors
- ▶ ever-increasing demand for health services
- ▶ key public sector clients managing within funding baselines
- ▶ the ongoing risks of pandemics and other outbreaks of infectious diseases
- ▶ emerging obesity and diabetes epidemics
- ▶ the ageing demographics of New Zealand and the impact this will have on health service demands and costs
- ▶ the impacts and costs of rapidly changing technologies
- ▶ increasing ethnic diversity
- ▶ Māori and Pacific peoples, the young and the old, suffering ill health disproportionately.

Our work provides innovative science, robust research and high-quality information and analysis intelligence to address these and other challenges. The main direct impacts of our work are as follows.

1. The early detection of public health hazards and disease outbreaks

Time is of the essence in managing threats to public health; the early detection of risks and outbreaks enables early intervention. With early detection based on the accurate and timely identification of infectious disease events, hazards and diseases can sometimes be prevented altogether. Once there is an imminent threat to public health, the sooner that authorities can intervene – armed with scientific data – the easier it is to minimise the spread of disease and the consequential impacts on public health. Our work contributes to early detection directly through health intelligence, surveillance, analysis and reference laboratory services.

2. The application of effective interventions to manage risk and the incidence of public health hazards and diseases

Managing the risk and incidence of hazards and diseases can only be effective if the right interventions are applied (at the right time). Our work helps public health organisations to manage and improve responses to public health problems effectively. This includes providing research as an evidence base for policy and operational improvement, and effective management of the national vaccine supply.

In the future, we will look to provide a wider range of services and innovative support to a wider range of clients. We will increasingly aim to work with the New Zealand health process system, increasing treatment and technology sector companies and providers to innovate smarter systems and technologies, with the aim of improving operational efficiency and effectiveness and, where feasible, supporting growth in export earnings.

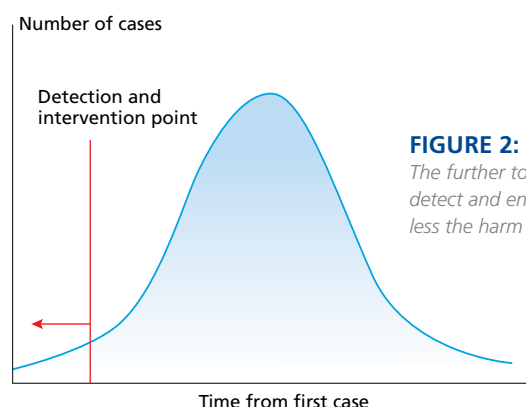
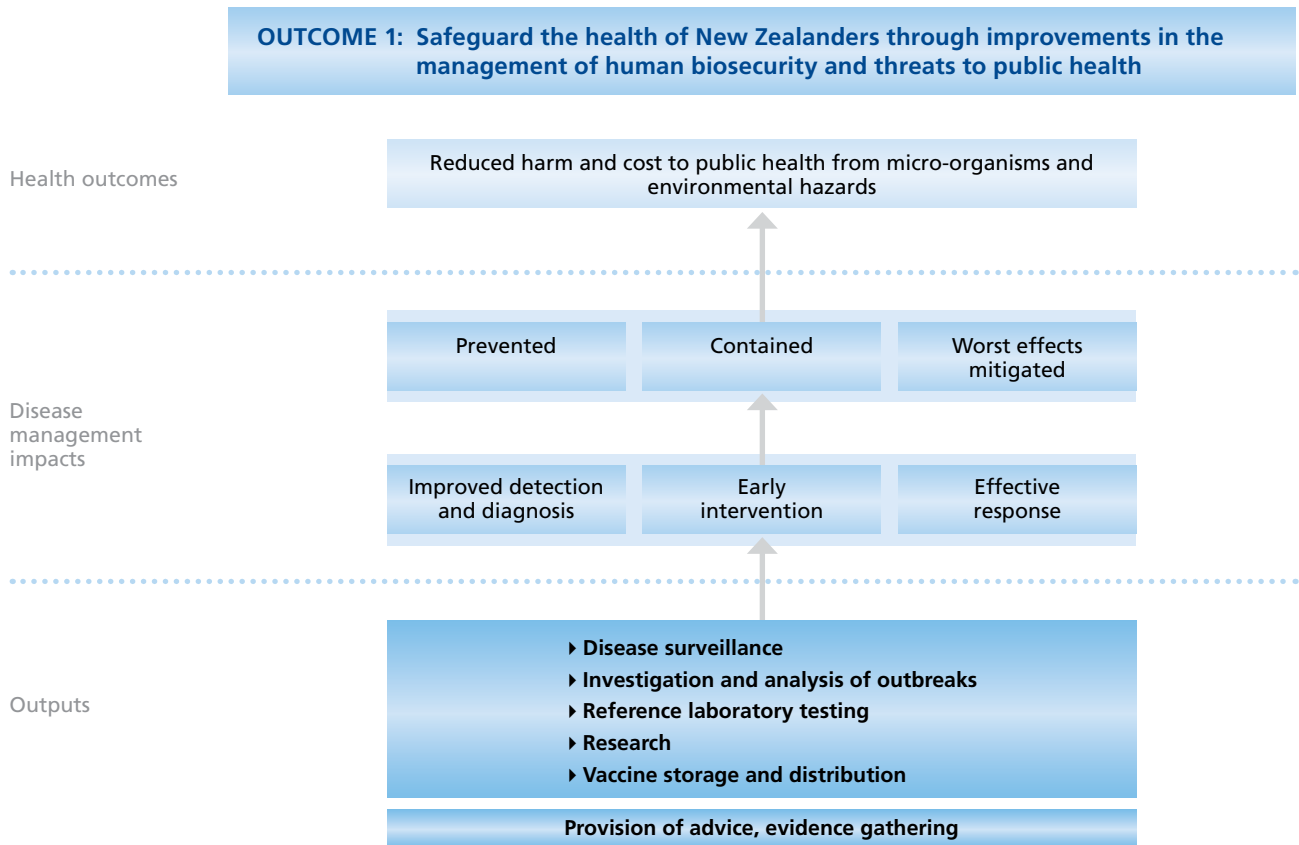


FIGURE 2: EPIDEMIC CURVE

The further to the left of the graph we can detect and enable effective intervention, the less the harm and cost.

FIGURE 3: RATIONALE FOR OUR PUBLIC HEALTH OUTPUTS



WHAT WILL WE DO TO ACHIEVE THIS?

ESR undertakes many activities that underpin and inform rapid and effective responses to public health risks and problems. These include:

- ▶ **microbiological reference laboratory testing** (including the Virological Reference Laboratory (incorporating the National Influenza Centre, SARS Laboratory and Polio Laboratory) and our microbiological laboratories (including the National Enteric Reference Laboratory, Nosocomial Infection Laboratory, Invasive Pathogens Laboratory, Legionella Laboratory, Bloodborne Virus Laboratory, Norovirus Reference Laboratory, Leptospira Laboratory and Anti-microbial Resistance Laboratory))
- ▶ **surveillance and analysis:**
 - the operation of EpiSurv, the New Zealand notifiable disease surveillance system

- the identification of aberrant patterns of infectious disease
- the microbiological and epidemiological investigation and analysis of infectious disease outbreaks
- the coordination of national outbreak investigations on behalf of the Ministry of Health
- ▶ the maintenance and development of the New Zealand Reference Culture Collection of medically significant bacteria
- ▶ the storage and distribution of vaccines, the forecasting of vaccine requirements (including recommendations on the composition of seasonal influenza vaccines) and the oversight of tendering processes for the provision of vaccines to Pharmac
- ▶ research into infectious diseases, public health events, climate change and social systems to improve health service delivery

- ▶ ESR NCRS programme testing of environmental radioactivity samples and global monitoring of atmospheric radioactivity data collected from stations around the world as part of New Zealand’s contribution to the Comprehensive Nuclear-Test-Ban Treaty, field measurements of non-ionising radiation, on-site inspections, calibration, training and the Personal Dosimetry Service.

ESR operates and provides services to central government under negotiated and agreed contracts with the key government health and biosecurity agencies. These contracts enable us to deliver core health science services at local and community levels to district health boards (DHBs) and local government. An important aspect of the infectious disease science we perform on behalf of the Ministry of Health is that it enables New Zealand to meet International Health Regulations requirements, set by WHO.

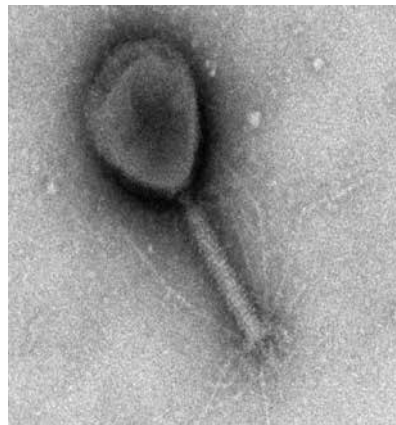
FOCUS AND ACTIVITIES

Our partnerships are currently centred on the public health units, DHB and university collaborators, research partners in primary care, the Health Research Council and the US Centers for Disease Control and Prevention. In future we will look to extend our partnerships to include the European Union, DHBs, the primary care sector and provider partners more broadly.

WHAT ARE OUR KEY INITIATIVES?

Key initiatives in the coming year include the following:

- ▶ Broadening ESR's sphere of influence in both the epidemiological analysis of non-notifiable infectious diseases and support for DHBs: We will build on the surveillance of notifiable infectious diseases to explore the surveillance and analysis of those infectious diseases that create a social, system and financial burden, such as pneumonia and other respiratory infections and cellulitis, and rheumatic fever – a Government public sector objective.
 - ▶ Building on the recent success in establishing SHIVERS (the Southern Hemisphere Influenza and Vaccine Effectiveness Research and Surveillance Project): This initiative to commission a Southern Hemisphere 'flu laboratory was enabled by ESR and collaborators winning funding from the US Centers for Disease Control and Prevention in an internationally contestable process. There is an opportunity for us to build on this major international research success to position New Zealand well as an international centre for similar research. This would involve promoting a more collaborative 'NZ Inc' approach with partners that include DHB laboratories, clinicians, hospitals and reference science providers.
 - ▶ Implementing a new laboratory information management system (LIMS): This major investment will help us to provide a better, faster public health information service. This initiative is described in more detail in the section on ESR's capability, as it is infrastructure that helps us to improve a range of our services.
 - ▶ Establishing baseline measures for all health performance measures as a means to monitor ESR's relative performance in the next five years.
- We will engage with potential new clients to understand how we might be able to meet their needs through science-based innovation. They include private sector health providers and insurers, DHBs, pharmaceutical companies, medical professionals and water treatment providers.



DEFINING SUCCESS: HOW WILL WE MEASURE OUR PERFORMANCE?

Measures	
Impacts	
<ul style="list-style-type: none"> ▶ Early detection of public health hazards and disease outbreaks through accurate and timely identification of infectious disease events, leading to reduced incidences and impacts ▶ Effective interventions are applied by public health organisations to manage and reduce the risk and incidence of public health hazards and diseases, including effective placement of vaccines 	<p>Through accurate, early typing and identification of diseases and their sources (through our laboratory testing, surveillance and analysis services and our networks), our work enables early detection of outbreaks and the correct diagnoses and interventions in individual cases.</p> <p>Measures we use to assess our impact on early detection and effective intervention to control disease outbreaks are:</p> <ul style="list-style-type: none"> ▶ the time between presentation of outbreak index cases and implementation of control measures ▶ reported effectiveness of ESR information and advice in enabling implementation of effective interventions (measured through client surveys and/or international feedback) ▶ extent to which ESR-forecast and sourced vaccine supply matches virus strains circulating in New Zealand, and supply and location are matched to demand. <p>Measuring the extent to which our work contributes to a reduction in the harm and costs associated with public health hazards and diseases is challenging, given that our work is only one of a number of inputs to decision-making and actions by others to manage problems and risks. Because of this complexity, we cannot currently quantify our attributable contribution to these overall impacts, but are working on this. We are currently exploring a modelling approach that would enable us to estimate the harm/cost avoided as a result of early detection of disease outbreaks, and as a result of more effective targeting of interventions to the right people at the right time.</p>
<p>Safer working environment for users and medical recipients of radiation sources.</p>	<ul style="list-style-type: none"> ▶ Environmental radioactivity levels comply with relevant legislation and standards. ▶ Level of compliance by radiation users with relevant legislation and standards.
Outputs	
<p>Core advisory, information, testing and research outputs, including:</p> <ul style="list-style-type: none"> ▶ National Notifiable Disease Database management ▶ microbiological reference laboratory services ▶ epidemiological analysis and advice ▶ notifications and follow-up of rare disease notifications ▶ national disease outbreak identification and investigation coordination ▶ national vaccine supply management ▶ NCRS – calibration, compliance monitoring and training 	<p>ESR is required to comply with a range of stringent international performance-based standards and agreed service levels that are specified through the ISO system (which we have to meet to retain accreditation) and ensure delivery to clients and/or service agreements with clients.</p> <p>Our goal is for all our public health outputs to meet relevant requirements/standards at least to the level specified in each case and/or exceed some.</p> <p>We have not listed all relevant standards here, but key measures for our public health outputs include:</p> <ul style="list-style-type: none"> ▶ outputs meet all requirements to maintain our laboratory accreditation, and ESR does not receive any 'Strong Recommendations' or 'Corrective Action Required' assessments by the auditing body for our public health laboratory services ▶ accuracy of disease typing by ESR ▶ accuracy in identification of sources of disease by ESR ▶ the percentage of reports recalled due to mistakes is below the specified standard ▶ maintaining facilities/containment



OUTCOME 2: INCREASE EFFECTIVENESS OF FORENSIC SCIENCE SERVICES APPLIED TO SAFETY, SECURITY AND JUSTICE INVESTIGATIONS AND PROCESSES

ESR's forensic services will expand into 'ESR Crime Science' by leveraging its existing scientific testing and information services into high-value intelligence that addresses key problems and challenges. This includes providing scientific methodologies for existing and new policy programmes designed to change the behaviour of offenders and/or to reduce the costs incurred by the state to manage their behaviour.

WHAT DO WE SEEK TO ACHIEVE?

Through the delivery of government-contracted forensic operations and services, ESR directly supports key justice sector goals relating to reducing crime, holding offenders to account, delivering a trusted justice system, protecting New Zealand's security, and reducing the cost of the justice system.

We need to work within the constrained spending environment of government agencies while at the same time responding to their increasing demands for new and improved services. Our work contributes to the drive for Better Public Services and the sustainable management of the criminal justice 'pipeline'. The New Zealand forensic service provider model has proved to be both cost effective and efficient. New Zealand is one of the few countries in the world that doesn't have a backlog of forensic work. Our turnaround times in DNA analysis are among the best in the world. Through the development of mutually agreed end-to-end processes with justice sector partners, we have dramatically improved the timeliness of delivery of forensic services to investigators and to the courts.

The immediate impacts of our work are:

- ▶ faster, more effective examinations of crime scenes
- ▶ better forensic evidence
- ▶ faster, definitive identification of individuals
- ▶ a more efficient and effective delivery of evidence at trial.

These immediate impacts will in turn lead to the achievement of justice sector goals through:

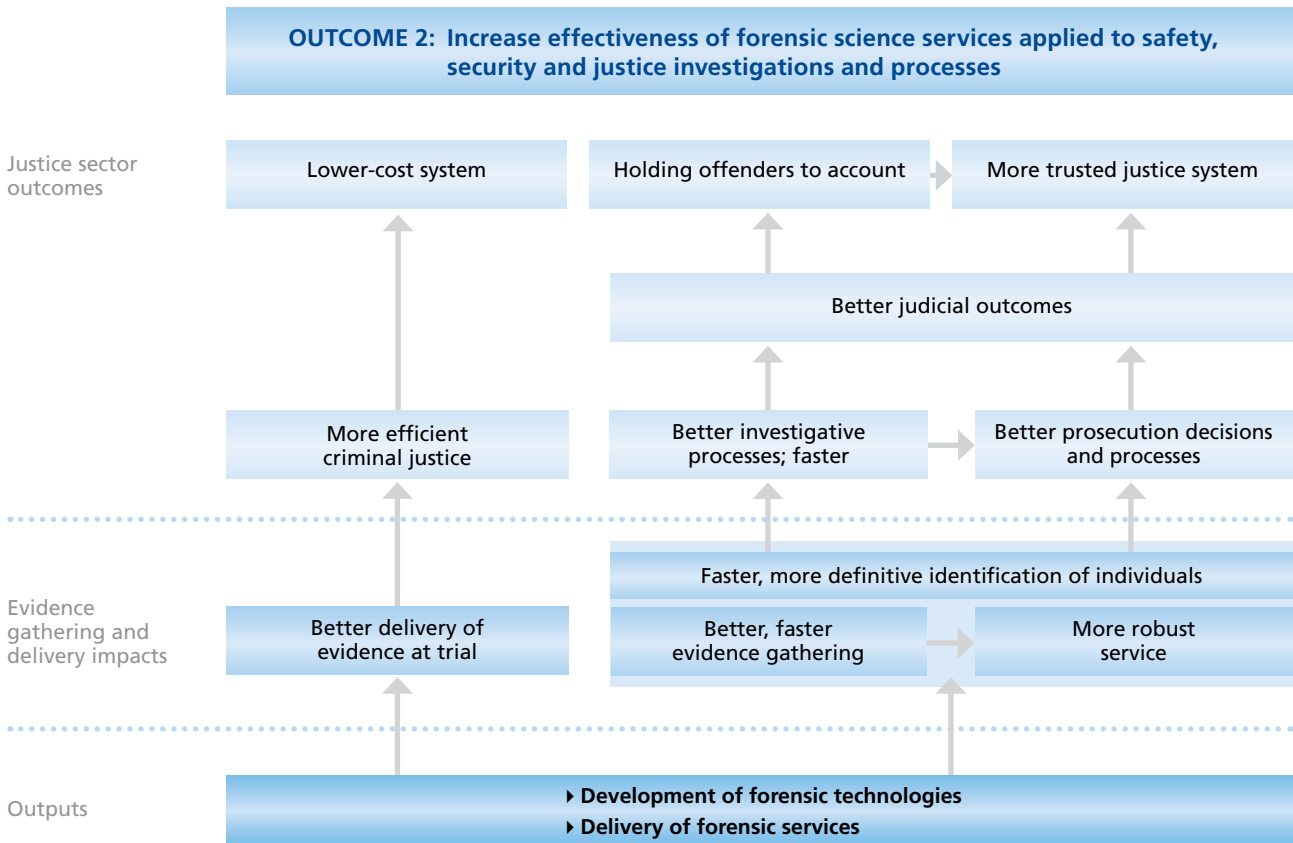
- ▶ more effective and efficient investigations, including the earlier apprehension and charging of alleged offenders
- ▶ better prosecution decisions
- ▶ better judicial outcomes
- ▶ lower-cost, more efficient criminal justice processes.

As our new strategic direction becomes embedded in our business plan, we expect in the future to also be contributing to sector growth impacts through an increase in export earnings from innovative, intelligence-based solutions to justice sector problems, engagement with New Zealand security and safety sector companies, and the provision of consultancy and training.

Similarly, our intended future focus will support early intervention to reduce longer-term serious crimes. This will lower overall justice system costs by reducing the inflow into the criminal justice pipeline.



FIGURE 4: RATIONALE FOR OUR CURRENT FORENSIC SERVICE OUTPUTS



WHAT WILL WE DO TO ACHIEVE THIS?

ESR provides forensic services to the New Zealand Police, courts, coroners, pathologists, prisons and the judiciary. We will continue to develop, adapt and innovate new and existing technologies to meet the casework requirements of criminal investigations and the wider needs of the justice system through the:

- ▶ delivery of forensic services ‘from the crime scene to the courtroom’, compliant with the international quality accreditation requirements of the Laboratory Accreditation Board of the American Society of Crime Laboratory Directors (ASCLD/LAB). This accreditation is specifically for forensic laboratories and provides a

framework for the forensic services that ESR provides and that underpin an effective and trusted criminal justice system. Staff are trained in all aspects of the forensic services that ESR supports, including tikanga Māori

- ▶ assessment and implementation of innovative technologies that meet new challenges in criminal investigations
- ▶ delivery of scientific evidence rapidly to improve the efficiency of criminal investigations and to support ‘streamlined’ criminal justice processes (including Government Criminal Procedure Simplification initiatives) by investing in enabling infrastructure

- ▶ alignment of forensic science solutions with wider justice sector and crime-reduction initiatives by making ESR expertise in social systems science available
- ▶ provision of innovative services that enhance crime prevention, law enforcement, public safety and justice sector activities, including drug and alcohol-free workplaces and counterterrorism preparedness.

FOCUS AND ACTIVITIES

WHAT ARE OUR KEY INITIATIVES?

Key initiatives in the coming year include the following:

► **The Future Crime Scene project:**

ESR has recently developed advanced crime scene recording and expert evidence presentation tools using core funding. These tools are being piloted, and we intend to pursue their wider implementation. The tools apply spherical photography and laser scanning to record locations of evidence in a way that allows people (such as jurors) to visit a virtual crime scene and clearly see the relationships between items of evidence, and make complex forensic evidence easier to understand. These technologies are expected to lead to faster crime scene investigations, a simplified capture of accurate data (for example, for determining ballistics trajectories), the faster identification of individuals and the more efficient delivery of evidence at trial, saving time and cost.

► **International opportunities:** ESR has recognised specialist expertise in DNA interpretation, particularly the interpretation of mixed DNA. The benefits this brings to New Zealand are through being able to offer improved services to the New Zealand justice system and through the reputation earned by ESR as a world leader in this field. An example of the New Zealand sphere of influence in this field is the assistance that ESR has provided to Australian forensic laboratories in the understanding and interpretation of complex DNA results. ESR is partnering with agencies in Australia and the United States to provide specialist services. We will be exploring these and other revenue opportunities by offering top-end training and consultancy internationally, which also helps to defray the costs of developing new technologies.

► Establishing baseline measures across all forensic performance measures as a means to monitor ESR's relative performance in the next five years.

ESR does not currently have a way of measuring on an ongoing basis the impacts of its services and innovations on court times/costs. We will be exploring the feasibility of this kind of evaluation with the Ministry of Justice.

A longer-term objective is to develop innovative science-based products and services that marry forensic and social science in a way that supports early interventions into offending behaviour to save substantial money and harm later by reducing more serious crime and recidivism.

We intend to identify and actively engage with potential new clients and partners to build relationships, in order to be able to deliver science-based innovations that meet their needs, including:

- the insurance and risk management sector, including insurance companies, ACC and property development companies
- businesses undertaking commercialisation and innovation for competitive advantage in international markets, including security system, technology and software companies, and informatics, data mining and modelling companies.



DEFINING SUCCESS: HOW WILL WE MEASURE OUR PERFORMANCE?

Measures	
Impacts	
<p>Faster, definitive identification of individuals</p> <p>More efficient and effective delivery of evidence at trial</p>	<ul style="list-style-type: none"> ▶ Percentage of loads that give positive results for: <ul style="list-style-type: none"> – crime-to-crime intelligence links – crime-to-person intelligence links. <p>This measure enables a long-term overview of the performance of the DNA Profile Databank in terms of its ability to support positive identifications and provide valuable intelligence using DNA.</p> <p>ESR does not currently have a way of measuring on an ongoing basis the impacts of its services and innovations on court times/costs. This is largely because the process of simplifying and streamlining criminal procedures and processes is ongoing and significant at the present time. In light of other significant changes driven by the Ministry of Justice, it is impractical to disaggregate the impact of ESR innovations at this time. We will be exploring the feasibility of this kind of evaluation with the Ministry of Justice on a case-by-case basis as new technology is implemented,</p>
Outputs	
DNA Profile Databank management.	Management of the DNA Profile Databank meets all legislative standards and requirements, including New Zealand Police audits.
Forensic services.	<ul style="list-style-type: none"> ▶ The service meets contracted case turnaround times (TAT) with New Zealand Police (80% of cases closed will be equal to or less than the agreed TAT). ▶ Police satisfaction with ESR’s service, including the: <ul style="list-style-type: none"> – percentage return of survey forms (number issued versus number returned) – overall service (rated as ‘Excellent’ 90% of the time) – timeliness of reports (percentage of statements/reports received when required).

OUTCOME 3: ENHANCE THE PROTECTION OF NEW ZEALAND'S FOOD-BASED ECONOMY THROUGH THE MANAGEMENT OF FOOD SAFETY RISKS ASSOCIATED WITH TRADED GOODS

ESR will leverage its substantial food safety capabilities, including its diagnostic and testing expertise, to focus on the safety and protection of consumers while also maintaining New Zealand's access to key markets and international brand in regard to food safety and integrity.

WHAT DO WE SEEK TO ACHIEVE?

New Zealand's economy is heavily dependent on revenues from exported food products, so protecting the integrity of food production systems, our products and our reputation in this area is critical. When sanitary and phytosanitary barriers to trade are raised against New Zealand exports, market access is denied or threatened. Conversely, a strong reputation for trusted food products can be a source of competitive advantage for New Zealand firms when trading in other countries.

New Zealand must continue to meet and exceed standards set by importers of New Zealand products. Our focus is on contributing to the effective management of food safety risks associated with traded goods, and enhancing the integrity and transparency of New Zealand's food supply chain.

Beyond the trade impacts of the food system, a healthy nation is a productive nation. In New Zealand, foodborne illness has been estimated to cost a staggering \$50 million per annum on *Campylobacter* alone from factors including lost productivity and health care. Our focus is also on helping to diagnose, track and respond rapidly to episodes and outbreaks caused by the consumption of contaminated food.

To achieve these goals, New Zealand must remain ahead of the game scientifically and be recognised internationally as having cutting-edge, robust food safety systems, underpinned by international best practice science. One of ESR's major clients, the Ministry for Primary Industries, relies on ESR's

science to inform and assist in the implementation of its internationally respected risk management framework.

Key contextual issues impacting on our work in this area include:

- ▶ decreasing tolerance among international partners of biological and chemical contamination of food, resulting in new and increasingly challenging trade barriers
- ▶ increasing requirements internationally relating to the traceability of food, including the need for verification of the sources, safety and authenticity of food and food ingredients
- ▶ the risk of 'food fraud' that might have a negative impact on the New Zealand brand – food fraud occurs when products are deliberately mislabelled overseas as being from New Zealand
- ▶ the increase in New Zealand production taking place offshore
- ▶ a continued burden of foodborne illness affecting the New Zealand public.

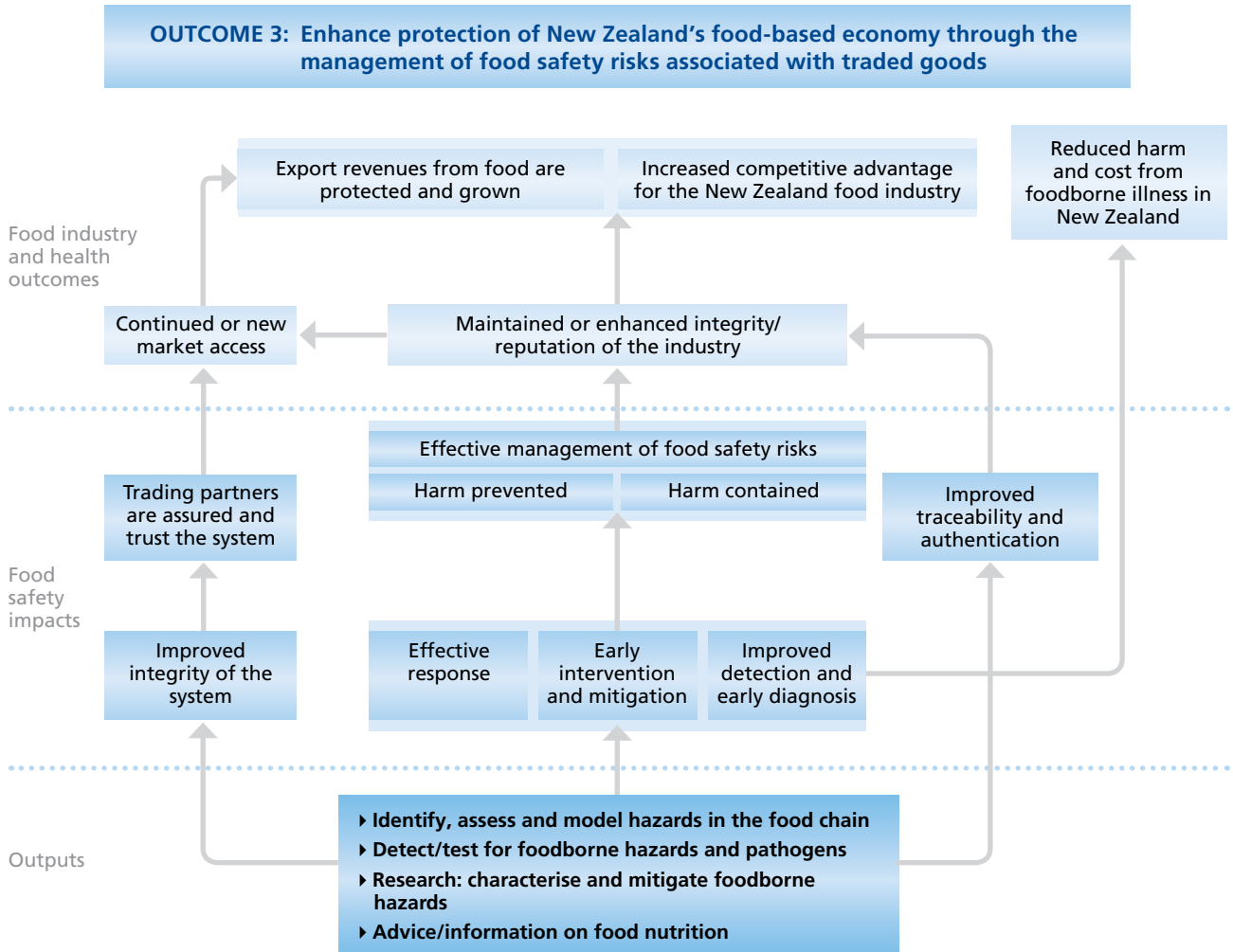
The intended impacts of our work are:

- ▶ the early detection of food safety risks and problems before consumption
- ▶ the prompt diagnosis of foodborne microbial, radiation and chemical hazards
- ▶ effective responses to food safety issues, including stopping problems before they start
- ▶ maintaining and improving the integrity of New Zealand's food production systems.

These impacts will in turn lead to the prevention of harm, and trust in the integrity of New Zealand's food production systems, which will protect and enhance New Zealand's trade position and reduce the costs of illness (both direct costs to individuals and the health system, and the costs of lost productivity).



FIGURE 5: RATIONALE FOR OUR FOOD SYSTEM INTEGRITY OUTPUTS



WHAT WILL WE DO TO ACHIEVE THIS?

ESR provides advisory, monitoring and diagnostic services and research to help the regulator and food industry to develop and implement interventions to avoid and respond to foodborne hazards. Our work includes:

- ▶ risk-based approaches to the identification, assessment and modelling of microbial, including radiation and chemical, hazards in the food chain
- ▶ the use of internationally agreed methods for the detection of foodborne pathogens and chemical hazards (including radiation levels) present in foods and from patient samples, and the development and application of new and rapid methods

- ▶ the characterisation of pathogens isolated using specialist and innovative sub-typing methods necessary for outbreak investigations and epidemiological studies
- ▶ research to provide new interventions aimed at reducing/ eliminating pathogenic *Escherichia coli* (*E. coli*) O157 (and the so-called Super 6 pathogenic *E. coli*) in export and domestic meat
- ▶ information for clients on levels of essential nutrients, trace elements and contaminants in the food supply, including the New Zealand Total Diet Surveys undertaken in the past 20 years.

We partner with other providers in New Zealand’s science sector to deliver total solutions, including the Ministry for Primary Industries, Massey University, AgResearch,ASUREQuality, Plant & Food Research, and the Cawthron Institute. ESR also has partnerships with leading organisations worldwide, including memoranda of understanding with the United States Department of Agriculture and the Chinese Cereals and Oils Association.

FOCUS AND ACTIVITIES

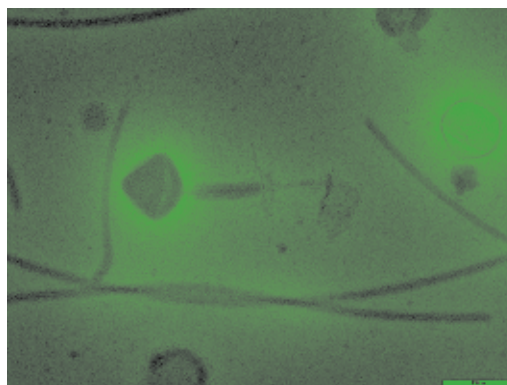
WHAT ARE OUR KEY INITIATIVES?

ESR has unique biocontrol products and diagnostic tools that reduce the risk of bacterial contamination during food processing. ESR will leverage these capabilities in the coming year to undertake the following initiatives:

- ▶ Recent (2011) proposals by the United States to change export beef microbiological requirements demonstrate the risks to the New Zealand economy from any issue that cannot be countered or contained. The United States has declared zero tolerance for the six pathogenic strains of *E. coli* most frequently causing disease (the so-called 'Super 6'). New Zealand needs to be able to demonstrate, 'from farm to dock', that these pathogens are not present in consignments. We will be working with the Ministry for Primary Industries to develop world-class methods to detect and characterise the Super 6 *E. coli*, so that the screening for these pathogens can become more effective. This will help to protect the \$1 billion per annum New Zealand beef export trade to the United States.
- ▶ We will further develop novel mitigation strategies for organisms of relevance to the export and domestic food sectors. Our research on phage technologies for the control of pathogenic *E. coli* is the most advanced of our interventions and we will continue to advance our research on naturally occurring novel antimicrobials against foodborne pathogens including *Campylobacter*, a major cause of gastroenteritis in New Zealand.
- ▶ We will continue to develop new and rapid detection and sub-typing assays for foodborne microorganisms based on the patented Multiplex Ligation-dependant Probe Amplification approach, together with our international collaborator MRC-Holland.

- ▶ Traceability and food fraud are becoming more significant issues, with the potential for both harm to New Zealand's economy and an opportunity to build a source of advantage based on our reputation (coupled with strong traceability and authentication). We will be carrying out work to support better authentication. An example is our work on the authentication of meat species, to ensure that meat being sold is what it claims to be. The 'Prove It!' campaign will be developed to raise the profile of the work we do for the industry.
- ▶ We will establish baseline measures for all food safety performance measures as a means to monitor ESR's relative performance in the next five years.

We will also identify and engage with new and potential clients to develop an understanding of their needs and how we might be positioned to help them through science-based innovation. These include local and international supermarket chains, food chain technology vendors, international food companies and international government agencies. In future we intend to contribute to innovations in food authentication and traceability that lead to increased competitive advantage for New Zealand food-producing firms.



DEFINING SUCCESS: HOW WILL WE MEASURE OUR PERFORMANCE?

Measures	
Impacts	
Prompt diagnosis of foodborne microbial and chemical hazards.	As with our public health impacts, our work enables early detection and management of food safety issues that impact on public health, through accurate, early typing and identification of foodborne diseases and their sources. The main measure of our impact on prompt diagnosis and action is the time between (a) the presentation of foodborne outbreak index cases, (b) identification of foodborne hazard in food samples, and/or (c) characterisation of outbreak-implicated microorganisms, and reporting of appropriate results to stakeholders (for example, the ministries of Primary Industries and Health, and public health units) of control measures.
Effective responses to food safety issues.	<ul style="list-style-type: none"> ▶ Extent to which client agencies adopt effective interventions based on advice and research received from ESR (client survey feedback) ▶ Extent to which ESR's advice led to a recall or change in policy (assessed on a case-by-case basis rather than through review of every piece of advice) ▶ Extent to which clients commission work to investigate food safety issues
Maintaining and improving the integrity of New Zealand's food production systems.	<ul style="list-style-type: none"> ▶ Number of 'food forensic' or 'Prove It!' jobs undertaken and their turnaround times ▶ Amount of industry funding invested in ESR solutions for identified industry issues ▶ Number of consignments (that were tested by ESR) stopped at overseas docks due to detection of <i>E. coli</i>
Outputs	
Laboratory services and food safety advice	<ul style="list-style-type: none"> ▶ Turnaround times for sample investigations that have a public health impact ▶ Turnaround times for STEC Super 6 confirmations for industry ▶ Quality of scientific advice and services (as assessed by clients)



OUTCOME 4: IMPROVE THE SAFETY OF FRESHWATER AND GROUNDWATER RESOURCES FOR HUMAN USE AND THE SAFER USE OF BIOWASTES

Water and radiation science programmes will leverage ESR’s infectious disease knowledge to focus on safe water and environments to protect human health.

WHAT DO WE SEEK TO ACHIEVE?

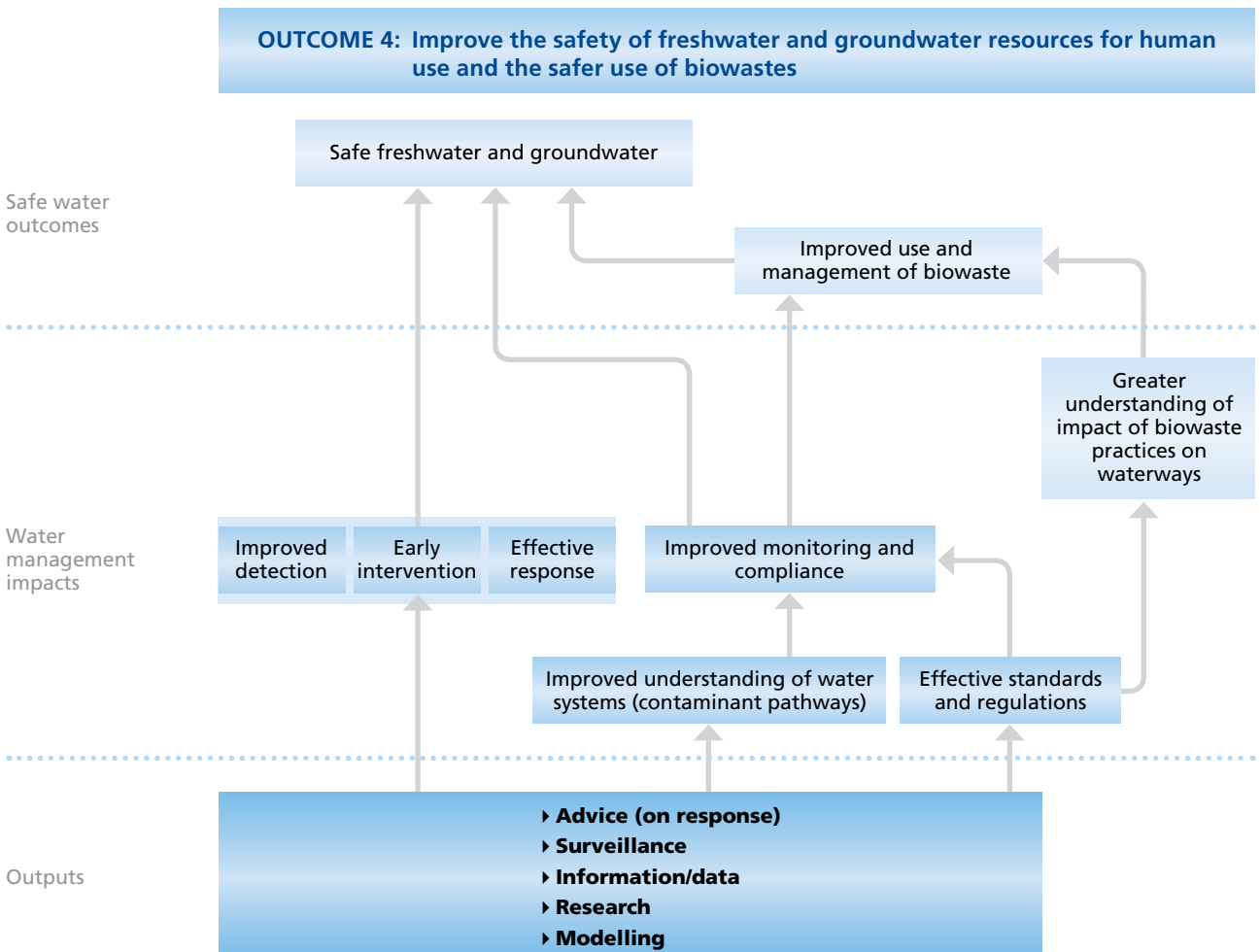
Freshwater is New Zealand’s key strategic and productive asset and we are water rich; water provides more than \$5 billion per year to the economy (Minister for the Environment, 2011). However, there are water shortages in some areas, and increased pressure from land intensification is impacting on the quality and safety of water. Water quality issues can adversely affect our international reputation for food production, environmental practice, health, stock productivity and tourism.

Water management that takes account of competing demands for the resource (drinking water, energy generation, primary production, recreation, tourism, etc.) is the single biggest environmental problem for New Zealand to solve. Within this overall challenge, ESR aims to contribute to the safety of freshwater and groundwater resources through our understanding of water contaminant transport and attenuation processes, and the impacts of the environment on human health, and the contribution that this can make to improving policy.

The intended impacts of our work are:

- ▶ faster detections of and responses to hazards
- ▶ improved water management practice from the perspective of public health impacts
- ▶ improved understanding of contaminant pathways in water systems, and the impacts of biowaste practices on waterways
- ▶ effective regulation, standards and monitoring
- ▶ leveraging New Zealand’s unique water science internationally.

FIGURE 6: RATIONALE FOR OUR WATER SAFETY OUTPUTS



WHAT WILL WE DO TO ACHIEVE THIS?

Our major clients – the Ministry of Health, DHBs, public health services, and regional and district councils – expect ESR to provide robust advice and underpinning research to inform policy on a range of critical environmental health issues.

ESR will use its knowledge of contaminants and their pathways in the areas of groundwater, wastewater, biowaste and surface water to provide a range of important surveillance and research services, including:

- ▶ the development of, and the use of, new internationally recognised methods for the detection of human pathogens and chemical hazards present in water, sediment, soil, biowastes and wastewater
- ▶ the use of internationally recognised approaches for public health risk assessments of microbial and chemical hazards in the water environment
- ▶ research to characterise contaminant pathways from land into and through groundwater and surface water systems, and the connections between these systems
- ▶ research to manage the safe and sustainable use of biowastes such as sewage sludge (biosolids) and greywater resources – the ESR-led Centre for Integrated Biowaste Research will become a focal point for national activity in this area
- ▶ expertise and information to support the implementation of national drinking-water programmes, for example annually surveying and reporting on drinking-water quality in New Zealand, and maintaining registers of community drinking-water supplies.

ESR also has a role to play in constantly refreshing relationships among relevant agencies to assist the national overview. ESR connects research and information across the fields of environment and health, which have historically been funded and managed separately. ESR assists multiple agencies mandated under different legislation (the Resource

Management Act 1991 and the Health Act 1956) to fulfil their functions. ESR leads several groundwater research projects in collaboration with other CRIs, independent research organisations and universities, and is an active participant in moves to fully integrate freshwater research in New Zealand in partnerships with iwi and Māori. We aim to increase partnerships with other science and innovation system participants, including other CRIs, independent research organisations, universities, and private consulting and engineering firms.

WHAT ARE OUR KEY INITIATIVES?

Key initiatives in the coming year include:

- ▶ working with the University of Canterbury, Environment Canterbury, Christchurch City Council and other partners to aid the recovery of water quality and safety in Christchurch
- ▶ exploiting the high presence of radon in alluvial aquifers in New Zealand and our unique combination of water and radiation science to provide a more accurate assessment of surface water recharge into groundwater systems to allow more informed allocation decisions
- ▶ continuing to work with our key collaborators Lincoln Agritech and Aqualinc Research and with regional councils to assess measures of groundwater assimilative capacity for the key water contaminants of nitrates and microbial pathogens to allow those measures to be incorporated into water management
- ▶ working directly with regional and district councils to evaluate different options for their disposal of water and waste – we will increasingly partner with engineering firms to provide solutions to and options for issues that local authorities face in this area, which requires a wide range of interdisciplinary skills
- ▶ continuing to explore the safe and sustainable application of biosolids to land building on previous work at Kaikōura and Mokai – ESR’s expertise

in community and stakeholder engagement methodology and the integration of this with our biophysical science expertise in contaminants and effects will aid the case study communities to make informed decisions about sustainable waste management

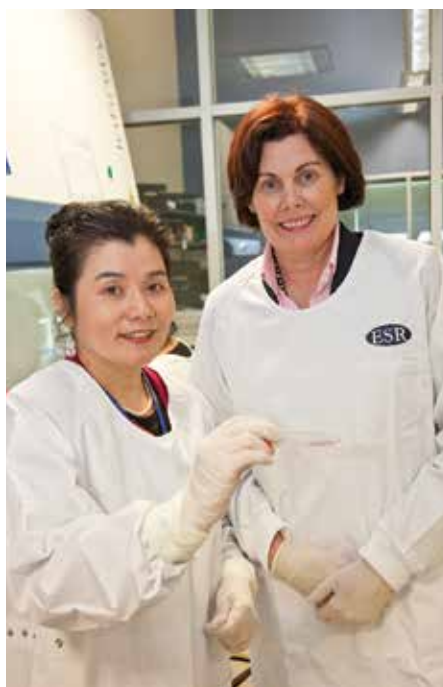
- ▶ increasing the level of work performed in the Pacific nations, working through the Ministry of Foreign Affairs and Trade; the Ministry of Business, Innovation, and Employment’s Science Diplomacy group; or directly with regional organisations and national governments – this will fund a more diverse base of expertise than would be possible from New Zealand Government funding only
- ▶ establishing baseline measures across all water science performance measures as a means to monitor ESR’s relative performance in the next five years.



FOCUS AND ACTIVITIES

DEFINING SUCCESS: HOW WILL WE MEASURE OUR PERFORMANCE?

Measures	
Impacts	
Resource management decisions are well informed by the human health impacts relating to freshwater use	Through its work in this area, ESR is seeking to support and improve decision-making about water management. Measuring our impact in this area is possible by reviewing a sample of relevant decisions and reports to understand the extent to which our advice has been reflected. However, this measurement approach is not cost effective given the relatively low proportion of investment that the water-related services represent for ESR (around 10%). Instead, ESR will report the impact of its water-related advice and services on a case-by-case basis depending on the size of the investment and the issues involved. This will consider the extent to which there were policy changes or other benefits gained (including costs avoided) as a result of ESR advice.
Improved water management practice from the perspective of public health impacts	
Effective policy, regulation, standards and monitoring in New Zealand and the Pacific	
Outputs	
Advice, research and information.	▶ Quality of advice and research (including providing relevant, accurate evidence to support policy-making and standard-setting) – measured through client survey
Investigation and information.	▶ Quality and timeliness of hazard investigations, analysis and advice – measured through client survey



Capability and Resources

PEOPLE

ESR continues its development of a forward-thinking organisational strategy that focuses on ensuring the organisation's financial viability and long-term future. One of the key platforms underlying the successful implementation of this strategy is the development and embedding of a high-performance and research-based culture. We will implement and maintain best practice human resources initiatives (such as recruitment, remuneration strategy and structure, and performance management) that support the business in the following areas:

- ▶ Excellence in people leadership and management
- ▶ Strong scientific and leadership capability that can be flexibly deployed to meet ESR's needs
- ▶ A highly engaged and energised work force
- ▶ Aligning the effort and commitment for all people within a core set of values, and a clear organisational direction and strategy

The two key areas of focus in the coming years continue to be developing management capabilities and putting in place stronger performance measurement systems to drive accountabilities down to the individual staff level. There is also an organisation-wide conversation taking place about the best ways to reward and recognise contribution.

We will use the good employer criteria of the Human Rights Commission to measure the following key aspects of our organisational health:

- ▶ Our culture is adaptive, client focused and performance oriented.
- ▶ We attract and retain staff using fair and effective processes.
- ▶ We invest in staff development and promotion.
- ▶ Our voluntary turnover is kept at moderate levels.
- ▶ Staff can balance their work and life commitments.
- ▶ We offer a positive, safe and healthy working environment.

ESR's measures of organisational health for our workforce are based on the '7 key elements' of being a good employer published by the Human Rights Commission. Performance as a "Good employer" is reported on the ESR external website.

INFORMATION, COMMUNICATIONS AND TECHNOLOGY

Significant changes in technology are not only creating new demands on ESR's information and communications technology (ICT) (e.g. more storage, more processing power), but creating exciting opportunities to strategically change the way we collect and deliver information to our customers and to New Zealand. Through the adoption of the All of Government open data initiative and contracts such as the Common Web Platform (CWP) and Infrastructure as a Service (IaaS – providing core ICT services on demand with economies of scale), ESR is embracing technology led innovation.

A modern and robust technology platform is essential to the delivery of ESR's scientific services. Our information technology systems and process will:

- ▶ encourage the exploration of new science and commercialisation opportunities through the innovative use of technology.
- ▶ make the best use of the available technologies to deliver cost efficiencies and streamline business processes.
- ▶ support commercial opportunities and international sales through the creation of new products and services.
- ▶ leverage the internal and external demand for social and mobility computing services to provide opportunities to deliver new services to our customers and information to New Zealand.
- ▶ align with and support our customers' needs and direction. Enabling more efficient processes and new business opportunities.



CAPABILITY AND RESOURCES

The delivery of the operational reporting as part of the new LIMS, is the first step towards the unified data access point in the ESR data landscape. Further combining LIMS and financial data in a unified platform will deliver the required capability to support our future growth strategy. These are seen as key steps on our journey to provide tailored data marts for the delivery of rich information to our customers.

Within ICT services there is a major requirement to redevelop or re-platform our core systems and services. Many are now end-of-life with serious and increasing risks around reliability and maintainability.

ESR will also be progressing work to:

- ▶ migrate to IaaS as quickly and as firmly as possible. Wherever possible, ESR should purchase services at a virtual server level and higher. It should only own its own server hardware where no practical or affordable alternative exists.
- ▶ refresh our core technology infrastructure, operating systems and applications
- ▶ work closer with our customers to explore new technology initiatives that will improve crime scene analysis and disease surveillance reporting and alerting.
- ▶ further improve the resilience, robustness and security of our ICT systems.
- ▶ implement a modern secure remote access capability to enable staff and partners to easily access ESR systems securely from any location. Remote access will provide an essential component of the ESR Business Continuity Plan.
- ▶ Expand our high performance computing capability to ignite new scientific exploration in the area of omics and informatics. This work will facilitate access to both internal and external computing resources such as NZGL, NESI and Amazon Web Services.

- ▶ improve access to ESR information and record keeping practices through the investigation into the adoption of an electronic document and records management system.
- ▶ improve external stakeholder engagement and management through the introduction of a Customer Relationship Management system.
- ▶ facilitate the breakdown of regional communication barriers through a more connected unified communicated capability that brings together voice, video and desktop sharing with PC's and mobile devices in a federated model. Then leverage this capability to explore new products and services for our customers and partners.
- ▶ leverage the All of Government technology contracts relating to desktop and printer procurement services, while adopting the CWP for the hosting of our websites.

ESR is also responsible for managing several critical databases and collections for the broader benefit of New Zealand. We:

- ▶ manage the New Zealand Reference Culture Collection (Medical section) on behalf of the Ministry of Health. ESR assists other CRIs, universities, industries and other laboratories to perform their functions by providing access to the cultures in the Collection on a cost-recovery basis
- ▶ are the custodian of the DNA Profile Databank, and ensure that the Databank is maintained and available as a primary criminal intelligence tool for law enforcement and security purposes.
- ▶ co-ordinate the operation of the national notifiable disease surveillance database 'EpiSurv' on behalf of the Ministry of Health, providing quality surveillance information.

SCIENCE INFRASTRUCTURE AND FACILITIES

ESR maintains facilities at five sites. These are located in Auckland, Wellington and Christchurch. The sites are strategically located to support our client base.

Strategic five-year goals for the sites are to:

- ▶ maximise site utilisation
- ▶ ensure that facilities are fit for purpose to support the specialised scientific capabilities required for excellent client services
- ▶ apply whole-of-life asset management practices to ensure that the assets remain robust and reliable to support the core business functions and long-term strategic science goals.

We will be conducting a full condition review of all sites the next year in this period to serve our longer-term property management strategy.

INTELLECTUAL PROPERTY POLICIES

ESR has policies and procedures in place relating to the access, use, maintenance, enhancement, exploitation and transfer of intellectual property and know-how. These ensure the effective management of intellectual property and maximise the application of the results of research and technological developments, including transfers to end-users and other third parties for the benefit of New Zealand.

General principles and procedures relating to the intellectual property, research and benefits of research held by ESR (other than national databases and reference collections) meet the requirements of the Transfer Agreement between ESR and the Crown. Particular regard is paid to ESR's statutory requirement to promote and facilitate the application of the results of its research and technological developments, while remaining financially viable.

On behalf of the Ministry of Health, ESR is responsible for managing the national microbiological reference collections and the New Zealand Reference Culture Collection (Medical section). ESR assists other CRIs, universities and laboratories to perform their functions by providing access to the cultures in the collection on a cost-recovery basis.

The collection is held at the Kenepuru Science Centre. Access to the reference collection will be as outlined below.

POLICY FOR ACCESS TO NATIONAL REFERENCE COLLECTIONS

ESR will provide access to the above reference collection except where access is clearly not to the benefit of New Zealand. In providing this access:

- ▶ the costs of collection, archiving and maintenance will be recovered only to the extent that they have not been paid for from public goods funding
- ▶ the costs of the actual retrieval of information from databases and reference collections will be recovered
- ▶ in situations where a third party wishes to obtain large portions of information from a database or reference collection for direct commercial use, ESR reserves the right to negotiate a copyright, royalty or licence fee.

ESR will not encumber or dispose of any national database or reference collection without the prior written consent of the shareholding ministers, and will immediately notify the shareholding ministers if, in the Board's view, it cannot reasonably maintain the integrity, security and quality of any national database or reference collection. ESR will remain responsible for the reference collection until after the shareholding ministers have notified the Board of their determination regarding the future maintenance of, or access to, the database or reference collection.

ESR will ensure that shareholding ministers are advised in a timely manner of any disputes over access to, or the use of, the reference collection held by ESR. Under the terms of the Transfer Agreement, shareholding ministers can appoint a person with relevant expertise to decide the matter. Any such decision will be binding on ESR.



Investment of Core Funding

OVERVIEW

During 2012/13, ESR has evolved its allocation framework for core funding to focus more on capabilities and impacts. ESR received approximately \$7.7 million in the 2012/13 financial year.

ALLOCATION FRAMEWORK

A portfolio approach is taken to assess the overall balance of the investments and ensure a mix of projects with an appropriate level of risk and rewards.

STRATEGIC STRENGTHENING OF ESR'S IMPACTS

Strategic funding is to enable ESR to identify projects that improve ESR's impact on New Zealand in the four outcome areas. This will be informed by strategic and business planning processes, and will be allocated to areas considered critical to ESR delivering on its Statement of Corporate Intent but where current external support is not available. It is anticipated that there will be only a few large projects in this portfolio at any one time. The selection criteria for these projects will be based on the strategic fit with ESR's goals and the impacts on the sectors to which ESR aims to contribute.

These may be projects that maintain or enhance ESR's capability ('Omics, Future Crime Scene, Health Informatics), provide co-funding for key stakeholder engagement (Public Health Laboratory Network) or provide a pathway for the commercialisation of scientific ideas (phage) that result in a significant impact for New Zealand.

The key criteria are as follows:

- ▶ Does the project apply ESR's recognised key capabilities to increase ESR's impact?
- ▶ What is the contribution to that impact?
- ▶ Does the project generate/have potential to generate external income and by how much?
- ▶ How will the project actively engage with its relevant sector?
- ▶ Will the sector provide any co-funding?

DIRECTED CAPABILITY AND TECHNOLOGY DEVELOPMENT

Directed funding is to enable ESR to develop capabilities or technologies in areas identified that will significantly improve ESR's impact in the four outcome areas. The capabilities and technologies that are required will be explicit and the criteria that will be used clearly identified.

The key criteria are as follows:

- ▶ Does the project respond to clearly identified sector issues or opportunities?
- ▶ Does the project strengthen or develop key capabilities (existing or new) that will increase ESR's impact?
- ▶ What is the contribution to that impact?
- ▶ Does the project generate/have potential to generate external income and by how much?
- ▶ How will the project actively engage with its relevant sector?

SCIENCE CAPABILITY AND TECHNOLOGY DEVELOPMENT

Science directed funding is to harness the expertise of ESR's scientists by providing funding that will increase capabilities across the programmes, develop science around potential revenue streams, enable identified capability gaps to be filled and develop technologies that will allow ESR to maintain and improve its outputs leading to better impacts.

The key criteria are as follows:

- ▶ Does the project strengthen or develop key capabilities that will increase ESR's impact?
- ▶ What is the contribution to that impact?
- ▶ How much cross-programme activity does the project initiate and/or enhance?
- ▶ Does capability fill an identified gap and how quickly?

FIGURE 7: PORTFOLIO ALLOCATION FOR CORE FUNDING

Strategic strengthening of ESR's impacts: 20%
Directed capability and technology development: 20%
Science capability and technology development (contestable): 50%
Pioneer Fund (contestable): 10%

PIONEER FUND: INNOVATION FUNDING

Pioneer funding will provide a small, fully internally contestable fund to allocate small amounts of core funding (up to \$30,000) for short investigative projects with high commercial relevance. Projects will be required to enhance an existing capability or provide evidence for a new science idea. Projects must also show a path to future development and adoption.

The key criteria are as follows:

- ▶ Is a problem or opportunity clearly identified?
- ▶ Is the project feasible?
- ▶ Is the project aligned with a future funding stream?
- ▶ Does the project provide a competitive advantage?
- ▶ Are end-users clearly identified?
- ▶ Does the project have clear outcomes?
- ▶ Can the project be executed quickly?

HORIZONS

Projects in each area will also be assessed to ensure there is an appropriate distribution to the following horizons:

- ▶ H1 – defend current core business by providing a mechanism for ongoing service development, commercialisation and sector/ stakeholder engagement.
- ▶ H2 – build emerging business based on new directions or extensions of current core business.
- ▶ H3 – develop good ideas into opportunities.



CORE FUNDING INVESTMENT

Vote expense category	Outcome areas	Value in 2013/14 (projected)
Urban development and infrastructure	Safety of freshwater and groundwater resources	298,000
Land and freshwater (including terrestrial ecosystems)	Safety of freshwater and groundwater resources	1,626,000
Health and society (\$4.8m)	Safeguard the health of New Zealanders	433,000
	Increase effectiveness of forensic science services	1,935,000
Capability maintenance and development (\$1m)	Protection of New Zealand’s food-based economy	1,560,000
	Safety of freshwater and groundwater resources	913,000
	Core funding not yet committed in FY14	958,000
Total core funding		\$7,723,000



Measuring Our Performance

This section sets out the way in which we will assess our performance, including financial and non-financial performance measures.

FINANCIAL PERFORMANCE

FINANCIAL MEASURES

The five-year financial plan is underpinned by the strategic direction that ESR is proposing in response to the challenges presented (outlined in the section titled 'Strategic Context and Direction'). ESR aims to grow its revenues in the next five years to \$106 million to ensure that the organisation can fund the science and research capabilities required to deliver the sector impacts and client service required in the future.

In 2013/14 we have budgeted revenues of \$64 million, rising to \$106 million in 2017/18; earnings before interest and taxation of \$1.4 million, rising to \$8.3 million in 2017/18; and a return on equity of 2.7%, rising to 9.0% by 2017/18.

Our return on equity has been reduced in 2013/14 as a result of ESR needing to invest significantly in infrastructure and core capabilities to ensure that we maintain and improve client service as well as meet compliance requirements, for example maintaining the health and safety of our premises.

REVENUE

Two clients provide 60% of ESR's revenue (the Ministry of Health and the New Zealand Police). It is necessary for ESR to broaden its revenue base to mitigate commercial risks and improve sector outcomes. While organic growth is expected to contribute to the planned future growth, the additional revenues are expected to come from developing partnerships in new sectors and offshore.

OPERATING EXPENDITURE

Operating expenditure is budgeted to increase from \$57 million in 2013/14 to \$89 million in 2017/18. Operating expenditure budgeted in the out years is expected to reflect the activities needed to drive revenue growth. Expenditure as a percentage of revenue is budgeted to decline. Personnel costs remain the largest component of our expenditure; staff numbers are expected to grow in line with revenue growth.

BALANCE SHEET MANAGEMENT

In the next two years, ESR is budgeting for capital expenditure of 11% of revenue. This is reflected in the capital renewal ratio, which measures the capital expenditure to depreciation ratio. The ratio is expected to remain in the vicinity of 100%. This is a reflection of the need for ESR to reinvest to service existing clients and for future growth, including implementing the new computerised LIMS and reinvestment in ageing IT systems.

CASH FLOW

ESR continues to have strong operating cash flows. However, debt is required to fund the extensive capital investment programme to strengthen the core science delivery and support future growth and new business initiatives. ESR will require debt of \$4 million in 2014/15, growing to \$28 million in 2017/18 (a maximum gearing of 38%).

DIVIDEND

It is not anticipated that ESR will be in a financial position to have funds available for distribution due to investments and capital projects planned that underpin the growth and financial sustainability of ESR.

RISKS

- ▶ Sixty per cent of revenue is sourced from two clients within government. ESR has budgeted for a minimal increase in revenue from these sources. There is a risk that ESR will continue to invest in maintaining our capabilities and client service levels, yet will experience future reductions in revenue from the core contracts.
- ▶ Our budget assumes that we will be successful in achieving revenue growth (both organic and new) with our partners within the justice, health and food sectors, to help achieve economic growth for New Zealand.



FINANCIAL PERFORMANCE INDICATORS 2013 – 2018

	Forecast 12/13	Budget 13/14	Plan 14/15	Plan 15/16	Plan 16/17	Plan 17/18
Revenue (\$000s)	59,924	64,141	70,278	82,402	95,819	105,542
Revenue Growth	—	7.0%	9.6%	17.3%	16.3%	10.1%
Operating Results (\$000s)						
Operating Expenses	53,088	56,579	60,023	69,771	80,619	89,211
EBITDAF	6,836	7,561	10,255	12,631	15,200	16,332
Depreciation and Amortisation	5,535	6,193	6,975	6,900	7,664	8,017
EBIT	1,301	1,368	3,280	5,731	7,536	8,315
Net Profit after Tax	991	1,061	1,886	2,580	3,927	4,557
Total Assets	52,708	54,188	60,623	91,754	98,665	101,871
Closing Shareholders' Funds	38,848	39,909	41,794	44,374	48,300	52,858
Capital Expenditure	9,966	6,843	7,500	7,500	8,500	9,000
Capital Expenditure % to Revenue	16.6%	10.7%	10.7%	9.1%	8.9%	8.5%
Liquidity						
Current Ratio	1.1	1.1	1.0	1.0	1.0	1.0
Quick Ratio (Acid Test)	0.8	0.9	0.7	0.7	0.7	0.7
Profitability						
Return on Equity	2.6%	2.7%	4.6%	6.0%	8.5%	9.0%
Return on Total Assets	2.4%	2.6%	5.7%	7.5%	7.9%	8.3%
Operating Margin	11.4%	11.8%	14.6%	15.3%	15.9%	15.5%
Operating Margin per FTE (\$)	17,533	18,832	20,032	22,051	24,512	26,842
Operational Risk						
Profit Volatility	—	7.1%	21.9%	28.5%	33.3%	34.2%
Coverage						
Interest Cover	N/A	N/A	12.7	3.2	4.5	5.4
Growth/Investment						
Capital Renewal	1.8	1.1	1.1	1.1	1.1	1.1
Dividend	—	—	—	—	—	—
Financial Strength						
Gearing (Debt/Debt Equity) %	N/A	N/A	8.1	38.3	33.8	28.5
Equity Ratio (Equity/Total Assets) %	69.84	73.7	71.2	56.5	48.7	50.4
Cash and Short-term Deposits (\$Ms)	2.1	2.7	0.1	0.1	0.1	0.1
Debt (\$Ms)	—	—	3.7	27.6	24.7	21.1

Key: Statement of Corporate Intent Indicators

MEASURING OUR PERFORMANCE

NON-FINANCIAL PERFORMANCE

In addition to its financial performance measures, ESR will use a range of non-financial performance measures relating to impacts and outputs. These measures have been described in the section on our focus and activities.

Focus	Measures	Target
<p>End-user collaboration</p> <p>Develop strong, long-term partnerships with industry, government and Māori, and work with them to set research priorities that are well linked to the needs and potential of their end-users</p>	<ul style="list-style-type: none"> ▶ Percentage and number of relevant funding partners and other end-users that have a high level of confidence in ESR's ability to set research priorities, and the effectiveness of the collaborations and partnerships (survey data) – measured annually ▶ Total dollar value of revenue (in cash and in kind) and dollar value subcontracted to other organisations from each 'source category' per annum from rolling five years (administrative data) – measured quarterly 	<ul style="list-style-type: none"> ▶ Improve on 2012/13 achievement of 67% of survey respondents who were satisfied with the way ESR sets research priorities ▶ Increase the value of revenue in line with the 13/14 budget ▶ Make a contribution via end-user and research collaborations to one or more National Science Challenge
<p>Research collaboration</p> <p>Develop collaborative relationships with other CRIs, universities and other research institutions within New Zealand and internationally to form the best teams to deliver ESR's core purpose</p>	<ul style="list-style-type: none"> ▶ Percentage of relevant national and international research providers that have a high level of confidence in ESR's ability to form the best teams to deliver on ESR's outcomes (survey data) – measured annually ▶ Number and percentage of joint scientific peer-reviewed publications and intellectual property (IP) outputs with other New Zealand and international research institutions per annum (administrative data) – measured quarterly ▶ Number of research collaborations with CRIs, universities and international organisations ▶ Number of joint research projects ▶ New revenue from expanded international collaborations (particularly Australia, Europe and the US). 	<ul style="list-style-type: none"> ▶ Maintain level of confidence ▶ Increase from the 2012/13 achievement of 67 total and 52 joint publications ▶ Maintain the number of research collaborations ▶ Increase the number of joint research projects
<p>Technology and knowledge transfer (science relevance)</p> <p>Transfer technology and knowledge from domestic and international sources to New Zealand industry, Government and Māori</p>	<ul style="list-style-type: none"> ▶ Total number and percentage of licensing deals of ESR-derived IP (including technologies, products and services) with New Zealand and international partners per annum (administrative data) – measured quarterly ▶ Percentage of relevant end-users who have adopted knowledge and/or technology from ESR (survey data) – measured annually ▶ Percentage change in the number of requests for and enquiries about ESR's publicly available collections (administrative data) – measured quarterly ▶ Number of training programmes delivered and number of officers trained 	<ul style="list-style-type: none"> ▶ Increase the total number and percentage of licensing deals of ESR-derived IP (FY12: 1) ▶ Maintain the 2012/13 achievement of 92% of survey respondents who adopted knowledge or technology from ESR in the past three years ▶ Maintain the number of requests and enquiries at 2012/13 level (FY12: 1,867)
<p>Science quality</p> <p>Pursue excellence in all of ESR's activities</p>	<ul style="list-style-type: none"> ▶ Total number of international awards, invitations to participate on international committees, and editorial boards for ESR's published papers per annum – measured annually ▶ Average number of citations per ESR published paper – measured annually ▶ Proportion of published papers in the top 25 journals of international quality relevant to the scope of ESR – measured annually 	<ul style="list-style-type: none"> ▶ Increase from 2012/13 levels of two international awards and 24 international committee/editorial boards ▶ Increase from 2012/13 levels of 6.14 ▶ Increase from 2012/13 levels of 26%

Appendix 1: Statement of Core Purpose

ESR's purpose is to deliver enhanced scientific and research services to the public health, food safety, security and justice systems, and the environmental sector to improve the safety of and contribute to the economic, environmental and social well-being of people and communities in New Zealand.

OUTCOMES

ESR will fulfil its purpose through the provision of research and scientific services and the transfer of technology and knowledge in partnership with key stakeholders including government, industry, the community and Māori to:

- ▶ safeguard the health of New Zealanders through improvements in the management of human biosecurity and threats to public health (Outcome 1)
- ▶ increase the effectiveness of forensic science services applied to safety, security and justice investigations and processes (Outcome 2)
- ▶ enhance the protection of New Zealand's food-based economy through the management of food safety risks associated with traded goods (Outcome 3)
- ▶ improve the safety of freshwater and groundwater resources for human use and the safer use of biowastes (Outcome 4).

SCOPE OF OPERATION

To achieve these outcomes, ESR is the lead CRI in:

- ▶ forensic science services
- ▶ harm prevention from drugs and alcohol
- ▶ surveillance of human pathogens and zoonotic diseases
- ▶ domestic and export food safety in partnership with the regulator
- ▶ impacts of the environment on human health including groundwater, freshwater and drinking-water quality and safe biowaste use
- ▶ integrated social and biophysical research to support decision-making in the environmental, public health and justice sectors.

ESR will work with other research providers and end-users to contribute to the development of:

- ▶ assessing and responding to chemical, biological, radiological and explosive events and environmental threats, including adverse human impacts on natural resources
- ▶ biosecurity and freshwater management
- ▶ climate change adaptation and mitigation.

OPERATING PRINCIPLES

ESR will:

- ▶ operate in accordance with a Statement of Corporate Intent and business plan that describe how ESR will deliver against this Statement of Core Purpose, and describe what the shareholders will receive for their investment
- ▶ meet its obligations as a Crown company and remain financially viable, delivering an appropriate rate of return on equity
- ▶ develop strong, long-term partnerships with key stakeholders, including government, industry and Māori, and work in partnership with them to set priorities for research and service delivery that are well linked to the needs and potential of its end-users
- ▶ maintain a balance of research and scientific services that both provide for the near-term requirements of its sectors and demonstrate vision for their longer-term benefit
- ▶ transfer technology and knowledge from domestic and international sources to key New Zealand stakeholders, including industry, government and Māori
- ▶ develop collaborative relationships with other CRIs, universities and other research institutions (within New Zealand and internationally) to form the best teams to deliver its core purpose
- ▶ provide advice on matters of its expertise to the Crown

- ▶ represent New Zealand's interests on behalf of the Crown through contributions to science diplomacy and international scientific issues and/or bodies as required
- ▶ seek advice from scientific and user advisory panels to help ensure the quality and relevance of its research and scientific services
- ▶ establish policies, practices and a culture that optimise talent recruitment and retention
- ▶ enable the innovation potential of Māori knowledge, resources and people
- ▶ maintain its databases, collections and infrastructure and manage the scientific and research data it generates in a sustainable manner, providing appropriate access and maximising the reusability of data sets
- ▶ seek shareholder consent for significant activity beyond its scope of operation.



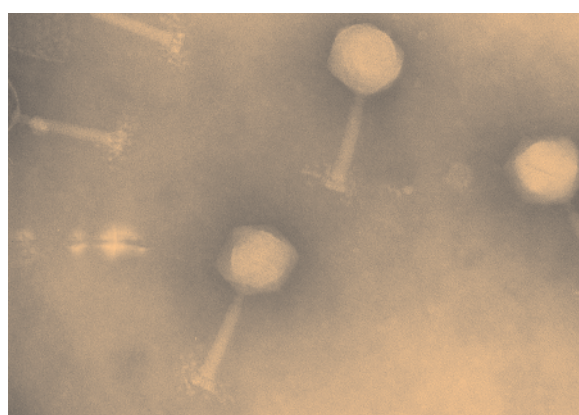
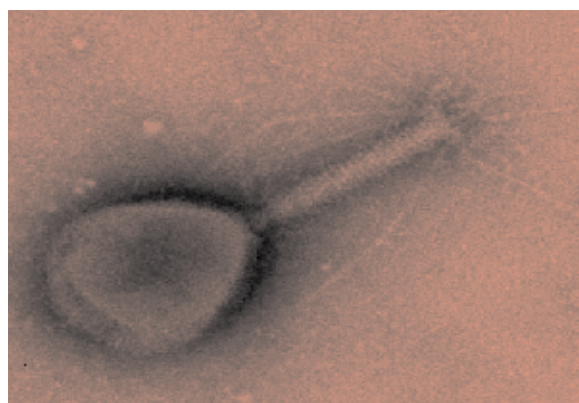
Appendix 2: Business Policies

ESR operates in accordance with the purpose and principles as stated in the Crown Research Institutes Act 1992 and has statutory obligations under other acts, including the Companies Act 1993 and Crown Entities Act 2004. Significant services are performed for the New Zealand Police under the Land Transport Act 1998 and the Misuse of Drugs Act 1975.

Policies and procedures are in place to ensure that all of our statutory obligations are met, including policies on:

- ▶ risk management
- ▶ shareholder consent for significant transactions
- ▶ intellectual property
- ▶ databases and collections
- ▶ dividends
- ▶ information to be disclosed
- ▶ accounting.

ESR's business policies are publicly available on the ESR website. [Click here to open](#)



Appendix 3: Statement of Significant Accounting Policies

REPORTING ENTITY

ESR is a Crown entity incorporated and domiciled in New Zealand. The address of its registered office is 34 Kenepuru Drive, Porirua.

ESR operates as a Crown research institute that provides specialist scientific solutions, including working with the New Zealand justice and health sectors to promote the protection of people and their environment.

BASIS OF PREPARATION

The financial statements are Parent and Group financial statements. The two subsidiaries of ESR are dormant, non-trading entities; consequently, there is no difference between the financial statements of the Group and those of the Parent.

The financial statements have been prepared in accordance with the requirements of the Crown Entities Act 2004, the Crown Research Institutes Act 1992, the Companies Act 1993 and the Financial Reporting Act 1993.

The financial statements are prepared on the basis of historical cost, except for financial instruments as identified in the specific accounting policies and accompanying notes.

The financial statements are presented in New Zealand dollars and all values are rounded to the nearest thousand dollars (\$000).

CHANGES IN ACCOUNTING POLICIES

Accounting policies have been applied on a basis consistent with the prior year.

Where necessary, comparative figures have been reclassified for consistency with current year disclosures.

STATEMENT OF COMPLIANCE

These financial statements have been prepared in accordance with New Zealand Generally Accepted Accounting Practice (NZ GAAP). They comply with New Zealand equivalents to the International Financial Reporting Standards (NZ IFRS) and other applicable financial reporting standards, as appropriate for profit-oriented entities. These consolidated financial statements comply with International Financial Reporting Standards (IFRS).

ACCOUNTING ESTIMATES AND JUDGEMENTS

The preparation of financial statements in conformity with NZ IFRS requires judgements, estimates and assumptions that affect the application of policies and reported amounts of assets, liabilities, income and expenses. The estimates and associated assumptions are based on historical experience and various other factors that are believed to be reasonable under the circumstances. Actual results may differ from these estimates.

Management's judgements, which have the most significant effect on amounts recognised in the financial statements, are found in Revenue, Employee Benefits, and Taxation.

Revenue

The Group uses the stage of completion method in accounting for its fixed price contracts to deliver scientific services. The use of the stage of completion method requires the Group to estimate the services performed to date as a proportion of the total services to be performed. Stage of completion is calculated and reviewed monthly, and significant variances are investigated to ensure that the stage of completion estimate is reasonable in line with the overall project plan, estimated completion date and prior measurements of progress.

PRINCIPLES OF CONSOLIDATION

Subsidiaries

The consolidated financial statements incorporate the assets and liabilities of all subsidiaries of ESR and the results of the operations of all subsidiaries for the year then ended.

Subsidiaries are those entities controlled, directly or indirectly, by the Parent. Subsidiaries are consolidated from the date on which control is transferred to ESR. They are de-consolidated from the date that control ceases.

The acquisition method of accounting is used to account for the acquisition of businesses by the Group. The cost of an acquisition is measured as the fair value of the assets given, equity instruments issued, and liabilities incurred or assumed at the date of exchange. Identifiable assets acquired, and liabilities and contingent liabilities assumed in a business combination are measured initially at their fair values at the acquisition date, irrespective of the extent of any non-controlling interest. The excess of the cost over the fair value of the Group's share of the identifiable net assets acquired is recorded as goodwill. If the cost of acquisition is less than the Group's share of the fair value of the identifiable net assets of the subsidiary acquired, the difference is recognised directly in the Statement of Comprehensive Income.

Intercompany transactions, balances and unrealised gains on transactions between subsidiary companies are eliminated. Unrealised losses are also eliminated unless the transaction provides evidence of the impairment of the asset transferred. Accounting policies of subsidiaries are consistent with those policies adopted by the Group.

APPENDIX 3: STATEMENT OF SIGNIFICANT ACCOUNTING POLICIES

PROPERTY, PLANT AND EQUIPMENT

Items of property, plant and equipment are initially recorded at cost, and subsequently at cost less accumulated depreciation and impairment. The cost of property, plant and equipment includes the value of consideration given to acquire the assets and the value of other directly attributable costs that have been incurred in bringing the assets to the location and condition necessary for their intended use.

The carrying amounts of plant, property and equipment are reviewed at least annually to determine if there is any indication of impairment. Where an asset's recoverable amount is less than its carrying amount, it will be reported at its recoverable amount and an impairment loss will be recognised. Losses resulting from impairment are reported in the Statement of Comprehensive Income.

Realised gains and losses arising from the disposal of property, plant and equipment are recognised in the Statement of Comprehensive Income in the periods in which the transactions occur.

Depreciation is charged on a straight-line basis at rates calculated to allocate the cost of an item of property, plant and equipment, less any estimated residual value, over its estimated useful life, as follows:

Type of asset	Estimated useful life
Land	Not depreciated
Freehold buildings	20 – 50 years
Leasehold improvements	10 years
Plant, equipment and vehicles	3 – 10 years
IT equipment and internal software	3 – 10 years

INTANGIBLE ASSETS

Computer software

Items of computer software that do not comprise an integral part of the related hardware are treated as intangible assets with finite lives. Intangible assets with finite lives are recorded at cost, and subsequently recorded at cost less any accumulated amortisation and impairment losses. Amortisation is charged to the Statement of Comprehensive Income on a straight-line basis over the useful life of the asset (between three and 10 years).

Customer contracts

The intangible asset 'customer contracts' represents the excess paid over net assets acquired under business combinations. Initial recognition of the intangible asset is stated at fair value. Subsequent to initial recognition, acquired intangible assets are stated at initially recognised amounts less accumulated amortisation and any impairment. Amortisation of acquired intangible assets is made according to the straight-line method over their estimated useful life, not exceeding 10 years.

Research and development costs – internally generated intangible assets

Expenditure on research is expensed when it is incurred. Development expenditure incurred on an individual project is capitalised if the process is technically and commercially feasible, future economic benefits are probable and ESR intends to and has sufficient resources to complete development and to use or sell the asset.

Any expenditure capitalised is amortised over the estimated useful life, not exceeding 10 years from the point the asset is ready for use.

IMPAIRMENT OF NON-FINANCIAL ASSETS

Assets that are subject to amortisation are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable. An impairment loss is recognised for the amount by which the asset's carrying amount exceeds its recoverable amount. The recoverable amount is the higher of an asset's fair value less costs to sell and value in use. For the purposes of assessing impairment, assets are grouped at the lowest levels for which there are separately identifiable cash flows (cash-generating units).

TAXATION

The income tax expense for the period is the tax payable on the current period's taxable income based on the national income tax rate for each jurisdiction. This is then adjusted by changes in deferred tax assets and liabilities attributable to temporary differences between the tax bases of assets and liabilities and their carrying amounts in the financial statements, and unused tax losses.

Deferred tax assets and liabilities are recognised for temporary differences at the tax rates expected to apply when the assets are recovered or liabilities settled. The relevant tax rates are applied to the cumulative amount of deductible and taxable temporary differences to measure the deferred tax asset or liability. An exception is made for certain temporary differences arising from the initial recognition of an asset or a liability. No deferred tax asset or liability is recognised in relation to temporary differences if they arose in a transaction, other than a business combination, and at the time of the transaction did not affect either accounting profit or taxable profit or loss.

Deferred tax assets are recognised for deductible temporary differences and unused tax losses only if it is probable that future taxable amounts will be available to utilise those temporary differences and losses.

Deferred income tax assets are recognised to the extent that it is probable that future taxable profit will be available against which the temporary differences can be utilised.

CASH AND CASH EQUIVALENTS

Cash means cash on hand, demand deposits and other highly liquid investments in which ESR has invested as part of its day-to-day cash management. The following definitions are used in the Statement of Cash Flows:

- ▶ Investing activities are those activities relating to the acquisition, holding and disposal of fixed assets and investments.
- ▶ Financing activities are those activities that result in changes in the size and composition of the capital structure of ESR and this includes both equity and debt not falling within the definition of cash. Dividends paid in relation to the capital structure are included in financing activities.
- ▶ Operating activities are the principal revenue-producing activities and other activities that are not investing or financing activities.

TRADE AND OTHER RECEIVABLES

Trade receivables are stated at their estimated realisable value after providing against debts where collection is doubtful. An estimate of the value of doubtful debts is made based on a review of debts at year end. Bad debts are written off in the period in which they are identified.

INVENTORIES

Stocks of consumables and work in progress are stated at the lower of cost and net realisable value. Cost is determined on a first in, first out basis.

TRADE AND OTHER PAYABLES

These amounts represent the best estimate of the expenditure required to settle an obligation arising from goods or services provided to ESR prior to period end. These amounts are unsecured and are usually paid within 30 days of recognition. Liabilities and provisions to be settled beyond 12 months are recorded at their present value.

EMPLOYEE BENEFITS

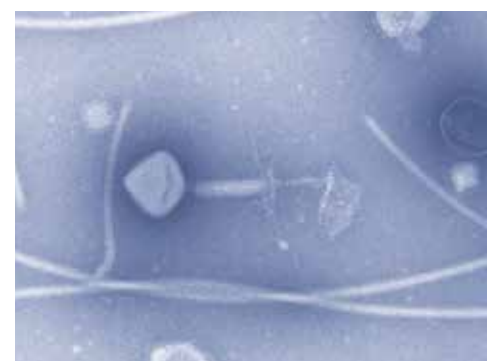
Wages, salaries and annual leave

Liabilities for wages and salaries, including annual leave that is expected to be settled within 12 months of the reporting date, are recognised in respect of employees' services up to the reporting date and are measured at the amounts expected to be paid when the liabilities are settled.

Obligations for contributions to defined contribution retirement plans are recognised in the Statement of Comprehensive Income as they fall due.

Long service leave, retirement leave and service leave

The liability for long service leave, retirement leave and service leave is recognised as an employee benefit liability and measured as the present value of expected future payments to be made in respect of services provided by employees up to the reporting date. Consideration is given to the expected future salary levels, experience of employee departures and periods of service. Expected future payments are discounted using market yields at the reporting date for Government Bonds with terms to maturity and currency that match, as closely as possible, the estimated future cash outflows.



APPENDIX 3: STATEMENT OF SIGNIFICANT ACCOUNTING POLICIES

LEASES

Finance leases transfer to ESR, as lessee, substantially all the risks and rewards incidental to ownership of a leased asset. Initial recognition of a finance lease results in an asset and liability being recognised at amounts equal to the lower of the fair value of the leased asset or the present value of the minimum lease payments. Each lease payment is allocated between the liability and finance charges so as to achieve a constant rate of finance charge over the term of the lease. Property, plant and equipment acquired under a finance lease are depreciated over the shorter of the assets' useful lives and lease terms.

Leases in which a significant portion of the risks and rewards of ownership are retained by the lessor are classified as operating leases. Payments made under operating leases (net of any incentives received from the lessor) are charged to the Statement of Comprehensive Income on a straight-line basis over the period of the lease.

BORROWINGS

Borrowings are initially recognised at fair value, net of costs incurred. Borrowings are subsequently measured at amortised cost. Any differences between the proceeds (net of transaction costs) and the redemption amount is recognised in the Statement of Comprehensive Income over the period of the borrowing using the effective interest method.

Borrowings are classified as current liabilities unless ESR has an unconditional right to defer settlement of the liability for at least 12 months after the balance date.

SHARE CAPITAL

Ordinary shares are classified as equity. Incremental costs directly attributable to the issue of new shares or options are shown as appropriate in equity as a deduction, net of tax, from the proceeds.

REVENUE

Sales of goods and services

Revenue is earned by ESR in exchange for the provision of outputs (services) to third parties.

Revenue from the supply of services is measured at the fair value of consideration received. Revenue from the supply of services is recognised in the accounting period in which the services are rendered, by reference to the stage of completion of the specific transaction assessed on the basis of the actual service provided as a proportion of the total services to be provided. Any revenue for which services have not been supplied as at the reporting date but for which payment has been received is deferred within the Statement of Financial Position as revenue in advance.

Core funding

ESR receives core funding from the Government in order to perform scientific research activities. Core funding (Government grants) are recognised in the Statement of Comprehensive Income on receipt.

Interest income

Interest income is recognised in the Statement of Comprehensive Income on a time proportion basis, using the effective interest rate method.

Vaccine revenue

ESR purchases vaccines on behalf of Pharmac. Pharmac maintains the risks and rewards related to the inventory and as such no inventory is recognised within ESR's Statement of Financial Position. ESR receives and recognises commission revenue only in relation to the services performed.



APPENDIX 3: STATEMENT OF SIGNIFICANT ACCOUNTING POLICIES

FOREIGN CURRENCY

Items included in the financial statements of each of the Group's entities are measured using the currency of the primary economic environment in which the entity operates. The Group financial statements are presented in New Zealand dollars, which is ESR's functional and presentation currency.

Foreign currencies transactions are recorded at the foreign exchange rates in effect at the dates of the transactions. Monetary assets and monetary liabilities denominated in foreign currencies are translated at the rates of exchange ruling at the end of each reporting period. Non-monetary assets and non-monetary liabilities denominated in foreign currencies that are measured at fair value are translated to the functional currency at the exchange rate at the date that the fair value was determined.

GOODS AND SERVICES TAX

Items in the Statement of Comprehensive Income and Statement of Cash Flows are disclosed net of Goods and Services Tax (GST). All items in the Statement of Financial Position are stated net of GST with the exception of receivables and payables, which include GST invoiced.

DIVIDENDS

A provision is made for the amount of any dividend declared on or before the end of the financial year but not distributed at balance date.

FINANCIAL INSTRUMENTS

The designation of financial assets and financial liabilities by ESR into instrument categories is determined by the business purposes of the financial instruments, policies and practices of management, the relationship with other instruments, and the reporting costs and benefits associated with each designation. The designations applied by ESR are reflected in the financial statements.

Financial assets

The Group classifies its financial assets as loans and receivables. Management determines the classification of its financial assets at initial recognition.

Loans and receivables are non-derivative financial assets with fixed or determinable payments that are not quoted in an active market. They are included in current assets, except for maturities greater than 12 months after the reporting date. These are classified as non-current assets. ESR's loans and receivables comprise 'trade and other receivables' and 'cash and cash equivalents' in the Statement of Financial Position.

Regular purchases and sales of financial assets are recognised on the trade-date – the date on which the Group commits to purchase or sell the asset. Investments are initially recognised at fair value plus transaction costs for all financial assets not carried at fair value through profit or loss. Financial assets are derecognised when the rights to receive cash flows from the investments have expired or have been transferred and the Group has transferred substantially all risks and rewards of ownership. Loans and receivables are carried at amortised cost using the effective interest method.

The Group assesses at each reporting date whether there is objective evidence that a financial asset or a group of financial assets is impaired.

Financial liabilities

Financial liabilities held by ESR include trade and other payables.

Such financial liabilities are recognised initially at fair value less transaction costs and subsequently measured at amortised cost using the effective interest rate method. Financial liabilities entered into with durations less than 12 months are recognised at their nominal value.

Derivatives

Derivative financial instruments are recognised both initially and subsequently at fair value. They are reported as either assets or liabilities depending on whether the derivative is in a net gain or net loss position. ESR does not use hedge accounting, and as such derivatives are classified as held-for-trading financial instruments with fair value gains or losses recognised in the Statement of Comprehensive Income. Such derivatives are entered into for risk management purposes.

PROVISIONS

Provisions are recognised when ESR has a present legal or constructive obligation as a result of past events; it is probable that an outflow of resources will be required to settle the obligation; and the amount can be reliably estimated. Restructuring provisions comprise employee termination payments. Provisions are not recognised for future operating losses.

Provisions are measured at the present value of the expenditures expected to be required to settle the obligation using a pre-tax rate that reflects current market assessments of the time, value of money and the risks specific to the obligation. The increase in the provision due to the passage of time is recognised as an interest expense.

Appendix 4: Directory

DIRECTORS

Dr Susan Macken – Chair

Ross Peat – Deputy Chair

Patricia Schnauer

Professor Bill Denny

Tahu Potiki

Marion Cowden

CHIEF EXECUTIVE

Graham Smith

SENIOR MANAGERS

Dr Keith Bedford, General Manager, Forensic

Dr Fiona Thomson-Carter, General Manager, Environmental Health

Esther Livingston, General Manager, Human Resources

Steve Pyne, Chief Information Officer

Nigel Thomson, General Manager, Business Services

Amanda Malu, General Manager, External Relations and Marketing

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AUDITOR

Chris Barber of PricewaterhouseCoopers on behalf of the Auditor-General

BANKER

ANZ Bank New Zealand Limited

SOLICITOR

Buddle Findlay



Institute of Environmental
Science and Research

Protecting New Zealand's health and wellbeing

